

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

IN THE MATTER OF THE VERIFIED)
PETITION OF INDIANA MICHIGAN POWER)
COMPANY FOR APPROVAL OF: (1))
DEMAND SIDE MANAGEMENT (DSM))
PLAN, INCLUDING ENERGY EFFICIENCY)
(EE) PROGRAMS, DEMAND RESPONSE) CAUSE NO.
PROGRAMS, AND ENHANCED)
CONSERVATION VOLTAGE; AND (2))
ASSOCIATED ACCOUNTING AND)
RATEMAKING TREATMENT, INCLUDING)
TIMELY RECOVERY THROUGH I&M'S)
DSM/EE PROGRAM COST RIDER OF)
ASSOCIATED COSTS, INCLUDING)
PROGRAM OPERATING COSTS, NET LOST)
REVENUE, AND FINANCIAL INCENTIVES.)

**SUBMISSION OF DIRECT TESTIMONY OF
JON C. WALTER**

Applicant, Indiana Michigan Power Company (I&M), by counsel, respectfully submits the direct testimony and attachments of Jon C. Walter in this Cause.

Respectfully submitted,



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INDIANA MICHIGAN POWER COMPANY

PRE-FILED VERIFIED DIRECT TESTIMONY

OF

JON C. WALTER

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**DIRECT TESTIMONY OF JON C. WALTER
ON BEHALF OF
INDIANA MICHIGAN POWER COMPANY**

I. Introduction

1 **Q1. Please state your name and business address.**

2 My name is Jon C. Walter, and my business address is Indiana Michigan Power
3 Center, P.O. Box 60, Fort Wayne, IN 46801.

4 **Q2. By whom are you employed and in what capacity?**

5 I am employed by Indiana Michigan Power Company (I&M or Company) as its
6 Consumer & EE Programs Manager.

7 **Q3. Briefly describe your educational background and professional
8 experience.**

9 I am a 1989 graduate of Purdue University with a Bachelor of Science degree in
10 Electrical Engineering Technology and am a 1996 graduate of Indiana
11 University with a Master of Business Administration degree.

12 I have worked for I&M and AEP (American Electric Power) for 32 years and
13 have held several different roles of increasing responsibility. I assumed my
14 current title in December 2016.

15 **Q4. Have you previously testified before any regulatory commissions?**

16 Yes. I have filed testimony before the Indiana Utility Regulatory Commission
17 (IURC or Commission) in I&M's Demand Side Management (DSM) Plan filings. I
18 have also testified in Demand Side Management/Energy Efficiency Rider (DSM
19 Rider) reconciliation filings and in I&M's most recent basic rate case. I have filed

1 testimony before the Michigan Public Service Commission in I&M's Energy
2 Waste Reduction (EWR) Plan filings and annual EWR Reconciliations.

3 **Q5. What are your job responsibilities?**

4 I am primarily responsible for I&M's Demand Side Management / Energy
5 Efficiency (DSM/EE), and Demand Response program planning.

6 **Q6. What other witnesses are filing testimony on behalf of I&M in this case?**

7 I&M's other witnesses include:

- 8 • Gregory Soller, Resource Planning Manager, who supports the level of
9 economic EE contained within the I&M 2022 Integrated Resource Plan
10 (IRP) Preferred Portfolio (IRP PP)
- 11 • Jeffrey Huber of GDS Associates, who supports I&M's Indiana Market
12 Potential Study and DSM inputs to the IRP
- 13 • Nicholas Elkins, Director of Customer Service and Business
14 Development, who supports the implementation and execution of EE
15 Plan and DR Plan programs
- 16 • Chad Burnett, Managing Director of Economic and Supply Forecasting,
17 who supports I&M's load forecast and Supplemental Efficiency
18 Adjustment
- 19 • Michael R. Whitmore, Regulatory Consultant Staff, who supports the
20 DSM Plan revenue requirement and DSM Plan tariff modifications
- 21 • Jennifer Duncan, Regulatory Consultant Staff, who supports the
22 proposed DSM/EE Rider rate factors and calculates the rate impacts of
23 the factors on I&M's customers.

II. Purpose of testimony

1 Q7. What is the purpose of your testimony?

2 My testimony presents the Company's proposed 2023-2025 DSM Plan (DSM
3 Plan). The DSM Plan consists of three components: 1) energy efficiency
4 programs (EE Plan); 2) demand response programs (DR Plan); and 3)
5 enhanced conservation voltage reduction (CVR Plan) deployment. Collectively,
6 these components are designed to achieve savings of 1.73% of I&M Indiana
7 retail sales, on average, over the three years of the DSM Plan.

8 The DSM Plan continues many programs previously approved by the
9 Commission and provides opportunities for customers from all customer classes
10 to participate in DSM programs. The EE and DR programs are based on and
11 are consistent with the Company's most recent Integrated Resource Plan (IRP)
12 and the 2021 Market Potential Study (I&M MPS). The programs are also
13 consistent with the advanced metering infrastructure (AMI) plan approved in
14 I&M's most recent basic rate case, Cause No. 45576.

15 For the EE Plan, I provide the program goals, descriptions, and budgets. I also
16 present the benefit cost results, evaluation, measurement, and verification
17 (EM&V) plans, forecast lost revenue, and forecast Shared Savings. I discuss the
18 status of large customer opt-out, the Company's request for EE Plan spending
19 flexibility, customer impact, and consistency with Indiana's recent state energy
20 assessment.

21 For the DR Plan, I provide the goals, program descriptions, incremental program
22 budgets, benefit cost results, and plans for EM&V. I discuss the Company's
23 request for DR Plan spending flexibility and the proposed DR Financial Incentive
24 Mechanism (DR FI).

25 For the CVR Plan, I present the Company's plans, proposed cost recovery,
26 EM&V plans, and benefit cost results.

1 Finally, I will explain the Company's proposed reporting for the DSM Plan and
2 provide the DSM Plan cost components used by Company witness Whitmore to
3 calculate the revenue requirement.

4 **Q8. Are you familiar with the Company's Petition in this Cause?**

5 Yes. A copy of the Petition is included with my testimony as Attachment JCW-1.

6 **Q9. Was the Petition and proposed DSM Plan provided to the Indiana Office of**
7 **Utility Consumer Counselor (OUCC) posted on the Company's Internet**
8 **web site?**

9 Yes.

10 **Q10. Please summarize the relief sought by I&M in this proceeding.**

11 I&M requests Commission approval of the Company's DSM Plan, including
12 specific approval for:

- 13 • I&M to administer and implement a reasonable and cost-effective
14 portfolio of DSM programs for the three-year period 2023 through 2025
- 15 • Cost recovery for the EE Plan through I&M's existing DSM/EE Rider,
16 including recovery of direct and indirect costs of the EE programs, EM&V
17 costs, reasonable net lost revenue, and Shared Savings
- 18 • Cost recovery for the incremental future costs of the DR Plan through
19 I&M's DSM/EE Rider, including recovery of direct and indirect costs of the
20 DR programs, EM&V costs, and a demand response financial incentive
- 21 • Associated cost recovery for the ongoing incremental operation and
22 maintenance (O&M) expense and program support costs for the CVR
23 program through I&M's DSM/EE Rider including recovery of direct and
24 indirect costs to operate, maintain, and support Enhanced CVR, EM&V
25 costs, and reasonable net lost revenue.

Q11. Are you sponsoring any attachments in this proceeding?

I am sponsoring the following Attachments to my written testimony:

- Attachment JCW-1 Petition
- Attachment JCW-2 DSM Plan Summary
- Attachment JCW-3 IRP Preferred Plan EE Optimal Resource Identification - Energy
- Attachment JCW-4 IRP Preferred Plan EE Optimal Resource Identification - Demand
- Attachment JCW-5 EE Plan Program Cost
- Attachment JCW-6 EE Plan 3 Year Benefit Cost Summary
- Attachment JCW-7 EE Plan 2023-2025 Residential Programs & Measures
- Attachment JCW-8 EE Plan 2023-2025 C&I Programs & Measures
- Attachment JCW-9 EE Plan 2023-2025 Forecast Lost Revenue
- Attachment JCW-10 EE Plan 2023-2025 Forecast Shared Savings
- Attachment JCW-11 DSM Plan Costs
- Attachment JCW-12 DR Plan Program Summary
- Attachment JCW-13 DR Plan Program Benefit Cost Summary
- Attachment JCW-14 DR Plan 2023-2025 Financial Incentive
- Attachment JCW-15 DR Plan Costs
- Attachment JCW-16 CVR Plan Summary
- Attachment JCW-17 CVR Plan Benefit Cost
- Attachment JCW-18 CVR Plan Costs
- Attachment JCW-19 EE Plan Program Descriptions
- Attachment JCW-20 DR Plan Program Descriptions
- Attachment JCW-21 Stakeholder Input

1 **Q12. Were these attachments prepared or assembled by you or under your**
2 **direction and supervision?**

3 Yes, all attachments were prepared by me or under my direction and
4 supervision. I used data and information from the I&M MPS to develop all
5 attachments except for Attachments JCW-16 through Attachment JCW-18,
6 which rely on internal Company distribution data and information.

7 **Q13. Did you submit any work papers?**

8 Yes. Electronic versions of work papers are submitted for individual programs
9 and measures, DSM Plan program models and designs, CVR forecasts, net lost
10 revenue, forecast energy sales data, and avoided cost data and other
11 information used for benefit cost scoring.

12 **Q14. Please define DSM and EE program as you are using these terms in your**
13 **testimony.**

14 I am using these two terms as defined by the Commission and applicable
15 statute. "DSM" "means the planning, implementation, and monitoring of a utility
16 activity designed to influence customer use of electricity that produces a desired
17 change in a utility's load shape, for example, a change in the time pattern and
18 magnitude of a utility's load.

19 DSM includes only an activity that involves deliberate intervention by a utility to
20 alter load shape." 170 IAC 4-8-1(e). "EE" and "energy efficiency improvement"
21 mean a reduction in electricity use for a comparable level of electricity service.
22 Ind. Code § 8-1-8.5-10(b) (Section 10); 170 IAC 4-8-1(j). In this context, the
23 above referenced "electricity service" means the light, heat, motor drive and
24 other service for which a customer purchases electricity from the utility. 170 IAC
25 170 4-8-1(k).

26 "EE program" means a program that is sponsored by an electricity supplier,
27 such as I&M, and designed to implement energy efficiency improvements.
28 Section 10(d). For example, to make one's home or business more efficient,

1 consumers may install Energy Star appliances, energy-efficient pumps, or
2 variable speed motors.

3 By implementing these energy efficiency improvements, individuals and
4 businesses may obtain a comparable level of heating, cooling, refrigeration,
5 motor drive or other energy service while reducing their energy usage. As
6 previously recognized by the Commission, not all DSM programs are EE
7 programs. *Indiana Michigan Power Company*, Cause No. 44486 (IURC
8 12/3/2014) at 12-13. “EE” is a subset of “DSM.” Id.

9 **Q15. How are you using the term “program cost” in your testimony?**

10 In my presentation of the proposed DSM Plan in this case, I have endeavored to
11 use the term “program costs” consistent with the Section 10(g) definition. I have
12 presented the direct costs of operating the programs (including EM&V) and the
13 indirect costs (also referred to as “portfolio level” costs).

14 I consider the direct and indirect cost components to be the cost of operating a
15 program (program operating costs). The program budgets I present reflect these
16 program operating costs.

III. DSM Plan Overview

17 **Q16. Please provide an overview of I&M’s DSM Plan.**

18 I&M seeks approval of its 2023-2025 DSM Plan, consisting of three
19 components:

- 20 • EE Plan
- 21 • DR Plan
- 22 • CVR Plan

1 The overall DSM Plan is summarized on Attachment JCW-2. The DSM Plan
2 contains offerings to all customer classes, including low-income customers,
3 based on I&M system and customer needs, seeks to balance short and long-
4 term perspectives and improve cost effectiveness and program design.

5 Consistent with Section 10, the EE Plan includes EE goals, EE programs to
6 achieve the EE goals, program budgets and program costs, and EM&V
7 procedures. EE Plan costs are listed, by program and year, on Attachment
8 JCW-3. Lost revenue and Shared Savings are summarized on Attachments
9 JCW-9 and Attachment JCW-10, respectively.

10 The DR Plan includes demand response programs, demand savings goals,
11 program budgets based on forecast incremental program costs (including the
12 AMI DR programs approved in Cause No. 45576), I&M's proposed demand
13 response financial incentive (DR FI), and EM&V procedures.

14 The CVR Plan reflects the continuation and enhancement of I&M's ongoing
15 program to manage voltage levels on the distribution system, which results in
16 lower power consumption. In Cause No. 45576, the Commission approved a
17 settlement agreement that, among other things, approved inclusion of the capital
18 costs of the CVR Plan in rate base. In this filing, I discuss the CVR Plan and
19 associated cost recovery.

20 **Q17. Please discuss the relationship between the DSM Plan, the IRP, and the**
21 **I&M MPS.**

22 The DSM Plan is the result of an integrated process that utilizes analysis,
23 information, and results from both the IRP and MPS processes. As discussed in
24 greater detail by witness Huber, the I&M MPS served as a planning guide by
25 helping to evaluate program design and overall reasonableness.

26 Specific to EE, the I&M MPS established bundles of EE resources utilized in the
27 IRP modeling, the amount of energy efficiency available for selection in the IRP
28 based on data specific to I&M's service area, and the associated costs of each

1 EE bundle. For DR, the I&M MPS determined the level of cost effective DR that
2 was used as a “going-in” resource in the IRP.

3 As described by Company witness Soller, I&M’s vendor Siemens used the
4 outputs of the I&M MPS as an input into the IRP model to properly characterize
5 EE and DR costs and performance parameters. In addition to EE and DR inputs
6 for the I&M MPS, the Company provided Siemens with an analysis that
7 determined the level of cost effective CVR that was used as a “going-in”
8 resource in the IRP. Both the DR Plan and CVR Plan reflect only cost-effective
9 implementations and are integral to the Company’s overall strategy for AMI and
10 Grid Modernization.

11 Based on the inputs received from the MPS, the Company analysis for CVR,
12 and various supply-side resource options, the IRP utilized the optimization tools
13 to develop an overall Preferred Portfolio that includes an economic level of EE.
14 This output from the IRP, combined with the “going-in” levels of DR and CVR,
15 was used to inform the development of specific programs included in the DSM
16 Plan.

17 **Q18. What are the overall energy and demand savings goals for the DSM Plan?**

18 As shown in Figure JCW-1 below, the DSM Plan components are designed to
19 achieve energy savings of 1.73% of I&M Indiana retail energy sales, on
20 average, and 1.72% of I&M Indiana retail demand, on average, over the three
21 years of the DSM Plan.

Figure JCW-1. DSM Plan three-year totals

DSM Plan Component	Energy Savings (kWh)	Demand Savings (kW)
EE Plan	346,360,937	59,575
DR Plan	0	26,892
CVR Plan	404,756,080	113,355

DSM Plan Total	751,117,017	199,822
Percent of Retail Sales	1.73%	1.72%

1 **Q19. Why are these energy and demand savings goals appropriate?**

2 The DSM Plan goals identified above are reasonable and appropriate because
3 they are reasonably achievable, consistent with I&M's most recent IRP and MPS
4 and are based on programs that are designed to aid I&M in achieving "an
5 optimal balance of energy resources" in I&M's service territory.

6 **Q20. For the 2023 through 2025 planning cycle of the DSM Plan, did I&M**
7 **complete a new Market Potential Study?**

8 Yes. I&M, with the assistance of its vendor GDS Associates (GDS), completed a
9 market potential study addressing the 20-year planning horizon 2023 through
10 2042, with a specific focus on 2023 through 2025 DSM programs and separate
11 evaluation for both of I&M's Indiana and Michigan service territories. Witness
12 Huber provides a copy of the I&M MPS as an attachment to his testimony.

13 **Q21. Did I&M provide opportunities for interested stakeholders to engage**
14 **during the development of the I&M MPS?**

15 Yes. I&M held four stakeholder meetings during the development of the I&M
16 MPS. These meetings were coordinated by I&M and implemented by GDS. For
17 each meeting, GDS discussed study progress and offered stakeholders the
18 opportunity to provide feedback on key areas of the study.

19 For example, GDS offered stakeholders the opportunity to review and provide
20 feedback on customer survey questions and their list of EE measures to be
21 included in the study. GDS responded to stakeholder feedback and adopted
22 several of the changes offered by stakeholders. Witness Huber discusses the
23 development of the I&M MPS further in his testimony.

1 **Q22. How did I&M use the I&M MPS to develop the EE Plan and DR Plan?**

2 The I&M MPS developed Indiana-specific models for residential and commercial
3 and industrial (C&I) sector measure potentials. For both EE and DR, the I&M
4 MPS evaluated Technical Potential, Economic Potential, Realistic Achievable
5 Potential (RAP), and Maximum Achievable Potential (MAP). These are typical
6 MPS analyses and are based solely on measure rebate cost levels.

7 GDS also developed Program Potential (PgmP), which incorporated industry
8 best practice programs. Both the EE and DR Plans are based on the PgmP
9 evaluation.

10 **Q23. Why did I&M ask GDS to develop the PgmP approach?**

11 In short, I&M sought a fresh perspective for which cost effective EE and DR
12 programs I&M should offer its customers based on industry best practices. In
13 addition, because GDS developed and analyzed end-use measures according
14 to end-use load shape and usage intensity by customer class and building type,
15 PgmP also resulted in detailed segmentation by end-use within each program
16 that can better facilitate targeted outreach effort by I&M and its implementation
17 partners. Targeted outreach can produce more efficient energy savings
18 realization and customer adoption. Through PgmP, I&M has a more user-
19 friendly roadmap for how EE savings can be attained.

EE Plan

20 **Goals**

21 **Q24. Please discuss the energy and demand savings goals for the EE Plan.**

22 The EE Plan is designed to achieve 0.8% of I&M Indiana retail sales, on
23 average, for the three years of the plan. *Figure JCW-2* summarizes the energy
24 and demand savings goals, which are also shown in *Attachment JCW-2*.

Figure JCW-2. EE Plan gross savings goals at-the-meter

	<i>Energy (kWh)</i>	<i>Peak Demand (kW)</i>
2023	118,003,665	20,078
2024	117,619,150	20,312
2025	<u>110,738,122</u>	<u>19,185</u>
	346,360,937	59,575

1 These goals reflect the Company's Section 10 energy efficiency plan targets
 2 derived as part of the optimal resource mix from the Company's IRP PP. The EE
 3 goals are reasonably achievable and consistent with both the IRP and the I&M
 4 MPS PgmP.

5 **Q25. Does the EE Plan contain programs to achieve the EE targets identified**
 6 **above?**

7 Yes. The EE programs are summarized in Attachment JCW-2 and listed in
 8 Figure JCW-3 further below.

9 **Q26. What is the likelihood of achieving the goal of the EE programs included in**
 10 **the EE Plan?**

11 Overall, while there will be challenges, I&M will make concerted effort to
 12 reasonably implement and manage the programs according to plan and to the
 13 benefit of customers, within the authority granted by the Commission regarding
 14 the EE Plan and overall DSM Plan. Company witness Elkins discusses the
 15 implementation aspects of the EE Plan further in his testimony.

16 **Q27. What are the projected changes in customer consumption of electricity**
 17 **that result from the implementation of the EE Plan?**

18 The annual projected energy and demand savings shown on Attachment JCW-2
 19 indicate how customer consumption is expected to change in 2023 through
 20 2025 because of the Company's implementation of the DSM Plan.

1 Attachment JCW-6 provides the projected net lifetime energy savings resulting
 2 from the EE Plan. These values indicate the changes in customer consumption
 3 associated with the life of the measures projected to be installed because of the
 4 EE Plan programs. Overall, the Company expects a corresponding decrease in
 5 customer consumption of 2,901,145,534 net kWh from the lifetime effects of the
 6 EE measures *projected* to be installed through the proposed EE programs.¹

7 Programs

8 **Q28. What programs are included in the EE Plan, and how do they compare to**
 9 **the currently approved EE programs?**

10 *Figure JCW-3* identifies the proposed EE programs and how they compare to
 11 current EE programs.

Figure JCW-3. EE programs

Home Energy Engagement	AMI redesign
Home Energy Products	HVAC measures moved to HVAC Midstream
HVAC Midstream	New
Residential New Construction	Same
Residential Online Energy Checkup	Same
Residential Income-Qualified Weatherproofing	Same
Work Custom	Same
Work Midstream	New
Work Prescriptive	HVAC measures moved to Work Midstream
Work Strategic Energy Management	New
Work Direct Install	Redesign

¹ Since DR and Enhanced CVR energy and demand savings do not persist beyond the year in which they are created, lifetime savings impacts for these programs are not included.

1 **Q29. Are the EE Plan programs consistent with those programs recommended**
2 **by the I&M MPS and the IRP optimization results?**

3 Yes. The EE Plan programs are aligned with I&M MPS PgmP program
4 recommendations for best practice programming. While some components were
5 reassigned to different programs for program implementation efficiency and
6 customer awareness, the program designs did not materially change and remain
7 consistent with those from the I&M MPS.

8 Further, since I&M MPS programs and measures comprise the EE bundles
9 (a.k.a. “Blocks” in IRP vernacular) used as inputs for IRP modelling and
10 optimization, EE Plan programs maintain consistency with the I&M MPS and
11 IRP optimization.

12 Specific to IRP optimization, the IRP PP selected EE bundles containing
13 measures from all I&M MPS programs, meaning no programs were eliminated
14 due to IRP optimization. Measure mapping from selected IRP EE measure
15 bundles back to I&M MPS programs confirms no programs were eliminated,
16 only certain higher-cost measure bundles.

17 The alignment of IRP PP optimized EE bundle energy savings with the EE Plan
18 annual gross energy savings confirms the consistency of the EE Plan with the
19 IRP. These savings levels can be compared between Attachment JCW-3, under
20 the “I&M IN IRP Preferred Plan Optimization EE Selection & Going-In EE
21 Energy Savings” section, Column 5, and Attachment JCW-2 for the EE Plan
22 under the “EE Plan Summary” section.

23 **Q30. Where can the Commission find additional details for the EE Plan**
24 **programs?**

25 Attachment JCW-5 provides the cost components of the programs including the
26 allocated costs of indirect programs. Attachment JCW-6 contains the program,
27 sector, and portfolio benefit cost test results for the EE Plan, along with the net
28 lifetime savings and the cost of conserved energy for each program, sector and
29 the portfolio.

1 Attachment JCW-19 provides the full program descriptions, containing the
2 respective program objectives, implementation plans, and EM&V plans.

3 **Q31. Did I&M consider actual program experience in developing the EE Plan?**

4 Yes. The I&M MPS analysis started with I&M's EE program performance history
5 as a basis. While I&M EE program history did not solely determine the final MPS
6 recommended programs, it did serve as a starting point for how I&M customers
7 had previously responded to the EE programs. Witness Huber discusses this
8 aspect in his testimony.

9 Additionally, I&M made some programmatic adjustments to the I&M MPS
10 recommended programs in the proposed EE programs contained in the EE
11 Plan. Company witness Elkins discusses some of these changes which are
12 based on I&M EE program implementation experience and program history.

13 **Q32. Please discuss the currently offered programs proposed for continuation**
14 **in the EE Plan.**

15 The following residential and C&I programs are currently offered by I&M and are
16 proposed to continue in 2023 through 2025:

- 17 • Home Energy Products – Appliances
- 18 • Income Qualified Weatherproofing
- 19 • Home New Construction
- 20 • Home Energy Engagement
 - 21 ○ AMI data portal
 - 22 ○ Home Energy Reports
- 23 • Online Energy Checkup
- 24 • Work Prescriptive Rebates
- 25 • Work Custom Rebates
- 26 • Work Direct Install.

1 In the EE Plan, the detailed measures for each program are shown in
2 Attachment JCW-7 and Attachment JCW-8. EE programs contain similar
3 measure categories, measures, and approaches reflected in the current DSM
4 Plan programs, but incorporate the following universal changes:

- 5 • Updates reflecting the build-out of measure end-use and building type
6 identification for specific energy and demand savings definition
- 7 • Updates to the measures mix planned for customer participation based
8 on measure recommendations, including new technologies, from the I&M
9 MPS
- 10 • Updates to some of the delivery channels relied upon to engage
11 customers (e.g., such as through an online marketplace)
- 12 • Updates to the cost of customer incentive levels needed to drive
13 participation and reflect specific market conditions.

14 Please see Attachment JCW-19 for additional program design information.

15 Residential Sector Programs

16 **Q33. Please briefly describe the EE Plan's new Residential aspects.**

17 The I&M MPS includes a new program, Residential Heating Ventilation and Air
18 Conditioning (HVAC) Midstream Program, and a new component to an existing
19 program (Home Energy Products – Energy Star Appliances).

20 **Q34. Please briefly discuss the Residential HVAC Midstream Program.**

21 The I&M MPS recommended a Residential HVAC Midstream Program that
22 focuses on several types of residential HVAC-related measures. This choice of
23 delivery model is consistent with the I&M MPS recommendation for a C&I HVAC
24 midstream program. Delivering HVAC units for both sectors through a
25 midstream model will streamline implementation and allow distributors to
26 address both markets in a comprehensive approach. Please see Attachment

1 JCW-19 for residential HVAC Midstream Program design information and data,
2 including reference information supporting the midstream program design.
3 Company witness Elkins discusses this program further in his testimony.

4 **Q35. Did the inclusion of the Residential HVAC Midstream Program impact**
5 **other residential programs in the EE Plan?**

6 Yes. The inclusion of a midstream program for HVAC measures led to changes
7 in design for both the Home New Construction Program and the Home Energy
8 Products Program.

9 More specifically, in the current DSM Plan (2020-2022 DSM Plan), the Home
10 New Construction Program contained rebates for HVAC units to encourage new
11 home construction containing higher efficiency HVAC systems. Since the
12 Midstream HVAC Program will now focus rebates to distributors for all HVAC
13 units, removal of HVAC rebates in the New Construction Program was
14 necessary to avoid the potential for rebate and savings overlap.

15 As a result, the Home New Construction Program will rebate only shell
16 measure(s) installation in new homes. For the same reason, the Home Energy
17 Products Program design changed to remove HVAC units. The expected energy
18 savings and budgets for both programs were adjusted in recognition of these
19 changes in program design.

20 **Q36. Please briefly discuss the new Home Energy Products (HEP) Energy Star**
21 **Appliances component.**

22 The I&M MPS recommended a new program component to expand I&M's
23 program reach into Energy Star Appliances. This component, like the midstream
24 program, seeks to influence retailer stocking levels and pays rebates to retailers
25 that participate in this national program.

26 The overarching goal is to attain national leverage to influence overall stocking
27 patterns of Energy Star-rated or higher efficiency level appliances so that
28 customer adoption occurs more readily in the form of market transformation.

1 National leverage is gained through increasing utility sponsorship in the
2 program. Please see Attachment JCW-19 for the program design information for
3 this program component of HEP.

4 **Q37. Which new measures will I&M rebate through the Energy Star Appliances**
5 **component of HEP?**

6 Attachment JCW-7 lists the Energy Star appliance measures included in the
7 HEP program. These new measures include, for example, Energy Star-rated
8 refrigerators, televisions, clothes washers, clothes dryers, and freezers.

9 While these new measures have been modelled as part of the EE Plan program,
10 the Energy Star program updates and potentially revises the list of measures
11 annually each September. Therefore, the measures contained within this
12 program may be revised or changed for any of the three years that the EE Plan
13 covers.

14 **Q38. Please discuss the Home Energy Engagement Program.**

15 The Home Energy Engagement (HEE) Program was previously offered by I&M
16 in the form of paper and electronic Home Energy Reports (HERs) intended to
17 encourage energy savings through changes in customer behavior.

18 The updated HEE Program proposed in the EE Plan has two components –
19 Home Energy Reports and AMI Energy Management Tools. These components
20 reflect the anticipated behavioral energy savings resulting from the Company's
21 transition from electronic Home Energy Reports (eHERs) to online AMI data,
22 information, tools and reports. Company witness Elkins further discusses how
23 customers can participate in the program and its implementation.

24 While cost-effectiveness was difficult to achieve for the historical HEE Program,
25 the new program design, coupled with the Company's AMI deployment, is cost
26 effective and is part of the optimal resource mix of EE Plan programs. Please
27 see Attachment JCW-19 for additional program details.

1 **Q39. Please briefly discuss the Income Qualified (IQ) Weatherproofing Program.**

2 The IQ Weatherization Program remains similar in design to the current IQ
3 program design. There are components for single family audits (either virtual or
4 on-site) and shell measures and multifamily audits (either virtual or on-site) and
5 shell measures. In addition, there are rebates for energy intensive measure
6 replacements or displacements, whether single family existing or multi-family
7 existing.

8 Consistent with prior IQ Weatherproofing Program design, the program can pay
9 100% of the audit and home weatherization improvements and rebates for
10 certain non-shell measure upgrades or displacements according to the program
11 maximum per unit rebate level.

12 The program continues to offer rebates (up to 100% of cost) for measures such
13 as air conditioner and heat pump upgrades to more efficient units, Electrically
14 Commutated Motor (ECM) fan motor upgrades, and water heater upgrades to
15 either heat pump water heaters or more efficient electric resistance water
16 heaters. All these measures have long lives and can dramatically improve the
17 electric usage profile for IQ customers under the appropriate circumstances and
18 baseline reference.

19 However, with the inclusion of the Residential HVAC Midstream Program in the
20 EE Plan, I&M will manage the HVAC IQ rebate process closely to ensure no
21 overlap exists with the non-IQ HVAC midstream delivery model. Please also see
22 Attachment JCW-19 for IQ Weatherproofing Program design information.

23 **C&I Sector Programs**

24 **Q40. Please discuss I&M's new C&I programs proposed in the EE Plan.**

25 The EE Plan includes the following new Work (C&I) programs and program
26 components are included:

- 27 • Work Direct Install Program
- 28 • Work Midstream Program

- 1 • Work Industrial Systems component of Work Custom
- 2 • Work Strategic Energy Management Program.

3 **Q41. Please discuss the Work Direct Install Program.**

4 The Work Direct Install Program historically focused on general service LED
5 (Light Emitting Diode) lighting for small and medium-size businesses and is no
6 longer offered in the current DSM Plan. As part of I&M MPS modelling, GDS
7 identified an opportunity to make this program cost effective through a focus on
8 C&I lighting measures directed to the food service and retail business segments.
9 This change in focus of certain lighting measures for these two business
10 segments brought the program into cost effectiveness.

11 Under the new design, the Work Direct Install Program is cost effective at a
12 three-year UCT score of 1.17. With Work Direct Install included in the EE Plan,
13 I&M looks forward to engaging these business segments again with efficient
14 lighting measures that can help improve their operations. Attachment JCW-19
15 contains the program design document for this program.

16 **Q42. Please briefly discuss the Work Midstream Program.**

17 Like the Residential Midstream Program described above, the Work Midstream
18 Program was identified in the I&M MPS to address efficient equipment stocking
19 practices at the local distributor level in the supply chain. I&M expects this
20 program to have similar implementation opportunities and challenges as the
21 Residential Midstream Program.

22 The Work Midstream Program aligns with the I&M MPS recommendation to
23 include HVAC in the midstream format. Based on feedback from I&M's
24 implementation partner, I&M re-mapped cooking measures into the Work
25 Prescriptive Program. The Work Midstream program design document provides
26 the full list of HVAC measures contained in the program.

1 Notably, the HVAC midstream measures are the HVAC units that are typically
2 purchased from distributors, including air conditioners, heat pumps, and
3 geothermal heat pumps. Other C&I HVAC measures, such as economizers,
4 chillers, and controls, reside in the Work Custom program. The Work Custom
5 program design document in Attachment JCW-19 provides the measure list
6 detail for those measures offered as custom measures, while the Work
7 Prescriptive program design document in Attachment JCW-19 details those
8 measures offered through prescriptive rebates.

9 Both Work Custom and Work Prescriptive measure lists have changed from
10 measures offered today through these programs, based on I&M MPS
11 recommendations and adjustments made by I&M during EE Plan development.

12 **Q43. Please briefly discuss the Work Industrial Systems Program.**

13 The I&M MPS identified the potential for a new stand-alone Work Industrial
14 Systems Program. For implementation efficiency, this was included in the EE
15 Plan as a new Work Custom program component called Work Industrial
16 Systems (IS) so that industrial end-uses can be targeted differently than the
17 commercial sector counterparts.

18 While IS offers rebates for the same type of measures in commercial buildings
19 (as standalone measures), industrial systems contain measures that are often
20 complex and inter-related due to the way they are operated. Depending on the
21 application and end-use pattern, IS measures can often yield higher energy
22 savings, but must be analyzed for their impact and contribution to the entire
23 process in which they are operated within. The I&M MPS recommends IS
24 because of the uniqueness of different industrial processes.

25 The IS list of measures contemplated in the I&M MPS and contained within the
26 EE Plan is listed below:

- 27 • Efficient compressed air equipment, systems, and controls
- 28 • Efficient HVAC operation and maintenance (O&M)

- 1 • Efficiency lighting O&M
- 2 • Efficient machine drive O&M
- 3 • Efficient process heat O&M
- 4 • Efficient process refrigeration O&M
- 5 • Water supply and wastewater treatment pumps and process efficiency.

6 **Q44. Please discuss the Work Strategic Energy Management (SEM) Program.**

7 The Consortium for Energy Efficiency (CEE) defines SEM as:

8 *Strategic Energy Management can be defined simply as taking a*
9 *holistic approach to managing energy use in order to continuously*
10 *improve energy performance, by achieving persistent energy and*
11 *cost savings over the long term.*

12 *It focuses on business practice change from senior management*
13 *through shop floor staff, affecting organizational culture to reduce*
14 *energy waste and improve energy intensity. SEM emphasizes*
15 *equipping and enabling plant management and staff to impact*
16 *energy consumption through behavioral and operational change.*

17 *While SEM does not emphasize a technical or project centric*
18 *approach, SEM principles and objectives may support capital project*
19 *implementation.²*

20 The I&M MPS recommended a SEM program, and as shown in Attachment
21 JCW-19, I&M proposes to implement three measures defined for
22 implementation. The first is Building Operator Certification, which provides a
23 rebate to offset the cost of training to building operators (e.g., plant maintenance

² CEE Strategic Energy Management Minimum Elements document, provided in Attachment JCW-19.

1 personnel) for the implementation and maintenance of building energy-use
2 systems and measures. This measure is defined as behavioral in nature.

3 The second and third measures are the same measure, building retro-
4 commissioning, simply separated into commercial and industrial buildings. The
5 SEM definition above specifies the holistic nature of behavior and operational
6 change needed to produce sustained whole building energy savings. These
7 retro-commissioning measures provide rebates for the operational change
8 portion of this program.

9 Overall, the SEM Program is projected to be cost effective for the three-year
10 period of the EE Plan at a UCT score of 1.66. Please also see Attachment JCW-
11 19 for SEM program design information with the CEE SEM Minimum Elements
12 reference paper included for program design support, along with other reference
13 papers.

14 Program Budgets

15 **Q45. Please discuss the EE Plan program budgets.**

16 Attachment JCW-5 sets forth the direct and indirect costs of the programs in the
17 EE Plan, which total \$50.67 million over the three-year period. Program delivery
18 costs (i.e., implementation costs), customer rebate costs, and the costs
19 associated with EM&V are considered direct costs of each program and are
20 shown by program. The budget categories that comprise indirect cost budgets
21 are shown in the legend on Attachment JCW-5 and comprise all other budget
22 cost items shown.

23 *Figure JCW-4* summarizes the operating costs of the EE Plan.

Figure JCW-4. EE Plan operating cost budget

	2023	2024	2025	Total
Direct cost	\$15,806,587	\$15,649,092	\$13,957,837	\$45,413,516
<u>Indirect cost</u>	<u>\$1,744,963</u>	<u>\$1,801,471</u>	<u>\$1,706,466</u>	<u>\$5,252,900</u>
Total	\$17,551,550	\$17,450,564	\$15,664,302	\$50,666,416

Q46. Please discuss the indirect costs contained in I&M's EE Plan.

There are certain indirect costs that support activity for each program. I refer to these as indirect costs because these costs facilitate the offering of the EE Plan as a whole. The annual level of these costs was determined in the I&M MPS through benefit cost analysis and were allocated across all measures contained within the EE Plan on a dollar-per-kWh-saved basis.

The indirect cost categories included in the EE Plan are shown in Attachment JCW-5 and include:

- Program Coordination
- Internal Marketing – program level
- Internal Budget Support
- Internal Analyst Support
- Internal IT (Information Technology) - DSM Database & IT Support
- Portfolio Marketing.

Indirect program costs are contained within the Program Cost category of the total DSM Plan cost components shown in Attachment JCW-11.

Q47. Please discuss the DSM Planning costs shown on Attachment JCW-11.

The DSM Planning cost budget line item provides for activities required to plan for future DSM and includes forecast costs for a future DSM market potential study to be undertaken prior to I&M's next IRP and forecast costs for annual DSM industry trade association memberships. These costs are reasonable and

1 necessary for I&M to stay current with DSM industry best practice. Since these
2 cost budgets are not necessarily tied to program implementation either directly,
3 or indirectly, they are identified as a DSM Plan cost and are not allocated as a
4 cost to the EE Plan, DR Plan, or CVR.

5 Commencing another MPS during 2024 will provide a new assessment of
6 energy efficiency and demand-side management potential for the I&M system
7 by the time the next IRP planning cycle will begin. The total funding included
8 across 2024 and 2025 for the next MPS is \$700,000. This forecasted cost is
9 based on the cost of the 2021 I&M MPS. The annual cost included in DSM
10 Planning for industry trade association memberships, which includes any staff
11 training costs provided for by these trade associations, is \$50,000. This level of
12 expense is commensurate with prior annual DSM Plan Staff & Memberships
13 indirect program budgets.

14 Benefit Cost Analysis

15 **Q48. Is the Company proposing a portfolio of cost-effective EE programs as**
16 **part of the EE Plan?**

17 Yes. The EE Plan three-year portfolio level Utility Cost Test (UCT or USCRT)
18 score, excluding the IQ Weatherproofing Program, is 2.31. The impacts from the
19 IQ Weatherproofing Program are not included in this calculation because this
20 specific program is not individually required to pass cost effectiveness. That
21 said, even if the IQ Weatherproofing Program were included, the overall portfolio
22 would remain cost-effective. The Company's overall benefit cost analysis results
23 for the portfolio of EE programs contained in the EE Plan are shown in
24 Attachment JCW-6.

25 **Q49. Please discuss the EE Plan's benefit cost scores shown in Attachment**
26 **JCW-6.**

27 Attachment JCW-6 contains two different benefit cost analyses and benefit cost
28 scores for the four required EE program cost tests, which include the UCT, the

1 Total Resource Cost (TRC) test, the Ratepayer Impact Measure (RIM) test, and
2 the Participant Cost (PCT) test. The two different analyses show the benefit cost
3 test results from I&M MPS modelling for Realistic Achievable Program Potential
4 measures (*i.e.*, before the IRP optimization screen), and the benefit cost test
5 results for the EE Plan resulting from the IRP optimization screen.

6 While the benefit cost test modelling approach is the same between the two
7 analyses, there is a slight difference between the I&M MPS and post-IRP
8 optimization benefit cost test results (2.26 vs. 2.31). This negligible difference
9 arises from the removal of the higher cost measures as part of the optimal
10 resource mix and the reassignment of certain measures between programs
11 versus the I&M MPS. In addition, because the IRP commenced more recently
12 than the I&M MPS, it used the 2021 (rather than 2020) vintage AEP
13 Fundamentals Forecast for avoided costs. Overall, the total benefit stream
14 remains the same, and the overall EE Plan remains cost-effective on a portfolio
15 basis under both the I&M MPS and post-IRP optimization benefit cost
16 evaluation.

17 **Q50. Did I&M make any changes to how cost effectiveness is determined for**
18 **this EE Plan?**

19 Yes, I&M made two important changes to better assess the cost effectiveness of
20 EE. These changes included:

- 21 • Use of an avoided transmission and distribution (T&D) benefit stream
- 22 • Use of peak demand system loss values as a proxy for marginal system
23 loss values.

24 Regarding system loss values, based on stakeholder feedback, I&M directed
25 GDS to use in the I&M MPS different system loss values than what had been
26 used for the prior I&M MPS and DSM Plan. Instead of using average system
27 loss values, the I&M MPS cost effectiveness analyses used peak demand
28 system values as a proxy for marginal system loss values for all three benefit
29 streams (*i.e.*, avoided energy, avoided capacity, and avoided T&D). Peak

1 demand system loss values are typically higher than average system loss
2 values and therefore provide increased value in the avoided cost benefit
3 streams thereby improving program UCT scores.

4 **Q51. Please discuss the Company's use and identification of T&D Avoided**
5 **Cost.**

6 The value used for the avoided T&D benefit is \$20 per kW year and this value
7 was used in the I&M MPS for all measure and program cost effectiveness
8 analyses to value an additional benefit stream to the typical avoided energy and
9 avoided capacity benefit streams attributed to each measure and program.
10 Attachment JCW-6 provides the breakout of avoided energy, avoided capacity,
11 and the avoided T&D benefit streams for each program, each sector, and the
12 overall portfolio.

13 The Company set the avoided T&D value at \$20 per kW-year through working
14 with an industry consultant, Accenture. Accenture developed a range of
15 industry observations at \$20-\$30 per kW-year and found I&M's estimates for
16 the average cost of distribution capacity to be reasonably aligned with this
17 levelized range.

18 **Q52. Did IRP inputs for EE & DR include a T&D avoided cost benefit?**

19 Yes. Since I&M directed GDS to include a T&D avoided cost benefit stream in
20 I&M MPS benefit cost screening, the I&M MPS EE and DR potential results
21 used for IRP input development by GDS reflect this inclusion. Witness Huber
22 further discusses how GDS included this T&D avoided cost benefit stream for
23 IRP input development. The application of avoided T&D in the IRP is discussed
24 in the IRP Report, in Section 7.5.2.

1 Spending Flexibility

2 **Q53. Please discuss the EE Plan program budget spending flexibility requested**
3 **by the Company.**

4 Consistent with I&M's current funding authority, for the three years of the EE
5 Plan, I&M is again requesting authority to roll forward into the next program year
6 any unused funds from the budget approved by the Commission that remain
7 unspent at the end of a plan year. This authority will afford I&M the ability to
8 either continue program spend or expand it from the annual budgets according
9 to need.

10 **Will I&M's implementation of the proposed EE Plan include ongoing**
11 **reporting?**

12 Yes. The Company proposes to continue reporting to the Commission and to
13 the OSB scorecard information consistent with the Cause No. 44841 Order (p.
14 17), which directed as follows:

15 *Scorecard. Beginning with the next DSM filing, I&M should submit a*
16 *scorecard which includes for each program: gross MWh savings at*
17 *the meter and gross MW savings at the meter. The savings to be*
18 *reported are to include: ex ante savings, audited savings, and*
19 *verified savings as these numbers become available.*

20 *The scorecard should also include budgeted and actual program*
21 *expenditures excluding lost revenues and performance incentives.*
22 *After the next DSM filing, future scorecards should be submitted on a*
23 *quarterly basis with the fourth quarter scorecard also including the*
24 *information for the full year.*

1 Evaluation, Measurement and Verification (EM&V)

2 **Q54. Does the DSM Plan include independent EM&V?**

3 Yes. I&M is committed to an outside EM&V review. I&M has experience with this
4 in both its Indiana and Michigan jurisdictions and will continue that independent
5 verification.

6 **Q55. Please explain the EM&V procedures.**

7 I&M's EM&V methodology is designed to meet all the evaluation requirements of
8 170 IAC 4-8-4. It also remains consistent with the EM&V Framework filed with
9 the Commission by the DSM Coordination Committee (DSMCC) for statewide
10 programs. That framework set the stage for I&M's current EM&V practices and
11 these practices are incorporated in the EE Plan.

12 In summary, the independent evaluator will perform a process and an impact
13 evaluation for each year of the plan. The process evaluation will identify how
14 well programs are implemented, will make recommendations to improve
15 programs based on customer, program implementer interviews, and data
16 review. The impact evaluation will examine the more technical effects of the
17 programs such as the multi-step review of energy savings (audited, verified,
18 evaluated, and net savings).

19 Further, the independent evaluator will perform the annual, actual benefit cost
20 calculations using the same avoided cost and system input data with which the
21 EE Plan was analyzed but will use their actual evaluated energy and demand
22 savings results from the program year. I&M relies upon these different review
23 levels to produce final verified energy savings, lost revenue, and Shared
24 Savings. Actual historical EM&V data was also used to develop the I&M MPS.

1 **Q56. How does I&M propose to conduct EM&V for the Home Energy Products**
2 **Energy Star Appliances component?**

3 In the case of this program, I&M recognizes that market transformation energy
4 savings is a key to success for this program. Energy Star program documents
5 provided in Attachment JCW-19 discuss the importance of market
6 transformation energy savings recognition to program success and demonstrate
7 that EM&V consultants provide appropriate guidance for the program evaluation
8 as part of program governance.

9 Assuming the Commission authorizes this program as part of the DSM Plan,
10 I&M will work with its third-party evaluator to ensure program evaluation is
11 consistent with recommendations by the Energy Star program and that the
12 effects of market transformation are evaluated appropriately.

13 Stakeholder Input

14 **Q57. Does I&M propose the same stakeholder input approach for 2023, 2024,**
15 **and 2025 that was approved by the Commission in the Cause No. 44841**
16 **settlement?**

17 Yes. This structure is outlined in Attachment JCW-21. I&M believes this
18 approach is aligned with the stakeholder process used to develop the IRP and
19 has worked well to garner input on I&M's DSM/EE offerings from both voting
20 Oversight Board (OSB) members and non-voting members of the public.
21 Quarterly meetings have been held during 2019, 2020, 2021, and the first
22 quarter in 2022. I&M posted the dates and times on its website for members of
23 the public to respond with interest in attending.

24 I&M reviews current DSM program progress during the quarterly meetings and
25 input has been received regarding how to improve public awareness of the
26 programs.

27 Further, I&M holds separate Board voting member meetings at set times each
28 quarter to provide voting members the opportunity to receive more frequent

1 communication about the progress of I&M's programs. These meetings are held
2 prior to each quarterly public stakeholder meeting, as voting Board members
3 have availability to attend. I&M appreciates how parties have worked within the
4 existing framework to address concerns. The Company seeks to continue the
5 same process into 2023, 2024, and 2025.

6 Large Customer Opt Out

7 **Q58. Please discuss the impact of Large Customer opt out/opt in on I&M's** 8 **DSM/EE programming.**

9 The number of I&M large customer accounts that have requested and been
10 approved for opt out has grown, where the largest jump in qualified opt outs
11 occurred for the 2020 program year.

12 While a handful of these opted out accounts have decided to opt back into EE
13 program participation, the current level of opt out account load is approximately
14 thirty percent of the total opt out eligible I&M Indiana customer load. This level of
15 opt out load is factored into the development of the EE Plan by having the I&M
16 MPS address only the remaining amount of eligible load for EE measure
17 potential.

18 As a result, EE Plan programs reflect the resulting amount of cost-effective C&I
19 energy and demand savings. Witness Huber further discusses how the I&M
20 MPS addresses the impact to EE potential from I&M's specific level of qualified
21 opt out customers. Company witness Duncan incorporates these opt out / opt in
22 cost responsibilities for qualified opt out / opt in customers in the DSM Program
23 Cost Rider cost allocation methodology, as shown in Attachment JCD-1.

24 **Q59. Please discuss opt out customer cost responsibility for the CVR Plan.**

25 As shown by Company witness Duncan in Attachment JCD-1, CVR costs are
26 allocated to all customers, including opt out customers. This is reasonable

1 because the CVR program is not considered an “energy efficiency program”
2 under the Section 9 opt out.

3 However, since forecasted CVR capital costs are included in the Company’s
4 rate base approved in Cause No. 45576, CVR capital costs will not be
5 recovered through the DSM Rider. As a result, the DSM Rider will only allocate
6 ongoing CVR O&M costs and lost revenue to opt out customers. Since I&M
7 does not earn Shared Savings on the CVR Program, no Shared Savings costs
8 are included in the allocation to opt out customers.

9 Customer Impact

10 **Q60. Will any undue or unreasonable preference to any customer class result or**
11 **potentially result from the implementation of the EE programs or from the**
12 **overall design of the EE Plan?**

13 No, I&M is not aware of any undue or unreasonable preference contained within
14 the overall design of the EE Plan. Beginning with the I&M MPS, I&M designed
15 the EE Plan to build opportunity for proactive customer engagement in the
16 programs while balancing program cost. The EE Plan contains midstream
17 programs that provide rebates for multiple market segments more efficiently
18 than counterpart downstream programs and can capture additional market
19 participation through broader market engagement. I&M seeks to update its
20 modes and channels of outreach with differing customer demographics and has
21 added new measures, technologies, and programs to specifically engage certain
22 customer segments accordingly. Examples include AMI usage data and
23 information availability, the Energy Star Appliances component of Home Energy
24 Products, Strategic Energy Management Program, and the Work Direct Install
25 Program. I&M has included programs to help income qualified customers and
26 governmental entities, including wastewater treatment facilities. Last, the DSM
27 Plan includes both DSM and EE programs intended to help balance the distinct
28 aspects of customer loads in I&M’s supply side resources.

1 **Q61. What is the effect, or potential effect, of the DSM Plan on the electric rates**
2 **and bills of customers that participate in EE programs compared to the**
3 **electric rates and bills of customers that do not participate in EE**
4 **programs?**

5 This type of effect is directionally measured by the RIM test, which is one of the
6 benefit cost tests required to be calculated in the Commission's rules. The RIM
7 test results are an "indication of the impact of energy efficiency programs on
8 customers who do not participate in the energy efficiency programs." As shown
9 in Attachment JCW-6 I&M performed calculations of the RIM test for EE Plan
10 programs and the portfolio. While the EE Plan portfolio does not pass the RIM
11 test because the score does not meet or exceed the passing score of 1.0, it is
12 reasonably designed to proactively engage as many customers as practicable
13 through EE measure diversity and broader market engagement. As such, I&M is
14 taking steps to maintain EE program offerings for all its customers and to
15 encourage and entice their participation in the programs. Taking such action by
16 offering a cost-effective portfolio of programs helps address the short term and
17 long-term impact on rates for non-participating customers because those that
18 become participants are taking action to reduce consumption for the long term.
19 All I&M customers realize the annual net benefits from the implementation of
20 programs that seek to educate, encourage, and entice customers to the extent
21 practicable and reasonable. Company witness Duncan calculates the DSM Plan
22 bill impact on the typical residential customer using 1,000 kWh per month and
23 for I&M's major tariff classes.

24 State Energy Analysis

25 **Q62. Are you familiar with the state energy analysis developed by the**
26 **Commission under Ind. Code § 8-1-8.5-3?**

27 Yes, and I consider the DSM Plan to be consistent with the December 2021
28 State Utility Forecasting Group (SUGF) Forecast. In pertinent part the 2021
29 Report states with respect to the treatment of DSM:

1 ***Demand-Side Resources***

2 *The current projection includes the energy and demand impacts of*
3 *existing or planned utility sponsored energy efficiency programs.*
4 *Incremental energy efficiency programs, which include new*
5 *programs and the expansion of existing programs, are projected to*
6 *reduce peak demand by approximately 200 MW at the beginning of*
7 *the forecast period and by about 1400 MW at the end of the forecast.*
8 *It should be noted that this represents a significantly higher impact*
9 *than in previous SUFG forecasts. Energy efficiency projections were*
10 *estimated from utility integrated resource plan filings and from*
11 *information collected directly from the utilities by SUFG.*

12 *These energy efficiency projections do not include the demand*
13 *response loads, which are projected to grow from about 850 MW to*
14 *1000 MW over the forecast horizon.*

15 2021 SUFG Report, p. 1-4.

16 As also explained in the 2021 SUFG Report (pp. 4-5 and 4-6),

17 ***DSM, Energy Efficiency, and Demand Response***

18 *Table 4-2 shows the peak demand reductions from embedded DSM*
19 *in 2019 and from incremental EE and annual DR available in 2020 in*
20 *Indiana. These estimates are derived from utility integrated resource*
21 *plan (IRP) filings, from utility filings with the federal Energy*
22 *Information Administration (EIA) and from information collected by*
23 *SUFG directly from the utilities. SUFG does not attempt to project*
24 *additional DSM savings beyond those identified by the utilities at the*
25 *time this report was prepared.*

26 *It should be noted that SUFG does not advocate any specific means*
27 *for meeting future resource requirements, with additional energy*
28 *efficiency being one of the options available for meeting those*
29 *requirements. Figure 4-2 shows projected values of peak demand*
30 *reductions for incremental energy efficiency and demand response*
31 *for 2020 and at five-year intervals starting in the year 2021. It should*

1 *be noted that these numbers differ significantly than those used in*
2 *previous forecasts.*

3 *This forecast reflects much higher levels of utility-sponsored EE*
4 *(about 1,400 MW of savings late in the forecast period as compared*
5 *to about 800 MW in the 2019 forecast), while DR peak demand*
6 *reductions are lower. The more aggressive DSM programs have a*
7 *noticeable impact on the forecast energy use, particularly in the*
8 *residential and commercial sectors.*

9 *Table 4-2. 2019 Embedded DSM and 2020 Incremental Peak*
10 *Demand Reductions from Energy Efficiency and Annual Demand*
11 *Response Programs (MW)*

2019 Embedded DSM	2020 Incremental Energy Efficiency	2020 Annual Demand Response
1,072	197	853

12
13 The 2021 SUFG Report was issued in December 2021. I&M worked with SUFG
14 to provide data regarding its DSM/EE programming and associated performance
15 levels. The information regarding the impact of DSM programs on the
16 Company's load projections that I&M provided for the 2021 SUFG forecast is
17 consistent with that used for I&M's 2021 IRP. Because the state energy analysis
18 reflects consideration of this information, the DSM Plan is consistent with the
19 state energy analysis.

20 **Net Lost Energy Savings & Net Lost Revenue**

21 **Q63. Does I&M propose to change the methodology that is currently in place to**
22 **calculate lost revenue?**

23 No. I&M proposes to continue the same methodology authorized by the
24 Commission in prior I&M DSM filings, including DSM/EE measure life tracking.

1 **Q64. Are all proposed EE Plan programs eligible for lost revenue recovery?**

2 Yes. All programs in the EE Plan are eligible for lost revenue recovery. The CVR
3 Program is also eligible for lost revenue recovery as a DSM Plan program and is
4 identified in EE Plan lost revenue for ease of presentation and consistency with
5 past practice in prior DSM Plans.

6 **Q65. Please discuss I&M's EE Plan net lost energy savings and lost revenue**
7 **forecast.**

8 Attachment JCW-9 provides the net lost energy savings and lost revenue
9 forecast for 2023, 2024, and 2025 based on the forecasts of measures installed
10 during those years. The accumulation of verified lost energy savings is based on
11 measure life persistence.

12 Further, to provide the Commission with a full picture of the lost revenue for EE
13 Plan program years, Attachment JCW-9 (columns 5, 6, and 7) also provides the
14 respective year forecast of net lost energy savings and net lost revenue (NLR)
15 resulting from the remaining effect lost savings from prior year verified DSM plan
16 measure installations. The lost revenue presented in Attachment JCW-9
17 accounts for any prior or current base rate case adjustments and the three-year
18 cap on NLR agreed to in Cause No. 45285.

19 In summary, I&M's net lost energy savings and resulting lost revenue for the
20 Plan is reasonable because it reflects accumulated lost energy savings only for
21 those measures whose useful life persists for each year of the forecast. Further,
22 the approach to the lost revenue calculation is based on actual sales reductions
23 based on EM&V actual results and aligns the lost revenue calculation with the
24 costs reflected in the revenue requirement used to establish I&M's basic rates.
25 Accordingly, the Commission should conclude the EE Plan's NLR forecast is
26 reasonable.

1 **Q66. Please explain how I&M factored the impact of its recently approved rate**
2 **case into the reporting of DSM cumulative energy savings used in legacy**
3 **net lost revenue recovery.**

4 The test year in I&M's recently approved basic rate case in Cause No. 45576 is
5 the twelve months ended December 31, 2022. The cumulative energy savings
6 used for lost revenue prior to that test year were set to zero and the energy
7 savings for those measures installed during 2022 are cut in half (annual energy
8 savings times $\frac{1}{2}$) to reflect the amount of energy savings contained test year
9 sales.

10 The other half of 2022 lost savings are used for lost revenue recovery. The
11 forecast Legacy energy savings shown in Attachment JCW-9 for 2023, 2024,
12 and 2025 contain $\frac{1}{2}$ of the forecast 2022 energy savings performance and are
13 subject to the shorter of measure life or 3 years (i.e., 3-year measure life cap).

14 The forecast Legacy energy savings for 2024 also contains the forecast 2023
15 energy savings performance from the EE Plan measures from that year, subject
16 to the same 3-year measure life cap. The forecast Legacy energy savings for
17 2025 also contains the forecast 2023 and 2024 energy savings performance
18 from the EE Plan measures from those years, subject to the same 3-year
19 measure life cap.

20 Financial Incentive (Shared Savings)

21 **Q67. What financial incentive is I&M proposing to receive for the EE Plan?**

22 The EE Plan continues the Shared Savings construct agreed to in the
23 settlement agreement approved by the Commission in Cause No. 45285. That
24 construct operates as follows:

25 *First, each individual sector's performance incentives for a given year will*
26 *be calculated based on the lower of: (1) 10% of each individual sector's net*
27 *benefits under the utility cost test, or (2) 15% of sector program costs.*

28 *The second step reduces the amount of incentive earned from the*

1 *residential or nonresidential sectors by 15% in any program year if I&M*
2 *does not hit an 85% savings target threshold for the respective sector or*
3 *increases the incentive by 10% in any program year if the utility exceeds*
4 *105% of the sector's portfolio savings goal.*

5 The one difference in this proceeding is that I&M is determining Shared Savings
6 using an avoided cost forecast that contains the effects of a forecasted carbon
7 tax. This approach maintains consistency with the Company's fundamentals
8 forecast used in the IRP that determined the targets for the EE Plan.

9 **Q68. Why is the proposed financial incentive reasonable and necessary?**

10 I&M's Shared Savings forecast is reasonable and necessary to level the playing
11 field between supply side and demand side resources by mitigating the financial
12 disincentive to offering the EE programs that would otherwise exist if the
13 financial incentive were not approved.

14 **Q69. Please elaborate on why I&M's Shared Savings construct is reasonable.**

15 I&M's proposed Shared Savings construct is inherently reasonable because:

- 16 • Earnings are based on annual program cost effectiveness performance
17 that is aligned with the IRP resource selection process.
- 18 • I&M's Shared Savings earnings are capped while customer benefits are
19 not
- 20 • The DSM/EE goals are determined from the optimal supply side and
21 demand side resource selection from the most recent IRP, not
22 independently by I&M
- 23 • I&M's opportunity to earn a return is based on how well customers
24 benefits are provisioned

- 1 • I&M's share of the Shared Savings is treated as above-the-line for
2 ratemaking purposes and included in the earnings test under the fuel
3 adjustment clause (FAC).

4 **Q70. Are all EE programs eligible for Shared Savings?**

5 All programs are eligible except for one – the IQ Weatherproofing Program. As
6 shown on Attachment JCW-10, all non-IQ EE programs are eligible for Shared
7 Savings earnings. However, since I&M only earns on programs that are cost
8 effectively implemented according to the UCT, I&M has specifically not included
9 the IQ Weatherproofing Program because it is not required to pass cost
10 effectiveness.

11 **Q71. Please discuss I&M's EE Plan Shared Savings forecast.**

12 The EE Plan Shared Savings forecast utilizes the UCT net benefits score by
13 program shown in Attachment JCW-6 to calculate the amount of potential
14 Shared Savings to be earned at the sector level. Based on each sector's net
15 benefits and program operating costs, and assuming savings at 100% of target,
16 the annual forecast Shared Savings performance for each year of the EE Plan is
17 \$1,629,106 for 2023, \$1,657,893 for 2024, and \$1,715,939 for 2025. Forecasted
18 Shared Savings will be trued-up based on actual verified energy savings and
19 target performance from each program year in annual reconciliation filings.

20 EE Plan Program Discussion

21 **Q72. Please discuss how I&M MPS PgmP EE measures were impacted through**
22 **the IRP optimization process.**

23 Attachment JCW-3 and Attachment JCW-4 provide an overview for how I&M
24 MPS EE bundle energy and demand savings flows to I&M MPS PgmP (based
25 on RAP) from IRP EE bundle selection in the IRP PP.

1 While I discuss these attachments in detail later in testimony, in Section IV,
 2 Column 1 in both attachments shows which EE bundles were selected as part of
 3 the IRP PP. Company witness Soller confirms which EE bundles were selected
 4 in IRP optimization in his testimony.

5 In Attachment JCW-3 and Attachment JCW-4, Column 2 and Column 3 provide
 6 the full amount of bundle energy and demand savings made available for IRP
 7 optimization. Column 4 in each attachment then shows which bundles were not
 8 selected from IRP optimization, where zero energy and demand savings
 9 represent which bundles were not selected. From the information shown in
 10 Column 5, EE measure impact from IRP optimization can be determined
 11 through mapping bundles back to I&M MPS measures.

12 *Figure JCW-5* provides the EE measures not selected in the IRP optimization
 13 process, by bundle and year of the EE Plan. Figure JCW-5 also shows the
 14 amount of energy savings potential not selected in kWh of energy and percent
 15 of total I&M MPS Indiana gross energy savings potential.

Figure JCW-5. EE bundle measures

EE Bundle Measures		2023 Selection	2024 Selection	2025 Selection
Res Block 1	ES Qualified Refrigerator w/ Smart Technology	No	No	No
Res Block 4	16 SEER central air conditioner	No	No	No
Res Block 4	17 SEER central air conditioner	No	No	No
Res Block 4	Smart room AC	No	No	No
Res Block 4	Smart room AC - controls retrofit	No	No	No
CI Block 2	AMI Data Presentment & Engagement	No	No	No
CI Block 4	Building Operator Certification	Yes	Yes	No
CI Block 4	Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Yes	Yes	No
CI Block 4	Compressed Air - Custom	Yes	Yes	No
CI Block 4	LED high bay fixture	Yes	Yes	No
CI Block 4	LED low bay fixture	Yes	Yes	No
CI Block 4	Occupancy Sensors	Yes	Yes	No
CI Block 4	Retro-commissioning_Bld Optimization	Yes	Yes	No
CI Block 4	Retro-commissioning_Compressed Air Optimization	Yes	Yes	No
CI Block 4	Retro-commissioning_Refrigerator Optimization	Yes	Yes	No
CI Block 5	Daylighting Controls	Yes	Yes	No
CI Block 6	Bi-Level Lighting Fixture – Stairwells, Hallways, and Garages	Yes	Yes	No
CI Block 6	LED downlight fixture	Yes	Yes	No
CI Block 6	LED downlight, screw-in lamp, 1-3W, interior Average 2 Watts	Yes	Yes	No
CI Block 6	LED downlight, screw-in lamp, 4-20W, interior Average 11 Watts	Yes	Yes	No
Indiana EE Measure Savings Potential Not Selected (gross kWh)		593,243	1,247,173	5,724,953
Percent Not Selected of Available I&M MPS IN EE Potential		0.50%	1.05%	4.83%

1 The amount of available potential not selected as part of the IRP PP is low,
2 ranging from .5 percent to 4.8% across the three-year period of the EE Plan.
3 Notably, the EE Plan energy savings targets represent 99.5 percent of the total
4 I&M MPS Indiana EE PP in 2023, 98.95 percent in 2024, and 95.17 percent in
5 2025.

DR Plan

6 **Q73. Please provide an overview of the Company's proposed DR Plan.**

7 The DR Plan is a cost-effective portfolio of DR programs that are based on the
8 Company's existing and AMI DR programs that were approved in Cause No.
9 45576, and new programs identified in the I&M MPS. As explained in Cause No.
10 45576, the Company worked jointly with the AMI business case vendor,
11 Accenture, to develop DR programs based on AMI-based DR offerings known in
12 the utility industry.

13 I&M also identified these proposed DR programs to GDS for their use in
14 development of the DR potential study. GDS subsequently developed their
15 independent analysis for DR Plan program potential based on this information
16 and developed other cost-effective DR program options as well. GDS performed
17 the benefit cost modelling for all I&M MPS developed DR program options and
18 then developed DR inputs using I&M MPS DR potential data for IRP modelling.

19 Goals

20 **Q74. Please discuss the goals of the DR Plan.**

21 DR Plan goals for the 2023 through 2025 plan period are shown in Attachment
22 JCW-2 in summary fashion and are compared to I&M Indiana retail peak
23 demand as a percent of the annual forecast peak demands.

24 The DR Plan goal for 2023 is 5.794 MW of peak demand reduction. The goal for
25 2024 is 8.562 MW and for 2025 the goal is 12.536 MW. These goal amounts are

1 cumulative, meaning each subsequent year builds upon prior year levels
2 attained since participants are assumed to remain enrolled year over year. New
3 annual participants increase the enrollment levels and the amount of demand
4 reduction that is possible each year.

5 As explained by Company witness Soller, DR Plan goals reflect I&M MPS DR
6 RAP potential for the identified programs and these levels were included in IRP
7 modelling as a “going-in” resource at the demand and cost levels shown in
8 Attachment JCW-2, Attachment JCW-12, and Attachment JCW-15.

9 Programs

10 **Q75. What DR programs are contained in the DR Plan?**

11 A list of DR programs from the DR Plan is provided below, according to I&M
12 MPS nomenclature:

- 13 • Commercial Thermostat Direct Load Control
- 14 • Commercial Real Time Pricing
- 15 • Commercial Critical Peak Pricing
- 16 • Commercial Time-of-Use
- 17 • Commercial Interruptible
- 18 • Commercial Water Heat Direct Load Control
- 19 • Residential Critical Peak Pricing
- 20 • Residential Time-of-Use
- 21 • Residential Thermostat Direct Load Control
- 22 • Residential Customer Engagement Demand Response
- 23 • Residential Air Conditioner Direct Load Control

1 **Q76. How do these DR programs compare to those proposed by the Company**
2 **in Cause No. 45576?**

3 The DR programs listed above are consistent and aligned with those in Cause
4 No. 45576, with additional programs identified by GDS. Attachment JCW-12
5 provides a DR program map, located at the bottom portion of the attachment
6 called "I&M DR Program Description", that shows the alignment of the DR
7 programs. The table also provides information, by program, for DR program
8 type, the type of technology each program is based on, I&M DR program status,
9 and what marketing approaches will be used for each.

10 Regarding the new DR programs identified by GDS, this table identifies how the
11 Company plans to deploy the potential identified for those new programs. For
12 some DR Plan programs such as Commercial Real Time Pricing and
13 Commercial Interruptible, the Company has identified an alternative program,
14 Voluntary Curtailment Service, that addresses the potential and cost identified in
15 the I&M MPS. The Company has identified this alternative program because, for
16 example, the Company's billing system is not capable of real time pricing
17 identification, tracking, and billing at this time.

18 As a result, the Company requests the Commission authorize this new DR
19 program and all DR programs under the budgets, demand savings, and program
20 characteristics identified by the I&M MPS and subsequently included in IRP
21 modelling. The Company will keep the Commission updated through
22 subsequent DSM Plan reconciliation filings for the actual costs resulting from
23 those alternative DR programs.

24 **Q77. Please briefly discuss Attachment JCW-20.**

25 Attachment JCW-20 provides the program design documents for the DR Plan
26 programs approved in Cause No. 45576, presented without change in this filing
27 to present a full picture to the Commission for DR Plan program consistency.

1 Budgets

2 **Q78. Please discuss the annual budgets of the DR Plan.**

3 The budget for each DR Plan program, by year, is shown in Attachment JCW-
4 12. DR Plan budgets are summarized in Attachment JCW-2 in the DSM
5 Program Summary section. The DR Plan budgets represent the program costs
6 determined by the I&M MPS DR program potential analysis and forecast
7 customer participation rates. As shown on Attachment JCW-12, the costs
8 reflected for recovery through the DSM Rider are all O&M expense; I&M is not
9 seeking recovery of any DR Plan capital costs at this time.

10 **Q79. Please discuss the DR Plan cost components.**

11 The DR Plan cost components are shown in Attachment JCW-12 for the 2023
12 through 2025 program years. To avoid double-counting DR program costs, the
13 O&M shown in Attachment JCW-15 is calculated by comparing total DR Plan
14 costs to the level of program costs embedded in base rates in Cause No. 45576
15 to arrive at the incremental O&M proposed for cost recovery through the DSM
16 Rider.

17 Last, while the Home Energy Management thermostat Direct Load Control
18 (DLC) program is an existing DR program with cost recovery through 2022 in
19 the DSM Rider, Attachment JCW-15 reflects the transition of HEM (Home
20 Energy Management) thermostat DLC costs to the DR Plan.

21 DR Financial Incentive

22 **Q80. Are there other costs associated with the DR Plan represented in the DR**
23 **Plan revenue requirement shown in Attachment JCW-15?**

24 Yes. The Company requests Commission approval of a DR financial incentive
25 based on annual DR Plan demand target attainment and the amount of annual
26 DR program cost incurred to achieve the target. A DR financial incentive is

1 reasonable and appropriate for the same reasons as I&M's existing EE Plan
2 Shared Savings approach. For DR, like EE, the Company foregoes the
3 opportunity to earn its regulated rate of return on future supply resources
4 because the need for these resources is mitigated because of DR programs.

5 A DR financial incentive restores that opportunity to the Company and maintains
6 the regulatory paradigm for recognition of that lost opportunity. The annual
7 forecast earnings from the Company's proposed DR financial incentive are
8 shown on Attachment JCW-15.

9 **Q81. Has the Company prepared a proposed DR Financial Incentive**
10 **Mechanism?**

11 Yes. The Company's proposed DR Financial Incentive (DR FI) is calculated
12 shown on Attachment JCW-14.

13 The Company proposes to begin DR FI earnings at 7.5 percent of DR program
14 cost once 50 percent of the annual MW target is achieved. After the 50 percent
15 demand reduction threshold is reached, the Company can earn up to 15 percent
16 of annual program cost if 100 percent of the annual MW target has been
17 achieved, at an increment tied to each year's DR target.

18 For example, in 2023, 0.36 percent of program cost is earned for every 0.138
19 MW achieved. The proposed DR FI then allows the Company to earn up to 20
20 percent of annual program cost if the annual MW target is exceeded under two
21 tiers. The Company can earn up to 17.5 percent of annual program cost if the
22 annual MW target achievement is between 100.1 percent and 104.99 percent. In
23 the second tier, the Company can earn up to 20 percent of annual program cost
24 if the annual MW target achievement is at, or more than, 105 percent.

25 **Q82. Is the Company requesting Commission approval of its proposed DR FI as**
26 **shown in Attachment JCW-14?**

27 Yes, the Company requests the Commission approve its proposed DR FI. The
28 Company further requests the Commission authorize DR FI earnings to be

1 recovered through the DSM Rider. The Company will reconcile annual DR Plan
2 costs, including DR FI performance earnings based on actual DR Plan annual
3 O&M costs through the DSM Rider annual reconciliation process. For 2023,
4 Attachment JCW-14 forecasts a potential DR FI earnings amount of \$245,641 if
5 100% of the MW target is achieved for that year, and up to \$327,521 if the
6 actual annual MW achievement is greater than 105 percent of target.

7 DR Benefit Cost Analysis

8 **Q83. Has the Company prepared a benefit cost analysis for the DR Plan?**

9 Yes. A DR Plan benefit cost analysis is shown in Attachment JCW-13 and is
10 based on I&M MPS RAP levels. The DR Plan portfolio passes cost effectiveness
11 with a UCT score of 2.1. GDS identified the following benefits streams in its
12 analysis:

- 13 • Avoided Generation Capacity supply
- 14 • Avoided Energy supply
- 15 • Avoided peak period energy supply
- 16 • Avoided transmission and distribution cost.

17 Both program benefits and program costs are evaluated using a 20-year
18 program horizon.

19 **Q84. Are there planned changes to the I&M MPS Residential AC DLC Program?**

20 Yes. As noted in the DR program map in Attachment JCW-12, the Company
21 intends for the I&M MPS Residential AC DLC program to be deployed as the
22 Company proposed IQ HVAC DLC Program and the IQ Water Heat DLC
23 Program which are the DR programs already part of Rider Home Energy
24 Management (Rider HEM).

25 Accordingly, while the benefit cost score for the I&M MPS Residential AC DLC
26 Program passes at a UCT score of 2.1, the Company anticipates this score to

1 lower when the IQ Water Heat DLC Program is combined with the IQ HVAC
2 DLC Program. It is typical for electric water heat DLC programs to be challenged
3 from a cost effectiveness perspective due to the lower peak demand
4 coincidence from electric water heaters and coupled with the associated costs to
5 install and operate a direct load control switch and pay IQ customers a bill
6 credit.

7 Despite the cost effectiveness challenges, the Company plans to deploy both
8 programs using the IQ, rural, and senior citizen populations as the eligible
9 participant segments for these programs to provide for the similar greater good
10 benefits found lawful for the EE IQ Weatherproofing Program.

11 I&M requests the Commission authorize these two IQ-focused DR programs as
12 exceptions to having passing benefit cost scores as part of the DR Plan portfolio
13 of programs. Specifically, I&M requests the Commission to consider these two
14 DR programs – in the same way that IQ EE programs are – not expected or
15 required to pass cost effectiveness because of recognized greater good benefits
16 for the costs incurred to provision those benefits.

17 EM&V

18 **Q85. Does the Company plan for EM&V on DR Plan programs?**

19 Yes. In fact, the Company plans for EM&V on DR Plan programs no different
20 from how EM&V is performed for its EE Plan programs, but with specific focus to
21 peak coincident demand reduction and energy usage shifting from peak periods
22 to off peak periods using available AML usage data.

23 I&M has already worked with its third-party evaluator to plan for DR Plan
24 program EM&V. Like the EE Plan EM&V, I&M will provide for annual EM&V
25 reporting on DR Plan programs and will provide these reports to the
26 Commission for review during annual combined EE Plan and DR Plan DSM
27 Rider reconciliations.

CVR Plan

1 **Q86. Please describe the Company's CVR Plan.**

2 In Cause No. 45576 I described the Company's plan for CVR, which is an
3 augmented plan for the former Electric Energy Consumption Optimization
4 Program (EECO). In short, CVR relies on the same underlying software control
5 algorithm and measures to manage voltage levels on distribution substation
6 busses and the associated distribution circuits in which CVR is deployed. CVR
7 uses AMI meter voltage readings to additionally inform, or enhance, CVR
8 operation and the resulting energy and demand savings from end-use load
9 response to lower, but still compliant, system voltage levels.

10 The Company's proposed CVR Plan forecasts CVR application and operation
11 for all the remaining cost-effective distribution substation busses in I&M's
12 Indiana service territory. Attachment JCW-16 sets forth the Company's overall
13 CVR Plan, which forecasts energy and demand savings, incremental cost, and
14 the number of new cost-effective circuits to be deployed through 2027.

15 Attachment JCW-16 also provides the forecast energy and demand savings and
16 incremental O&M for the existing set of circuits that already operate under CVR
17 but with an upgrade to CVR operation. Overall, the Company plans CVR
18 deployment to an additional 343 distribution circuits in the I&M Indiana service
19 territory, which result in a total incremental energy savings of 196,814,829 kWh
20 by 2027, the final year of additional deployment installation.

21 **Cost Recovery**

22 **Q87. Please discuss the Company's CVR cost recovery request.**

23 In this filing, the Company presents the CVR Plan, its standalone cost
24 effectiveness forecast, and the continued cost recovery through the DSM Rider
25 for the incremental CVR operation, maintenance, and program support costs,
26 including EM&V. The Company proposed and was authorized to reflect CVR
27 capital cost recovery in the forecast test year in Cause No. 45576. Attachment

1 JCW-16 provides incremental O&M and program support costs for the new CVR
2 additions along with the O&M and program support costs to continue operation
3 of the existing circuits. In Attachment JCW-18, the CVR Plan forecasts
4 incremental costs of \$851,459 in 2023, \$982,244 in 2024, and \$1,164,068 in
5 2025 for cost recovery as part of the total DSM Plan revenue requirement
6 shown in Attachment JCW-11.

7 Benefit Cost Analysis

8 **Q88. Has the Company performed a benefit cost analysis for CVR?**

9 Yes. The overall CVR Plan benefit cost score is 1.5. The results of the
10 Company's CVR benefit cost analysis is shown in Attachment JCW-17 and
11 reflects the full deployment plan for cost effective CVR distribution busses and
12 circuits where only those with a passing benefit cost score under the UCT are
13 included in the CVR Plan. As shown, all distribution buses and circuits pass with
14 a score greater to or equal to 1.0.

15 Reporting & EM&V

16 **Q89. Please discuss the Company's reporting of CVR performance and results.**

17 The Company plans to continue reporting the energy and demand savings
18 resulting from CVR operation as part of the energy and demand savings
19 reported for the EE Plan. This applies to the reporting of lost revenue as well,
20 where CVR lost revenue is shown in Attachment JCW-9, the lost revenue
21 forecast for the EE plan.

22 This is appropriate and reasonable since the Commission has previously
23 authorized the former EECO Program for this type of reporting and treatment,
24 and the CVR Program is expected to be cost effective on a standalone basis.

25 The Company plans to continue the same EM&V approach for CVR as that
26 used for EECO. The Company's third-party evaluator provides both concurrent
27 (monthly) and annual EM&V impact estimates, energy, and peak demand

1 savings, for this program using data specifically obtained from the CVR system.
2 The analysis performed by the third-party evaluator uses industry specific EM&V
3 methodology and protocol for their annual evaluation of the program.

IV. Resource Planning

4 **Q90. Has I&M submitted an integrated resource plan (IRP) and underlying**
5 **resource assessment to the Commission?**

6 Yes. Company witness Soller explains that I&M submitted an integrated
7 resource plan, which includes the underlying resource assessment, to the
8 Commission on January 31, 2022 (IRP). He also summarizes the diverse set of
9 resources, including EE, DR, and CVR resources, required to meet the capacity
10 planning requirements in the Preferred Plan.

1 **Q91. Is the EE Plan consistent with I&M's most recent IRP Preferred Plan**
 2 **submitted to the Commission?**

3 Yes. *Figure JCW-6* and *Figure JCW-7* illustrate that the Company's EE Plan
 4 was designed to meet the annual levels of EE selected by the IRP Preferred
 5 Plan for the Plan period.

Figure JCW-6. Comparison of EE savings in IRP and Plan (% of I&M retail sales)

	<i>IRP</i>	<i>EE Plan</i>
2023	0.81%	0.81%
2024	0.81%	0.81%
<u>2025</u>	<u>0.77%</u>	<u>0.77%</u>
Average	0.80%	0.80%

Figure JCW-7. Comparison of EE savings in IRP and Plan (kWh)

	<i>IRP</i>	<i>EE Plan</i>
2023	118,003,665	118,003,665
2024	117,619,150	117,619,150
<u>2025</u>	<u>110,738,122</u>	<u>110,738,122</u>
Total	346,360,937	346,360,937

6 Company witness Soller presents the cumulative level of energy savings in
 7 Figure GJS-1. Figure JCW-7 reflects the incremental amounts from the
 8 cumulative amounts shown by Company witness Soller. Attachments JCW-2
 9 and JCW-3 provide more detail regarding EE Plan consistency with the IRP.

10 **Q92. Please further discuss the consistency between the IRP Preferred Plan**
 11 **savings and the EE Plan Goals.**

12 In comparing the EE in the proposed EE Plan and the IRP is it important to
 13 recognize the difference between 1) "net" and "gross" savings; 2) Total
 14 Company and Indiana retail jurisdictional savings; and 3) savings at the
 15 generator versus savings at the customer level.

1 EE net savings best reflects the actual estimated impact on utility sales from EE
2 programs. I&M relies upon the EM&V process to produce the final determination
3 of net savings for demand and energy savings alignment to actual sales.

4 Because the load forecast used in IRP modeling has a baseline built from actual
5 historic sales, the level of EE selected in IRP is treated as net EE impacts. "Net"
6 energy savings refers to EE savings attributable to I&M /EE program efforts,
7 equating to savings that are net of free-riders and spill over.³

8 Further, I&M's EE plan filings have typically been forecasted at gross levels and
9 I have followed this approach in this case for consistency. Accordingly, in order
10 to obtain an apples-to-apples comparison, with levels of EE selected from the
11 IRP process, net savings from the IRP were adjusted to gross savings.

12 To adjust the levels of EE selected in the IRP Preferred Portfolio, I&M converted
13 EE bundle selection from the IRP to I&M MPS net savings and then to I&M MPS
14 gross savings using I&M MPS bundle input data and measure mapping
15 developed by GDS. Witness Huber further discuss the I&M MPS EE bundle
16 development process in his testimony. The resulting gross savings goals from
17 the IRP selection are shown in Table 4 above and on Attachments JCW-2 and
18 JCW-3.

19 Additionally, it was also necessary to modify the numbers reflected in the IRP to
20 reflect the Indiana retail jurisdictional levels. Columns 5 and 6 on Attachment
21 JCW-3 and Attachment JCW-4 provide the selected levels of EE for the I&M
22 Indiana jurisdiction, determined through the aforementioned bundle and
23 measure mapping conversion process to I&M MPS Indiana original RAP
24 Program Potential program and measure levels.

³ Free rider refers to a customer who would have installed the DSM/EE measure without participating in the utility sponsored program yet participates in the program and receives an incentive or bonus for participation. 170 IAC 4-8-1. The spillover effect refers to what the participants in the program have further done in terms of DSM/EE due to having participated in the program. Put another way, it is any reduction in energy consumption or demand that is due to a DSM program, other than reductions due to measures or actions taken by participants as part of the program.

1 Last, Attachment JCW-3, column 2, and Attachment JCW-4, column 2, provide
2 the levels of “net” EE selected in the IRP Preferred Portfolio at the I&M
3 generator level throughout the IRP planning horizon. As noted above, the EE
4 Plan reflects savings at the customer level. To allow for the comparison, the
5 values in columns 3 were adjusted to account for system losses because
6 savings at the customer level do not include system losses but savings at the
7 generator includes them.

8 Column 5 Attachment JCW-3 and Attachment JCW-4 provide the final IRP
9 demand and energy savings. These savings levels were used to determine the
10 EE Plan savings goals for the three years of the plan.

11 As shown in Attachment JCW-2, Attachment JCW-3, and Attachment JCW-4,
12 I&M’s 3-year EE Plan annual total portfolio goals are consistent with
13 corresponding annual IRP levels. Figure JCW-6 above shows how the EE Plan
14 savings goals compare to the savings levels in the IRP Preferred Plan for 2023,
15 2024, and 2025 in terms of percent of I&M Indiana retail sales.

16 **Q93. Please discuss how DSM Plan components DR Plan and CVR Plan are**
17 **consistent with the IRP PP.**

18 Both the DR Plan and the CVR Plan were inputs to the IRP. The I&M MPS
19 developed DR RAP potential and program cost that were used as DR Plan
20 characteristics for IRP inputs. Witness Huber discusses DR potential
21 development of the IRP inputs in his testimony. DR Plan inputs in the IRP are
22 also discussed in the IRP Section 7.8.2. CVR Plan inputs to the IRP were
23 developed through the internal analysis performed by the Company, as
24 discussed in the CVR section of this testimony. CVR energy savings, peak
25 demand savings, and cost were included characteristics in the IRP.

V. DSM Plan Cost Components

1 **Q94. What is the cost of the overall DSM Plan?**

2 The overall DSM Plan three-year cost is \$159,202,209 net of Gross Revenue
3 Conversion. Attachment JCW-11 provides detail breakout by DSM Plan
4 component (i.e., EE Plan, DR Plan, and CVR Plan) and by EE Plan component
5 (i.e., program cost, lost revenue, and Shared Savings). DR Plan required
6 revenue for the DR FI proposed by the Company is included as well in
7 Attachment JCW-11. Company witnesses Whitmore and Duncan use cost
8 components to develop the overall DSM Rider factors resulting from this
9 revenue requirement.

VI. Conclusion

10 **Q95. What is your conclusion regarding I&M's proposed 3 Year DSM Plan?**

11 I&M's DSM Plan is reasonable in its entirety and in the public interest. All DSM
12 Plan components, the EE Plan, DR Plan, and CVR Plan, are all individually cost
13 effective. EE Plan energy savings goals for all three years of the Plan are
14 reasonably achievable and designed to achieve an optimal balance of energy
15 resources in I&M's service territory.

16 Approving the DSM Plan will provide I&M's customers a continued opportunity
17 to reduce their energy and peak demand usage, to make informed decisions
18 about how to manage their energy consumption. The EE Plan maintains
19 flexibility, and its approval will allow the need for electricity supply within I&M's
20 service area to be met in part by EE resources according to, and consistent
21 with, IRP optimization. The DR Plan and CVR Plan are consistent with the IRP
22 PP as well. While both were included in the IRP, both are cost effective, are
23 reasonable and therefore should be approved by the Commission.

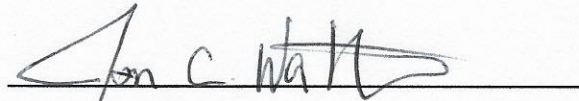
1 **Q96. Does this conclude your pre-filed verified direct testimony?**

2 Yes.

VERIFICATION

I, Jon C. Walter, EE & Consumer Programs Manager, affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information, and belief.

Date: March 30, 2022

A handwritten signature in black ink, appearing to read "Jon C. Walter", is written over a solid horizontal line.

Jon C. Walter

Attachment JCW-1

Verified Petition

[Not Reproduced Herein]

Indiana Michigan Power Company
 IRP Demand Side Management
 IRP Preferred Portfolio EE Optimal Resource Identification - Energy

IRP EE Block Vintage	Column 1			Column 2			Column 3			Column 4			Column 5			Column 6			Column 7		
	IRP Preferred Portfolio Optimized EE & Going-IN EE*			MPS Incremental Annual EE Bundle I&M System Energy Savings Available for IRP Optimization (RAP Gross with SEA Applied = RAP Net kWh at-the-generator)**			MPS SEA Bundles - I&M System Measures - Energy Savings Available for IRP Optimization (RAP Net kWh at-the-meter)			I&M System IRP Preferred Portfolio Optimization EE Selection Portfolio Savings From MPS SEA Bundles (RAP Gross kWh at-the-meter)			I&M IN IRP Preferred Portfolio Optimization EE Selection & Going-In EE Energy Savings (RAP Gross kWh at-the-meter)			Percent I&M IN IRP Optimization Bundle Selection to I&M System EE Selection			2023 IRP EE Bundle I&M System Levelized Cost of Energy (\$ / PV net lifetime kWh)	2024 IRP EE Bundle I&M System Levelized Cost of Energy (\$ / PV net lifetime kWh)	2025 IRP EE Bundle I&M System Levelized Cost of Energy (\$ / PV net lifetime kWh)
2023-2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025
CI Block 1	1	1	1	21,452,443	23,062,065	23,952,461	20,405,634	21,936,712	22,783,659	20,405,634	21,936,712	22,783,659	16,921,680	18,389,003	19,223,504	83%	84%	85%	0.0198	0.0194	0.0188
CI Block 2	0	0	0	690,116	1,458,166	2,342,969	690,116	1,458,166	2,342,969	0	0	0	0	0	0	0%	0%	0%	0.1664	0.1664	0.1664
CI Block 3	1	1	1	64,570,655	58,987,233	57,578,848	61,419,818	56,108,849	54,769,188	61,419,818	56,108,849	54,769,188	50,334,780	46,296,887	45,777,020	82%	83%	84%	0.0101	0.0102	0.0104
CI Block 4	1	1	0	6,646,796	7,477,676	9,057,869	6,322,297	7,112,790	8,615,874	6,322,297	7,112,790	8,615,874	4,877,001	5,497,572	0	77%	77%	0%	0.0441	0.044	0.0433
CI Block 5	1	1	0	4,498,760	4,638,073	5,444,150	4,279,226	4,411,751	5,178,493	4,279,226	4,411,751	5,178,493	3,395,271	3,568,474	0	79%	81%	0%	0.07	0.0707	0.0704
CI Block 6	1	1	0	1,928,326	1,982,160	2,276,929	1,834,230	1,885,437	2,165,823	1,834,230	1,885,437	2,165,823	1,442,215	1,507,854	0	79%	80%	0%	0.0657	0.0656	0.0644
CI Block 7	1	1	1	13,180,337	9,931,187	6,251,221	12,537,180	9,446,578	5,946,182	12,537,180	9,446,578	5,946,182	10,344,472	7,818,974	5,933,292	83%	83%	100%	0.0096	0.0095	0.0096
CI Block 8	1	1	1	1,603,857	1,886,046	2,215,822	1,525,594	1,794,013	2,107,697	1,525,594	1,794,013	2,107,697	1,206,822	1,416,694	1,673,078	79%	79%	79%	0.0059	0.0057	0.0056
Res Block 1	0	0	0	58,912	58,950	58,998	58,912	58,950	58,998	0	0	0	0	0	0	0%	0%	0%	0.5159	0.5161	0.5162
Res Block 2	1	1	1	509,870	577,491	637,322	469,105	531,319	586,367	469,105	531,319	586,367	314,156	365,793	411,867	67%	69%	70%	0.1215	0.1254	0.1283
Res Block 3	1	1	1	6,341,294	6,457,287	6,524,191	5,834,293	5,941,013	6,002,567	5,834,293	5,941,013	6,002,567	4,291,450	4,389,049	4,442,784	74%	74%	74%	0.03	0.0223	0.0338
Res Block 4	0	0	0	18,775	21,972	24,825	18,775	21,972	24,825	0	0	0	0	0	0	0%	0%	0%	0.2463	0.2497	0.2521
Res Block 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%	0%	0%	0	0	0	
Res Block 6	1	1	1	42,904,495	50,632,054	56,682,630	39,474,188	46,583,912	52,150,732	39,474,188	46,583,912	52,150,732	24,365,009	27,851,577	32,723,016	62%	60%	63%	0.0297	0.0256	0.0243
Residential Income Qualified Weatherproofing	1	1	1	-	-	-	-	-	-	-	-	-	510,809	517,273	523,559						
Total	11	11	8	164,404,574	167,170,361	173,048,235	154,869,476	157,291,462	162,733,375	154,101,673	155,752,373	144,346,393	118,003,665	117,619,150	110,738,122						
Cumulative Total				164,404,574	331,574,935	504,623,170	154,869,476	312,160,938	474,894,313	154,101,673	309,854,046	454,200,439	118,003,665	235,622,815	346,360,937						
% of I&M Retail Sales				0.92%	0.96%	0.99%	0.87%	0.90%	0.93%	0.86%	0.89%	0.83%									
% of I&M IN Retail Sales													0.81%	0.81%	0.77%						

*Res Block 5 was not included in IRP modelling and optimization. Residential Income Qualified Weatherproofing included in the IRP Preferred Plan as a Going-In resource.
 **SEA applies 100% of RAP Gross in the year of measure installation, therefore annual incremental energy savings with SEA applied = RAP Net with losses applied for at-the-generator IRP analysis

Indiana Michigan Power Company
 IRP Demand Side Management
 IRP Preferred Portfolio EE Optimal Resource Identification - Demand

IRP EE Block Vintage	Column 1			Column 2			Column 3			Column 4			Column 5			Column 6			Column 7		
	IRP Preferred Portfolio Optimized EE & Going-IN EE*			MPS Incremental Annual EE Bundle I&M System Demand Savings Available for IRP Optimization (RAP Gross with SEA Applied = RAP Net MW at-the-generator)**			MPS SEA Bundles - I&M System Measures - Demand Savings Available for IRP Optimization (RAP Net MW at-the-meter)			I&M System IRP Preferred Portfolio Optimization EE Selection Demand Savings From MPS SEA Bundles (RAP Gross MW at-the-meter)			I&M IN IRP Preferred Portfolio Optimization EE Selection & Going-IN EE Demand Savings (RAP Gross MW at-the-meter)			Percent I&M IN IRP Optimization Bundle Selection to I&M System EE Selection			2023 IRP EE Bundle I&M System Annual Cost of Peak Demand Savings (\$ /KW-yr.)	2024 IRP EE Bundle I&M System Annual Cost of Peak Demand Savings (\$ /KW-yr.)	2025 IRP EE Bundle I&M System Annual Cost of Peak Demand Savings (\$ /KW-yr.)
	2023-2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024	2025	2023	2024
CI Block 1	1	1	1	3.00	3.23	3.35	2.85	3.07	3.19	2.85	3.07	3.19	2.37	2.57	2.69	83%	84%	85%	915	851	819
CI Block 2	0	0	0	0.00	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%	0%	0%	0	0	0
CI Block 3	1	1	1	10.19	9.31	9.09	9.69	8.85	8.64	9.69	8.85	8.64	7.94	7.31	7.22	82%	83%	84%	579	633	649
CI Block 4	1	1	0	1.34	1.50	1.82	1.27	1.43	1.73	1.27	1.43	1.73	0.98	1.11	0.00	77%	77%	0%	895	796	0
CI Block 5	1	1	0	0.78	0.80	0.94	0.74	0.76	0.89	0.74	0.76	0.89	0.59	0.62	0.00	79%	81%	0%	1,368	1,327	0
CI Block 6	1	1	0	0.34	0.34	0.40	0.32	0.33	0.38	0.32	0.33	0.38	0.25	0.26	0.00	79%	80%	0%	1,275	1,240	0
CI Block 7	1	1	1	1.00	0.75	0.47	0.95	0.72	0.45	0.95	0.72	0.45	0.78	0.59	0.45	83%	83%	100%	1,182	1,568	2,491
CI Block 8	1	1	1	1.43	1.68	1.97	1.36	1.60	1.88	1.36	1.60	1.88	1.07	1.26	1.49	79%	79%	79%	60	51	43
Res Block 1	0	0	0	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0%	0%	0%	0	0	0
Res Block 2	1	1	1	1.01	1.14	1.26	0.92	1.05	1.16	0.92	1.05	1.16	0.62	0.72	0.81	67%	69%	70%	612	540	489
Res Block 3	1	1	1	4.04	4.11	4.16	3.72	3.78	3.82	3.72	3.78	3.82	2.73	2.80	2.83	74%	74%	74%	280	275	272
Res Block 4	0	0	0	0.04	0.04	0.05	0.04	0.04	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0%	0%	0%	0	0	0
Res Block 5	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0%	0%	0%	0	0	0
Res Block 6	1	1	1	4.69	5.53	6.19	4.31	5.09	5.69	4.31	5.09	5.69	2.66	3.04	3.57	62%	60%	63%	1,455	1,233	1,101
Residential Income Qualified Weatherproofing	1	1	1	0.00	-	-	0.00	-	-	0.00	-	-	0.09	0.09	0.09						
Total	11	11	8	27,838	28,446	29,699	26,178	26,724	27,891	26,134	26,673	24,831	20,086	20,362	19,161						
% of I&M Retail Peak Demand				0.71%	0.73%	0.77%	0.67%	0.69%	0.72%	0.67%	0.69%	0.64%									
% of I&M IN Retail Peak Demand													0.58%	0.59%	0.56%						

*Res Block 5 was not included in IRP modeling and optimization. Residential Income Qualified Weatherproofing included in the IRP Preferred Plan as a Going-In resource.
 **SEA applies 100% of RAP Gross in year 1 of measure installation, therefore annual incremental energy savings with SEA applied = RAP Net with losses applied for at-the-generator IRP analysis

Indiana Michigan Power Company
EE Plan
2023-2025 Program Cost Summary

Program Cost Budget Component	EE Plan Operating Cost Budget Summary			
	2023 Program Cost	2024 Program Cost	2025 Program Cost	Three Year Program Cost
Program Direct Cost Budget	\$15,806,587	\$15,649,092	\$13,957,837	\$45,413,516
Program Indirect Cost Budget	\$1,744,963	\$1,801,471	\$1,706,466	\$5,252,900
Total EE Plan Cost Budget	\$17,551,550	\$17,450,564	\$15,664,302	\$50,666,416

Residential EE Program	2023 Total Rebate Cost	2023 Pgm Delivery	2023 Pgm Coordination	2023 Internal Marketing	2023 EM&V	2023 Internal Budget Support	2023 Internal Analyst Support	2023 Internal IT	2023 Portfolio Marketing	2023 Total Cost
Home Energy Engagement	\$30,508	\$32,013	\$38,199	\$22,813	\$13,287	\$2,281	\$2,873	\$1,670	\$835	\$144,479
Home Energy Products	\$2,122,132	\$1,187,438	\$214,042	\$222,938	\$71,819	\$36,496	\$51,976	\$26,723	\$13,362	\$3,946,926
HVAC Midstream	\$746,638	\$230,634	\$41,573	\$43,301	\$13,949	\$7,089	\$10,095	\$5,190	\$2,595	\$1,101,064
Residential Income Qualified Weatherproofing	\$265,127	\$337,619	\$67,646	\$23,727	\$13,675	\$9,491	\$11,953	\$6,949	\$3,475	\$739,660
Residential New Construction	\$119,555	\$71,188	\$16,134	\$5,417	\$8,323	\$2,167	\$2,729	\$1,587	\$793	\$227,893
Residential Online Energy Check-up	\$100,695	\$214,465	\$115,158	\$21,506	\$50,102	\$8,602	\$10,834	\$6,299	\$3,149	\$530,809
Total	\$3,384,654	\$2,073,356	\$492,751	\$339,701	\$171,155	\$66,125	\$90,460	\$48,419	\$24,209	\$6,690,831

C&I EE Program	2023 Total Rebate Cost	2023 Pgm Delivery	2023 Pgm Coordination	2023 Internal Marketing	2023 EM&V	2023 Internal Budget Support	2023 Internal Analyst Support	2023 Internal IT	2023 Portfolio Marketing	2023 Total Cost
Work Custom	\$2,446,476	\$1,564,636	\$94,908	\$5,147	\$250,135	\$41,175	\$41,175	\$56,427	\$5,147	\$4,505,224
Work Midstream	\$64,767	\$27,718	\$1,300	\$90	\$4,374	\$720	\$720	\$987	\$90	\$100,764
Work Prescriptive	\$2,404,463	\$2,053,597	\$152,181	\$6,686	\$275,064	\$53,490	\$53,490	\$73,305	\$6,686	\$5,078,964
Work Strategic Energy Mgmt	\$53,778	\$306,536	\$18,594	\$1,008	\$49,005	\$8,067	\$8,067	\$11,055	\$1,008	\$457,119
Work Direct Install	\$215,988	\$387,040	\$10,405	\$1,257	\$73,846	\$10,053	\$5,026	\$13,777	\$1,257	\$718,648
Total	\$5,185,471	\$4,339,527	\$277,387	\$14,188	\$652,423	\$113,505	\$108,478	\$155,551	\$14,188	\$10,860,719

Legend	Customer Rebates	Program Delivery	Program Coordination	Internal Marketing	Program EM&V	Internal Budget Support	Internal Analyst Support	Internal IT	Portfolio Marketing
Direct Program Cost Budget Item	X	X			X				
Indirect Program Cost Budget Item			X	X		X	X	X	X

Indiana Michigan Power Company
EE Plan
2023-2025 Program Cost Summary

Residential EE Program	2024 Total Rebate Cost	2024 Pgm Delivery	2024 Pgm Coordination	2024 Internal Marketing	2024 EM&V	2024 Internal Budget Support	2024 Internal Analyst Support	2024 Internal IT	2024 Portfolio Marketing	2024 Total Cost
Home Energy Engagement	\$25,211	\$35,652	\$42,477	\$25,367	\$14,774	\$2,537	\$3,195	\$1,857	\$929	\$151,999
Home Energy Products	\$1,850,814	\$1,193,758	\$215,181	\$224,124	\$72,202	\$36,690	\$52,253	\$26,865	\$13,433	\$3,685,320
HVAC Midstream	\$867,401	\$277,420	\$50,006	\$52,085	\$16,779	\$8,527	\$12,143	\$6,243	\$3,122	\$1,293,726
Residential Income Qualified Weatherproofing	\$265,040	\$350,171	\$70,161	\$24,609	\$14,183	\$9,844	\$12,397	\$7,208	\$3,604	\$757,215
Residential New Construction	\$225,706	\$137,486	\$31,160	\$10,462	\$16,075	\$4,185	\$5,270	\$3,064	\$1,532	\$434,939
Residential Online Energy Check-up	\$106,576	\$225,018	\$120,824	\$22,564	\$52,567	\$9,026	\$11,367	\$6,609	\$3,304	\$557,853
Total	\$3,340,746	\$2,219,505	\$529,808	\$359,211	\$186,580	\$70,807	\$96,626	\$51,847	\$25,923	\$6,881,053

C&I EE Program	2024 Total Rebate Cost	2024 Pgm Delivery	2024 Pgm Coordination	2024 Internal Marketing	2024 EM&V	2024 Internal Budget Support	2024 Internal Analyst Support	2024 Internal IT	2024 Portfolio Marketing	2024 Total Cost
Work Custom	\$2,639,088	\$1,702,323	\$103,259	\$5,600	\$272,146	\$44,798	\$44,798	\$61,393	\$5,600	\$4,879,005
Work Midstream	\$75,163	\$33,117	\$1,553	\$107	\$5,226	\$860	\$860	\$1,179	\$107	\$118,173
Work Prescriptive	\$2,020,587	\$1,754,470	\$130,116	\$5,712	\$234,715	\$45,695	\$45,695	\$62,622	\$5,712	\$4,305,325
Work Strategic Energy Mgmt	\$71,267	\$406,222	\$24,641	\$1,336	\$64,942	\$10,690	\$10,690	\$14,650	\$1,336	\$605,775
Work Direct Install	\$201,112	\$354,286	\$9,524	\$1,150	\$67,596	\$9,202	\$4,601	\$12,611	\$1,150	\$661,233
Total	\$5,007,218	\$4,250,418	\$269,093	\$13,906	\$644,625	\$111,246	\$106,644	\$152,455	\$13,906	\$10,569,511

Legend	Customer Rebates	Program Delivery	Program Coordination	Internal Marketing	Program EM&V	Internal Budget Support	Internal Analyst Support	Internal IT	Portfolio Marketing
Direct Program Cost Budget Item	X	X			X				
Indirect Program Cost Budget Item			X	X		X	X	X	X

Indiana Michigan Power Company
EE Plan
2023-2025 Program Cost Summary

Residential EE Program	2025 Total Rebate Cost	2025 Pgm Delivery	2025 Pgm Coordination	2025 Internal Marketing	2025 EM&V	2025 Internal Budget Support	2025 Internal Analyst Support	2025 Internal IT	2025 Portfolio Marketing	2025 Total Cost
Home Energy Engagement	\$20,464	\$42,003	\$49,976	\$29,846	\$17,383	\$2,985	\$3,759	\$2,185	\$1,093	\$169,693
Home Energy Products	\$1,925,247	\$1,248,641	\$225,074	\$234,428	\$75,521	\$38,377	\$54,655	\$28,101	\$14,050	\$3,844,095
HVAC Midstream	\$968,531	\$317,658	\$57,259	\$59,639	\$19,213	\$9,763	\$13,905	\$7,149	\$3,574	\$1,456,691
Residential Income Qualified Weatherproofing	\$264,910	\$363,048	\$72,741	\$25,514	\$14,705	\$10,205	\$12,853	\$7,473	\$3,736	\$775,184
Residential New Construction	\$280,427	\$174,748	\$39,605	\$13,297	\$20,432	\$5,319	\$6,699	\$3,895	\$1,947	\$546,368
Residential Online Energy Check-up	\$111,155	\$233,829	\$125,555	\$23,447	\$54,625	\$9,379	\$11,812	\$6,868	\$3,434	\$580,104
Total	\$3,570,733	\$2,379,926	\$570,210	\$386,172	\$201,878	\$76,028	\$103,683	\$55,670	\$27,835	\$7,372,134

C&I EE Program	2025 Total Rebate Cost	2025 Pgm Delivery	2025 Pgm Coordination	2025 Internal Marketing	2025 EM&V	2025 Internal Budget Support	2025 Internal Analyst Support	2025 Internal IT	2025 Portfolio Marketing	2025 Total Cost
Work Custom	\$2,133,676	\$1,027,184	\$62,307	\$3,379	\$164,214	\$27,031	\$27,031	\$37,045	\$3,379	\$3,485,245
Work Midstream	\$84,944	\$38,378	\$1,799	\$125	\$6,056	\$997	\$997	\$1,366	\$125	\$134,785
Work Prescriptive	\$1,940,994	\$1,608,408	\$117,778	\$5,240	\$217,995	\$41,919	\$41,919	\$57,448	\$5,240	\$4,036,941
Work Strategic Energy Mgmt	\$37,391	\$213,129	\$12,928	\$701	\$34,072	\$5,609	\$5,609	\$7,686	\$701	\$317,826
Work Direct Install	\$94,626	\$171,511	\$4,611	\$557	\$32,723	\$4,455	\$2,227	\$6,105	\$557	\$317,372
Total	\$4,291,630	\$3,058,609	\$199,423	\$10,001	\$455,060	\$80,010	\$77,783	\$109,650	\$10,001	\$8,292,168

Legend	Customer Rebates	Program Delivery	Program Coordination	Internal Marketing	Program EM&V	Internal Budget Support	Internal Analyst Support	Internal IT	Portfolio Marketing
Direct Program Cost Budget Item	X	X			X				
Indirect Program Cost Budget Item			X	X		X	X	X	X

Indiana Michigan Power Company
EE Plan
3 Year Benefit Cost Summary

Attachment JCW-6
Witness: J.C. Walter
Page 1 of 1

I&M Market Potential Study Realistic Achievable Potential Benefit Cost Test Scoring Summary

Program	MPS Analysis* 3 Year EE Program USCRT Cost Test					MPS Analysis* 3 Year EE Program Total Resource Cost Test (TRC)					MPS Analysis* 3 Year EE Program Ratepayer Impact Cost Test (RIM)					MPS Analysis* 3 Year EE Program Participant Cost Test (PCT)					Lifetime Energy Savings (net kWh at-the-meter)	Cost of Conserved Energy - (\$ / PV Lifetime net kWh)
	Benefits			Costs	Benefit Cost Ratio	Benefits			Costs	Benefit Cost Ratio	Benefits			Costs	Benefit Cost Ratio	Benefits			Costs	Benefit Cost Ratio		
	Avoided Energy	Avoided Capacity	Avoided T&D			Avoided Energy	Avoided Capacity	Avoided T&D			Avoided Energy	Avoided Capacity	Avoided T&D			Avoided Energy	Avoided Capacity	Avoided T&D				
Home Energy Engagement	\$922,319	\$25,067	\$77,779	\$335,150	3.75	\$922,319	\$25,067	\$77,779	\$335,150	3.75	\$922,319	\$25,067	\$77,779	\$5,682,263	0.22	\$5,336,996	\$0	\$0	\$40,963	130.29	\$1,343,639	0.011
Home Energy Products	\$6,890,707	\$4,155,942	\$1,105,958	\$11,487,556	1.06	\$6,890,707	\$4,155,942	\$1,105,958	\$11,487,556	1.06	\$6,890,707	\$4,155,942	\$1,105,958	\$41,248,162	0.29	\$39,615,662	\$0	\$0	\$13,988,418	2.96	241,615,947	0.082
Home Energy Reports	\$110,634	\$28,963	\$9,809	\$131,162	1.14	\$110,634	\$28,963	\$9,809	\$131,162	1.14	\$110,634	\$28,963	\$9,809	\$1,048,972	0.14	\$964,678	\$0	\$0	\$35,219	27.39	\$3,952,977	0.033
HVAC Midstream	\$3,486,944	\$3,224,296	\$78,042	\$4,889,104	1.53	\$3,486,944	\$3,224,296	\$78,042	\$7,306,328	1.03	\$3,486,944	\$3,224,296	\$78,042	\$18,794,551	0.4	\$14,909,569	\$0	\$0	\$6,204,962	2.4	134,404,922	0.058
Residential New Construction	\$762,310	\$576,342	\$152,577	\$1,209,200	1.22	\$762,310	\$576,342	\$152,577	\$2,093,827	0.7	\$762,310	\$576,342	\$152,577	\$3,681,761	0.4	\$2,916,239	\$0	\$0	\$1,926,609	1.51	\$4,863,524	0.071
Residential Online Energy Check-up	\$1,699,063	\$236,049	\$61,289	\$1,668,766	1.2	\$1,699,063	\$236,049	\$61,289	\$1,899,787	1.07	\$1,699,063	\$236,049	\$61,289	\$9,108,313	0.22	\$8,553,219	\$0	\$0	\$630,225	12.36	\$1,473,739	0.036
Residential Income Qualified Weatherproofing	\$554,220	\$199,549	\$49,277	\$2,272,059	0.35	\$554,220	\$199,549	\$49,277	\$2,363,718	0.34	\$554,220	\$199,549	\$49,277	\$4,498,483	0.18	\$2,395,621	\$0	\$0	\$886,734	2.7	21,778,231	0.167
Residential Total	\$14,416,197	\$8,676,207	\$2,224,732	\$21,972,997	1.15	\$14,416,197	\$8,676,207	\$2,224,732	\$30,281,258	0.84	\$14,416,197	\$8,676,207	\$2,224,732	\$84,062,525	0.3	\$72,691,884	\$0	\$0	\$23,012,931	3.16	\$28,332,979	0.0374
Biz-Custom	\$32,151,848	\$12,528,568	\$2,868,288	\$13,357,389	0.56	\$32,151,848	\$12,528,568	\$2,868,288	\$1,620,983	0.92	\$32,151,848	\$12,528,568	\$2,868,288	\$116,437,748	0.41	\$85,321,600	\$0	\$0	\$55,010,690	1.55	1,171,482,892	0.0026
Biz-Custom RCx	\$639,705	\$246,065	\$64,863	\$1,625,862	0.58	\$639,705	\$246,065	\$64,863	\$2,052,236	0.46	\$639,705	\$246,065	\$64,863	\$3,247,151	0.29	\$2,843,004	\$0	\$0	\$656,821	4.33	15,927,564	1.0237
Biz-Industrial Systems	\$2,300,687	\$979,588	\$240,957	\$4,437,269	0.79	\$2,300,687	\$979,588	\$240,957	\$5,350,797	0.66	\$2,300,687	\$979,588	\$240,957	\$11,582,437	0.3	\$10,496,941	\$0	\$0	\$3,318,706	3.16	65,275,763	0.1847
Biz-Midstream	\$900,797	\$1,720,716	\$388,524	\$353,722	0.51	\$900,797	\$1,720,716	\$388,524	\$6,751,615	0.45	\$900,797	\$1,720,716	\$388,524	\$2,910,197	1.15	\$2,189,679	\$0	\$0	\$9,222,211	0.27	29,804,452	0.0828
Biz-Prescriptive	\$27,161,624	\$8,534,110	\$1,965,924	\$9,134,365	4.12	\$27,161,624	\$8,534,110	\$1,965,924	\$29,639,360	1.27	\$27,161,624	\$8,534,110	\$1,965,924	\$114,671,321	0.33	\$67,109,708	\$0	\$0	\$28,812,996	2.33	965,623,200	0.0051
Biz-SEM	\$2,029,224	\$879,050	\$210,350	\$1,754,898	1.78	\$2,029,224	\$879,050	\$210,350	\$2,548,965	1.22	\$2,029,224	\$879,050	\$210,350	\$6,656,529	0.47	\$5,387,439	\$0	\$0	\$1,000,526	5.38	67,060,387	0.0065
Biz-Work DI	\$1,711,268	\$609,094	\$140,985	\$1,587,940	1.24	\$1,711,268	\$609,094	\$140,985	\$2,564,379	0.95	\$1,711,268	\$609,094	\$140,985	\$9,366,059	0.29	\$2,951,721	\$0	\$0	\$1,198,711	3.3	61,919,908	0.1570
CAI Total	\$66,895,252	\$25,497,191	\$5,879,892	\$32,651,344	3.01	\$66,895,252	\$25,497,191	\$5,879,892	\$100,558,025	0.98	\$66,895,252	\$25,497,191	\$5,879,892	\$263,571,482	0.37	\$177,300,901	\$0	\$0	\$98,218,661	1.81	2,376,993,976	0.0180
Portfolio Total	\$81,311,449	\$34,173,398	\$8,104,623	\$54,624,341	2.26	\$81,311,449	\$34,173,398	\$8,104,623	\$130,839,283	0.94	\$81,311,449	\$34,173,398	\$8,104,623	\$347,634,007	0.36	\$249,992,075	\$0	\$0	\$121,231,592	2.06	2,906,326,955	0.0388
Residential Sector without IQ Weatherproofing	\$14,416,197	\$8,676,207	\$2,224,732	\$21,972,997	1.15	\$14,416,197	\$8,676,207	\$2,224,732	\$30,281,258	0.84	\$14,416,197	\$8,676,207	\$2,224,732	\$84,062,525	0.3	\$72,691,884	\$0	\$0	\$23,012,931	3.16	\$28,332,979	0.0374
Portfolio without IQ Weatherproofing	\$81,311,449	\$34,173,398	\$8,104,623	\$54,624,341	2.26	\$81,311,449	\$34,173,398	\$8,104,623	\$130,839,283	0.94	\$81,311,449	\$34,173,398	\$8,104,623	\$347,634,007	0.36	\$249,992,075	\$0	\$0	\$121,231,592	2.06	2,906,326,955	0.0388

*The I&M MPS cost effectiveness screening was performed using MPS Realistic Achievable Potential energy and demand savings and cost using the Company's 2020H2 (June 2020) Fundamentals Forecast. Demand Savings in the I&M MPS used Indiana TRM (and other sources as appropriate and reasonable) peak demand coincidence factors representative but not wholly specific to I&M Indiana service territory.

I&M IRP Optimal EE Resource Benefit Cost Test Scoring Summary

Program	EE Plan IRP Optimal Resource Analysis** 3 Year EE Program USCRT Cost Test					EE Plan IRP Optimal Resource Analysis** 3 Year EE Program Total Resource Cost Test (TRC)					EE Plan IRP Optimal Resource Analysis** 3 Year EE Program Ratepayer Impact Cost Test (RIM)					EE Plan IRP Optimal Resource Analysis** 3 Year EE Program Participant Cost Test (PCT)					Lifetime Energy Savings (net kWh at-the-meter)	Cost of Conserved Energy - (\$ / PV Lifetime net kWh)
	Benefits			Costs	Benefit Cost Ratio	Benefits			Costs	Benefit Cost Ratio	Benefits			Costs	Benefit Cost Ratio	Benefits			Costs	Benefit Cost Ratio		
	Avoided Energy	Avoided Capacity	Avoided T&D			Avoided Energy	Avoided Capacity	Avoided T&D			Avoided Energy	Avoided Capacity	Avoided T&D			Avoided Energy	Avoided Capacity	Avoided T&D				
Home Energy Engagement	\$984,117	\$137,992	\$56,389	\$466,312	2.53	\$984,117	\$137,992	\$56,389	\$466,312	2.53	\$984,117	\$137,992	\$56,389	\$6,731,256	0.18	\$6,301,674	\$0	\$0	\$76,182	82.72	\$5,296,616	0.013
Home Energy Products	\$6,653,054	\$2,952,243	\$897,601	\$11,476,341	0.92	\$6,653,054	\$2,952,243	\$897,601	\$16,080,077	0.65	\$6,653,054	\$2,952,243	\$897,601	\$41,105,327	0.26	\$38,669,560	\$0	\$0	\$12,775,496	3.03	262,176,928	0.057
HVAC Midstream	\$3,341,940	\$1,942,022	\$502,114	\$3,851,481	1.5	\$3,341,940	\$1,942,022	\$502,114	\$6,008,743	0.96	\$3,341,940	\$1,942,022	\$502,114	\$17,983,609	0.33	\$14,249,435	\$0	\$0	\$5,279,146	2.7	111,505,895	0.057
Residential New Construction	\$747,084	\$374,893	\$90,435	\$1,209,200	1	\$747,084	\$374,893	\$90,435	\$2,063,827	0.58	\$747,084	\$374,893	\$90,435	\$3,681,761	0.33	\$2,916,239	\$0	\$0	\$1,926,609	1.51	\$4,863,524	0.071
Residential Online Energy Check-up	\$1,652,459	\$262,564	\$78,123	\$1,668,766	1.19	\$1,652,459	\$262,564	\$78,123	\$1,869,787	1.07	\$1,652,459	\$262,564	\$78,123	\$9,108,313	0.22	\$8,553,219	\$0	\$0	\$630,225	12.36	\$1,473,739	0.036
Residential Income Qualified Weatherproofing	\$537,935	\$130,873	\$34,809	\$2,272,059	0.31	\$537,935	\$130,873	\$34,809	\$2,363,718	0.3	\$537,935	\$130,873	\$34,809	\$4,498,483	0.16	\$2,285,608	\$0	\$0	\$886,734	2.58	21,778,231	0.167
Residential Total	\$13,916,589	\$5,800,597	\$1,659,471	\$20,944,159	1.92	\$13,916,589	\$5,800,597	\$1,659,471	\$28,892,463	0.74	\$13,916,589	\$5,800,597	\$1,659,471	\$92,808,748	0.26	\$79,975,735	\$0	\$0	\$21,474,193	3.31	\$27,094,933	0.0349
Work Custom	\$22,971,910	\$8,106,758	\$2,205,084	\$12,869,428	2.59	\$22,971,910	\$8,106,758	\$2,205,084	\$38,677,776	0.86	\$22,971,910	\$8,106,758	\$2,205,084	\$84,520,973	0.39	\$66,665,121	\$0	\$0	\$38,776,725	1.72	859,590,803	0.0035
Work Midstream	\$796,152	\$1,519,970	\$397,952	\$353,722	7.67	\$796,152	\$1,519,970	\$397,952	\$6,751,615	0.4	\$796,152	\$1,519,970	\$397,952	\$2,910,197	1.04	\$2,189,679	\$0	\$0	\$8,222,211	0.27	29,804,452	1.0667
Work Prescriptive	\$37,223,386	\$10,562,449	\$2,858,754	\$13,421,278	3.77	\$37,223,386	\$10,562,449	\$2,858,754	\$47,356,808	1.07	\$37,223,386	\$10,562,449	\$2,858,754	\$158,992,568	0.32	\$94,622,250	\$0	\$0	\$47,865,564	1.98	1,355,775,051	0.0110
Work Strategic Energy Mgmt	\$1,751,036	\$540,131	\$155,259	\$1,380,709	1.77	\$1,751,036	\$540,131	\$155,259	\$2,014,297	1.21	\$1,751,036	\$540,131	\$155,259	\$6,045,532	0.4	\$4,602,644	\$0	\$0	\$796,024	5.78	67,060,387	0.0071
Work Direct Install	\$1,530,710	\$379,192	\$103,681	\$1,697,228	1.19	\$1,530,710	\$379,192	\$103,681	\$2,204,860	0.91	\$1,530,710	\$379,192	\$103,681	\$7,704,894	0.26	\$3,423,517	\$0	\$0	\$1,014,345	3.38	61,819,908	0.2505
CAI Total	\$64,273,194	\$21,108,500	\$5,720,730	\$29,722,364	3.07	\$64,273,194	\$21,108,500	\$5,720,730	\$97,007,356	0.94	\$64,273,194	\$21,108,500	\$5,720,730	\$257,674,163	0.35	\$171,503,211	\$0	\$0	\$96,674,969	1.77	2,374,650,601	0.0153
Portfolio Total	\$78,189,783	\$26,909,087	\$7,380,201	\$50,566,523	2.22	\$78,189,783	\$26,909,087	\$7,380,201	\$124,869,820	0.89	\$78,189,783	\$26,909,087	\$7,380,201	\$340,662,911	0.33	\$242,478,946	\$0	\$0	\$118,149,162	2.05	2,901,145,334	0.0218
Residential Sector without IQ Weatherproofing	\$13,978,654	\$5,669,714	\$1,624,662	\$18,672,100	1.11	\$13,978,654	\$5,669,714	\$1,624,662	\$26,516,745	0.78	\$13,978,654	\$5,669,714	\$1,624,662	\$78,310,265	0.26	\$68,690,127	\$0	\$0	\$20,587,459	3.34	\$27,094,933	0.0349
Portfolio without IQ Weatherproofing	\$77,651,848	\$26,776,214	\$7,345,392	\$46,394,464	2.31	\$77,651,848	\$26,776,214	\$7,345,392														

IRP Bundle Selection 2023 IRP Bundle #	(Multiple Items) (Multiple Items)	Measure Name	Measure Description	End-Use	Home Type	Replacement Type	Measure Life	NTG Ratio	2023 Participants	2023 Rebate Cost	2023 Energy Savings (kWh)	2023 IRP Peak Demand Savings (kW)		
Home Energy Engagement	AM Data Portal	AM Data Portal	AM Data Portal	Behavioral	MF	NC	1	1.00	1	365	0.000	0.000		
		Home Energy Reports	Email home energy report	Behavioral	MF	Retain	1	1.00	3,442	\$1,136	875,044	95,254	0.217	
	Home Energy Products	RW LED	Standard LED replacing standard halogen bulb	Lighting	MF	Retain	1	1.00	18,764	\$6,192	4,770,512	520,361	0.045	
			CEE Tier 2 Refrigerator	CEE Tier 2 Refrigerator	Appliances	MF	Retain	1	1.00	3,006	\$5,006	328,849	35,309	0.247
		ENERGY STAR Air Purifier	Air Purifier meeting ENERGY STAR spec	Appliances	MF	Retain	1	1.00	20,149	\$20,149	2,393,271	261,336	0.066	
			ENERGY STAR Clothes Dryer (Electric)	ES Qualified Dryer (CFE3,130)	Appliances	MF	Retain	1	0.53	3,028	\$722	6,265	6,453	0.007
		ENERGY STAR Clothes Washer (Electric WH Dryer)	ES Qualified Clotheswasher (MEF:2.23: 1.75 Baseline)	Appliances	MF	Retain	1	0.53	49,301	\$5,367	147,504	16,150	0.010	
			ENERGY STAR Clothes Washer (NG WHE Dryer)	ES Qualified Clotheswasher (MEF:2.23: 1.75 Baseline)	Appliances	MF	Retain	1	0.53	224	\$43	873	0.014	0.000
		ENERGY STAR Clothes Washer (NG WHE Dryer)	ES Qualified Clotheswasher (MEF:2.23: 1.75 Baseline)	Appliances	MF	Retain	1	0.53	65	\$6,313	6,268	6,268	0.007	0.000
			ENERGY STAR Dehumidifier	ES Qualified Dehumidifier (L/kWh = 2.0)	Appliances	MF	Retain	1	0.53	0	\$1,796	14,792	8,000	0.000
ENERGY STAR Freezer	ES Qualified Freezer (10% more efficient than NAECA)	Appliances	MF	Retain	1	0.53	177	\$1,796	83	25	0.003	0.000		
	ENERGY STAR Most Efficient Dehumidifier	ES Qualified Dehumidifier (L/kWh = 2.3)	Appliances	MF	Retain	1	0.53	0	\$1,796	471,266	51,534	0.013		
ENERGY STAR Refrigerator	ES Qualified Refrigerator	Appliances	MF	Retain	1	0.53	87	\$8,723	13,910	15,819	15,819	0.016		
	Exterior LED Lamp	Exterior LED	Lighting	MF	Retain	1	0.53	0	\$10	108	0.002	0.000		
Heat Pump Dryer	Heat Pump Dryer (CEF:10.4)	Appliances	MF	Retain	1	0.53	1,031	\$4,833	172,000	15,649	0.000	0.000		
	Heat Pump Water Heater-gas heat	Heat pump water heater - gas heating	Water Heating	MF	Retain	1	0.53	324	\$18,506	33,394	3,712	0.000		
Heat Pump Water Heater-heat pump heat	Heat pump water heater - heat pump heating	Water Heating	MF	Retain	1	0.53	4,468	\$209,840	495,738	4,011	0.000	0.000		
	LED Nightlights	LED nightlights replacing incandescent nightlights	Lighting	MF	Retain	1	0.53	25	\$32	59	0.006	0.000		
Smart Clothes Dryer (Electric)	Smart ES Qualified Dryer (5.5% additional energy savings)	Appliances	MF	Retain	1	0.53	1,259	\$1,454	245,416	2,798	0.000	0.000		
	Smart Power Strips - Tier 2	Use of an advanced power strip instead of a standard power strip	Plug Load	MF	Retain	1	0.53	219	\$5,952	7,870	0.016	0.001		
Smart Television	ENERGY STAR 7.0 television	Plug Load	MF	Retain	1	0.53	1,195	\$2,256	41,912	0.001	0.000			
	Smart Water Heater - Tank Controls and Sensors	Smart WH controls	Water Heating	MF	Retain	1	0.53	4	\$32	3	0.000	0.000		
Smart CEE Tier3 Clothes Washer (Electric WH Dryer)	CEE Tier 3 Qualified ClothesWasher (MEF:2.92: 1.75 Baseline)	Appliances	MF	Retain	1	0.53	1,037	\$5,341	31,739	0.000	0.000			
	Smart CEE Tier3 Clothes Washer (NG WHE Dryer)	CEE Tier 3 Qualified ClothesWasher (MEF:2.92: 1.75 Baseline)	Appliances	MF	Retain	1	0.53	0	\$24	150	0.016	0.000		
HVAC Midstream	Air Source Heat Pump 16 SEER - Furnace baseline	16 SEER hp in homes with electric furnaces	HYAC Equipment	MF	Retain	1	0.53	547	\$14,441	37,459	2,608	0.000		
	Air Source Heat Pump 16 SEER - Heat pump baseline	16 SEER hp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	4,482	\$18,223	28,934	24,568	0.001		
Air Source Heat Pump 17 SEER - Furnace baseline	17 SEER hp in homes with electric furnaces	HYAC Equipment	MF	Retain	1	0.53	48	\$34	64	0.001	0.000			
	Air Source Heat Pump 17 SEER - Heat pump baseline	17 SEER hp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	108	\$8,322	40,109	4,280	0.004		
Air Source Heat Pump 18 SEER - Furnace baseline	18 SEER hp in homes with electric furnaces	HYAC Equipment	MF	Retain	1	0.53	15	\$4,469	17,250	1,888	0.000			
	Air Source Heat Pump 18 SEER - Heat pump baseline	18 SEER hp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	0	\$9	65,557	6,003	0.014		
Air Source Heat Pump 21 SEER - Furnace baseline	21 SEER hp in homes with electric furnaces	HYAC Equipment	MF	Retain	1	0.53	27	\$9,417	56,690	6,000	0.000			
	Air Source Heat Pump 21 SEER - Heat pump baseline	21 SEER hp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	0	\$66	334	0.038	0.000		
Central Air Conditioner 15 SEER	15 SEER central air conditioner	HYAC Equipment	MF	Retain	1	0.53	130	\$45,508	289,125	3,000	0.000			
	Central Air Conditioner 16 SEER	16 SEER central air conditioner	HYAC Equipment	MF	Retain	1	0.53	300	\$182	1,074	0.117	0.000		
Central Air Conditioner 17 SEER	17 SEER central air conditioner	HYAC Equipment	MF	Retain	1	0.53	1	\$227	4,951	0.446	0.000			
	Central Air Conditioner 18 SEER	18 SEER central air conditioner	HYAC Equipment	MF	Retain	1	0.53	1,636	\$1,252	32,248	0.001	0.000		
Ductless Heat Pump 17 SEER 9.5 HSPF - Electric resistance baseline	17 SEER 9.5 hgt ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	Retain	1	0.53	4	\$3	60	0.007	0.000			
	Ductless Heat Pump 17 SEER 9.5 HSPF - Heat pump baseline	17 SEER 9.5 hgt ductless heat pump in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	10	\$1,658	2,486	0.208	0.000		
Ductless Heat Pump 19 SEER 9.5 HSPF - Electric resistance baseline	19 SEER 9.5 hgt ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	Retain	1	0.53	0	\$3	27	0.003	0.000			
	Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	19 SEER 9.5 hgt ductless heat pump in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	108	\$15,527	21,488	2,046	0.000		
Ductless Heat Pump 21 SEER 10.0 HSPF - Electric resistance baseline	21 SEER 10.0 hgt ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	Retain	1	0.53	0	\$6	87	0.010	0.000			
	Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	21 SEER 10.0 hgt ductless heat pump in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	4,966	\$48,659	788,281	86,077	0.002		
Ductless Heat Pump 23 SEER 10.0 HSPF - Electric resistance baseline	23 SEER 10.0 hgt ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	Retain	1	0.53	26,168	\$26,678	4,239,183	482,902	0.000			
	Ductless Heat Pump 23 SEER 10.0 HSPF - Heat pump baseline	23 SEER 10.0 hgt ductless heat pump in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	4,462	\$6,616	63,658	403,664	0.000		
ECM HVAC Motor	ECM HVAC motor	HYAC Equipment	MF	Retain	1	0.53	24,868	\$13,480	1,800	2,000,291	0.015	0.000		
	Efficient ceramic space heater	Efficient ceramic space heater	HYAC Equipment	MF	Retain	1	0.53	7	\$71	983	0.026	0.000		
ENERGY STAR Room Air Conditioner	ENERGY STAR room air conditioner	HYAC Equipment	MF	Retain	1	0.53	0	\$86	178	0.000	0.000			
	Ground Source Heat Pump 20 SEER - Heat pump baseline	20 SEER gshp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	379	\$9,023	150,923	16,483	0.000		
Ground Source Heat Pump 21.5 SEER - Heat pump baseline	21.5 SEER gshp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	1	\$14	76	0.000	0.000			
	Ground Source Heat Pump 25.5 SEER - Heat pump baseline	25.5 SEER gshp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	0	\$20	129	0.001	0.000		
Ground Source Heat Pump 29 SEER - Heat pump baseline	29 SEER gshp in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	0	\$20	129	0.001	0.000			
	PTHP Variable Speed SEER 17 11.9 HSPF Upgrade from PTHC SEER 10.5 Electric Resistance Heat	Variable speed PTHP in homes with electric resistance heating	HYAC Equipment	MF	Retain	1	0.53	117	\$20,678	64,711	79,400	0.000		
PTHP Variable Speed SEER 17 11.9 HSPF Upgrade from PTHC SEER 10.5 HSPF 7.7 Smart Room AC	Variable speed PTHP in homes with heat pumps	HYAC Equipment	MF	Retain	1	0.53	1	\$25	54,541	5,001	0.000			
WFI Thermostat - Furnace baseline	WFI thermostat in homes with manual thermostats	HYAC Equipment	MF	Retain	1	0.53	0	\$20	35.139	0.001	0.000			
	WFI Thermostat - Heat pump baseline	WFI thermostat in homes with manual thermostats	HYAC Equipment	MF	Retain	1	0.53	0	\$20	35.139	0.001	0.000		

ISM Program	Measure Name	Measure Description	End-Use	Home Type	Replacement Type	Measure Life	NTG Ratio	2023 Participants	2023 Rebate Cost	2023 Energy Savings (kWh)	2023 Demand Savings (kW)
Residential Income Qualified Weatherproofing	AC Tune Up	Central AC tune-up	HVAC Equipment	MF	DI	15	1.00	20	\$1,674	1,268	3,381
	Air Sealing Average Sealing - Electric furnace	Air sealing in homes with average leakiness	Shell	DI	DI	15	1.00	71	\$4,516	2,423	8,962
	Air Sealing Average Sealing - Heat pump	Air sealing in homes with average leakiness	Shell	DI	DI	15	1.00	16	\$10,025	22,869	0,374
	Air Sealing Inadequate Sealing - Electric furnace	Air sealing in homes with above average leakiness	Shell	DI	DI	15	1.00	4	\$2,360	3,597	0,176
	Air Sealing Inadequate Sealing - Heat pump	Air sealing in homes with above average leakiness	Shell	DI	DI	15	1.00	5	\$2,863	4,293	0,102
	Air Sealing Poor Sealing - Electric furnace	Air sealing in homes with excessive leakiness	Shell	DI	DI	15	1.00	20	\$12,135	40,155	0,863
	Air Sealing Poor Sealing - Heat pump	Air sealing in homes with excessive leakiness	Shell	DI	DI	15	1.00	1	\$865	1,344	0,034
	Air Source Heat Pump 15 SEER - Furnace baseline	Air sealing in homes with electric furnaces	HVAC Equipment	MF	DI	15	1.00	3	\$1,842	6,877	0,326
	Air Source Heat Pump 15 SEER - Heat pump baseline	Air sealing in homes with heat pumps	HVAC Equipment	MF	DI	15	1.00	1	\$153	1,109	0,019
	Air Source Heat Pump 16 SEER - Furnace baseline	Air sealing in homes with electric furnaces	HVAC Equipment	MF	DI	16	1.00	0	860	1,261	0,038
	Air Source Heat Pump 16 SEER - Heat pump baseline	Air sealing in homes with heat pumps	HVAC Equipment	MF	DI	16	1.00	0	1,162	8,469	0,133
	Air Source Heat Pump 17 SEER - Furnace baseline	Air sealing in homes with electric furnaces	HVAC Equipment	MF	DI	17	1.00	0	860	928	0,038
	Air Source Heat Pump 17 SEER - Heat pump baseline	Air sealing in homes with heat pumps	HVAC Equipment	MF	DI	17	1.00	0	879	114	0,029
	Air Source Heat Pump 18 SEER - Furnace baseline	Air sealing in homes with electric furnaces	HVAC Equipment	MF	DI	18	1.00	0	864	821	0,024
	Air Source Heat Pump 18 SEER - Heat pump baseline	Air sealing in homes with heat pumps	HVAC Equipment	MF	DI	18	1.00	0	834	40	0,023
	Air Source Heat Pump 19 SEER - Furnace baseline	Air sealing in homes with electric furnaces	HVAC Equipment	MF	DI	19	1.00	0	816	187	0,037
	Air Source Heat Pump 19 SEER - Heat pump baseline	Air sealing in homes with heat pumps	HVAC Equipment	MF	DI	19	1.00	0	868	789	0,022
	Air Source Heat Pump 21 SEER - Furnace baseline	Air sealing in homes with electric furnaces	HVAC Equipment	MF	DI	21	1.00	0	816	3,195	0,087
	Air Source Heat Pump 21 SEER - Heat pump baseline	Air sealing in homes with heat pumps	HVAC Equipment	MF	DI	21	1.00	0	873	468	0,017
	ASHP Tune Up	Heat pump tune up	HVAC Equipment	MF	DI	5	1.00	2	\$133	701	0,204
	Attic Insulation - Poor Insulation - Electric furnace	Attic insulation in homes with poor insulation	Shell	DI	DI	25	1.00	4	\$4,526	4,601	0,170
	Attic Insulation - Poor Insulation - Heat pump	Attic insulation in homes with poor insulation	Shell	DI	DI	25	1.00	3	\$3,245	3,303	0,137
	Bathroom Aerator 1.5 gpm	1.5 gpm bathroom aerator	Water Heating	MF	DI	15	1.00	54	\$88	888	0,008
	Central Air Conditioner 15 SEER	15 SEER central air conditioner	HVAC Equipment	MF	MO	15	1.00	123	\$200	4,426	0,370
	Central Air Conditioner 16 SEER	16 SEER central air conditioner	HVAC Equipment	MF	MO	16	1.00	11	\$1,587	876	1,596
	Central Air Conditioner 17 SEER	17 SEER central air conditioner	HVAC Equipment	MF	MO	17	1.00	4	\$1,078	566	1,334
	Central Air Conditioner 18 SEER	18 SEER central air conditioner	HVAC Equipment	MF	MO	18	1.00	14	\$4,149	2,341	5,532
	Duct Sealing - Average Sealing - Electric furnace	Duct sealing in homes with average sealing	Shell	DI	DI	15	1.00	2	\$1,223	3,712	8,757
	Duct Sealing - Average Sealing - Heat pump	Duct sealing in homes with average sealing	Shell	DI	DI	15	1.00	7	\$2,787	3,550	0,726
	Duct Sealing - Inadequate Sealing - Electric furnace	Duct sealing in homes with inadequate sealing	Shell	DI	DI	15	1.00	2	\$1,522	841	1,007
	Duct Sealing - Inadequate Sealing - Heat pump	Duct sealing in homes with inadequate sealing	Shell	DI	DI	15	1.00	2	\$793	1,459	0,208
	Duct Sealing - Inadequate Sealing - Gas Heating	Duct sealing in homes with inadequate sealing	Shell	DI	DI	15	1.00	53	\$21,300	4,509	12,022
	Duct Sealing - Inadequate Sealing - Heat pump	Duct sealing in homes with inadequate sealing	Shell	DI	DI	15	1.00	5	\$278	1,428	2,881
	Duct Sealing/Insulation - Poor Sealing - Electric furnace	Duct sealing/insulation in homes with poor sealing	Shell	DI	DI	15	1.00	5	\$1,843	2,468	1,040
	Duct Sealing/Insulation - Poor Sealing - Gas Heating	Duct sealing/insulation in homes with poor sealing	Shell	DI	DI	15	1.00	13	\$5,367	1,428	2,444
	Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing/insulation in homes with poor sealing	Shell	DI	DI	15	1.00	31	\$12,249	3,303	8,540
	Ductless Heat Pump 17 SEER 9.5 HSPF - Electric resistance baseline	17 SEER 9.5 hgt ductless heat pump in homes with electric resistance heating	HVAC Equipment	MF	MO	17	1.00	3	\$1,060	1,173	0,739
	Ductless Heat Pump 17 SEER 9.5 HSPF - Heat pump baseline	17 SEER 9.5 hgt ductless heat pump in homes with heat pumps	HVAC Equipment	MF	MO	17	1.00	1	\$184	3,127	0,134
	Ductless Heat Pump 19 SEER 9.5 HSPF - Electric resistance baseline	19 SEER 9.5 hgt ductless heat pump in homes with electric resistance heating	HVAC Equipment	MF	MO	19	1.00	0	893	1,780	0,128
	Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	19 SEER 9.5 hgt ductless heat pump in homes with heat pumps	HVAC Equipment	MF	MO	19	1.00	1	\$204	2,919	0,184
Ductless Heat Pump 21 SEER 10.0 HSPF - Electric resistance baseline	21 SEER 10.0 hgt ductless heat pump in homes with electric resistance heating	HVAC Equipment	MF	MO	21	1.00	0	841	31	0,046	
Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	21 SEER 10.0 hgt ductless heat pump in homes with heat pumps	HVAC Equipment	MF	MO	21	1.00	0	819	228	0,213	
Ductless Heat Pump 22 SEER 10.0 HSPF - Electric resistance baseline	22 SEER 10.0 hgt ductless heat pump in homes with electric resistance heating	HVAC Equipment	MF	MO	22	1.00	1	\$225	2,264	0,025	
Ductless Heat Pump 22 SEER 10.0 HSPF - Heat pump baseline	22 SEER 10.0 hgt ductless heat pump in homes with heat pumps	HVAC Equipment	MF	MO	22	1.00	1	\$241	2,858	0,258	
ENERGY STAR Refrigerator - early replacement	Replace Existing Refrigerator with ENERGY STAR Qualified Unit	Appliances	MF	DI	18	1.00	0	\$194	499	0,382	
Ground Source Heat Pump 20 SEER - Heat pump baseline	20 SEER ghp in homes with heat pumps	HVAC Equipment	MF	DI	17	1.00	113	\$87,613	101,533	1,127	
Ground Source Heat Pump 21 SEER - Heat pump baseline	21 SEER ghp in homes with heat pumps	HVAC Equipment	MF	DI	18	1.00	0	855	186	0,089	
Ground Source Heat Pump 23 SEER - Heat pump baseline	23 SEER ghp in homes with heat pumps	HVAC Equipment	MF	DI	18	1.00	1	\$208	1,115	0,419	
Ground Source Heat Pump 20 SEER - Heat pump baseline	20 SEER ghp in homes with heat pumps	HVAC Equipment	MF	DI	18	1.00	0	874	308	0,073	
Heat Pump Water Heater-heat pump heat	Heat pump water heater - heat pump heating	Water Heating	MF	DI	18	1.00	0	\$201	598	0,271	
Kitchen Filtr Aerator 1.5 gpm	1.5 gpm kitchen faucet aerator	Water Heating	MF	DI	15	1.00	19	\$340	12,336	1,888	
Low Flow Showerhead 1.5 gpm	1.5 gpm low flow showerhead	Water Heating	MF	DI	15	1.00	33	\$53	6,313	0,300	
Pipe Wrap	Adding pipe wrap to uninsulated pipes	Water Heating	MF	DI	15	1.00	50	\$182	1,324	0,466	
PTHP Variable Speed SEER 17 11.0 HSPF Upgrade from PTHP SEER 10.5 Electric Resistance Heat	Variable speed PTHP in homes with electric resistance heating	HVAC Equipment	MF	DI	15	1.00	21	\$38	991	0,104	
PTHP Variable Speed SEER 17 11.0 HSPF Upgrade from PTHP Baseline SEER 10.5 HSPF 7.7 Thermostatic Restrictor Shower Valve	Variable speed PTHP in homes with heat pumps	HVAC Equipment	MF	DI	18	1.00	0	\$41	240	0,176	
Wall Insulation - Electric furnace	Insulation of wall insulation in uninsulated walls	Shell	DI	DI	15	1.00	2	\$48	168	0,012	
Wall Insulation - Heat pump	Insulation of wall insulation in uninsulated walls	Shell	DI	DI	25	1.00	3	\$48	2,432	0,072	
Water Heater Temperature Setback	High efficiency is a hot water tank with the thermostat reduced to no lower than 120	Water Heating	MF	DI	25	1.00	2	\$118	271	0,013	
Water Heater Wrap	Add WR wrap to reduce standby losses	Water Heating	MF	DI	2	1.00	34	\$12	825	0,095	
WiFi Thermostat - Furnace baseline	WiFi thermostat in homes with manual thermostats	HVAC Equipment	MF	DI	15	1.00	1	\$166	829	0,000	
WiFi Thermostat - Heat pump baseline	WiFi thermostat in homes with manual thermostats	HVAC Equipment	MF	DI	15	1.00	4	\$517	3,358	0,000	
Gold Star HERS 67- Gas & Electric	Construction of gas/electric home meeting Gold Star standard (HERS <=67)	New Construction	MF	NC	25	0.68	26	\$33,880	215,523	22,988	
Platinum Star HERS 69 Gas & Electric	Construction of gas/electric home meeting Platinum Star standard (HERS <=69)	New Construction	MF	NC	25	0.68	4	\$4,588	8,802	3,715	
Silver Star HERS 75 Gas & Electric	Construction of gas/electric home meeting Silver Star standard (HERS <=75)	New Construction	MF	NC	25	0.68	19	\$24,901	31,796	20,254	
Standard LED replacing standard halogen bulbs	Standard LED replacing standard halogen bulbs	Lighting	MF	DI	25	0.68	4	\$4,521	8,325	5,940	
1.0 gpm bathroom aerator	1.0 gpm bathroom aerator	Water Heating	MF	DI	2	0.95	2,060	\$6,413	101,253	11,056	
1.5 gpm kitchen faucet aerator	1.5 gpm kitchen faucet aerator	Water Heating	MF	DI	10	0.95	1,116	\$1,809	40,281	4,377	
LED Nightlights	LED nightlights replacing incandescent nightlights	Lighting	MF	DI	10	0.95	177	\$207	8,366	0,084	
Low Flow Showerhead 1.5 gpm	1.5 gpm low flow showerhead	Water Heating	MF	DI	10	0.95	393	\$625	74,323	8,116	
Pool Timer	Installation of pool pump timer	Miscellaneous	MF	DI	15	0.95	45	\$76	3,067	0,060	
Programmable Thermostat - Furnace baseline	Programmable thermostat in homes with manual thermostats	HVAC Equipment	MF	DI	15	0.95	117	\$8,363	48,387	5,349	
Programmable Thermostat - Heat pump baseline	Programmable thermostat in homes with manual thermostats	HVAC Equipment	MF	DI	15	0.95	28	\$51	5,877	0,620	
Thermostatic Restrictor Shower Valve	Thermostatic restrictor valve	Water Heating	MF	DI	15	0.95	41	\$811	10,860	1,186	
Well Pump	Installation of high efficiency well pump in place of typical efficiency unit	Miscellaneous	MF	DI	15	0.95	203	\$5,212	89,774	7,819	
Grand Total								206,158	\$3,364,654	29,485,423	6,191,125

BP Bundle Selection 2024	Multiple Items	Multiple Items	Measure Description	End-Use	Home Type	Replacement Type	Measure Life	2024 NGTO Ratio	2024 Participants	2024 Rebate Cost	2024 Energy Savings (kWh)	2024 BP Peak Demand Savings (kW)
Home Energy Engagement	JMI Data Portal	AMR data portal	Behavioral	MF	NC	Retrolite	1	1.00	7,438	\$2	1,881	0.205
			Behavioral	MF	NC	Retrolite	1	1.00	6,177,960	\$2,009	1,582,865	170,407
			Behavioral	MF	NC	Retrolite	1	1.00	40,261	\$13	913	112
Home Energy Reports	Email home energy report	Behavioral	MF	NC	Retrolite	1	1.00	33,679,793	\$11,114	8,519,343	930,246	
		Behavioral	MF	NC	Retrolite	1	1.00	4,761	\$6	86	0.006	
		Behavioral	MF	NC	Retrolite	1	1.00	1,020,380	\$1,620	171,413	18,778	
Home Energy Products	SW LED	Standard LED replacing standard halogen bulb	Lighting	MF	NC	Retrolite	3	1.00	26,287	\$24	2,347	0.266
			Lighting	MF	NC	Retrolite	3	1.00	10,360,745	\$10,391	1,211,546	132,307
			Lighting	MF	NC	Retrolite	3	0.83	8,098,407	\$272	9,025	0.988
CEE Tier 2 Refrigerator	CEE Tier 2 Refrigerator	Appliances	MF	NC	Retrolite	12	0.83	46,302	\$9	140	0.015	
		Appliances	MF	NC	Retrolite	12	0.83	507,018	\$86	1,521	0.169	
		Appliances	MF	NC	Retrolite	12	0.87	88,375	\$8	11	0.007	
ENERGY STAR Air Purifier	Air Purifier meeting ENERGY STAR spec	Appliances	MF	NC	Retrolite	17	0.87	592,243	\$51,796	7,432	8.167	
		Appliances	MF	NC	Retrolite	17	0.87	4,550	\$42	68	0.007	
		Appliances	MF	NC	Retrolite	17	0.87	177,394	\$8	166	0.006	
ENERGY STAR Clothes Dryer (Electric)	ES Qualified Dryer (CEFL35)	Appliances	MF	NC	Retrolite	9	0.87	3,113	\$48	471,938	0.006	
		Appliances	MF	NC	Retrolite	9	0.87	807,088	\$8	900	0.033	
		Appliances	MF	NC	Retrolite	9	0.87	101,237	\$10,152	16,189	1.766	
ENERGY STAR Clothes Washer (Electric WH Dryer)	ES Qualified ClothesWasher (MEF2.21: 1.75 Baseline)	Appliances	MF	NC	Retrolite	14	0.87	1,745	\$175	279	0.03	
		Appliances	MF	NC	Retrolite	14	0.87	1,454,609	\$104,005	166,577	18.19	
		Appliances	MF	NC	Retrolite	14	0.87	1,009	\$3	0	0.001	
ENERGY STAR Clothes Washer (NG WHE Dryer)	ES Qualified ClothesWasher (MEF2.21: 1.75 Baseline)	Appliances	MF	NC	Retrolite	14	0.87	1,531,081	\$84,883	172,030	0.001	
		Appliances	MF	NC	Retrolite	14	0.87	4,472	\$28	53	0.006	
		Appliances	MF	NC	Retrolite	14	0.87	0,000	\$0	0	0	
ENERGY STAR Dehumidifier	ES Qualified Dehumidifier (L/W/h + 2.0)	Appliances	MF	NC	Retrolite	13	0.87	0,000	\$0	0	0	
		Appliances	MF	NC	Retrolite	13	0.87	28,357	\$71	5,627	0.614	
		Appliances	MF	NC	Retrolite	13	0.87	0,009	\$1	0	0.001	
ENERGY STAR Freezer	ES Qualified Freezer (10% more Efficient than NAECA)	Appliances	MF	NC	Retrolite	12	0.87	1,252,544	\$21,454	245,416	29,788	
		Appliances	MF	NC	Retrolite	12	0.87	1,722	\$43	508	0.037	
		Appliances	MF	NC	Retrolite	12	0.87	248,434	\$3,739	8,855	0.949	
ENERGY STAR Most Efficient Dehumidifier	ES Qualified Dehumidifier (L/W/h + 2.3)	Appliances	MF	NC	Retrolite	13	0.87	1,543,399	\$1,206	47,483	0.003	
		Appliances	MF	NC	Retrolite	13	0.87	3,579	\$83	125	0.014	
		Appliances	MF	NC	Retrolite	13	0.87	23,732	\$1,177	2,277	0.755	
ENERGY STAR Refrigerator	ES Qualified Refrigerator	Appliances	MF	NC	Retrolite	13	0.87	0,008	\$1	317,579	0.001	
		Appliances	MF	NC	Retrolite	13	0.87	1,033,187	\$5,341	54,627	5.647	
		Appliances	MF	NC	Retrolite	13	0.87	1,251	\$61	377	0.041	
Exterior LED Lamp	Exterior LED	Lighting	MF	NC	Retrolite	17	0.87	548,998	\$1,441	27,459	2.996	
		Lighting	MF	NC	Retrolite	17	0.87	4,491,184	\$118,223	24,004	0.003	
		Lighting	MF	NC	Retrolite	17	0.87	3,911	\$88	146	0.019	
Heat Pump Dryer	Heat Pump Dryer (CFE15.4)	Appliances	MF	NC	Retrolite	6	0.83	8,825,579	\$28,905	244,545	29,714	
		Appliances	MF	NC	Retrolite	6	0.83	26,968	\$84	1,332,710	3,079	
		Appliances	MF	NC	Retrolite	6	0.83	11,143	\$10,808	3,399	0.43	
Heat Pump Water Heater-gas heat	Heat pump water heater - gas heating	Water Heating	MF	NC	Retrolite	16	0.87	12,204	\$3,309	4,621	0.508	
		Water Heating	MF	NC	Retrolite	16	0.87	2,028	\$10	14	0.002	
		Water Heating	MF	NC	Retrolite	16	0.87	127,276	\$24,009	47,915	5.232	
Heat Pump Water Heater-heat pump heat	Heat pump water heater - heat pump heating	Water Heating	MF	NC	Retrolite	16	0.87	16,345	\$5,311	21,844	2.385	
		Water Heating	MF	NC	Retrolite	16	0.87	0,009	\$1	77	0.009	
		Water Heating	MF	NC	Retrolite	16	0.87	81,888	\$28,800	105,564	11,527	
LED Nightlights	LED nightlights replacing incandescent nightlights	Lighting	MF	NC	Retrolite	10	0.87	1,191	\$67	241	0.027	
		Lighting	MF	NC	Retrolite	10	0.87	33,889	\$1,861	69,509	7.048	
		Lighting	MF	NC	Retrolite	10	0.87	416	\$48	859	0.094	
Smart Clothes Dryer (Electric)	Smart ES Qualified Dryer (5.5% additional energy savings)	Appliances	MF	NC	Retrolite	13	0.87	103,772	\$67,500	337,038	36,801	
		Appliances	MF	NC	Retrolite	13	0.83	1,988	\$49	2,781	0.302	
		Appliances	MF	NC	Retrolite	13	0.83	3,030,079	\$227	4,691	0.446	
Smart Power Strips - Tier 2	Use of an advanced power strip instead of a standard power strip	Plug Load	MF	NC	Retrolite	16	0.87	10,894	\$9	22,248	0.003	
		Plug Load	MF	NC	Retrolite	16	0.87	12,504	\$1,324	2,452	0.272	
		Plug Load	MF	NC	Retrolite	16	0.87	0,001	\$19,824	25,470	2.800	
Smart Television	ENERGY STAR 7.0 television	Plug Load	MF	NC	Retrolite	8	0.87	3,350	\$94	71	0.001	
		Plug Load	MF	NC	Retrolite	8	0.87	1,388	\$14	292	0.025	
		Plug Load	MF	NC	Retrolite	8	0.87	4,995,900	\$48,659	788,281	86,277	
Smart Water Heater - Tank Controls and Sensors	Smart WH controls	Water Heating	MF	NC	Retrolite	16	0.87	7,566	\$76	114	0.014	
		Water Heating	MF	NC	Retrolite	16	0.87	26,147,799	\$61,478	4,229,183	462,402	
		Water Heating	MF	NC	Retrolite	16	0.87	4,961,559	\$45,618	633,008	69,824	
Smart/CEE Tier3 Clothes Washer (Electric WH Dryer)	CEE Tier 3 Qualified ClothesWasher (MEF2.92: 1.75 Baseline)	Appliances	MF	NC	Retrolite	14	0.87	3,362	\$34	3,454	0.207	
		Appliances	MF	NC	Retrolite	14	0.87	48,488,074	\$248,881	3,454,176	200,291	
		Appliances	MF	NC	Retrolite	14	0.87	18,273	\$163	2,536	1.617	
Smart/CEE Tier3 Clothes Washer (NG WHE Dryer)	CEE Tier 3 Qualified ClothesWasher (MEF2.92: 1.75 Baseline)	Appliances	MF	NC	Retrolite	14	0.87	1,077	\$65	427	0.045	
		Appliances	MF	NC	Retrolite	14	0.87	441,812	\$4,902	175,218	15.133	
		Appliances	MF	NC	Retrolite	14	0.87	3,464	\$274	1,825	0.19	
HYAC Midstream	Air Source Heat Pump 16 SEER - Furnace baseline	HYAC Equipment	MF	NC	Retrolite	16	0.80	1,420,559	\$17,269	746,346	81,716	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	79,165	\$7,269	16,562	1,809	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,008	\$6	14	0.002	
Air Source Heat Pump 17 SEER - Furnace baseline	17 SEER hp in homes with electric furnaces	HYAC Equipment	MF	NC	Retrolite	16	0.80	1,897,950	\$18,011	853,139	38.78	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,542	\$50	113	0.012	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,000	\$0	0	0	
Air Source Heat Pump 18 SEER - Furnace baseline	18 SEER hp in homes with electric furnaces	HYAC Equipment	MF	NC	Retrolite	16	0.80	2,075	\$65	105	0.005	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,000	\$0	0	0	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,000	\$0	0	0	
Air Source Heat Pump 21 SEER - Furnace baseline	21 SEER hp in homes with electric furnaces	HYAC Equipment	MF	NC	Retrolite	16	0.80	2,277	\$65	105	0.005	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,000	\$0	0	0	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,000	\$0	0	0	
Central Air Conditioner 15 SEER	15 SEER central air conditioner	HYAC Equipment	MF	NC	Retrolite	16	0.80	458,808	\$65,271	27,847	54,937	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	2,361	\$36	143	0.011	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	499,036	\$122,570	55,039	104,504	
Central Air Conditioner 16 SEER	16 SEER central air conditioner	HYAC Equipment	MF	NC	Retrolite	16	0.80	524,788	\$160,430	90,515	178,442	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	2,590	\$74	457	0.026	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	82,362	\$24,871	17,470	34,835	
Central Air Conditioner 17 SEER	17 SEER central air conditioner	HYAC Equipment	MF	NC	Retrolite	16	0.80	801	\$161	159	0.253	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	673,411	\$502,023	143,933	282,262	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	2,277	\$65	105	0.005	
Ductless Heat Pump 17 SEER 9.5 HSPF - Electric resistance baseline	17 SEER 9.5 hp/ ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	NC	Retrolite	16	0.80	22,500	\$6,986	102,940	11,242	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,609	\$167	215	0.137	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	1,816	\$6	12	0.004	
Ductless Heat Pump 19 SEER 9.5 HSPF - Heat pump baseline	19 SEER 9.5 hp/ ductless heat pump in homes with heat pumps	HYAC Equipment	MF	NC	Retrolite	16	0.80	11,588	\$117	6,140	0.311	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,005	\$13	24	0.005	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	2,075	\$65	105	0.005	
Ductless Heat Pump 21 SEER 10.0 HSPF - Electric resistance baseline	21 SEER 9.5 hp/ ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	NC	Retrolite	16	0.80	20,100	\$6,853	94,639	10,534	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	0,608	\$250	282	0.18	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	13,300	\$438	8,655	5.131	
Ductless Heat Pump 21 SEER 10.0 HSPF - Heat pump baseline	21 SEER 9.5 hp/ ductless heat pump in homes with heat pumps	HYAC Equipment	MF	NC	Retrolite	16	0.80	2,017	\$749	5,550	0.715	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	19,343	\$7,596	91,197	10,596	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	824	\$309	498	0.316	
Ductless Heat Pump 23 SEER 10.0 HSPF - Electric resistance baseline	23 SEER 9.5 hp/ ductless heat pump in homes with electric resistance heating	HYAC Equipment	MF	NC	Retrolite	16	0.80	1,822	\$6	19	0.009	
		HYAC Equipment	MF	NC	Retrolite	16	0.87	15,891	\$5,825	14,173	9.028	
		HYAC Equipment	MF	NC	Retrolite	16	0.80	1,923	\$73	6,279	0.686	
Ductless Heat Pump 23 SEER 10.0 HSPF - Heat pump baseline	23 SEER 9.5 hp/ ductless heat pump in homes with heat pumps	HYAC Equipment	MF	NC	Retrolite	16	0.80	18,320	\$7,886	91,298	9,965	
		HYAC Equipment	MF	NC	Retrolite	16	0.8					

IAM Program	Measure Name	Measure Description	End-Use	Home Type	Replacement Type	Measure Life	NRC Ratio	2024				
								Participants	Rebate Cost	Energy Savings (kWh)	Peak Demand Savings (kW)	NPV Peak Demand Savings (\$/yr)
Residential Income Qualified Weatherproofing	AC Tune Up	Central AC tune-up	HVAC Equipment	MF	DI	5	100	25,381	\$1,618	1,235	3,113	3,111
	Air Sealing Average Sealing - Electric furnace	Air sealing in homes with average leakiness	Shell	MF	DI	5	100	88,220	\$4,366	3,509	8,864	8,864
	Air Sealing Average Sealing - Heat pump	Air sealing in homes with average leakiness	Shell	MF	DI	5	100	15,831	\$8,691	22,141	0.36	0.36
	Air Sealing Inadequate Sealing - Electric furnace	Air sealing in homes with above average leakiness	Shell	MF	DI	5	100	2,153	\$1,100	1,353	0.06	0.06
	Air Sealing Inadequate Sealing - Heat pump	Air sealing in homes with above average leakiness	Shell	MF	DI	5	100	3,679	\$2,281	3,488	0.17	0.17
	Air Sealing Poor Sealing - Electric furnace	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	4,448	\$2,758	6,027	0.09	0.09
	Air Sealing Poor Sealing - Heat pump	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	18,301	\$11,731	38,711	0.63	0.63
	Air Sealing Floor Sealing - Electric furnace	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	1,366	\$865	1,267	0.02	0.02
	Air Sealing Floor Sealing - Heat pump	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	4,403	\$2,761	6,063	0.29	0.29
	Air Source Heat Pump 15 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	1,160	\$5,059	30,824	0.501	0.501
	Air Source Heat Pump 15 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	1,122	\$995	1,860	0.02	0.02
	Air Source Heat Pump 16 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	2,561	\$1,588	4,437	0.315	0.315
	Air Source Heat Pump 16 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	875	\$275	1,474	0.02	0.02
	Air Source Heat Pump 17 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	6,677	\$3,023	5,968	0.102	0.102
	Air Source Heat Pump 17 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	2,074	\$225	4,081	0.111	0.111
	Air Source Heat Pump 18 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	2,068	\$85	1,597	0.05	0.05
	Air Source Heat Pump 18 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,156	\$47	4,693	0.033	0.033
	Air Source Heat Pump 19 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	1,189	\$75	1,176	0.038	0.038
	Air Source Heat Pump 19 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,061	\$25	24	0.016	0.016
	Air Source Heat Pump 20 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,466	\$243	110	0.073	0.073
	Air Source Heat Pump 20 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,184	\$92	1,180	0.035	0.035
	Air Source Heat Pump 21 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,066	\$33	39	0.022	0.022
	Air Source Heat Pump 21 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,205	\$103	180	0.103	0.103
	Air Source Heat Pump 22 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,145	\$87	1,003	0.027	0.027
	Air Source Heat Pump 22 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	MF	DI	5	100	0,281	\$225	4,081	0.111	0.111
	ADMP Tune Up	Heat pump tune up	HVAC Equipment	MF	DI	5	100	0,050	\$54	97	0.045	0.045
	Attic Insulation - Poor Insulation - Electric furnace	Attic insulation in homes with poor insulation	Shell	MF	DI	5	100	2,079	\$185	462	0.21	0.21
	Attic Insulation - Poor Insulation - Heat pump	Attic insulation in homes with poor insulation	Shell	MF	DI	5	100	2,007	\$128	673	0.235	0.235
	Bathroom Aerator 1.5 gpm	1.0 gpm bathroom aerator	Water Heating	MF	DI	5	100	5,417	\$347	1,839	0.688	0.688
	Central Air Conditioner 15 SEER	15 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	3,575	\$4,380	4,436	0.184	0.184
	Central Air Conditioner 16 SEER	16 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	8,160	\$3,007	15,167	0.52	0.52
	Central Air Conditioner 17 SEER	17 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	2,561	\$1,137	3,088	0.132	0.132
	Central Air Conditioner 18 SEER	18 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	422	\$65	965	0.158	0.158
	Central Air Conditioner 19 SEER	19 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	119,185	\$193	4,279	0.338	0.338
	Central Air Conditioner 20 SEER	20 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	279	\$21	208	0.49	0.49
	Central Air Conditioner 21 SEER	21 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	13,448	\$2,017	860	2.029	2.029
	Central Air Conditioner 22 SEER	22 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	5,135	\$1,270	410	0.968	0.968
	Central Air Conditioner 23 SEER	23 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	14,165	\$3,792	1,698	4.007	4.007
	Central Air Conditioner 24 SEER	24 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	5,843	\$1,273	556	1.396	1.396
	Central Air Conditioner 25 SEER	25 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	14,471	\$4,341	2,449	5.779	5.779
Central Air Conditioner 26 SEER	26 SEER central air conditioner	HVAC Equipment	MF	DI	5	100	7,659	\$2,118	1,025	2.966	2.966	
Duct Sealing - Average Sealing - Electric furnace	Duct sealing in homes with average sealing	Shell	MF	DI	5	100	1,488	\$1,467	3,884	9.183	9.183	
Duct Sealing - Average Sealing - Heat pump	Duct sealing in homes with average sealing	Shell	MF	DI	5	100	6,735	\$2,694	3,423	0.7	0.7	
Duct Sealing - Inadequate Sealing - Electric furnace	Duct sealing in homes with inadequate sealing	Shell	MF	DI	5	100	1,916	\$767	1,427	0.288	0.288	
Duct Sealing - Inadequate Sealing - Heat pump	Duct sealing in homes with inadequate sealing	Shell	MF	DI	5	100	8,152	\$3,951	8,977	4.83	4.83	
Duct Sealing - Inadequate Sealing - Gas Heating	Duct sealing in homes with inadequate sealing	Shell	MF	DI	5	100	51,478	\$20,591	4,347	11.59	11.59	
Duct Sealing - Inadequate Sealing - Heat pump	Duct sealing in homes with inadequate sealing	Shell	MF	DI	5	100	1,301	\$950	403	0.12	0.12	
Duct Sealing/Insulation - Poor Sealing - Electric furnace	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	4,403	\$1,781	2,380	1.003	1.003	
Duct Sealing/Insulation - Poor Sealing - Gas Heating	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	1,301	\$1,472	1,207	0.288	0.288	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	4,688	\$1,875	3,377	1.304	1.304	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	12,816	\$5,198	902	2.465	2.465	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	29,003	\$11,841	3,088	8.233	8.233	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	1,122	\$449	494	0.228	0.228	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	2,561	\$1,024	1,690	0.712	0.712	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,283	\$97	759	0.03	0.03	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,775	\$213	3,617	0.155	0.155	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,108	\$24	82	0.028	0.028	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,330	\$81	175	0.121	0.121	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,224	\$74	703	0.044	0.044	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,715	\$298	3,366	0.213	0.213	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,411	\$64	747	0.05	0.05	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,382	\$126	231	0.208	0.208	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,220	\$65	81	0.055	0.055	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,702	\$350	3,417	0.265	0.265	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,145	\$54	87	0.019	0.019	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,461	\$178	407	0.312	0.312	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,212	\$87	89	0.022	0.022	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,675	\$197	3,306	0.209	0.209	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,149	\$61	56	0.018	0.018	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,462	\$190	440	0.375	0.375	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	40,370	\$24,222	36,373	4.464	4.464	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	108,937	\$65,362	98,153	1.089	1.089	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,150	\$54	177	0.03	0.03	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,458	\$179	810	0.311	0.311	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,173	\$68	242	0.045	0.045	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,538	\$370	1,128	0.425	0.425	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,200	\$75	201	0.071	0.071	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,274	\$244	990	0.242	0.242	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,121	\$87	211	0.027	0.027	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,228	\$295	906	0.275	0.275	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	4,242	\$7,118	7,396	1.14	1.14	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	7,522	\$11,328	15,594	2.132	2.132	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	18,522	\$29	3,601	0.187	0.187	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	32,258	\$51	6,103	0.29	0.29	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	25,239	\$91	3,014	0.451	0.451	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	48,250	\$176	17,370	0.888	0.888	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	14,683	\$27	701	0.073	0.073	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	23,337	\$43	1,115	0.117	0.117	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	3,322	\$332	8,607	1.428	1.428	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	0,416	\$42	244	0.178	0.178	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	1,863	\$47	162	0.011	0.011	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	3,590	\$90	313	0.022	0.022	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	4,214	\$383	1,360	0.14	0.14	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell	MF	DI	5	100	8,111	\$926	2,344	0.089	0.089	
Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing in homes with poor sealing	Shell										

EM Program	Measure Name	Measure Description	End-Use	Home Type	Replacement Type	Measure Life	2025 Participants	2025 Rebate Cost	2025 Energy Savings	2025 (kW Peak Demand Savings (kW))	
Residential Income Qualified Weatherproofing	AC Tune Up	Central AC tune-up	HVAC Equipment	MF	DI	5	24	\$1,556.3	1,167	3.16	
	Air Sealing Average Sealing - Electric furnace	Air sealing in homes with average leakiness	Shell	SF	DI	5	66	\$4,226.6	3,203	8.87	
	Air Sealing Average Sealing - Heat pump	Air sealing in homes with average leakiness	Shell	SF	Retrofit	15	15	\$9,381.8	21,368	0.348	
	Air Sealing Inadequate Sealing - Electric furnace	Air sealing in homes with above average leakiness	Shell	SF	DI	15	4	\$1,232.2	1,325	0.064	
	Air Sealing Inadequate Sealing - Heat pump	Air sealing in homes with above average leakiness	Shell	SF	Retrofit	15	18	\$2,208.2	3,347	0.164	
	Air Sealing Poor Sealing - Electric furnace	Air sealing in homes with excessive leakiness	Shell	SF	DI	15	1	\$2,469.7	5,865	0.056	
	Air Sealing Poor Sealing - Heat pump	Air sealing in homes with excessive leakiness	Shell	SF	Retrofit	15	8	\$1,336.2	37,360	0.608	
	Air Source Heat Pump 15 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	SF	DI	15	1	\$871.8	1,223	0.141	
	Air Source Heat Pump 15 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	SF	DI	15	8	\$4,897.9	29,747	0.484	
	Air Source Heat Pump 16 SEER - Furnace baseline	Air sealing in homes with excessive leakiness	Shell	SF	DI	15	1	\$974.4	1,814	0.086	
	Air Source Heat Pump 16 SEER - Heat pump baseline	Air sealing in homes with excessive leakiness	Shell	SF	DI	15	2	\$1,537.1	4,212	0.304	
	ADBP Tune Up	Heat pump tune up	Heat pump tune up	HVAC Equipment	SF	DI	18	1	\$252.9	7436	0.127
	Attic Insulation - Poor Insulation - Electric furnace	Attic insulation in homes with poor insulation	Attic insulation in homes with poor insulation	Shell	SF	DI	18	0	\$21.4	5	0.011
	Attic Insulation - Poor Insulation - Heat pump	Attic insulation in homes with poor insulation	Attic insulation in homes with poor insulation	Shell	SF	Retrofit	18	0	\$99.5	1,969	0.053
	Bathroom Aerator 1.5 gpm	1.5 gpm bathroom aerator	1.5 gpm bathroom aerator	Water Heating	SF	DI	18	0	\$26.4	8,652	0.233
	Central Air Conditioner 15 SEER	15 SEER central air conditioner	15 SEER central air conditioner	HVAC Equipment	SF	MO	18	0	\$14.6	8	0.009
	Central Air Conditioner 16 SEER	16 SEER central air conditioner	16 SEER central air conditioner	HVAC Equipment	SF	MO	18	0	\$54.3	5,263	0.160
	Central Air Conditioner 17 SEER	17 SEER central air conditioner	17 SEER central air conditioner	HVAC Equipment	SF	MO	18	0	\$84.2	1,468	0.044
	Central Air Conditioner 18 SEER	18 SEER central air conditioner	18 SEER central air conditioner	HVAC Equipment	SF	MO	18	0	\$23.8	23	0.016
	Duct Sealing - Average Sealing - Electric furnace	Duct sealing in homes with average sealing	Duct sealing in homes with average sealing	Shell	SF	DI	18	0	\$73.8	107	0.074
	Duct Sealing - Average Sealing - Heat pump	Duct sealing in homes with average sealing	Duct sealing in homes with average sealing	Shell	SF	Retrofit	18	0	\$112.0	1,439	0.042
	Duct Sealing - Inadequate Sealing - Electric furnace	Duct sealing in homes with inadequate sealing	Duct sealing in homes with inadequate sealing	Shell	SF	DI	18	0	\$32.0	37	0.021
	Duct Sealing - Inadequate Sealing - Gas Heating	Duct sealing in homes with inadequate sealing	Duct sealing in homes with inadequate sealing	Shell	SF	DI	18	0	\$99.3	175	0.100
	Duct Sealing - Inadequate Sealing - Heat pump	Duct sealing in homes with inadequate sealing	Duct sealing in homes with inadequate sealing	Shell	SF	Retrofit	18	0	\$108.4	1,200	0.034
	Duct Sealing/Insulation - Poor Sealing - Electric furnace	Duct sealing/insulation in homes with poor sealing	Duct sealing/insulation in homes with poor sealing	Shell	SF	DI	18	0	\$265.5	5,400	0.198
	Duct Sealing/Insulation - Poor Sealing - Gas Heating	Duct sealing/insulation in homes with poor sealing	Duct sealing/insulation in homes with poor sealing	Shell	SF	Retrofit	18	0	\$52.1	94	0.044
	Duct Sealing/Insulation - Poor Sealing - Heat pump	Duct sealing/insulation in homes with poor sealing	Duct sealing/insulation in homes with poor sealing	Shell	SF	DI	18	0	\$118.8	438	0.204
	Ductless Heat Pump 17 SEER 8.5 HSPF - Electric resistance baseline	17 SEER 8.5 heat ductless heat pump in homes with electric resistance heating	17 SEER 8.5 heat ductless heat pump in homes with electric resistance heating	HVAC Equipment	SF	MO	18	2	\$124.4	650	0.247
	Ductless Heat Pump 17 SEER 8.5 HSPF - Heat pump baseline	17 SEER 8.5 heat ductless heat pump in homes with heat pumps	17 SEER 8.5 heat ductless heat pump in homes with heat pumps	HVAC Equipment	SF	MO	18	1	\$205.6	1,770	0.462
	Ductless Heat Pump 19 SEER 8.5 HSPF - Electric resistance baseline	19 SEER 8.5 heat ductless heat pump in homes with electric resistance heating	19 SEER 8.5 heat ductless heat pump in homes with electric resistance heating	HVAC Equipment	SF	MO	18	1	\$4,239.8	4,281	0.158
	Ductless Heat Pump 19 SEER 8.5 HSPF - Heat pump baseline	19 SEER 8.5 heat ductless heat pump in homes with heat pumps	19 SEER 8.5 heat ductless heat pump in homes with heat pumps	HVAC Equipment	SF	MO	18	1	\$9,073.3	14,658	0.542
	Ductless Heat Pump 21 SEER 10 HSPF - Electric resistance baseline	21 SEER 10 heat ductless heat pump in homes with electric resistance heating	21 SEER 10 heat ductless heat pump in homes with electric resistance heating	HVAC Equipment	SF	MO	18	1	\$3,037.0	2,980	0.128
	Ductless Heat Pump 21 SEER 10 HSPF - Heat pump baseline	21 SEER 10 heat ductless heat pump in homes with heat pumps	21 SEER 10 heat ductless heat pump in homes with heat pumps	HVAC Equipment	SF	MO	18	1	\$6,154.5	1,528	0.123
	Ductless Heat Pump 23 SEER 10 HSPF - Electric resistance baseline	23 SEER 10 heat ductless heat pump in homes with electric resistance heating	23 SEER 10 heat ductless heat pump in homes with electric resistance heating	HVAC Equipment	SF	MO	18	1	\$1,115	1,158	0.346
	Ductless Heat Pump 23 SEER 10 HSPF - Heat pump baseline	23 SEER 10 heat ductless heat pump in homes with heat pumps	23 SEER 10 heat ductless heat pump in homes with heat pumps	HVAC Equipment	SF	MO	18	1	\$2,921.7	234	0.222
	ENERGY STAR Refrigerator - early replacement	Replace Existing Refrigerator with ES Qualified Unit	Replace Existing Refrigerator with ES Qualified Unit	Appliances	SF	MO	18	0	\$2,272.6	960	2.287
	Ground Source Heat Pump 20 SEER - Heat pump baseline	20 SEER ghp in homes with heat pumps	20 SEER ghp in homes with heat pumps	HVAC Equipment	SF	MO	18	0	\$1,544.4	452	0.091
	Ground Source Heat Pump 21 SEER - Heat pump baseline	21 SEER ghp in homes with heat pumps	21 SEER ghp in homes with heat pumps	HVAC Equipment	SF	MO	18	0	\$4,263.0	1,914	4.516
	Ground Source Heat Pump 23 SEER - Heat pump baseline	23 SEER ghp in homes with heat pumps	23 SEER ghp in homes with heat pumps	HVAC Equipment	SF	MO	18	0	\$1,618.4	680	0.438
	Ground Source Heat Pump 29 SEER - Heat pump baseline	29 SEER ghp in homes with heat pumps	29 SEER ghp in homes with heat pumps	HVAC Equipment	SF	MO	18	0	\$4,467.1	2,520	5.946
	Heat Pump Water Heater-heat pump heat	Heat pump water heater - heat pump heating	Heat pump water heater - heat pump heating	Water Heating	SF	MO	18	1	\$2,791.1	1,548	4.245
	Kitchen Flip Aerator 1.5 gpm	1.5 gpm kitchen faucet aerator	1.5 gpm kitchen faucet aerator	Water Heating	SF	DI	18	0	\$5.62	3,997	9.429
	Low Flow Showerhead 1.5 gpm	1.5 gpm low flow showerhead	1.5 gpm low flow showerhead	Water Heating	SF	DI	18	0	\$1,144.3	966	0.168
	Pipe Wrap	Adding pipe wrap to uninsulated pipes	Adding pipe wrap to uninsulated pipes	Water Heating	SF	DI	18	0	\$5.62	3,997	9.429
	PTFP Variable Speed SEER 17 11.8 HSPF Upgrade from PTAC SEER 10.5 Electric Resistance Heat	Variable speed PTFP in homes with electric resistance heating	Variable speed PTFP in homes with electric resistance heating	HVAC Equipment	SF	Retrofit	18	0	\$1,144.3	966	0.168
	PTFP Variable Speed SEER 17 11.8 HSPF Upgrade from PTFP Baseline SEER 10.5 HSPF 7.7 Thermostatic Restrictor Shower Valve	Variable speed PTFP in homes with heat pumps	Variable speed PTFP in homes with heat pumps	HVAC Equipment	SF	Retrofit	18	0	\$1,144.3	966	0.168
	Thermostatic Restrictor Shower Valve	Thermostatic restrictor valve	Thermostatic restrictor valve	Water Heating	SF	DI	18	0	\$24.5	157	0.011
	Wall Insulation - Electric furnace	Installation of wall insulation in uninsulated walls	Installation of wall insulation in uninsulated walls	Shell	SF	DI	18	0	\$86.8	350	0.021
	Wall Insulation - Heat pump	Installation of wall insulation in uninsulated walls	Installation of wall insulation in uninsulated walls	Shell	SF	Retrofit	18	0	\$201.7	1,312	0.039
	Water Heater Temperature Setback	High efficiency is a hot water tank with the thermostat reduced to no lower than 120 deg	High efficiency is a hot water tank with the thermostat reduced to no lower than 120 deg	Water Heating	SF	DI	25	2	\$99.3	435	0.067
Water Heater Wrap	Add WRH wrap to reduce standby losses	Add WRH wrap to reduce standby losses	Water Heating	SF	DI	2	20	\$65.6	489	0.056	
WiFi Thermostat - Furnace baseline	WiFi thermostat in homes with manual thermostats	WiFi thermostat in homes with manual thermostats	HVAC Equipment	SF	Retrofit	15	2	\$104.4	778	0.089	
WiFi Thermostat - Heat pump baseline	WiFi thermostat in homes with manual thermostats	WiFi thermostat in homes with manual thermostats	HVAC Equipment	SF	Retrofit	15	2	\$258.4	1,541	0.266	
Gold Star HERS 67.48 Electric	Construction of all electric home meeting Gold Star standard (HERS <=67)	Construction of all electric home meeting Gold Star standard (HERS <=67)	New Construction	SF	NC	25	11	\$14,572.0	30,279	0.891	
Gold Star HERS 67. Gas & Electric	Construction of gas/electric home meeting Gold Star standard (HERS <=67)	Construction of gas/electric home meeting Gold Star standard (HERS <=67)	New Construction	SF	NC	25	61	\$79,488.0	489,892	53,261	
Platinum Star HERS 70 Gas & Electric	Construction of gas/electric home meeting Platinum Star standard (HERS <=60)	Construction of gas/electric home meeting Platinum Star standard (HERS <=60)	New Construction	SF	NC	25	45	\$58,406.9	74,581	47,508	
Silver Star HERS 75 Gas & Electric	Construction of gas/electric home meeting Silver Star standard (HERS <=70)	Construction of gas/electric home meeting Silver Star standard (HERS <=70)	New Construction	SF	NC	25	13	\$10,865.1	21,873	13,933	
SW LED	Standard LED replacing standard halogen bulb	Standard LED replacing standard halogen bulb	Lighting	SF	DI	25	52	\$4,127.4	73,824	8,861	
Bathroom Aerator 1.0 gpm	1.0 gpm bathroom aerator	1.0 gpm bathroom aerator	Water Heating	SF	DI	2	2,090	\$1,171.0	61,720	0.675	
Kitchen Flip Aerator 1.5 gpm	1.5 gpm kitchen faucet aerator	1.5 gpm kitchen faucet aerator	Water Heating	SF	DI	2	33,751	\$6,417.7	101,253	11,566	
LED Nightlights	LED nightlights replacing incandescent nightlights	LED nightlights replacing incandescent nightlights	Lighting	SF	DI	10	1,116	\$1,807.7	40,081	4,377	
Low Flow Showerhead 1.5 gpm	1.5 gpm low flow showerhead	1.5 gpm low flow showerhead	Water Heating	SF	DI	10	415	\$925.8	6,814	3,628	
Pool Timer	Installation of pool pump timer	Installation of pool pump timer	Miscellaneous	SF	Retrofit	10	303	\$624.6	74,323	8,116	
Programmable Thermostat - Furnace baseline	Programmable thermostat in homes with manual thermostats	Programmable thermostat in homes with manual thermostats	HVAC Equipment	SF	Retrofit	10	1,613	\$2,564.3	305,133	33,319	
Programmable Thermostat - Heat pump baseline	Programmable thermostat in homes with manual thermostats	Programmable thermostat in homes with manual thermostats	HVAC Equipment	SF	Retrofit	10	3	\$132.2	2,284	2,020	
Thermostatic Restrictor Shower Valve	Thermostatic restrictor valve	Thermostatic restrictor valve	Water Heating	SF	DI	3	919	\$780.3	12,503	1,365	
Well Pump	Installation of high efficiency well pump in place of typical efficiency unit	Installation of high efficiency well pump in place of typical efficiency unit	Water Heating	SF	NC	20	45	\$127.7	15,565	1,703	
Grand Total							314,468	\$3,370,784.4	38,161,227	7,205,646	

Indiana Michigan Power Company
EE Plan
2023-2025 Forecast Lost Revenue

Attachment JCW-9
Witness: J.C. Walter
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Program	DSM Plan Forecast Lost Revenue			Prior DSM Plan Legacy Lost Revenue			2023 Total Forecast Lost Revenue
	2023 Forecast Energy Savings (net kWh)	Partial Year Measure Installation Adjustment	2023 Forecast Lost Energy Savings (net kWh)	2023 Forecast Lost Revenue	2023 Forecast Legacy Energy Savings* (net kWh)	2023 Forecast Legacy* Lost Revenue	
	(1)	(2)	(3) = (1) x (2)	(4) = (3) x (Sector Net Lost Realization Factor)	(5)	(6) = (5) x (Sector Net Lost Realization Factor)	(7) = (4) + (6)
Home Energy Engagement	8,271,599	100%	8,271,599	\$886,136	0	\$0	\$886,136
Home Energy Products	10,624,200	50%	5,312,100	\$569,085	404,934	\$43,381	\$612,466
HVAC Midstream	1,890,275	50%	945,138	\$101,253	0	\$0	\$101,253
Residential New Construction	266,465	50%	133,233	\$14,273	178,910	\$19,167	\$33,440
Residential Online Energy Check-up	2,706,018	50%	1,353,009	\$144,948	0	\$0	\$144,948
Residential Income Qualified Weatherproofing	480,160	50%	240,080	\$25,720	505,316	\$54,135	\$79,855
Residential Enhanced CVR	37,083,544	100%	37,083,544	\$3,972,760	0	\$0	\$3,972,760
Residential Total	61,322,261		53,338,703	5,714,175	1,089,161	\$116,682	\$5,830,857
Work Custom	25,835,903	50%	12,917,952	\$1,354,447	10,399,231	\$1,090,359	\$2,444,806
Work Midstream	575,956	50%	287,978	\$30,194	0	\$0	\$30,194
Work Prescriptive	42,165,333	50%	21,082,667	\$2,210,518	5,092,912	\$533,992	\$2,744,510
Work Strategic Energy Mgmt	2,646,632	100%	2,646,632	\$277,499	0	\$0	\$277,499
Work Direct Install	2,021,449	50%	1,010,725	\$105,975	0	\$0	\$105,975
C&I Enhanced CVR	65,926,301	100%	65,926,301	\$6,912,373	0	\$0	\$6,912,373
C&I Total	139,171,574		103,872,255	\$10,891,006	15,492,142	\$1,624,351	\$12,515,357
Portfolio Total	200,493,835		157,210,958	\$16,605,181	16,581,303	\$1,741,033	\$18,346,214
Cause No. 45235 Net Lost Realization Factors							
Residential	0.10713						
C&I	0.10485						

*Contains 1/2 of 2022 DSM Plan forecast measure savings as Legacy energy savings in effect from the recent I&M Indiana basic rate case in Cause No. 45576 with a 2022 forecast Test Year subject to 3 year cap.

Indiana Michigan Power Company
EE Plan
2023-2025 Forecast Lost Revenue

Program	DSM Plan Forecast Net Lost Revenue			Prior DSM Plan Legacy Lost Revenue			2024 Total Forecast Lost Revenue
	2024 Forecast Energy Savings (net kWh)	Partial Year Measure Installation Adjustment	2024 Forecast Lost Energy Savings (net kWh)	2024 Forecast Lost Revenue	2024 Forecast Legacy Energy Savings* (net kWh)	2024 Forecast Legacy* Lost Revenue	
	(1)	(2)	(3) = (1) x (2)	(4) = (3) x (Sector Net Lost Realization Factor)	(5)	(6) = (5) x (Sector Net Lost Realization Factor)	(7) = (4) + (6)
Home Energy Engagement	11,423,154	100%	11,423,154	\$1,223,762	0	\$0	\$1,223,762
Home Energy Products	10,424,403	50%	5,212,202	\$558,383	11,029,134	\$1,181,551	\$1,739,934
HVAC Midstream	2,222,613	50%	1,111,307	\$119,054	2,295,209	\$245,886	\$364,940
Residential New Construction	503,056	50%	251,528	\$26,946	671,399	\$71,927	\$98,873
Residential Online Energy Check-up	2,775,332	50%	1,387,666	\$148,661	3,110,952	\$333,276	\$481,937
Residential Income Qualified Weatherproofing	486,237	50%	243,119	\$26,045	885,094	\$94,820	\$120,865
Residential Enhanced CVR	47,849,703	100%	47,849,703	\$5,126,139	0	\$0	\$5,126,139
Residential Total	75,684,498		67,478,679	7,228,990	17,991,787	\$1,927,460	\$9,156,450
Work Custom	28,103,798	50%	14,051,899	\$1,473,342	36,235,134	\$3,799,254	\$5,272,596
Work Midstream	688,148	50%	344,074	\$36,076	575,956	\$60,389	\$96,465
Work Prescriptive	35,955,744	50%	17,977,872	\$1,884,980	47,258,245	\$4,955,027	\$6,840,007
Work Strategic Energy Mgmt	3,509,096	100%	3,509,096	\$367,929	0	\$0	\$367,929
Work Direct Install	1,849,123	50%	924,562	\$96,940	2,021,449	\$211,949	\$308,889
C&I Enhanced CVR	85,066,138	100%	85,066,138	\$8,919,185	0	\$0	\$8,919,185
C&I Total	155,172,047		121,873,641	\$12,778,452	86,090,783	\$9,026,619	\$21,805,071
Portfolio Total	230,856,545		189,352,320	\$20,007,442	104,082,571	\$10,954,079	\$30,961,521
Cause No. 45235 Net Lost Realization Factors							
Residential	0.10713						
C&I	0.10485						

*Contains 1/2 of 2022 DSM Plan forecast measure savings as Legacy energy savings in effect from the recent I&M Indiana basic rate case in Cause No. 45576 with a 2022 forecast Test Year and 2023 measure savings with life remaining in 2024, all subject to a three year cap.

Indiana Michigan Power Company
EE Plan

2023-2025 Forecast Lost Revenue

Program	DSM Plan Forecast Net Lost Revenue			Prior DSM Plan Legacy Lost Revenue			
	2025 Forecast Energy Savings (net kWh)	Partial Year Measure Installation Adjustment	2025 Forecast Lost Energy Savings (net kWh)	2025 Forecast Lost Revenue	2025 Forecast Legacy Energy Savings* (net kWh)	2025 Forecast Legacy* Lost Revenue	2025 Total Forecast Lost Revenue
	(1)	(2)	(3) = (1) x (2)	(4) = (3) x (Sector Net Lost Realization Factor)	(5)	(6) = (5) x (Sector Net Lost Realization Factor)	(7) = (4) + (6)
Home Energy Engagement	15,601,863	100%	15,601,863	\$1,671,428	0	\$0	\$1,671,428
Home Energy Products	10,644,815	50%	5,322,408	\$570,190	21,453,537	\$2,298,317	\$2,868,507
HVAC Midstream	2,487,766	50%	1,243,883	\$133,257	4,517,822	\$483,994	\$617,251
Residential New Construction	625,020	50%	312,510	\$33,479	1,174,455	\$125,819	\$159,298
Residential Online Energy Check-up	2,819,167	50%	1,409,584	\$151,009	5,886,284	\$630,598	\$781,607
Residential Income Qualified Weatherproofing	492,146	50%	246,073	\$26,362	1,371,331	\$146,911	\$173,273
Residential Enhanced CVR	60,778,942	100%	60,778,942	\$6,511,248	0	\$0	\$6,511,248
Residential Total	93,449,719		84,915,263	9,096,973	34,403,428	\$3,685,639	\$12,782,612
Work Custom	23,075,060	50%	11,537,530	\$1,209,710	64,338,932	\$6,745,937	\$7,955,647
Work Midstream	797,462	50%	398,731	\$41,807	11,663,335	\$1,222,901	\$1,264,708
Work Prescriptive	33,260,595	50%	16,630,298	\$1,743,687	88,520,308	\$9,281,354	\$11,025,041
Work Strategic Energy Mgmt	1,831,409	100%	1,831,409	\$192,023	0	\$0	\$192,023
Work Direct Install	897,530	50%	448,765	\$47,053	14,269,803	\$1,496,189	\$1,543,242
C&I Enhanced CVR	108,051,452	100%	108,051,452	\$11,329,195	0	\$0	\$11,329,195
C&I Total	167,913,508		138,898,185	\$14,563,475	178,792,376	\$18,746,381	\$33,309,856
Portfolio Total	261,363,227		223,813,448	\$23,660,448	213,195,805	\$22,432,020	\$46,092,468

Cause No. 45235 Net Lost Realization Factors
Residential 0.10713
C&I 0.10485

*Contains 1/2 of 2022 DSM Plan forecast measure savings as Legacy energy savings in effect from the recent I&M Indiana basic rate case in Cause No. 45576 with a 2022 forecast Test Year, 2023 measure savings with life remaining in 2024, and 2024 measures with life remaining in 2025, all subject to a three year cap.

Indiana Michigan Power Company
EE Plan
2023-2025 Shared Savings Forecast

Component 1					
<u>Program</u> (1)	Utility Cost Test Net Benefit* (2)	10% Pre-Tax Shared Savings (3)=(2) x 10%	Program Operating Costs (4)	15% Sector Program Operating Cost Cap (5)=(4) x 15%	15% Capped Shared Savings (6)=min(3),(5)
Home Energy Engagement	\$112,126		\$144,571		
Home Energy Products	(\$598,864)		\$3,946,926		
HVAC Midstream	\$478,654		\$1,101,064		
Residential New Construction	(\$7,476)		\$227,893		
Residential Online Energy Check-up	\$65,531		\$530,809		
Residential Income Qualified Weatherproofing	\$0		\$0		
Residential Sector Total	\$49,971	\$4,997	\$5,951,263	\$892,690	\$4,997
Work Custom	\$5,537,280		\$4,505,207		
Work Midstream	\$608,800		\$100,764		
Work Prescriptive	\$13,476,799		\$5,078,983		
Work Strategic Energy Mgmt	\$174,841		\$457,115		
Work Direct Install	\$74,516		\$718,637		
Commercial and Industrial Sector Total	\$19,872,235	\$1,987,224	\$10,860,707	\$1,629,106	\$1,629,106
Total at 100% Energy Savings Target Attainment	\$19,922,206	\$1,992,221	\$16,811,970	\$2,521,796	\$1,634,103

Component 2			
	(8) 2023 Savings Target	(9) = (8) * 85% 85% Threshold	(10) = (7) * 15% 15% Performance Impact
Residential Sector Energy Savings Target Attainment less than 85%	29,481,423	25,059,210	(\$750)
Commercial & Industrial Energy Savings Target Attainment less than 85%	88,522,242	75,243,905	(\$244,366)
Total Final Shared Savings Earnings with Downside Performance Impact (11) = (7) + (10)			\$1,388,987

	(12) 2023 Savings Target	(13) = (12) * 105% 105% Threshold	(14) = (7) * 10% 10% Performance Impact
Residential Energy Savings Target Attainment >= 105%	29,481,423	30,955,494	\$0
Commercial & Industrial Energy Savings Target Attainment >= 105%	88,522,242	92,948,354	\$162,911
Total Final Shared Savings Earnings with Upside Performance Impact (15) = (7) + (14)			\$1,797,014

Indiana Michigan Power Company
EE Plan
2023-2025 Shared Savings Forecast

Component 1					
<u>Program</u> (1)	Utility Cost Test Net Benefit* (2)	10% Pre-Tax Shared Savings (3)=(2) x 10%	Program Operating Costs (4)	15% Sector Program Operating Cost Cap (5)=(4) x 15%	15% Capped Shared Savings (6)=min(3),(5)
Home Energy Engagement	\$221,151		\$152,047		
Home Energy Products	(\$244,615)		\$3,685,320		
HVAC Midstream	\$641,608		\$1,293,726		
Residential New Construction	(\$1,899)		\$434,939		
Residential Online Energy Check-up	\$108,449		\$557,853		
Residential Income Qualified Weatherproofing	\$0		\$0		
Residential Sector Total	\$724,693	\$72,469	\$6,123,886	\$918,583	\$72,469
Work Custom	\$6,611,577		\$4,878,987		
Work Midstream	\$783,432		\$118,173		
Work Prescriptive	\$12,083,817		\$4,305,341		
Work Strategic Energy Mgmt	\$344,502		\$605,770		
Work Direct Install	\$74,639		\$661,223		
Commercial and Industrial Sector Total	\$19,897,966	\$1,989,797	\$10,569,495	\$1,585,424	\$1,585,424
Total at 100% Energy Savings Target Attainment	\$20,622,659	\$2,062,266	\$16,693,381	\$2,504,007	\$1,657,893

Component 2			
	(8) 2024 Savings Target	(9) = (8) * 85% 85% Threshold	(10) = (7) * 15% 15% Performance Impact
Residential Sector Energy Savings Target Attainment less than 85%	38,101,227	32,386,043	(\$10,870)
Commercial & Industrial Energy Savings Target Attainment less than 85%	72,636,895	75,243,905	(\$237,814)
Total Final Shared Savings Earnings with Downside Performance Impact (11) = (7) + (10)			\$1,385,419

	(12) 2024 Savings Target	(13) = (12) * 105% 105% Threshold	(14) = (7) * 10% 10% Performance Impact
Residential Energy Savings Target Attainment >= 105%	38,101,227	30,955,494	\$0
Commercial & Industrial Energy Savings Target Attainment >= 105%	72,636,895	92,948,354	\$158,542
Total Final Shared Savings Earnings with Upside Performance Impact (15) = (7) + (14)			\$1,816,435

Indiana Michigan Power Company
EE Plan
2023-2025 Shared Savings Forecast

Component 1					
<u>Program</u> (1)	Utility Cost Test Net Benefit* (2)	10% Pre-Tax Shared Savings (3)=(2) x 10%	Program Operating Costs (4)	15% Sector Program Operating Cost Cap (5)=(4) x 15%	15% Capped Shared Savings (6)=min(3),(5)
Home Energy Engagement	\$378,910		\$169,693		
Home Energy Products	(\$129,964)		\$3,844,095		
HVAC Midstream	\$814,333		\$1,456,691		
Residential New Construction	\$12,587		\$546,368		
Residential Online Energy Check-up	\$150,400		\$580,104		
Residential Income Qualified Weatherproofing	\$0		\$0		
Residential Sector Total	\$1,226,267	\$122,627	\$6,596,950	\$989,543	\$122,627
Work Custom	\$6,600,352		\$5,150,349		
Work Midstream	\$968,120		\$134,785		
Work Prescriptive	\$11,662,695		\$4,036,954		
Work Strategic Energy Mgmt	\$172,186		\$692,012		
Work Direct Install	(\$123,411)		\$607,979		
Commercial and Industrial Sector Total	\$19,279,942	\$1,927,994	\$10,622,079	\$1,593,312	\$1,593,312
Total at 100% Energy Savings Target Attainment	\$20,506,208	\$2,050,621	\$17,219,030	\$2,582,855	\$1,715,939

Component 2			
	(8) 2025 Savings Target	(9) = (8) * 85% 85% Threshold	(10) = (7) * 15% 15% Performance Impact
Residential Sector Energy Savings Target Attainment less than 85%	29,481,423	25,059,210	(\$18,394)
Commercial & Industrial Energy Savings Target Attainment less than 85%	88,522,242	75,243,905	(\$238,997)
Total Final Shared Savings Earnings with Downside Performance Impact (11) = (7) + (10)			\$1,376,712

	(12) 2025 Savings Target	(13) = (12) * 105% 105% Threshold	(14) = (7) * 10% 10% Performance Impact
Residential Energy Savings Target Attainment >= 105%	29,481,423	30,955,494	\$0
Commercial & Industrial Energy Savings Target Attainment >= 105%	88,522,242	92,948,354	\$159,331
Total Final Shared Savings Earnings with Upside Performance Impact (15) = (7) + (14)			\$1,875,270

Indiana Michigan Power Company
DSM Plan
DSM Program Cost Rider Cost Components

	DSM Plan Component	Enhanced CVR Plan Cost			DR Plan Cost			EE Plan Cost			DSM Plan Total		
		Residential	C&I	Total	Residential	C&I	Total	Residential	C&I	Total	Residential	C&I	Total
2023	Program Cost	\$306,525	\$544,934	\$851,459	\$0	\$0	\$0	\$6,690,831	\$10,860,719	\$17,551,550	\$6,997,356	\$11,405,653	\$18,403,009
	DSM Planning	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,011	\$30,989	\$50,000
	Lost Revenue*	\$0	\$0	\$0	\$0	\$0	\$0	\$5,830,857	\$12,515,357	\$18,346,214	\$5,830,857	\$12,515,357	\$18,346,214
	Shared Savings / FIM	\$0	\$0	\$0	\$179,318	\$66,323	\$245,641	\$4,997	\$1,629,106	\$1,634,103	\$184,315	\$1,695,429	\$1,879,744
2024	Program Cost	\$353,608	\$628,636	\$982,244	\$559,055	\$206,774	\$765,829	\$6,881,053	\$10,569,511	\$17,450,564	\$7,793,716	\$11,404,921	\$19,198,637
	DSM Planning	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$223,273	\$326,727	\$550,000
	Lost Revenue*	\$0	\$0	\$0	\$0	\$0	\$0	\$9,156,450	\$21,805,071	\$30,961,521	\$9,156,450	\$21,805,071	\$30,961,521
	Shared Savings / FIM	\$0	\$0	\$0	\$159,295	\$58,917	\$218,212	\$72,469	\$1,585,424	\$1,657,893	\$231,764	\$1,644,341	\$1,876,105
2025	Program Cost	\$419,064	\$745,004	\$1,164,068	\$2,009,136	\$743,105	\$2,752,240	\$7,372,134	\$8,292,168	\$15,664,302	\$9,800,334	\$9,780,276	\$19,580,611
	DSM Planning	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$125,128	\$124,872	\$250,000
	Lost Revenue*	\$0	\$0	\$0	\$0	\$0	\$0	\$12,782,612	\$33,309,856	\$46,092,468	\$12,782,612	\$33,309,856	\$46,092,468
	Shared Savings / FIM	\$0	\$0	\$0	\$217,512	\$80,450	\$297,962	\$122,627	\$1,593,312	\$1,715,939	\$340,139	\$1,673,762	\$2,013,901
DSM Plan 3 Year Total	Program Cost	\$1,079,198	\$1,918,573	\$2,997,771	\$2,568,191	\$949,879	\$3,518,070	\$20,944,018	\$29,722,398	\$50,666,416	\$24,591,406	\$32,590,850	\$57,182,256
	DSM Planning	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$367,413	\$482,587	\$850,000
	Lost Revenue*	\$0	\$0	\$0	\$0	\$0	\$0	\$27,769,919	\$67,630,283	\$95,400,203	\$27,769,919	\$67,630,283	\$95,400,203
	Shared Savings / FIM	\$0	\$0	\$0	\$556,125	\$205,690	\$761,815	\$200,093	\$4,807,842	\$5,007,935	\$756,218	\$5,013,532	\$5,769,750
	Total	\$1,079,198	\$1,918,573	\$2,997,771	\$3,124,316	\$1,155,569	\$4,279,885	\$48,914,030	\$102,160,523	\$151,074,554	\$53,484,957	\$105,717,253	\$159,202,209

*Enhanced CVR Forecast Lost Revenue shown as part of EE Plan Forecast Lost Revenue on Attachment JCW-9.

Indiana Michigan Power Company
DR Plan
Program Summary

Attachment JCW-12
Witness: J.C. Walter
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DR Program	2023				2024				2025				2026			
	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M
Com_Smart_Tstat	0.048	34.89	-	\$51,072	0.114	83.25	-	\$53,137	0.255	187.84	-	\$56,710	0.518	385.75	-	\$62,083
Com_RTP	0.038	15.72	-	\$176,814	0.099	41.62	-	\$94,120	0.241	102.70	-	\$97,149	0.443	190.99	-	\$99,950
Com_CPP_no_tech	0.046	62.87	-	\$156,457	0.12	166.49	-	\$73,879	0.294	410.81	-	\$78,632	0.54	763.95	-	\$82,764
Com_TOU_no_tech	0.01	35.72	-	\$37,024	0.027	94.60	-	\$38,189	0.066	233.41	-	\$39,958	0.121	434.06	-	\$41,534
Com_Interruptible_Rate	0.027	0.66	-	\$100,019	0.07	1.74	-	\$102,544	0.172	4.29	-	\$105,092	0.316	7.98	-	\$107,545
Com_DLC_DWH	0.047	36.54	-	\$159,727	0.126	96.76	-	\$139,984	0.31	238.74	-	\$169,556	0.577	443.97	-	\$199,049
Res_CPP_no_tech	0.06	303	-	\$122,426	0.45	2,283	-	\$87,991	0.937	4,762	-	\$112,016	1.777	9,049	-	\$112,016
Res_TOU_no_tech	0.152	1,762	-	\$78,812	0.548	6,382	-	\$95,433	1.043	12,165	-	\$128,900	1.895	22,169	-	\$128,900
Res_Tstat_smart	5.074	4,774	-	\$533,918	5.153	4,859	-	\$383,389	5.359	5,066	-	\$423,035	5.855	5,548	-	\$423,035
Res_behavioral_total	0.095	683	-	\$89,881	0.717	5,140	-	\$124,400	1.491	10,721	-	\$242,990	2.827	20,374	-	\$242,990
Res_DLC_Central AC	0.197	246	-	\$131,454	1.138	1,429	-	\$261,681	2.368	2,980	-	\$532,373	4.488	5,663	-	\$532,373

DR Program	2027				2028				2029				2030			
	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M
Com_Smart_Tstat	0.916	688.98	-	\$68,961	1.381	1,048.50	-	\$75,521	1.818	1,392.27	-	\$80,380	2.185	1,686.19	-	\$83,925
Com_RTP	0.786	342.50	-	\$103,608	1.317	578.94	-	\$107,945	2.024	898.02	-	\$112,429	2.904	1,253.59	-	\$115,989
Com_CPP_no_tech	0.959	1,370.01	-	\$90,198	1.606	2,315.76	-	\$99,948	2.47	3,592.06	-	\$109,949	3.421	5,014.37	-	\$116,030
Com_TOU_no_tech	0.215	778.41	-	\$44,055	0.361	1,315.77	-	\$47,257	0.555	2,040.95	-	\$50,549	0.768	2,849.08	-	\$52,740
Com_Interruptible_Rate	0.561	14.30	-	\$110,095	0.94	24.18	-	\$112,836	1.445	37.50	-	\$115,723	2.001	52.35	-	\$118,656
Com_DLC_DWH	1.035	796.19	-	\$257,730	1.75	1,345.82	-	\$342,196	2.714	2,087.55	-	\$439,653	3.788	2,914.13	-	\$518,188
Res_CPP_no_tech	2.918	14,906	-	\$128,349	4.057	20,777	-	\$131,481	4.886	25,099	-	\$120,363	5.36	27,619	-	\$106,265
Res_TOU_no_tech	3.055	35,836	-	\$151,936	4.212	49,534	-	\$155,679	5.054	59,619	-	\$138,603	5.535	65,499	-	\$117,156
Res_Tstat_smart	6.763	6,427	-	\$458,710	8.009	7,632	-	\$497,770	9.347	8,933	-	\$530,216	10.606	10,169	-	\$555,626
Res_behavioral_total	4.644	33,561	-	\$346,523	6.454	46,779	-	\$453,238	7.774	56,510	-	\$536,005	8.528	62,184	-	\$589,223
Res_DLC_Central AC	7.373	9,328	-	\$733,383	10.248	13,001	-	\$823,562	12.344	15,706	-	\$774,121	13.54	17,283	-	\$676,728

DR Program	2031				2032				2033				2034			
	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M
Com_Smart_Tstat	2.483	1,929.59	-	\$86,885	2.725	2,131.23	-	\$89,558	2.944	2,314.22	-	\$92,557	3.112	2,457.77	-	\$94,579
Com_RTP	3.499	1,575.06	-	\$117,934	4.008	1,815.74	-	\$118,688	4.331	1,972.19	-	\$119,245	4.515	2,065.48	-	\$120,258
Com_CPP_no_tech	4.268	6,300.24	-	\$115,506	4.89	7,262.95	-	\$110,218	5.283	7,888.77	-	\$104,202	5.508	8,261.91	-	\$99,989
Com_TOU_no_tech	0.959	3,579.68	-	\$53,064	1.098	4,126.68	-	\$52,033	1.187	4,482.26	-	\$50,793	1.237	4,694.27	-	\$50,066
Com_Interruptible_Rate	2.497	65.77	-	\$121,557	2.86	75.82	-	\$124,380	3.09	82.36	-	\$127,145	3.222	86.25	-	\$129,914
Com_DLC_DWH	4.76	3,661.42	-	\$551,592	5.487	4,220.91	-	\$545,157	5.96	4,584.60	-	\$523,639	6.242	4,801.46	-	\$505,516
Res_CPP_no_tech	5.59	28,901	-	\$96,851	5.689	29,516	-	\$92,517	5.767	30,016	-	\$93,449	5.755	30,048	-	\$90,684
Res_TOU_no_tech	5.769	68,491	-	\$102,525	5.869	69,926	-	\$95,302	5.949	71,093	-	\$95,765	5.936	71,168	-	\$90,834
Res_Tstat_smart	11.761	11,314	-	\$578,703	12.846	12,401	-	\$602,105	13.965	13,522	-	\$629,841	14.976	14,548	-	\$650,473
Res_behavioral_total	8.894	65,071	-	\$621,641	9.052	66,456	-	\$642,560	9.176	67,582	-	\$661,592	9.157	67,654	-	\$672,136
Res_DLC_Central AC	14.122	18,085	-	\$603,059	14.373	18,470	-	\$563,783	14.571	18,783	-	\$567,672	14.539	18,803	-	\$534,137

DR Program	2035				2036				2037				2038			
	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M
Com_Smart_Tstat	3.272	2,592.72	-	\$97,309	3.426	2,722.51	-	\$100,072	3.578	2,849.31	-	\$102,892	3.733	2,976.94	-	\$105,875
Com_RTP	4.616	2,118.89	-	\$121,869	4.669	2,149.36	-	\$123,899	4.699	2,167.16	-	\$126,248	4.732	2,185.84	-	\$129,051
Com_CPP_no_tech	5.631	8,475.56	-	\$97,995	5.696	8,597.45	-	\$97,650	5.732	8,668.63	-	\$98,379	5.773	8,743.38	-	\$100,645
Com_TOU_no_tech	1.265	4,815.66	-	\$49,979	1.279	4,884.91	-	\$50,362	1.287	4,925.36	-	\$51,062	1.297	4,967.83	-	\$52,214
Com_Interruptible_Rate	3.294	88.48	-	\$132,750	3.332	89.75	-	\$135,602	3.353	90.50	-	\$138,530	3.377	91.28	-	\$141,570
Com_DLC_DWH	6.403	4,925.62	-	\$496,237	6.495	4,996.46	-	\$494,414	6.549	5,037.82	-	\$497,638	6.606	5,081.26	-	\$510,776
Res_CPP_no_tech	5.743	30,079	-	\$92,681	5.731	30,108	-	\$94,682	5.72	30,136	-	\$96,728	5.713	30,163	-	\$98,841
Res_TOU_no_tech	5.924	71,239	-	\$92,830	5.911	71,308	-	\$94,827	5.899	71,373	-	\$96,869	5.892	71,436	-	\$98,978
Res_Tstat_smart	16.002	15,593	-	\$676,582	17.037	16,652	-	\$702,766	18.079	17,723	-	\$729,194	18.543	18,217	-	\$719,213
Res_behavioral_total	9.138	67,723	-	\$682,884	9.119	67,789	-	\$693,653	9.101	67,852	-	\$704,655	9.089	67,912	-	\$715,985
Res_DLC_Central AC	14.51	18,822	-	\$540,602	14.48	18,841	-	\$547,055	14.45	18,858	-	\$553,617	14.432	18,875	-	\$560,375

DR Program	2039				2040				2041				2042			
	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M	MW	Participants	Capital	O&M
Com_Smart_Tstat	3.884	3,100.36	-	\$108,720	4.036	3,224.36	-	\$111,755	4.19	3,348.96	-	\$114,836	4.345	3,474.24	-	\$117,965
Com_RTP	4.735	2,189.58	-	\$131,488	4.74	2,193.43	-	\$134,434	4.746	2,197.41	-	\$137,447	4.753	2,201.54	-	\$140,525
Com_CPP_no_tech	5.776	8,758.31	-	\$101,160	5.782	8,773.72	-	\$103,438	5.789	8,789.62	-	\$105,767	5.798	8,806.16	-	\$108,152
Com_TOU_no_tech	1.298	4,976.31	-	\$52,885	1.299	4,985.07	-	\$54,073	1.3	4,994.10	-	\$55,287	1.302	5,003.50	-	\$56,529
Com_Interruptible_Rate	3.379	91.43	-	\$144,681	3.382	91.59	-	\$147,903	3.386	91.76	-	\$151,198	3.392	91.93	-	\$154,563
Com_DLC_DWH	6.617	5,089.94	-	\$510,394	6.629	5,098.90	-	\$521,195	6.641	5,108.14	-	\$532,271	6.653	5,117.75	-	\$543,654
Res_CPP_no_tech	5.706	30,189	-	\$101,022	5.701	30,213	-	\$103,269	5.698	30,236	-	\$105,566	5.696	30,258	-	\$107,915
Res_TOU_no_tech	5.885	71,495	-	\$101,156	5.88	71,551	-	\$103,399	5.876	71,605	-	\$105,694	5.874	71,657	-	\$108,040
Res_Tstat_smart	18.985	18,886	-	\$734,962	19.395	19,123	-	\$750,054	19.771	19,520	-	\$764,355	20.105	19,872	-	\$777,799
Res_behavioral_total	9.08	67,970	-	\$727,651	9.071	68,024	-	\$739,635	9.066	68,076	-	\$751,869	9.062	68,126	-	\$764,350
Res_DLC_Central AC	14.417	18,891	-	\$567,332	14.404	18,906	-	\$574,476	14.395	18,920	-	\$581,770	14.389	18,934	-	\$589,221

Indiana Michigan Power Company
DR Plan
Program Summary

I&M DR Program Description						
MPS DR Program Acronym		MPS DR Program Name	MPS DR Program Type	I&M DR Program Technology	I&M DR Program Status	I&M DR Program Marketing
Com_Smart_Tstat	=>	Commercial Thermostat DLC	Direct Load Control Peak Reduction	Customer-owned & AMI data presentment	Approved in Settlement in Cause No. 45576 Rider WEM: Small Business DLC Program	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Com_RTP	=>	Commercial Real Time Pricing	High Cost Period Peak Reduction	Customer-owned & AMI data presentment	Pending - Cause No. 45661 Voluntary Curtailment Service High Cost Period Reduction	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Com_CPP_no_tech	=>	Commercial Critical Peak Pricing	Tiered Pricing Peak Reduction	Customer-owned & AMI data presentment	Approved in Settlement in Cause No. 45576 General Service Critical Peak Pricing	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Com_TOU_no_tech	=>	Commercial Time-of-Use	Load Shifting Peak Reduction	Customer-owned & AMI data presentment	Available for Customer Enrollment under existing tariffs: G.S. - TOD2, L.G.S. - TOD, G.S. - PEV	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Com_Interruptible_Rate	=>	Commercial Interruptible	High Cost Period Peak Reduction	Customer-owned & AMI data presentment	Pending - Cause No. 45661 Voluntary Curtailment Service High Cost Period Reduction	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Com_DLC_DWH	=>	Commercial Water Heat DLC	Direct Load Control Peak Reduction	Customer-owned & AMI data presentment	Approved in Settlement in Cause No. 45576 Rider WEM: Future Small Business DLC Program Component	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Res_CPP_no_tech	=>	Residential Critical Peak Pricing	High Cost Period Peak Reduction	Customer-owned & AMI data presentment	Approved in Settlement in Cause No. 45576 Residential Critical Peak Pricing	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Res_TOU_no_tech	=>	Residential Time-of-Use	Load Shifting Peak Reduction	Customer-owned & AMI data presentment	Available for Customer Enrollment under existing tariffs: R.S. - OPES, R.S. - TOD 2, R.S. - PEV	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Res_Tstat_smart	=>	Residential Thermostat DLC	Direct Load Control Peak Reduction	Customer-owned	Available for Customer Enrollment - Rider HEM: Thermostat DLC	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Res_behavioral_total	=>	Residential Customer Engagement DR	Behavioral Demand Response	Customer-owned & AMI data presentment	Approved in Settlement in Cause No. 45576 Rider HEM: Customer Engagement Demand Response Program	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement
Res_DLC_Central AC	=>	Residential AC DLC	Direct Load Control Peak Reduction	DLC switch & AMI system	Approved in Settlement in Cause No. 45576 Rider HEM: IQ HVAC DLC Program & IQ Water Heat DLC Program	AMI technology umbrella marketing; AMI data presentment portal; segmentation direct engagement

Indiana Michigan Power Company
DR Plan
Program Benefit Cost Summary

I&M MPS DR Program Nomenclature	I&M Indiana DR Program Name	20 YR NPV Benefits				20 YR NPV Costs (UCT)	20 YR UCT	Residential Portion of Avoided Generation Capacity Benefit	C&I Portion of Avoided Generation Capacity Benefit
		Annual Avoided Generation Capacity Benefit	Annual Energy Benefit	Annual Energy Shift Benefit	Annual Avoided T&D Benefit				
Com_Smart_Tstat	Commercial Thermostat DLC	\$2,048,066	\$0	\$6,328	\$454,582	\$904,827	2.8		
Com_RTP	Commercial Real Time Pricing	\$2,588,200	\$0	\$10,603	\$573,156	\$1,351,310	2.3		
Com_CPP_no_tech	Commercial Critical Peak Pricing	\$3,157,237	\$0	\$12,934	\$699,169	\$1,160,279	3.3		
Com_TOU_no_tech	Commercial Time-of-Use	\$709,210	\$0	\$11,622	\$157,054	\$532,191	1.6		
Com_Interruptible_Rate	Commercial Interruptible	\$1,846,906	\$0	\$2,648	\$408,997	\$1,357,150	1.7		
Com_DLC_DWH	Commercial Water Heat DLC	\$3,565,255	\$0	\$13,091	\$788,403	\$4,223,246	1		
Res_CPP_no_tech	Residential Critical Peak Pricing	\$4,102,026	\$0	\$18,047	\$933,327	\$1,193,982	4.2		
Res_TOU_no_tech	Residential Time-of-Use	\$4,257,474	\$119,004	\$75,131	\$970,461	\$1,240,005	4.4		
Res_Tstat_smart	Residential Thermostat DLC	\$11,655,242	\$0	\$17,879	\$2,688,801	\$6,336,337	2.3		
Res_behavioral_total	Residential Customer Engagement DR	\$6,526,714	\$0	\$10,050	\$1,485,013	\$5,258,339	1.5		
Res_DLC_Central AC	Residential AC DLC	\$10,366,088	\$0	\$15,965	\$2,358,930	\$5,976,588	2.1		
Total I&M Indiana DR		\$50,822,419	\$119,004	\$194,299	\$11,517,893	\$29,534,253	2.1		

I&M Indiana DR Sector Summary	Annual Avoided Generation Capacity Benefit	Annual Energy Benefit	Annual Energy Shift Benefit	Annual Avoided T&D Benefit	20 YR NPV Costs (UCT)	20 YR UCT	Residential Portion of Avoided Generation Capacity Benefit	C&I Portion of Avoided Generation Capacity Benefit
I&M Indiana Commercial DR	\$13,914,875	\$0	\$57,226	\$3,081,361	\$9,529,003	1.8		
I&M Indiana Residential DR	\$36,907,545	\$119,004	\$137,073	\$8,436,532	\$20,005,250	2.3		
I&M Indiana Total DR	\$50,822,419	\$119,004	\$194,299	\$11,517,893	\$29,534,253	2.1	73%	27%

Indiana Michigan Power Company
DR Plan
2023 - 2025 Financial Incentive

2023 DR FIM Basis			2023 DR FIM Performance Earnings			
Incremental Base MW	Incremental MW Threshold	Incremental MW Target	Percent of MW Target Earned	MW Earned	DR FIM Earnings	DR Earnings Percent of Total O&M
5.79	2.90	5.79	50%	2.90	\$122,820	7.50%
			53%	3.04	\$128,961	7.87%
			55%	3.19	\$135,102	8.25%
			58%	3.33	\$141,243	8.62%
			60%	3.48	\$147,384	9.00%
			63%	3.62	\$153,525	9.37%
			65%	3.77	\$159,666	9.75%
			68%	3.91	\$165,807	10.12%
			70%	4.06	\$171,948	10.50%
			73%	4.20	\$178,089	10.87%
			75%	4.35	\$184,230	11.25%
			78%	4.49	\$190,371	11.62%
			80%	4.64	\$196,512	12.00%
			83%	4.78	\$202,653	12.37%
			85%	4.92	\$208,795	12.75%
			88%	5.07	\$214,936	13.13%
			90%	5.21	\$221,077	13.50%
			93%	5.36	\$227,218	13.88%
			95%	5.50	\$233,359	14.25%
			98%	5.65	\$239,500	14.63%
			100%	5.79	\$245,641	15.00%
			100.1% to 104.99%	5.799 to 6.083	\$286,581	17.50%
			>= 105%	6.08	\$327,521	20.00%
DR FIM Initial Threshold			50%	of	MW Target	
DR FIM Upper Boundary @ MW Target			100%	of	MW Target	
DR FIM Earnings O&M & MW Increments			0.36%	per	0.138	MW achieved
DR FIM Earnings Percentage of			15%	of	Total O&M Cost	
DR FIM Earnings MW Target Exceedance Level 1			17.5%	of	Total O&M Cost	between 100.1% and 104.99%
DR FIM Earnings MW Target Exceedance Level 2			20%	of	Total O&M Cost	equal to or greater than 105% MW Achieved

Indiana Michigan Power Company
DR Plan
2023 - 2025 Financial Incentive

2024 DR FIM Basis			2024 DR FIM Performance Earnings			
Incremental Base MW	Incremental MW Threshold	Incremental MW Target	Percent of MW Target Earned	MW Earned	DR FIM Earnings	DR Earnings Percent of Total O&M
2.77	1.38	2.77	50%	1.38	\$109,106	7.50%
			53%	1.45	\$114,561	7.87%
			55%	1.52	\$120,017	8.25%
			58%	1.59	\$125,472	8.62%
			60%	1.66	\$130,927	9.00%
			63%	1.73	\$136,383	9.38%
			65%	1.80	\$141,838	9.75%
			68%	1.87	\$147,293	10.12%
			70%	1.94	\$152,749	10.50%
			73%	2.01	\$158,204	10.88%
			75%	2.08	\$163,659	11.25%
			78%	2.15	\$169,114	11.62%
			80%	2.21	\$174,570	12.00%
			83%	2.28	\$180,025	12.37%
			85%	2.35	\$185,480	12.75%
			88%	2.42	\$190,936	13.13%
			90%	2.49	\$196,391	13.50%
			93%	2.56	\$201,846	13.87%
			95%	2.63	\$207,302	14.25%
			98%	2.70	\$212,757	14.63%
			100%	2.77	\$218,212	15.00%
			100.1% to 104.99%	2.8 to 2.9	\$254,581	17.50%
			>= 105%	2.91	\$290,950	20.00%
DR FIM Initial Threshold			50%	of	MW Target	
DR FIM Upper Boundary @ MW Target			100%	of	MW Target	
DR FIM Earnings O&M & MW Increments			0.36%	per	0.066	MW achieved
DR FIM Earnings Percentage of			15%	of	Total O&M Cost	
DR FIM Earnings MW Target Exceedance Level 1			17.5%	of	Total O&M Cost	between 100.1% and 104.99%
DR FIM Earnings MW Target Exceedance Level 2			20%	of	Total O&M Cost	equal to or greater than 105% MW Achieved

Indiana Michigan Power Company
DR Plan
2023 - 2025 Financial Incentive

2025 DR FIM Basis			2025 DR FIM Performance Earnings			
Incremental Base MW	Incremental MW Threshold	Incremental MW Target	Percent of MW Target Earned	MW Earned	DR FIM Earnings	DR Earnings Percent of Total O&M
3.97	1.99	3.97	50%	1.99	\$148,981	7.50%
			53%	2.09	\$156,430	7.88%
			55%	2.19	\$163,879	8.25%
			58%	2.29	\$171,328	8.63%
			60%	2.38	\$178,777	9.00%
			63%	2.48	\$186,226	9.37%
			65%	2.58	\$193,675	9.75%
			68%	2.68	\$201,124	10.12%
			70%	2.78	\$208,573	10.50%
			73%	2.88	\$216,022	10.87%
			75%	2.98	\$223,471	11.25%
			77%	3.08	\$230,920	11.62%
			80%	3.18	\$238,369	12.00%
			82%	3.28	\$245,818	12.37%
			85%	3.38	\$253,267	12.75%
			87%	3.48	\$260,716	13.12%
			90%	3.58	\$268,166	13.50%
			92%	3.68	\$275,615	13.88%
			95%	3.78	\$283,064	14.25%
			97%	3.87	\$290,513	14.63%
			100%	3.97	\$297,962	15.00%
			100.1% to 104.99%	3.98 to 4.17	\$347,622	17.50%
			>= 105%	4.17	\$397,282	20.00%
DR FIM Initial Threshold			50%	of	MW Target	
DR FIM Upper Boundary @ MW Target			100%	of	MW Target	
DR FIM Earnings O&M & MW Increments			0.36%	per	0.095	MW achieved
DR FIM Earnings Percentage of			15%	of	Total O&M Cost	
DR FIM Earnings MW Target Exceedance Level 1			17.5%	of	Total O&M Cost	between 100.1% and 104.99%
DR FIM Earnings MW Target Exceedance Level 2			20%	of	Total O&M Cost	equal to or greater than 105% MW Achieved

Indiana Michigan Power Company
DR Plan Costs

I&M Indiana IRP Total DR Plan						I&M Indiana AMI DR Programs	I&M Indiana Existing DR Program	I&M Indiana DR Plan	I&M Indiana DR Plan	I&M Indiana DR Plan
I&M MPS / IRP DSM										
Total DR (MW)	Total Participants	Total Capital Cost	Total O&M Cost	Total O&M Cost - Cumulative		Cause No. 45576 Forecast Test Year (2022) O&M Cost	Home Energy Management Thermostat DLC Program Current DSM Plan Costs With Cost Recovery Through Current DSM Program Cost Rider Rate Factors	Incremental Cost (TY O&M less New MPS/IRP DSM Cost)	DR Plan Financial Incentive Mechanism (DR FIM) Forecast Earnings (@ 100% Forecast Performance)	DR Plan Incremental Revenue Requirement
2022				\$0		\$2,326,523	\$823,735	\$0	\$0	\$0
2023	5.79	7,954	-	\$1,637,604	\$1,637,604		\$0	\$0	\$245,641	\$245,641
2024	8.56	20,577	-	\$1,454,748	\$3,092,352		\$0	\$765,829	\$218,212	\$984,041
2025	12.54	36,872	-	\$1,986,411	\$5,078,763		\$0	\$2,752,240	\$297,962	\$3,050,202
2026	19.36	65,030	-	\$2,032,238	\$7,111,001					
2027	29.23	104,048	-	\$2,493,547	\$9,604,548					
2028	40.34	144,352	-	\$2,847,433	\$12,451,981					
2029	50.43	175,915	-	\$3,007,991	\$15,459,972					
2030	58.54	196,524	-	\$3,050,526	\$18,510,498					
2031	64.60	208,974	-	\$3,049,317	\$21,559,815					
2032	68.90	216,402	-	\$3,036,302	\$24,596,117					
2033	72.22	222,320	-	\$3,065,900	\$27,662,017					
2034	74.20	224,588	-	\$3,038,587	\$30,700,604					
2035	75.80	226,473	-	\$3,081,717	\$33,782,321					
2036	77.18	228,138	-	\$3,134,981	\$36,917,302					
2037	78.45	229,681	-	\$3,195,813	\$40,113,115					
2038	79.19	230,650	-	\$3,233,523	\$43,346,638					
2039	79.76	231,437	-	\$3,822,054	\$47,168,692					
2040	80.32	232,184	-	\$3,890,686	\$51,059,377					
2041	80.86	232,887	-	\$3,406,060	\$54,465,438					
2042	81.37	233,542	-	\$3,468,714	\$57,934,151					
Total				\$57,934,151						

Indiana Michigan Power Company
DSM Plan
CVR Plan Summary

I&M Indiana CVR Plan Forecast - New Future Deployments Forecast																								
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Total	
Total Incremental Capital*	\$1,370,000	\$18,170,000	\$8,520,000	\$12,000,000	\$15,250,000	\$20,250,000	\$7,500,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$83,060,000	
Internal Labor Breakout	\$105,100	\$1,752,400	\$823,950	\$1,159,200	\$1,473,150	\$1,956,150	\$724,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$7,994,450
Outside Services Breakout	\$420,400	\$7,009,600	\$3,295,800	\$4,636,800	\$5,892,600	\$7,824,600	\$2,898,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$31,977,800
Material Breakout	\$525,500	\$8,762,000	\$4,119,750	\$5,796,000	\$7,365,750	\$9,780,750	\$3,622,500	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$39,972,250
AMI CBA Incremental Outside Services- Vendor Incremental Costs	\$119,000	\$646,000	\$280,500	\$408,000	\$518,500	\$688,500	\$255,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,915,500
AMI CBA Incremental CVR IT Stand Up Functionality	\$200,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$200,000
Incremental O&M	\$0	\$14,886	\$95,697	\$130,785	\$181,824	\$246,685	\$332,811	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$364,710	\$6,473,343
Cumulative O&M	\$0	\$14,886	\$110,583	\$241,368	\$423,192	\$669,876	\$1,002,688	\$1,367,398	\$1,732,108	\$2,096,819	\$2,461,529	\$2,826,239	\$3,190,950	\$3,555,660	\$3,920,370	\$4,285,081	\$4,649,791	\$5,014,501	\$5,379,212	\$5,743,922	\$6,108,633	\$6,473,343		
IN CVR New Cost Effective Circuits Annual Energy Savings (kWh)	7,893,392	39,724,191	20,560,860	29,905,996	35,914,553	44,839,111	17,976,726	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	196,814,829
IN CVR New Cost Effective Circuits Total Annual Energy Savings (kWh)	7,893,392	47,617,583	68,178,443	98,084,439	133,998,992	178,838,103	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	196,814,829	
IN CVR New Cost Effective Circuits Annual Demand Savings (MW)	2.56	13.04	6.11	8.69	10.93	13.92	5.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.77
IN CVR New Cost Effective Circuits Total Annual Demand Savings (MW)	2.56	15.60	21.71	30.40	41.33	55.25	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	60.77	
IN CVR New Cost Effective Number of Circuits	14	76	33	48	61	81	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	343
IN CVR New Cost Effective Total Number of Circuits	14	90	123	171	232	313	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	

I&M Indiana CVR Plan Forecast - Existing Deployments Forecast																								
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Total	
IN CVR New Cost Effective Circuits Total Annual Energy Savings (kWh)	20,457,973	20,457,973	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	34,831,402	737,543,986	
IN CVR New Cost Effective Circuits Total Annual Demand Savings (MW)	6.58	6.58	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	145.96	
IN CVR Total Number of Circuits	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	
Incremental O&M	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$740,876	\$16,299,275
Cumulative O&M	\$740,876	\$1,481,752	\$2,222,628	\$2,963,505	\$3,704,381	\$4,445,257	\$5,186,133	\$5,927,009	\$6,667,885	\$7,408,762	\$8,149,638	\$8,890,514	\$9,631,390	\$10,372,266	\$11,113,142	\$11,854,018	\$12,594,895	\$13,335,771	\$14,076,647	\$14,817,523	\$15,558,399	\$16,299,275		

I&M Indiana CVR Plan Forecast -Total Forecast																							
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	Total
IN CVR New Cost Effective Circuits Total Annual Energy Savings (kWh)	28,351,365	68,075,556	103,009,845	132,915,841	168,830,394	213,669,505	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	231,646,231	4,421,192,202
IN CVR New Cost Effective Circuits Total Annual Demand Savings (MW)	9.14	22.18	28.35	37.04	47.97	61.89	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41	67.41
IN CVR Total Number of Circuits	78	154	187	235	296	377	407	407	407	407	407	407	407	407	407	407	407	407	407	407	407	407	407
Incremental O&M	\$740,876	\$755,762	\$851,459	\$962,244	\$1,164,068	\$1,410,752	\$1,743,664	\$2,108,274	\$2,472,984	\$2,837,695	\$3,202,405	\$3,567,116	\$3,931,826	\$4,296,536	\$4,661,247	\$5,025,957	\$5,390,667	\$5,755,378	\$6,120,088	\$6,484,798	\$6,849,509	\$7,214,219	\$77,567,424
Cumulative O&M	\$740,876	\$1,496,638	\$2,348,097	\$3,330,342	\$4,494,409	\$5,905,162	\$7,648,825	\$9,757,000	\$12,229,984	\$15,067,679	\$18,270,084	\$21,837,200	\$25,769,026	\$30,065,562	\$34,726,808	\$39,752,765	\$45,143,433	\$50,898,810	\$57,018,898	\$63,503,697	\$70,353,205	\$77,567,424	

*2021 & 2022 CVR Capital Expenditure Cost Recovery addressed in I&M basic rate case Cause No. 45576 Forecast Test Year

Indiana Michigan Power Company
DSM Plan
CVR Plan Benefit Cost

Attachment JCW-17
Witness: J.C. Walter
Page 1 of 1

Distribution Bus (Substation Name)	Number of Distribution Circuits	Annual Energy Savings (kWh)	Annual Demand Savings (MW)	CVR Benefits	CVR Costs	CVR Net Benefits	CVR UCT Score	Residential Energy Portion of Total Distribution Bus Energy (%)	C&I Energy Portion of Total Distribution Bus Energy (%)
ALBANY	1	724,957	0.188	\$435,276	\$262,031	\$173,245	1.66	56%	44%
ALBION	1	1,276,953	0.317	\$803,262	\$262,031	\$541,231	3.07	18%	82%
ALCONDA	1	447,955	0.106	\$273,693	\$262,031	\$11,662	1.05	0%	100%
ANCHOR HOOKING	3	2,833,565	0.6853	\$1,727,602	\$786,093	\$941,509	2.20	12%	88%
ANTHONY	5	2,541,229	0.7983	\$1,708,844	\$1,310,155	\$398,689	1.30	46%	54%
ARNOLD HOGAN	4	2,018,135	0.9997	\$1,328,542	\$1,048,124	\$280,418	1.27	86%	14%
AVIATION	3	1,948,735	0.4244	\$1,147,410	\$786,093	\$361,317	1.46	4%	96%
BEECH ROAD	3	1,401,094	0.6094	\$1,089,104	\$921,093	\$168,011	1.18	70%	30%
BERNE	3	2,188,533	0.6396	\$1,428,888	\$721,093	\$707,795	1.98	17%	83%
BIXLER	4	2,499,730	0.7333	\$1,635,827	\$1,048,124	\$587,703	1.56	4%	96%
BLANE STREET	4	1,469,865	0.5311	\$870,392	\$638,124	\$232,267	1.52	65%	35%
BLUFF POINT	1	242,043	0.2024	\$275,967	\$262,031	\$13,936	1.05	57%	43%
BLUTER	3	2,111,952	0.5799	\$1,347,648	\$721,093	\$626,555	1.87	34%	66%
CAPITAL AVENUE	2	1,298,675	0.2723	\$756,036	\$524,062	\$231,974	1.44	41%	59%
CHELUBISSO	1	1,033,625	0.3039	\$677,011	\$262,031	\$414,980	2.58	34%	66%
CLEVELAND	3	1,912,610	0.6882	\$1,381,983	\$921,093	\$460,890	1.48	69%	31%
COLFAX	3	2,062,295	0.9812	\$1,328,927	\$721,093	\$607,834	1.84	23%	77%
COLONY BAY	6	3,077,052	0.9161	\$2,025,297	\$1,442,186	\$583,110	1.40	46%	54%
CONANT	3	2,190,442	0.6963	\$1,480,073	\$786,093	\$693,980	1.88	18%	82%
CONKORD	6	3,694,189	1.1875	\$2,490,239	\$1,572,186	\$918,053	1.58	13%	87%
COUNTRYSIDE	3	1,401,730	0.4391	\$941,515	\$786,093	\$155,422	1.20	50%	50%
COUNTY ROAD 4	3	1,584,464	0.6208	\$1,172,300	\$921,093	\$251,207	1.27	41%	59%
CROSS STREET	3	1,098,148	0.429	\$810,886	\$786,093	\$24,793	1.00	81%	19%
DARDEN ROAD	6	2,730,333	1.3627	\$2,274,410	\$1,572,186	\$702,223	1.45	53%	47%
DECATUR	5	2,112,326	0.6435	\$1,403,010	\$1,310,155	\$92,855	1.07	45%	55%
DEER CREEK	4	2,739,569	0.8107	\$1,628,266	\$1,048,124	\$580,141	1.55	31%	69%
DIEBOLD ROAD	3	2,009,915	0.6121	\$1,334,814	\$786,093	\$548,721	1.70	14%	86%
DREWYS	4	1,807,577	0.5809	\$1,226,847	\$1,226,124	-\$71,277	1.00	56%	44%
DUNLAP	6	2,560,134	1.0711	\$1,983,022	\$1,347,186	\$635,836	1.45	42%	58%
ELLISON ROAD	2	1,354,108	0.4584	\$939,234	\$524,062	\$415,172	1.79	13%	87%
ELMHIDGE	3	1,382,656	0.2967	\$802,274	\$786,093	\$16,181	1.02	9%	91%
ELWOOD	3	1,498,678	0.428	\$910,886	\$786,093	\$124,793	1.20	65%	35%
FAIRMOUNT	2	1,040,522	0.2911	\$668,645	\$524,062	\$144,583	1.28	78%	22%
FERGUSON	3	1,901,633	0.6672	\$1,339,384	\$786,093	\$553,271	1.70	4%	96%
FISHER BODY	1	1,056,367	0.1785	\$577,227	\$1,185,022	-\$607,795	2.20	100%	0%
FILTON	3	1,776,562	0.4429	\$1,094,647	\$786,093	\$308,554	1.39	30%	70%
GAS CITY	2	831,988	0.2865	\$581,257	\$524,062	\$57,195	1.11	73%	27%
GERMAN	6	4,498,432	1.3543	\$2,973,086	\$2,048,124	\$924,962	1.69	17%	83%
GLENBROOK	6	2,950,330	0.8731	\$1,837,312	\$1,572,186	\$265,126	1.23	4%	96%
GRANGER	6	2,684,047	0.8885	\$1,941,420	\$757,186	\$1,184,233	1.77	51%	49%
GRANT	3	2,873,093	0.8496	\$1,711,529	\$786,093	\$925,436	2.18	2%	98%
GREENLEAF	3	1,708,753	0.6389	\$1,237,696	\$786,093	\$451,602	1.57	4%	96%
HADLEY	5	3,447,480	0.9742	\$2,223,807	\$1,310,155	\$913,652	1.70	17%	83%
HAMILTON	2	1,046,191	0.3275	\$711,192	\$524,062	\$187,130	1.36	54%	46%
HARTFORD CITY	3	1,149,782	0.415	\$819,881	\$786,093	\$33,788	1.04	61%	39%
HARVEST PARK	2	977,862	0.3933	\$711,368	\$524,062	\$187,306	1.26	12%	88%
HAYMOND	3	1,650,000	0.6471	\$1,221,329	\$786,093	\$435,236	1.55	49%	51%
HILLCREST	5	2,632,807	0.7899	\$1,738,159	\$1,335,155	\$403,003	1.30	61%	39%
HUMMEL CREEK	2	1,330,790	0.3566	\$881,537	\$524,062	\$357,475	1.61	79%	21%
ILLINOIS ROAD	3	1,380,339	0.5199	\$955,103	\$721,093	\$234,010	1.38	74%	26%
INDUSTRIAL PARK	6	2,824,138	0.96	\$1,982,309	\$1,572,186	\$390,123	1.25	9%	91%
INLAND ROAD	4	1,987,639	0.6498	\$1,230,712	\$1,048,124	\$182,587	1.17	38%	62%
JACKSON ROAD	5	2,741,236	0.8934	\$1,911,130	\$1,310,155	\$600,975	1.46	6%	94%
JAY	2	1,138,952	0.3203	\$733,356	\$214,062	\$519,294	3.43	68%	32%
KAWKAEE	3	1,629,503	0.5005	\$1,165,814	\$786,093	\$379,721	1.48	31%	69%
KENDALLVILLE	4	1,540,243	0.5365	\$1,081,440	\$1,048,124	\$33,315	1.03	64%	36%
KENNER PARK	3	1,541,726	0.5787	\$1,118,667	\$786,093	\$332,574	1.42	40%	60%
LIGNIER	4	2,716,970	0.9272	\$1,578,488	\$1,048,124	\$530,364	1.51	20%	80%
LISHER AVENUE	3	2,085,107	0.7951	\$1,468,960	\$1,408,093	\$60,867	1.12	7%	93%
LYDICK	3	1,584,329	0.5648	\$1,115,636	\$786,093	\$329,543	1.42	63%	37%
LYNN	1	453,176	0.161	\$289,233	\$262,031	\$27,202	1.14	54%	46%
MACKEY	5	3,078,079	1.0131	\$2,109,918	\$1,355,155	\$754,761	1.58	23%	77%
MAYFIELD	3	1,401,788	0.4027	\$909,938	\$786,093	\$123,845	1.16	71%	29%
MCALLARD ROAD	5	2,490,600	0.8505	\$1,733,959	\$1,310,155	\$423,803	1.39	32%	68%
MCKINLEY	2	989,623	0.5457	\$709,352	\$262,031	\$447,321	2.71	34%	66%
MELITA	5	2,659,500	0.8933	\$1,578,154	\$1,310,155	\$267,999	1.20	39%	61%
MILAN	2	977,390	0.2949	\$648,669	\$524,062	\$124,606	1.29	57%	43%
MISSISSNEWA	2	1,107,137	0.1058	\$535,276	\$524,062	\$11,214	1.02	3%	97%
MONROE	1	532,290	0.2389	\$418,435	\$262,031	\$156,404	1.60	50%	50%
MONTGOMERY	3	1,468,594	0.3846	\$958,933	\$786,093	\$172,840	1.14	45%	55%
NOBLE	1	752,509	0.3498	\$604,476	\$262,031	\$342,445	2.31	6%	94%
NORTH KENDALLVILLE	3	1,478,254	0.4873	\$1,013,948	\$786,093	\$227,855	1.29	37%	63%
NORTH PORTLAND	4	2,317,145	0.7028	\$1,536,191	\$1,048,124	\$488,067	1.47	6%	94%
OSSIAN	3	1,220,338	0.4016	\$836,451	\$786,093	\$50,358	1.06	91%	9%
PARNELL	5	2,769,544	0.8511	\$1,845,947	\$1,310,155	\$535,792	1.41	36%	64%
PEACOCK	1	474,384	0.1846	\$349,876	\$262,031	\$87,845	1.34	77%	23%
PINE ROAD	3	2,075,911	0.7167	\$1,452,002	\$786,093	\$665,908	1.85	17%	83%
PORTLAND	3	1,768,873	0.7122	\$1,325,362	\$786,093	\$539,269	1.69	39%	61%
PRICE	2	2,215,900	0.6381	\$1,266,094	\$524,062	\$742,032	2.42	0%	100%
REED	4	1,913,948	0.6217	\$1,478,414	\$1,048,124	\$430,289	1.41	78%	22%
ROBINSON PARK	6	2,783,883	0.8856	\$1,968,442	\$1,572,186	\$396,256	1.25	69%	31%
ROSBELL	1	697,171	0.1884	\$385,019	\$385,019	\$0	1.47	82%	18%
ROYERTON	2	980,498	0.3064	\$657,934	\$524,062	\$133,871	1.26	59%	41%
SILVER LAKE	2	1,076,131	0.325	\$712,309	\$524,062	\$188,246	1.36	54%	46%
SOUTH DECATUR	4	2,582,649	0.7395	\$1,674,355	\$1,048,124	\$626,231	1.60	2%	98%
SOUTH WOOD	3	2,855,105	0.6716	\$1,724,318	\$786,093	\$938,225	2.19	63%	37%
SOUTH SUMMITVILLE	1	1,141,419	0.2921	\$709,945	\$262,031	\$447,914	2.71	0%	100%
SOYA	1	1,295,251	0.3931	\$772,005	\$262,031	\$510,174	2.95	100%	0%
SPRINGVILLE	2	1,201,280	0.5837	\$821,975	\$524,062	\$297,913	1.57	67%	33%
STUDEBAKER	4	2,008,929	0.6455	\$1,383,416	\$1,048,124	\$335,291	1.30	12%	88%
SUMMIT	5	3,786,596	1.1015	\$2,481,892	\$945,155	\$1,536,737	1.52	2%	98%
SWANSON	2	2,598,921	0.8829	\$1,892,163	\$1,121,093	\$771,070	1.69	86%	14%
THOMAS ROAD	3	1,306,828	0.4378	\$902,538	\$786,093	\$116,445	1.15	21%	79%
TRETT M	2	1,719,803	0.5498	\$1,129,135	\$524,062	\$605,073	1.89	9%	91%
TILLOTSON	3	2,401,980	0.6215	\$1,499,695	\$786,093	\$713,603	1.91	36%	64%
TRIER	3	1,247,887	0.4627	\$900,307	\$331,093	\$569,414	2.72	74%	26%
TWENTY-FIRST STREET	4	2,523,091	0.8474	\$1,493,305	\$1,048,124	\$445,181	1.24	44%	56%
UPLAND	3	1,239,725	0.3508	\$799,927	\$786,093	\$13,834	1.02	54%	46%
UTICA	6	3,670,521	1.0905	\$2,413,928	\$1,572,186	\$841,742	1.54	25%	75%
VAN BUREN	2	990,469	0.2904	\$655,989	\$524,062	\$131,926	1.06	3%	97%
WABASH AVENUE	1	1,822,401	0.4778	\$1,143,268	\$786,093	\$357,175	1.45	36%	64%
WALLEN	6	2,878,949	0.9834	\$2,013,215	\$962,186	\$1,051,029	3.04	55%	45%
WEST DEL	4	1,882,515	0.5338	\$1,125,112	\$1,048,124	\$77,988	1.16	17%	83%
WEST END	2	1,387,951	0.2726	\$783,468	\$524,062	\$259,406	1.49	65%	35%
WEST SIDE	6	4,535,892	1.0159	\$2,694,996	\$1,572,186	\$1,122,810	1.71	30%	70%
WESTMINSTER	3	1,245,292	0.6371	\$1,050,866	\$786,093	\$264,773	1.34	44%	56%
W.M IN CVR Total	343	196,814,829	60.77	\$130,934,783	\$87,186,647	\$43,748,136	1.50	77%	23%

Indiana Michigan Power Company
DSM Plan
CVR Plan Costs

I&M DSM Plan Enhanced CVR				I&M DSM Plan Enhanced CVR	I&M DSM Plan Enhanced CVR	I&M DSM Plan Existing CVR	I&M DSM Plan Enhanced CVR	I&M DSM Plan Enhanced CVR
I&M IRP DSM								
Total Capital Cost	Total O&M Cost	Total O&M Cost - Cumulative		Cause No. 45576 Forecast Test Year (2021 + 2022) Incremental Capital Cost	Cause No. 45576 Forecast Test Year (2021 + 2022) Incremental O&M Cost	CVR Current DSM Plan Costs With Cost Recovery Through Current DSM Program Cost Rider Rate Factors	CVR Incremental O&M Cost	CVR DSM/EE Program Cost Rider Incremental Revenue Requirement
2021	\$1,370,000	\$0	\$0	\$1,370,000	\$0	\$740,876		
2022	\$18,170,000	\$14,886	\$14,886	\$18,170,000	\$0	\$740,876		
2023	\$8,520,000	\$95,697	\$110,583		\$0	\$740,876	\$110,583	\$851,459
2024	\$12,000,000	\$130,785	\$241,368		\$0	\$740,876	\$241,368	\$982,244
2025	\$15,250,000	\$181,824	\$423,192		\$0	\$740,876	\$423,192	\$1,164,068
2026	\$20,250,000	\$246,685	\$669,876					
2027	\$7,500,000	\$332,811	\$1,002,688					
2028	\$0	\$364,710	\$1,367,398					
2029	\$0	\$364,710	\$1,732,108					
2030	\$0	\$364,710	\$2,096,819					
2031	\$0	\$364,710	\$2,461,529					
2032	\$0	\$364,710	\$2,826,239					
2033	\$0	\$364,710	\$3,190,950					
2034	\$0	\$364,710	\$3,555,660					
2035	\$0	\$364,710	\$3,920,370					
2036	\$0	\$364,710	\$4,285,081					
2037	\$0	\$364,710	\$4,649,791					
2038	\$0	\$364,710	\$5,014,501					
2039	\$0	\$364,710	\$5,379,212					
2040	\$0	\$364,710	\$5,743,922					
2041	\$0	\$364,710	\$6,108,633					
2042	\$0	\$364,710	\$6,473,343					
Total	\$83,060,000	\$6,473,343						

Home Energy Engagement - Indiana

Objective:	<p>The overall objective of the Home Energy Engagement (HEE) Program is to provide those I&M Indiana residential customers that opt-in to the AMI electronic Energy Management Tools with tips, advice, and timely and frequent data and information regarding their electric usage. The program is a combination of residential sector behavior change elements designed to engage I&M’s residential customers with the data and information necessary to manage their usage via online and electronic means and to trigger behavioral change response for energy conservation.</p> <p>Specific HEE Program objectives include:</p> <ol style="list-style-type: none"> 1. Produce cost effective energy and demand savings in the residential consumer sector by engaging customers through a common online/electronic customer engagement channel. 2. Engage and encourage residential customers to change their energy usage patterns and implement energy efficiency recommendations tailored to their home through the use of AMI data and information made available through online AMI Energy Management Tools. 3. Raise customer awareness of energy efficiency improvements and rebates available through I&M programs by offering no-additional-cost efficient measures through an online marketplace as enticements to further action.
Target Market:	<p>HEE targets all of I&M’s Indiana residential customers based on their home profile and online connectivity and data preferences. The program will offer full AMI meter data functionality enhancements as I&M transitions to AMI meters for all residential customers.</p>
Program Duration:	<p>The Residential Home Energy Engagement program will be a program in I&M’s 2023 - 2025 EE Plan residential sector portfolio.</p>
Program Description:	<p>The HEE Program contains AMI Energy Management Tools (e.g. online and customized usage information and usage data, tips, advice, calls to action, etc.) that works in conjunction with the Home Online Energy Checkup Program. Research has indicated that even the most-timely and detailed usage information presented in isolation, does not prompt a significant number of users to change their energy usage patterns. For this reason, through one common engagement approach, the HEE program will provide the more-timely and detailed AMI usage data joint with personalized information that will educate, encourage, and entice residential customers to implement energy efficient measures and improvements relevant to their home. Using more granular and more-current AMI usage data, customers will be able to track their actual usage over time, complete customized online energy audits through more granular usage disaggregation, set goals, compare their energy usage and energy</p>

	<p>saving actions with homes of similar characteristics, and receive timely alerts and notifications on their specific energy use. The program will provide personalized information that equips the residential customer with the knowledge necessary to implement energy efficient measures and/or improvements relevant to their home. Through the Online Energy Checkup, self-install measures are provided at no-additional-cost through an online marketplace as an option for those customers completing the online assessment of their home. Online audit reports generated by customers, or electronic reports and alerts sent to select customers will also provide other I&M energy efficiency program cross promotion to help further engage customers in support of their energy consumption reduction behavior.</p>
<p>Incentive Strategy:</p>	<p>The Home Energy Engagement program is available to all I&M Indiana customers as a no-additional-cost service on an opt-in basis (i.e., self-engagement in the Energy Management Tools) through online account creation where online log-in activity can be tracked on a per customer basis.</p>
<p>Eligible Measures:</p>	<p>Appendix A provides eligible measure lists for the HEE Program.</p>
<p>Implementation Strategy:</p>	<p>I&M will implement this program through the business partners to provide for the web-facing AMI Energy Management Tools and online audit tool, and for efficient measures available to online audit participants.</p>
<p>Marketing Strategy:</p>	<p>I&M will work with a Home Energy Engagement business partner to develop a marketing and communications plan to successfully implement the program in concert with the Company's AMI marketing and customer communications outreach plans. Due to the program targeting all I&M residential customers for online web activity and a subset of I&M's customers for the selected activity, marketing activities will be geared towards initial customer engagement of targeted participants, reengagement of these same individuals, thereafter, and web engagement of all other residential customers.</p>
<p>Evaluation, Measurement & Verification:</p>	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p>

The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.

The impact evaluation will use a treatment and control analysis methodology and protocol to determine the actual, verified energy and demand reductions achieved by those customers engaging in and using the Energy Management Tools. A cost/benefit analysis of the program will be performed as part of the impact evaluation process.

For AMI Energy Management Tools behavior savings (impact) determination, the usage of those that regularly engage with the AMI Energy Management Tools will be compared with those that don't regularly use the data and tools. A treatment and control evaluation analysis including accounting for savings overlap from other program participation, will be used to determine the actual behavior energy savings resulting from the availability of AMI data and its associated granular functionality and tools.

The Company's third party evaluation vendor has access to and receives I&M's AMI meter data and customer information and will capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, back to I&M. The evaluator is expected to work closely with I&M and its implementation partner to ensure proper data collection, energy reduction calculation methodology, and reporting.

Home Energy Products Program - Indiana

Objective:	<p>The overall objective of the Home Energy Products (HEP) Program is encourage residential energy efficient product uptake through rebates for appliances, smart lighting, and other efficient products using smart technology that can produce cost effective energy savings. HEP may utilize different rebate measure delivery methods based on the most efficient way to promote and offer rebates for the various end-use measures in the program, such as downstream rebate methods, online marketplace functionality or retail business partner rebates through the Energy Star Appliances component.</p> <p>Savings are achieved by promoting the benefits associated with eligible energy efficiency measures and offering cash-back rebates structured to cover a portion of the incremental cost of purchasing them but HEP rebates will be paid to different market actors according to the measure and the portion of the market that is targeted for rebate availability.</p> <p>Specific objectives of the Home Energy Products Program are to:</p> <ol style="list-style-type: none"> 1. Lower electric consumption in the residential market sector through the purchase and installation of eligible energy efficiency measures and attribute electric energy savings to those purchases that receive a rebate through the program. 2. Provide a streamlined and efficient process for customers (or their Trade Ally) and retail partners to receive rebates for measures authorized in the program. 3. Educate residential customers regarding opportunities to manage their overall energy usage through the purchase and installation of energy efficient products. 4. Encourage equipment vendors and contractors to actively market eligible energy efficient technologies to residential customers. 5. Encourage retail partners to improve stocking levels and retail availability for certain Energy Star rated efficient appliances.
Target Market:	<p>The program will target all I&M Indiana residential customers through various channels of rebate delivery based on the measure and efficient end-use product. HEP will also specifically target certain appliances and measures for I&M Indiana residential customers having electric heat, electric water heat, or other electric energy intensive products in the home.</p>
Program Duration:	

	<p>The program will be a part of I&M’s 2023 – 2025 EE Plan residential sector portfolio.</p>
<p>Program Description:</p>	<p>The Home Energy Products Program (HEP) has multiple components, with each component having its own delivery channel. The components of HEP include:</p> <ol style="list-style-type: none"> 1. Energy Star (retailer midstream) Appliances; 2. Online Marketplace efficient products; 3. Downstream efficient products. <p>The Energy Star Appliances component is an Energy Star midstream program that seeks market transformation at the national level for the efficient stocking and availability of Energy Star rated appliances and other efficient end-use technologies such as electronics at the retail store level. Utilities that enroll in the program are program sponsors and provide rebates into the program based on retail store agreements. Efficient appliance measures are determined annually by sponsors as part of a collaborative effort and individual sponsors pay rebates to participating retail stores based on stocking and sales data provided by each store within the utility service territory footprint. Individual utility regulatory approval is required for program participation where the authority to count market transformation energy savings is needed to make the program effective for the utility. Additional Energy Star Appliance Midstream Program information is provided in Appendix A.</p> <p>The Online Marketplace delivery model pays utility program rebates direct to I&M customers to buy-down the cost of efficient electric technologies used in the home.</p> <p>The downstream efficient products will increase customer awareness and uptake for energy efficient products through cash-back rebates designed to cover a portion of the incremental cost to upgrade to efficient technologies not included in the other HEP program components. The component may also engage certain Trade Allies about the energy saving and non-energy benefits associated with efficient electric water heat measures and other measures not typically installed by do-it-yourself customers. This component may also provide an online Trade Ally engagement tool and reference center to both engage program-select Trade Allies and to inform participating customers of Trade Ally participation in the program with the availability of their services. This component will also provide an online sales/rebate marketplace channel for customer engagement and convenience in the purchase of efficient products and streamlined rebate approval</p>

	<p>and receipt. The online marketplace will also serve to help I&M to effectuate customer attribution.</p> <p>HEP measure lists and additional component program design information is provided in Appendix A.</p>
Incentive Strategy:	<p>HEP will pay rebates in all program components but to different market participants based on the measures targeted by component.</p> <p>The Energy Star Appliances component will pay rebates to retail store partners based on annual program agreements with each partner.</p> <p>The Online Marketplace component will pay lighting measure rebates direct to I&M customers. The downstream products component will pay rebates direct to end-use customers or their designated trade ally.</p>
Eligible Measures:	<p>Measure lists are provided in Appendix A.</p>
Implementation Strategy:	<p>I&M will implement the Energy Star Appliances component with in-house staff and also may engage an implementation partner to aid in program utility program participation in the collaborative activities of program sponsorship with Energy Star.</p> <p>I&M will implement the downstream products component of the program in-house and with an implementation partner and/or an online marketplace partner.</p>
Marketing Strategy:	<p>I&M will promote the Online Marketplace and downstream component of the program through the following marketing channels for the efficient products/appliance component of the program:</p> <ol style="list-style-type: none"> 1. Direct mail campaign; 2. Direct contacts with trade allies at their place of business; 3. Web-based marketing via the I&M's website (ongoing); 4. Direct e-mail or online media outreach to trade allies;

	<p>5. Bill stuffers and umbrella marketing;</p> <p>6. Direct outreach and targeted mailings to multi-family housing unit property owners;</p> <p>For the Energy Star Appliances component of the program, promotional signage may be placed in retail locations that promote the participant products and provide customers with cost and efficiency value information.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail, in-store, or online surveys.</p> <p>The impact evaluation is expected to determine the actual, verified energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.</p> <p>I&M and its implementation partners will capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, to I&M's independent third party evaluator. The evaluator is expected to work closely with I&M and the implementation vendor to ensure proper data collection, energy reduction calculation methodology, and reporting.</p> <p>For the Energy Star Appliances component, I&M will seek regulatory approval to capture and account for the market transformation impacts to be claimed from the program. Accordingly, I&M will engage its third party evaluator and the participating evaluators in the Energy Star program to evaluate the energy savings to be claimed from this component of the HEP program.</p>

Home New Construction Program - Indiana

Objective:	<p>The overall Home New Construction program objective is to produce long-term cost-effective electric savings in the residential market sector for new homes built within the I&M service territory through builder focused cash rebates for home shell improvements. The specific objectives of the Home New Construction Program are to:</p> <ol style="list-style-type: none"> 1. Realize the construction of more efficient homes than current building code in the I&M service territory residential market sector and to attribute electric energy savings to those new homes participating in the program. 2. Educate builders on building energy efficiency best practices. 3. Educate builders on opportunities to differentiate themselves by incorporating energy efficiency into their marketing strategy, making it a competitive issue to help move the new home construction market. <p>Through market-based activities, affect a long-term improvement in the market for energy efficient homes.</p>
Target Market:	Residential home builders who design and construct residential energy efficient single family homes, duplexes, and end-units of single story multi-residential properties located in I&M's Indiana service territory.
Program Duration:	The Home New Construction program will be a program in I&M's 2023 - 2025 EE Plan residential sector portfolio.
Program Description:	<p>The Home New Construction program will produce long-term electric energy savings by encouraging the construction of single family homes, duplexes, and end-units of multi-residential properties that individually meet one of two performance levels defined by a HERS index score. The program will identify and recruit targeted builders who do not consistently (or seldom) build homes to exceed baseline building codes for energy efficiency. Builders who choose to participate in the program will gain access to cash-back incentives that range from 20 to 63 percent of the cost to upgrade and certify each home, based on the intended primary heating source for the home.</p> <p>Given the stringent requirements and extensive training required for builders and contractors to meet the HERS index levels, market resistance is expected based on how receptive builders are to the increased costs of constructing more efficient homes.. To help address this challenge, I&M will utilize a tiered HERS index level approach, while implementing a comprehensive training program aimed at educating builders and contractors on advanced home design and construction practices to</p>

	<p>encourage the new home construction market to improve energy efficiency beyond current building codes in Indiana.</p> <p>Savings are achieved by training home builders on building practices designed to achieve the Home Energy Rating Scores (HERS) tiers along with strategies for incorporating the rating approach and energy efficiency message into their marketing efforts.</p>
<p>Incentive Strategy:</p>	<p>The Residential New Construction Program will provide incentives to residential home builders who design residential energy efficient homes based on the HERs rating of the home at incentive levels that increase with lower HERs scores.</p>
<p>Eligible Measures:</p>	<p>New construction residential single family, duplexes, and multi-family residential homes with requisite HERS ratings achieved based on home shell efficiency levels and other specific electric measures as designated by the home builder such as efficient electric water heat measures, so long as the appropriate alternative less efficient electric equipment baseline is identified and documented. Efficient HVAC measure rebates will be paid, and managed through the HVAC Midstream Program.</p> <p>Appendix A provides the list of eligible measures for the New Construction Program.</p>
<p>Implementation Strategy:</p>	<p>I&M may implement this program using in-house staff or may utilize an implementation vendor to implement this program who will be expected to educate and promote the program to residential home builders in the I&M service territory to construct new homes to the HERs ratings levels designated in the program.</p> <p>The Home New Construction Program will also work with Home Energy Rating vendors to assist builders with HER qualification and criteria.</p>
<p>Marketing Strategy:</p>	<p>The target market for the program is home builders who build in the I&M Indiana electric service territories. I&M will promote the program through the following marketing channels:</p> <ol style="list-style-type: none"> 1. Direct mail campaign and trade ally rollout meetings 2. Direct contact with Home Builders 3. Home builder advisory group meetings 4. Web-based marketing via email and the Indiana Michigan Power Company website 5. Direct marketing to trade allies and builders

	<p>6. Direct contact with new home construction market Trade Allies.</p> <p>In addition to general marketing I&M anticipates working with trade ally groups and home builder associations to promote the program.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data-collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.</p> <p>The impact evaluation is expected to determine the actual energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.</p> <p>The chosen implementation vendor is expected to capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, back to I&M and I&M's independent third party evaluator. The evaluator is expected to work closely with the implementation vendor to ensure proper data collection, energy reduction calculation methodology, and reporting.</p>

Income Qualified Weatherproofing Program - Indiana

Objective:	<p>The overarching objective of the Income Qualified (IQ) Weatherproofing Program is to engage I&M’s IQ customers through impactful approaches to improve their electric energy use profiles with the ultimate goal of improving their personal affordability of electric usage. For I&M, the objective is to produce long-term cost-effective electric savings in the residential sector through interactions and offerings focused on the specific needs of I&M’s IQ customer base.</p> <p>The specific objectives of the program are to:</p> <ol style="list-style-type: none"> 1. Confirm IQ customer participation through I&M pre-approved and accepted forms of qualification, joint with local IQ agencies providing similar services. 2. Partner with local IQ agencies to maximize program service delivery to jointly qualified customers. 3. Lower electrical energy consumption in the I&M IQ residential customer segment by providing direct install energy savings measures, home shell and weatherization improvements, efficient refrigerators, air conditioner/heat pump tune ups, robust rebates for non-tenant owned (i.e. multi-family commercial property owner owned) HVAC equipment and electric water heat equipment. 4. Educate residential customers about the benefits and opportunities to decrease energy consumption.
Target Market:	<p>This program will serve electric heat income qualified residential customers who earn a household income of up to an including 200% of the Federal Poverty Level. The program will serve both single-family detached homes and multi-unit properties, existing and new construction, with IQ specific measure rebates respective to the type of improvement and electric service basis.</p>
Program Duration:	<p>The program is part of I&M’s 2023 – 2025 EE Plan residential sector portfolio.</p>
Program Description:	<p>Overall, there are several elements set forth in the program design that affords I&M to flex the type of services provided to its IQ customers based on site specific conditions and equipment types and needs.</p> <p>The IQ Weatherproofing Program covers the full cost of home energy audits (virtual or on-site), direct install measures, efficient refrigerators, weatherization services and maintenance of electric HVAC equipment for income qualified single family homes and multi-family apartment complexes.</p> <p>As part of the program, I&M may partner with local IQ-related governmental agencies to provide the respective funding for those agencies’ partner costs to provision the</p>

same or similar services to I&M's IQ customers that may be served only under agency partner programming and criteria. I&M will receive the commensurate data and information necessary to support and justify measure installation funding associated electric energy use savings.

More specifically, the program provides for an on-site single family and multi-family dwellings energy audits and direct install of energy savings measures such as LED lighting and water saving measures for electric water heat customers. The audit provides an educational opportunity for customers about how to improve the energy efficiency of their home through a personalized home energy report provided to the customer at the completion of the on-site audit.

Additionally, the program provides for, if appropriate and feasible, efficient refrigerators, and home shell and weatherization improvement measures installed via a third party weatherization contractor that is pre-screened and trained through the program or joint through a partner local agency that will perform the work instead of I&M qualified contractors. For homes with central air conditioner systems that are in need to maintenance, the program will provide for the cost of the HVAC unit to be tuned up for more efficient operation by a qualified HVAC contractor once every five years.

The program has an additional element for specific program outreach and engagement for both single family and multi-family IQ complexes where full or partial rebates are provided for the more costly, energy intensive all-electric HVAC and water heat measures depending upon ownership status and up to an overall programs services cost cap per dwelling type. The respective cap amounts for total services provided by dwelling type are set at \$3,000 per single family home and \$2,000 per multi-family dwelling unit. Prescribed measures in the program can vary based on individual dwelling or complex need and energy use measurement baseline.

Using shell measures, with rebate amounts and cap levels specified in the program design, I&M can engage IQ property developers to provide rebates for new IQ single family home or multi-family unit construction as appropriate. I&M will also use the Home New Construction program design as a basis and as applicable to the new construction IQ property development for energy savings and baseline determination.

For HVAC measures, I&M will coordinate and specifically account for and address any HVAC units provided for in this program to insure the same units are not rebated in the Residential HVAC Midstream Program and Work Midstream Program. If I&M cannot insure rebate non-overlap with these programs, rebates for HVAC units designed under this program will account for any rebates also paid through these midstream programs.

I&M will select the appropriate program measures to deploy at each respective qualified customers home, premise, or property based on the on-site audit results and the feasibility to deploy the energy savings measures.

As part of outreach and program enrollment activity, I&M will seek to qualify customers for program participation and services based on income eligibility up to

	<p>200% of the Federal Poverty Level either through direct qualification of income level or through reliance on other forms of documentation including:</p> <ul style="list-style-type: none"> • Food stamp eligibility documentation; • WIC eligibility; • Medicaid eligibility; • IQ agency program documentation <p>The program will seek to confirm, verify, and provision actual IQ participant’s receipt of and benefit from I&M’s IQ program services. Certain electric service delivery installations and instances may dictate or inhibit the level in which I&M can provision full IQ program benefits to the actual IQ end-use electric account owner and/or unit resident. The IQ program design intent is to impact IQ customer/end-use electric account owner and/or the unit resident with the level of programs services that will maximize realization of program services benefits according to program qualification criteria, existing energy use baseline and profile, and program per dwelling type cap amounts.</p> <p>Last, the program also seeks to educate IQ customers on the benefits of energy efficiency through local workshops and educational outreach activities with local agencies and community based entities. The program may, at the discretion of the Company, offer low cost energy efficiency measures for distribution to a broader set of IQ customers through local food pantries or other means of direct distribution to customers for their self-installation. The Company will determine the fixed portion of the overall program budget to be designated for this type of measure delivery to customers, working in collaboration with the I&M Program Implementation Oversight Board.</p>
Incentive Strategy:	<p>The program will provide walk through home audits to residential income qualified customers and will provide, at no-additional-cost, efficient refrigerators, air conditioner/heat pump tune ups, and weatherization improvements to their home or premise, including air sealing and installation of additional insulation as appropriate and feasible. The program will also provide direct install measures by a Home Energy Auditor trained under this program, including LED lighting and water saving measures for electric heat customers.</p> <p>The program may also provide rebates for HVAC equipment upgrade, replacement, or new installation depending upon the dwelling type, need, and application type.</p>
Eligible Measures:	<p>An IQ Weatherproofing measure listing is provided in Appendix A.</p>
Implementation Strategy:	<p>I&M will implement direct participant services using either internal Home Auditors or business partner auditors, and will partner with local weatherization vendors to deliver home shell improvement services for I&M IQ program direct participants.</p>

	<p>I&M may partner with local IQ agencies that provide the same or similar services for IQ customers only qualified through those agencies.</p> <p>I&M will perform outreach and local education workshops internally but may partner with local IQ agencies in the delivery of the workshops.</p> <p>I&M will engage IQ property owners and developers direct, through a business partner, or through agency partnership.</p> <p>I&M will engage local HVAC trade allies for equipment maintenance activity and/or equipment upgrades as appropriate.</p> <p>I&M will utilize a vendor for purchase and delivery of efficient refrigerators provided to participants through this program.</p>
<p>Marketing Strategy:</p>	<p>I&M will focus outreach to income qualified all-electric, or electric heat customers in I&M service territory. I&M will work with local community government agencies and seek other available data to identify qualified customers. Outreach will be performed to enroll qualified customers in this program.</p> <p>I&M may provide HVAC equipment services such as AC tune-ups or replacement as justified, for some gas heat IQ customers as identified and as appropriate but the program will not target gas heat customers with full program services.</p>
<p>Evaluation, Measurement & Verification:</p>	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.</p> <p>The impact evaluation is expected to determine the actual, verified energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.</p> <p>I&M and its implementation partner will capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, to the independent third party evaluator. The evaluator is expected to work closely with I&M to ensure proper data collection, energy reduction calculation methodology, and reporting accuracy.</p>

Residential HVAC Midstream Program - Indiana

Objective:	<p>The objectives of the Residential HVAC Midstream Program include:</p> <ul style="list-style-type: none"> •Promote increased availability, sales, & installation of certain efficient HVAC equipment •Improve and increase the local stocking of higher efficiency equipment •Expand market reach for the efficient measures rebated •Improve participation levels in I&M’s EE Plan residential programs overall
Target Market:	<p>This program will be available to residential HVAC equipment distributors located in or adjacent to I&M’s Indiana service territory.</p>
Program Duration:	<p>The Residential HVAC Midstream Program will be a program in I&M’s 2023 - 2025 EE Plan residential sector portfolio.</p>
Program Description:	<p>Generally, a midstream program seeks to improve through market transformation the stocking levels for energy efficient HVAC equipment in the I&M Indiana service territory.</p> <p>Measure rebates offered to distributors through this program are not available for rebates in any other I&M residential energy efficiency program, except for the IQ Weatherproofing Program.</p>
Incentive Strategy:	<p>The rebates provided in this program will offset a portion of the cost barriers inhibiting the local stocking practices for more efficient HVAC measures.</p> <p>The prescriptive rebates in this program are pre-determined cash reimbursements for typical energy efficiency measures undertaken by residential end use customers. Measure rebates in this program are designed with the intent to provide a partial offset of the incremental measure cost but serve to offset the cost for distributors to stock the more efficient measures eligible for rebates in this program. Variations in rebate amount across measure categories will exist. I&M reserves the right to update or revise measure rebate amounts during a program year depending on market conditions, customer payback, and utility cost effectiveness considerations.</p>

	<p>Measures will be individually assessed for incentive payment according to current market costs for both the efficient technology and its direct baseline, less efficient option as available in the market.</p> <p>The program may also provide encouragement for distributors through other incentives if they demonstrate through and provide sales data that stocking levels have improved through the use of the distributor’s sales team, as applicable and as determined by I&M and its implementation partner for this program.</p>
<p>Eligible Measures:</p>	<p>End-use categories of measures available for rebates through this program include: Residential HVAC units</p> <p>A complete list of measures planned for rebates through this program can be found in the Appendix A.</p> <p>Measures rebated through this program will be reported with and evaluated using and compliant with the Indiana Technical Resource Manual (version 2.2) or other similar industry databases or manuals with regional usage information as appropriate.</p>
<p>Implementation Strategy:</p>	<p>I&M will implement this program through turnkey implementation vendor services.</p> <p>The implementation partner will provide program requirements development, distributor enrollment, engagement, and communications including outreach and marketing as appropriate. The partner will also provide for distributor rebate payments, distributor and program performance tracking and distributor interface and data management. The partner will also make program data through its program database available to I&M and I&M’s third party evaluation consultant for the purposes of program EM&V.</p> <p>The implementation partner will develop and implement a management plan that will account for supply chain definition for the measure categories contained within this program, a distributor account management plan including distributor program agreement development and use, distributor recruitment and enrollment, distributor training, data collection for stocking levels, and reporting and advertising.</p>
<p>Marketing Strategy:</p>	<p>I&M’s implementation partner will perform marketing and outreach for this program direct to distributors.</p>

Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.</p> <p>The impact evaluation is expected to determine the actual energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.</p> <p>The chosen implementation vendor is expected to capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, back to I&M and I&M's independent third party evaluator. The evaluator is expected to work closely with I&M and its implementation vendor to ensure proper data collection, energy reduction calculation methodology, and reporting.</p>
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Work Direct Install Program - Indiana

Objective:	<p>The objective of the Work Direct Install Program is to engage small and medium size business customers with energy audits and energy savings options available to their respective business, where those customers benefit from ease of program participation and direct install of energy saving technologies because of limited in-house capabilities to do so themselves.</p> <p>The program will provide walk through audits by program registered trade allies and a direct install component to increase energy savings by offering specific services and incentives to small business customers in the I&M Indiana service territory to help facilitate and accelerate the implementation of proven energy efficiency measures.</p>
Target Market:	<p>This program will be available to C&I, institutional, for-profit, and non-profit and public agencies in the I&M Indiana service territory.</p> <p>The program's target market will include all small businesses less than 150kW in demand. While program outreach will generally targeted to retail and food service small businesses for the most productive energy savings opportunities, other businesses may include but are not limited to: restaurants, grocery, convenience stores/gas stations, barber shops, beauty salons, auto service shops/dealers, health services, membership organizations, banks, and hotels/motels.</p>
Program Duration:	The Work Direct Install Program will be a program in I&M's 2023 - 2025 EE Plan C&I sector portfolio.
Program Description:	<p>This program will focus rebates for lighting improvements. Rebates for other end-use improvements in small businesses such as refrigeration measures are available the Work Prescriptive Program and Work Custom Program.</p> <p>The Direct Install component of the program will offer direct install of prescriptive measures in small businesses that have less than 150 kW in demand. I&M's implementation partner will provide turnkey services for this program and will qualify installation contractors and will coordinate data from projects with data collected for each measure incented and installed.</p>
Incentive Strategy:	Rebate amounts will vary and may be adjusted for market conditions, but will generally be based on measure incremental cost and labor to install the measures with a project cap applied. If the total cost of a customer project exceeds the project cap, the customer can apply for and receive rebates for the additional measures installed, but not already funded in the Direct Install Program, through the Work Prescriptive Program.
Eligible Measures:	Eligible measures for this program include C&I efficiency measures for internal lighting applications only.

	<p>A list of eligible measures rebated through this program is provided in Appendix A.</p> <p>Measures rebated through this program will be reported based on and evaluated with the Indiana Technical Resource Manual (TRM), version 2.2, or other appropriate and acknowledged databases or TRMs that provide sufficient detail for use and application in the I&M Indiana service territory.</p>
<p>Implementation Strategy:</p>	<p>I&M will partner with an implementation business partner that will provide turnkey services for this program.</p> <p>I&M’s implementation partner will pre-screen a group of qualified trade allies that will perform the energy audit and measure direct install services for participating customers. Trade ally qualification criteria for this program will include such items as reference checks, commitment to identifying holistic opportunities, and staff geographic availability to provide services within the I&M service territory. These trade allies will provide the necessary services to effectively implement the program and obtain the energy savings outlined below. Trade allies will be trained and certified in the use of a walk-through audit assessment tool that will be designed to identify and calculate savings and incentive values for measures included within the program. Key implementation aspects include:</p> <ul style="list-style-type: none"> • Additional outreach including outbound calling via local or remote resources or qualified trade allies will be made to eligible small business participants to determine their willingness to participate in an on-site visit for the installation of no cost / low cost energy efficiency products. • The initial on-site visit is expected to take an average of 30-60 minutes to complete the walk-through audit. During the audit the trade ally will collect the necessary facility information to develop the energy report. An exit briefing will be held with the appropriate customer contact to describe what no cost / low cost energy efficient products were installed during the visit, the estimated annual energy savings attributable to those products, and a review of the energy report indicating the recommended additional energy efficiency upgrades for the facility. The trade ally performing the walk-through audit will also discuss what additional energy efficiency equipment upgrades they may be eligible for from the other programs in the I&M service territory. • If applicable, the program trade ally will work with the customer to schedule the installation of additional energy efficient direct install equipment while still on site. If the customer cannot schedule at that time, the trade ally will provide a follow-up call to schedule this installation.
<p>Marketing Strategy:</p>	<p>I&M’s implementation vendor will perform marketing and outreach for this program via I&M’s website, direct mail, bill stuffers, and community event outreach efforts. The marketing strategy will include an appropriate mix of direct outreach and targeted campaigns utilizing printed outreach (email, bill inserts, association publications, etc.). Marketing efforts will be conducted to the extent necessary to achieve program targets.</p>

Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.</p> <p>The impact evaluation is expected to determine the actual, verified energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective basis.</p> <p>I&M will capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, to the independent third party evaluator. The evaluator is expected to work closely with the I&M and its implementation partner to ensure proper data collection, energy reduction calculation methodology, and reporting.</p>
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Work Midstream Program - Indiana

Objective:	<p>The objectives of the Work Midstream Program include:</p> <ul style="list-style-type: none"> •Promote increased availability, sales, & installation of certain efficient HVAC equipment •Improve and increase the local stocking of higher efficiency equipment •Expand market reach for the efficient measures rebated •Improve participation levels in I&M’s EE Plan C&I programs overall
Target Market:	<p>This program will be available to Commercial & Industrial (C&I) HVAC equipment distributors located in and adjacent to I&M’s Michigan service territory.</p>
Program Duration:	<p>The Work Midstream Program will be a program in I&M’s 2023 - 2025 EE Plan C&I sector portfolio.</p>
Program Description:	<p>The Work Midstream Program seeks to improve through market transformation the stocking levels for energy efficient HVAC and cooking equipment in the I&M Indiana service territory.</p> <p>Measure rebates offered to distributors through this program are not available for rebates in any other I&M commercial and industrial energy efficiency program.</p>
Incentive Strategy:	<p>The rebates provided in this program will offset a portion of the cost barriers inhibiting the local stocking practices for more efficient HVAC and cooking measures. The prescriptive rebates in this program are pre-determined cash reimbursements for typical energy efficiency measures undertaken by commercial and industrial end use customers.</p> <p>Measure rebates in this program are designed with the intent to provide a partial offset of the incremental measure cost but serve to offset the cost for distributors to stock the more efficient measures eligible for rebates in this program. Variations in rebate amount across measure categories will exist. I&M reserves the right to update or revise measure rebate amounts during a program year depending on market conditions, customer payback, and utility cost effectiveness considerations.</p> <p>Measures will be individually assessed for incentive payment according to current market costs for both the efficient technology and its direct baseline, less efficient option as available in the market.</p> <p>The program may also provide encouragement for distributors through other incentives if they demonstrate through and provide sales data that stocking levels have improved through the use of the distributor’s sales team, as applicable and as determined by I&M and its implementation partner for this program.</p>

Eligible Measures:	<p>The Work Midstream Program only includes C&I HVAC units.</p> <p>A detailed list of HVAC measures planned for rebates through this program can be found in the Appendix A.</p> <p>Measures rebated through this program will be reported based on and evaluated with the Indiana Technical Resource Manual (TRM), version 2.2, or other appropriate and acknowledged databases or TRMs that provide sufficient detail for use and application in the I&M Indiana service territory.</p>
Implementation Strategy:	<p>I&M will implement this program through turnkey implementation vendor services.</p> <p>The implementation partner will provide program requirements development, distributor enrollment, engagement, and communications including outreach and marketing as appropriate. The partner will also provide for distributor rebate payments, distributor and program performance tracking and distributor interface and data management. The partner will also make program data through its program database available to I&M and I&M's third party evaluation consultant for the purposes of program EM&V.</p> <p>The implementation partner will develop and implement a management plan that will account for supply chain definition for the measure categories contained within this program, a distributor account management plan including distributor program agreement development and use, distributor recruitment and enrollment, distributor training, data collection for stocking levels, and reporting and advertising.</p>
Marketing Strategy:	<p>I&M's implementation partner will perform marketing and outreach for this program direct to distributors.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and</p>

engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.

The impact evaluation is expected to determine the actual energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.

The chosen implementation vendor is expected to capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, back to I&M and I&M's independent third party evaluator. The evaluator is expected to work closely with I&M and its implementation vendor to ensure proper data collection, energy reduction calculation methodology, and reporting.

Work Prescriptive Rebates Program - Indiana

Objective:	<p>The objective of the Work Prescriptive Program is to encourage and promote energy efficient measurement installation and use by I&M’s program eligible commercial and industrial customers. The program will provide a streamlined and efficient process for customers (or their Trade Ally) to receive rebates for measures authorized in the program through the use of pre-determined (i.e. “prescriptive” measure rebates and deemed energy savings values based upon segment-specific typical operating characteristics).</p> <p>The program promotes customer uptake and installation of energy efficient measures by providing rebates that address the higher cost to acquire the more efficient measures and encourages customers to manage their cost of electric energy through the use of energy efficient measures.</p>
Target Market:	This program will be available to Commercial & Industrial (C&I), institutional, for-profit, non-profit, and public entities (such as governmental entity building energy management systems) in I&M’s Indiana service territory.
Program Duration:	The Work Prescriptive Program will be a program in I&M’s 2023 - 2025 EE Plan C&I sector portfolio.
Program Description:	<p>Customers can apply for rebates online via email or through a program internet website. Customers can also designate a trade alley that can apply for the rebate for the customer pending all application requirements are met.</p> <p>Applications are submitted after project completion, subject to program requirements.</p> <p>Applications are reviewed by I&M or its contracted program vendor for correctness, accuracy, the appropriateness of rebates claimed, and are subject to the stated requirements of the program for budget availability, program eligibility and measure definition.</p> <p>Program requirements include thresholds for advance approval of large projects (i.e. projects with a rebate cost of greater than a certain dollar-level threshold (typically \$5,000 to \$10,000) to allow I&M to confirm budget availability and manage participation against program participation requirements. I&M may adjust the threshold level as-needed based on budget availability and participation barriers identified throughout a given program year to aid customer ease of participation (e.g., severe economic conditions, customer project approval certainty, etc.)</p>
Incentive Strategy:	<p>The rebates provided in this program will offset a portion of the cost barriers inhibiting customer decisions to upgrade to more efficient measures.</p> <p>The prescriptive rebates in this program are pre-determined cash reimbursements for typical energy efficiency measures undertaken by commercial and industrial end use customers.</p> <p>Tangible measures rebated under this program have well-defined and predictable operational characteristics, and have reasonably stable cost profiles that afford</p>

	<p>streamlined and efficient processing of rebate applications for both the customer (or their designated Trade Ally) and I&M.</p> <p>Prescriptive rebates in this program are designed with the intent to provide a partial offset of the customer’s incremental measure cost for the specific measure(s) installed. Variations in rebate amount across measure categories will exist. I&M reserves the right to update or revise measure rebate amounts during a program year depending on market conditions, customer payback, and tility cost effectiveness considerations. Measures will be individually assessed for incentive payment according to current market costs for both the efficient technology and its direct baseline, less efficient option as available in the market.</p> <p>The program will provide participants with an incentive through an online application process where applications reflect the list of approved measures incented through the program.</p>
<p>Eligible Measures:</p>	<p>Categories of eligible measures for this program include:</p> <p>End-use categories of measures available for rebates through this program include: C&I efficient refrigeration applications; C&I efficient cooking appliances; C&I interior and exterior efficient lighting applications; C&I efficient water heating applications;</p> <p>A complete list of measures planned for rebates through this program can be found in the Appendix A.</p> <p>Measures rebated through this program will be reported based on and evaluated with the Indiana Technical Resource Manual (TRM), version 2.2, or other appropriate and acknowledged databases or TRMs that provide sufficient detail for use and application in the I&M Indiana service territory.</p> <p>I&M and its program implementation vendor will conduct periodic reviews to update measure characteristics. Conditions may warrant rebate updates for these measures, I&M reserves the right to change program measures list at any time, subject to appropriate customer and Trade Ally notification of such.</p>
<p>Implementation Strategy:</p>	<p>I&M will implement this program through partnering with an implementation vendor who will provide turkey program services, including interface, market, and support for trade allies and C&I customers participating in this program.</p> <p>The business partner implementing the program on behalf of I&M will perform segmentation analysis of I&M C&I customers and will reflect use-case applicability, benefits analysis, and cost analysis while performing customer and TA outreach as part of the turnkey implementation for the program.</p>
<p>Marketing Strategy:</p>	<p>I&M’s implementation vendor will perform segment-specific marketing and outreach for this program direct to trade allies and I&M C&I customers, via direct outreach,</p>

	<p>I&M's website, direct mail, bill stuffers, umbrella marketing, and community event outreach efforts. This program will be continually promoted and supported during its operation throughout the program year.</p> <p>Promotion and support will be provided by either I&M, its implementation vendor, or both parties through on-site customer and Trade Ally engagement or via other channels described above.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.</p> <p>The impact evaluation is expected to determine the actual energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.</p> <p>The chosen implementation vendor is expected to capture participant information, perform energy reduction calculations, and provide detailed information, as specified to meet evaluation needs, back to I&M and I&M's independent third party evaluator. The evaluator is expected to work closely with I&M and its implementation vendor to ensure proper data collection, energy reduction calculation methodology, and reporting.</p>

Work Strategic Energy Management Program - Indiana

Objective:	The Work Strategic Energy Management Program (SEM) is a framework that prescribes and encourages business practice change through energy management principles and practices that can produce long term energy savings. SEM is a holistic approach to managing energy use to create energy savings through continuous improvement in commercial and industrial businesses.
Target Market:	This program will be available to I&M Indiana commercial and industrial sector customers.
Program Duration:	The program is proposed in I&M's 2023 – 2025 EE Plan C&I sector portfolio.
Program Description:	<p>SEM relies on a systematic approach to energy management within a commercial or industrial facility and is similar in concept to continual change practices and standards for business quality improvement, safety improvement, etc. (e.g. ISO 9001).</p> <p>SEM viability depends upon participating customer adoption and use of three elements:</p> <ol style="list-style-type: none"> 1. Demonstrated commitment through policies, goals, and allocation of resources; 2. Demonstrated energy management planning and implementation; and 3. Implementing and using a system for measuring and reporting performance. <p>Accordingly, SEM will provide rebates, training, and energy savings identification and verification. Training rebates will provide for Building Operator Certification (BOC) training on a per-participant basis. Behavioral energy savings will be evaluated according to building type for those participating in the training.</p> <p>SEM will also pay rebates based on a whole building assessment for energy savings, dependent upon the building type.</p> <p>Appendix A contains other industry documents that discuss and present the program design elements for a SEM program. Implementation efforts for SEM will be determined jointly with I&M's selected implementation partner and will follow the concepts and requirements presented in these industry documents.</p>

Incentive Strategy:	Customer incentives in SEM will be paid based on training completion and whole building energy savings realization according to the type of building participating in the program.
Eligible Measures:	<p>Eligible measure end-use categories for SEM include:</p> <ul style="list-style-type: none"> • C&I behavioral energy savings for BOC training completed; • Whole building analysis of energy use. <p>Additionally, the Industrial Systems component of the Work Custom Program provides measure rebates intended to support SEM application in customer buildings through operation and maintenance activities that support efficient building operation.</p> <p>A complete list of C&I SEM Program measures is provided in Appendix A. Please also see an accompanying IS component measure list in the Work Custom Program measure list provided in Appendix A.</p>
Implementation Strategy:	I&M will implement this program by partnering with an implementation vendor that can provide turnkey services for end-use measure categories offered for rebates through this program.
Marketing Strategy:	I&M's implementation vendor will perform marketing and outreach for this program through I&M's website and direct outreach.
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform process and impact evaluations to ensure that the program is effectively implemented, that the program is achieving the expected savings, and to offer suggestions for improving the effectiveness of the program, if warranted.</p> <p>The process evaluation is expected to include a review of program objectives, implementation processes, data collection procedures, quality assurance methodologies, reporting timelines, and tracking of costs. The process evaluation is also expected to determine the primary drivers of customer satisfaction and customer engagement. The methods used for evaluating these customer satisfaction and engagement will likely be based on questionnaires delivered via telephone, mail or online surveys.</p> <p>The impact evaluation is expected to determine the actual, verified energy reductions achieved by the program, and provide cost/benefit analyses of the program both on historical and prospective bases.</p> <p>The chosen implementation vendor is expected to capture participant information, perform energy reduction calculations, and provide detailed information, as</p>

	<p>specified to meet evaluation needs, back to I&M and I&M's independent third party evaluator. The evaluator is expected to work closely with the implementation vendor to ensure proper data collection, energy reduction calculation methodology, and reporting.</p>
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ENERGY STAR. The simple choice for energy efficiency.



Creating a More Energy Efficient Future for Residential Customers

The ENERGY STAR® Retail Products Platform



June 2020

ENERGY STAR. The simple choice for energy efficiency.



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ENERGY STAR. The simple choice for energy efficiency.



What is ENERGY STAR®?

The U.S. Environmental Protection Agency's ENERGY STAR is:

- A voluntary partnership among government, business and consumers to save money and protect our climate through superior energy efficiency
- A widely recognized and trusted mark on products, homes and buildings that meet strict energy efficiency requirements
- The simple choice for energy efficiency!



In 2018 alone, ENERGY STAR and its partners helped Americans save nearly 430 billion kWh of electricity and avoid \$35 billion in energy costs.

ENERGY STAR. The simple choice for energy efficiency.



The Need for Change

- Shrinking retailer participation in traditional programs
- Introduce cost and complexity
- Small incentives do not influence customers
- Data hard to secure

Retailer Perspective: Traditional Programs

10 Data Firms
46 Product Lists
18 Trainings
35 POP Materials
55 Stops
55 Starts
++\$\$ Instant
60 Legal Agreements
41 Mail In Forms
32 Incentives



Retailer Perspective: ESRPP

- 1 Contract
- 1 Start Date
- 1 Data Interface
- 1 Incentive Pool
- 1 Product List
- 1 POP Set
- 1 Evaluation Interview



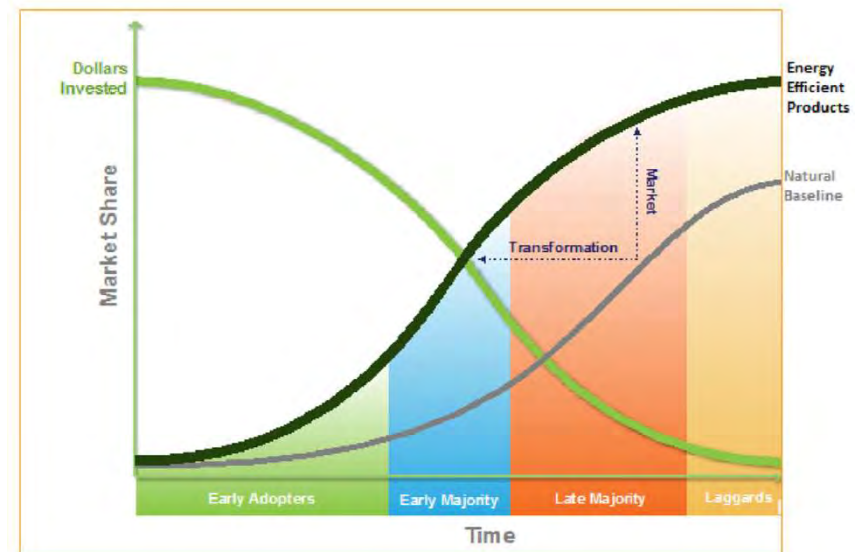
Why this matters to Program Managers:
The retailer focus is on improving Energy Efficiency

ENERGY STAR. The simple choice for energy efficiency.



What is the ENERGY STAR Retail Products Platform?

- The ENERGY STAR® Retail Products Platform (ESRPP) is a collaborative midstream initiative of ENERGY STAR, energy efficiency program sponsors, retailer partners, and other key stakeholders, facilitated by the U.S. Environmental Protection Agency
- Significant budgets and low administrative costs create strong value proposition for retailers
- Creates savings in growing “miscellaneous/plug load” product categories at significantly lower cost to program sponsors



Source: Northwest Energy Efficiency Alliance—“NEEA’s Definition of Market Transformation”

ENERGY STAR. The simple choice for energy efficiency.



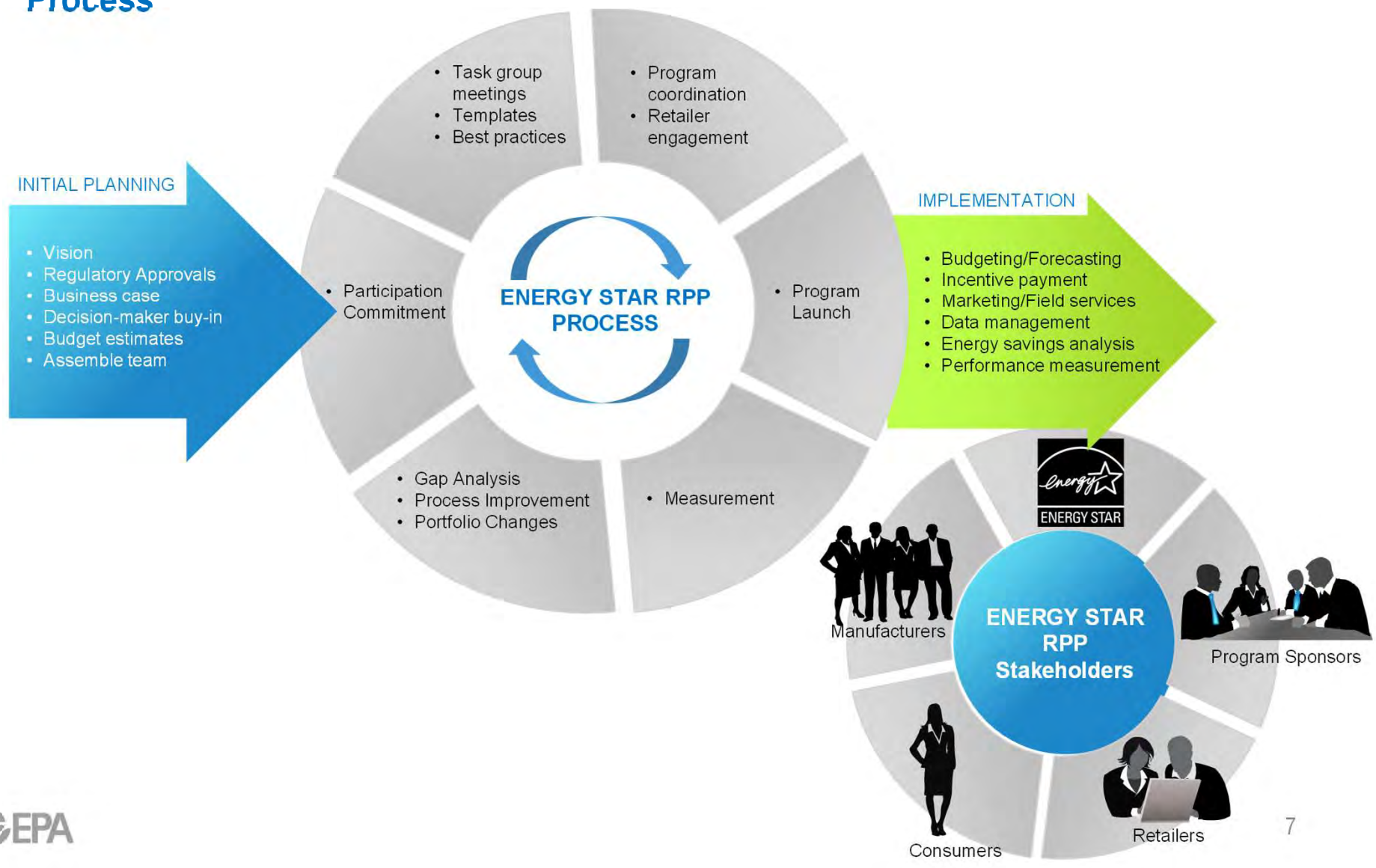
The Midstream Approach

- In a midstream model, program sponsors provide incentives to retailers to encourage stocking, promoting, and selling a higher percentage of energy efficient products.
- Small per-unit incentives, which may be trivial to a consumer in a downstream program, may be significant for a retailer when compared to their profit margin on a product – thus influencing a retailer’s product stocking behavior.
- Resulting increases in sales of high efficiency models can prompt manufacturers to permanently shift to production of these models.



ENERGY STAR. The simple choice for energy efficiency.

Process



ENERGY STAR. The simple choice for energy efficiency.



A Message from the ENERGY STAR Retail Action Council

- “We support program sponsors efforts to build scale via the ENERGY STAR Retail Products Platform”
- “We believe the ESRPP is the future of energy efficiency programs, and the future is now!”
- “We are offering to help regulators recognize the energy saving opportunities”
- “We will assist innovative Program Sponsors who join together with the EPA transform the energy efficiency market”



sears



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ESRPP Retailer Participation Agreement

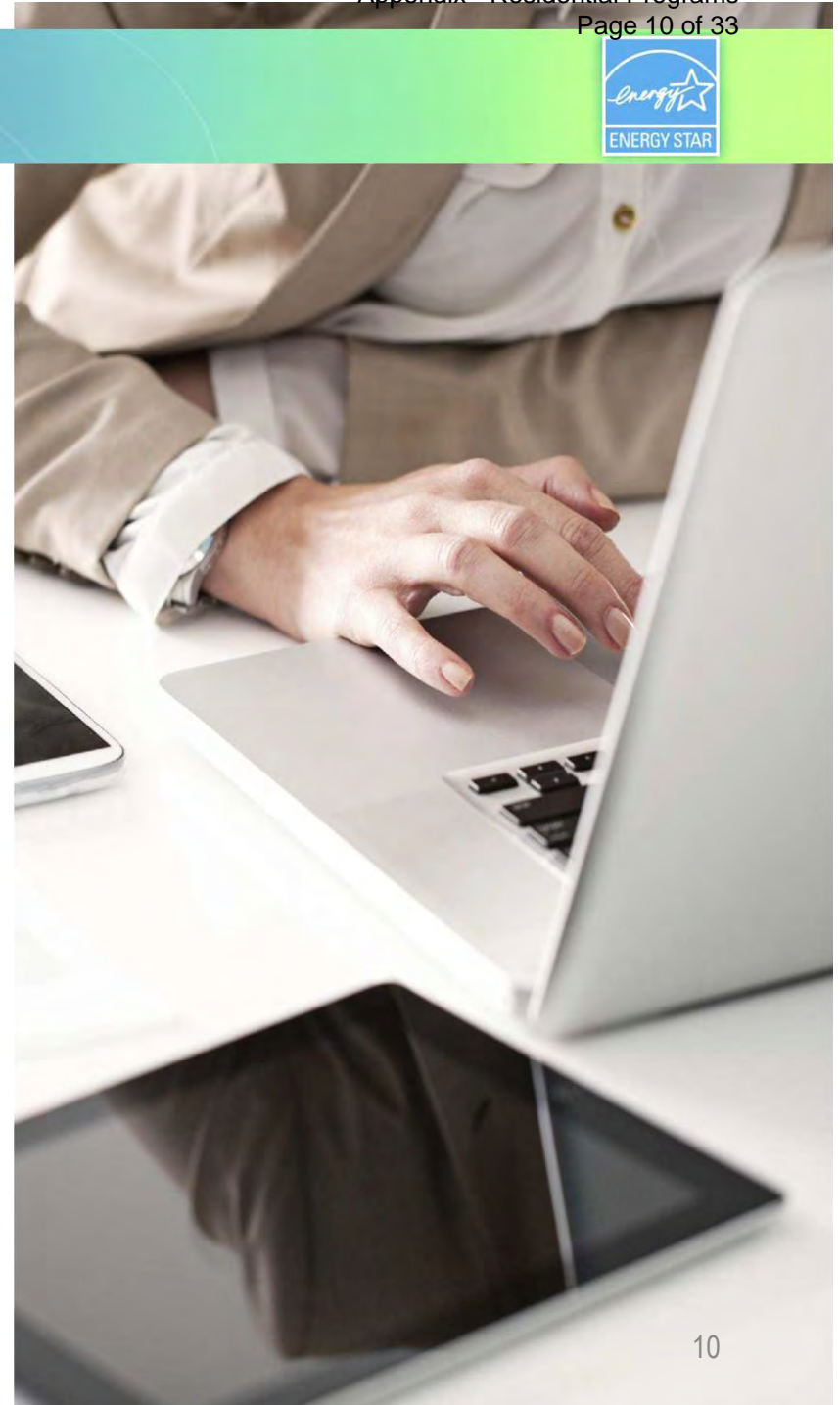
- Developed by retailers and program sponsors with provisions for
 - Common signage, marketing plans, data formats, data transmissions, field services Letters of Authorizations, and evaluation interviews with retail merchants and marketers
 - Customizable exhibits for program sponsor-specific requirements: store lists, qualifying products
- Includes many elements that are energy efficiency industry firsts
 - Ongoing category sales data
 - 12 months of historic sales data
 - A mutually created implementation plan
 - A common EM&V interview process



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Data

- Benefits
 - Program sponsors gain access to better data
 - Retailers benefit from consistent program structure
- Requirements
 - Model number
 - Sales Date
 - Store ID
- Data solutions company
 - Serves as interface between retailers and program sponsors



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Products

In 2020, the ESRPP product portfolio will include the following products:

- ENERGY STAR certified dryers
- ENERGY STAR certified freezers
- ENERGY STAR certified room air conditioners
- ENERGY STAR certified clothes washers
- ENERGY STAR certified refrigerators
- ENERGY STAR certified smart thermostats

The ESRPP Program Sponsors decided to focus on the products in the 2020 portfolio based on opportunities to streamline program operations and reduce administration costs, the ability to increase leverage with retailers, and specification revisions underway,

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Marketing, Field Services, and Implementation

- Marketing: in-store signage
 - Retailers pre-approve, no turnaround time or review
 - Prominent program sponsor branding
 - Flexible color scheme and tagline for program sponsor brand alignment
- Implementation Plan
- Letters of Authorization
- Field Services Tool Kit



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Evaluation—A Different Approach is Required

- ESRPP is still in the early stages of evaluation where the focus is on proving the concept.
- The following program evaluation design and analysis methods are recommended for ESRPP:
 - Use a theory-driven evaluation approach based on a pre-established program theory and logic model
 - Set clear and measurable short-term, mid-term, and long-term indicators to be used as a measure of progress over time.
 - Establish a baseline against which the program impacts can be measured.

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ENERGY STAR Retail Products Platform Update

2020 Participants*

- CA: PG&E and SMUD
- CT: Eversource CT, UIL Holdings
- ID, MT, OR & WA: NEEA
- IL: ComEd
- MD: BGE, PEPCO, SMECO, Delmarva Power, Potomac Edison-FirstEnergy
- MN: Xcel Energy
- NY: Con Ed, NYSEG, RG&E
- VT: Efficiency Vermont

Discussions Regarding 2020/2021

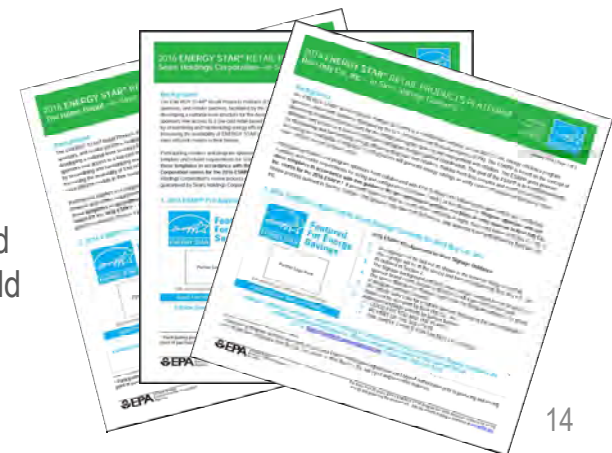
- CA: SCE and SDG&E
- DC: DC SEU
- IL: Ameren
- MA: Eversource
- RI: Eversource

*ESRPP program years run from April 1 – March 30.



- Implementing at more than 1,000 store locations at Best Buy, Home Depot, Sears, Nationwide Marketing Group, and Lowe's in program year 2020.
- Receiving on-going full category sales data
- 12 months historic category sales data
- Retailers and Program Sponsors working together to select future product categories
- Largest appliance and CE manufacturers beginning to collaborate with ESRPP

Pre – approved
signage and field
services
authorization

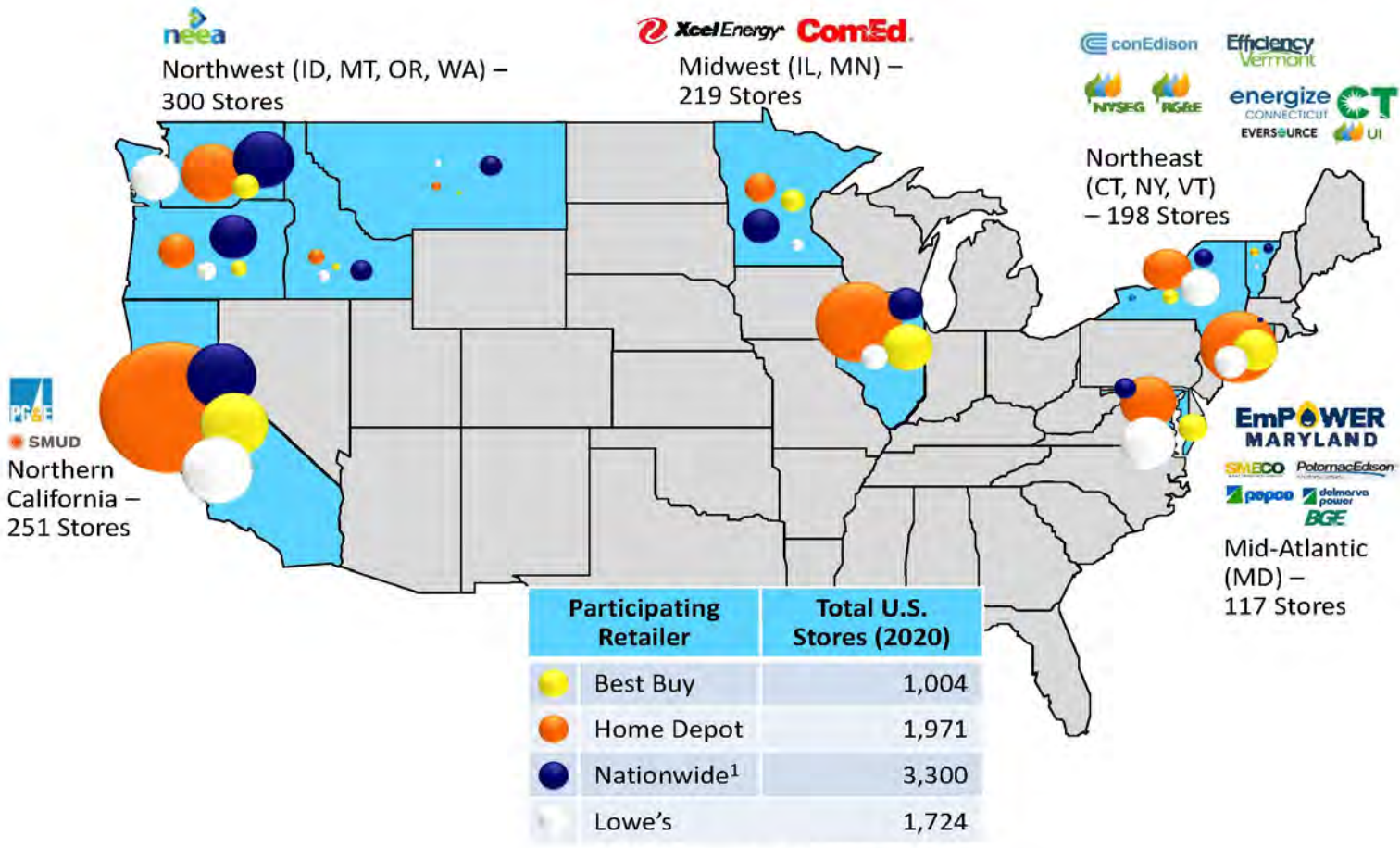




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2020* Highlights

- 4 participating retailers
- More than 1,000 storefronts
- 16 program sponsors in 11 states
- More than 18% of the U.S. market covered



1. Only stores selling appliances

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2020 and Beyond

- **Build platform and scale to support national energy savings**
 - Undertake executive level/regulatory outreach
 - Support EM&V and Share Best Practices
 - Refine Working Groups and Program Infrastructure



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Getting Involved

Getting Started

- Contact EPA via esrpp@energystar.gov to discuss program concept and potential role
- Help shape discussions with regulators and evaluators
- Visit www.energystar.gov/ESRPP

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Appendix

- FAQs
- Resources
- Basic Structure
- Roles, Responsibilities, Working Structure

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FAQs:

Where can I find the additional resources?

Visit www.energystar.gov/ESRPP. Additional resources, including information regarding ESRPP evaluation, data, products, participation, and marketing/field services, can be found on the ESRPP Google Drive. For access to Google Drive, please contact ESRPP@energystar.gov.

How is the group structured?

ESRPP is structured to incorporate input from all participants, including retailers, program sponsors, and manufacturers. The program has developed task forces for each major component of the program and these task forces meet regularly to review updates and resolve issues or questions. The task forces include members from the program sponsors, EPA, and stakeholders. ESRPP members convene bi-weekly to review progress made within the task forces and discuss how best to move the program forward.

How are decisions made among program sponsors involved in the pilot?

The ESRPP is a collaborative effort, so all decisions are made at the task force level once a consensus is reached among participants. This ensures that all participants have a voice in program developments. Once an issue is resolved at the task force level, it is discussed among the full group during the bi-weekly status meetings.

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ESRPP Resources

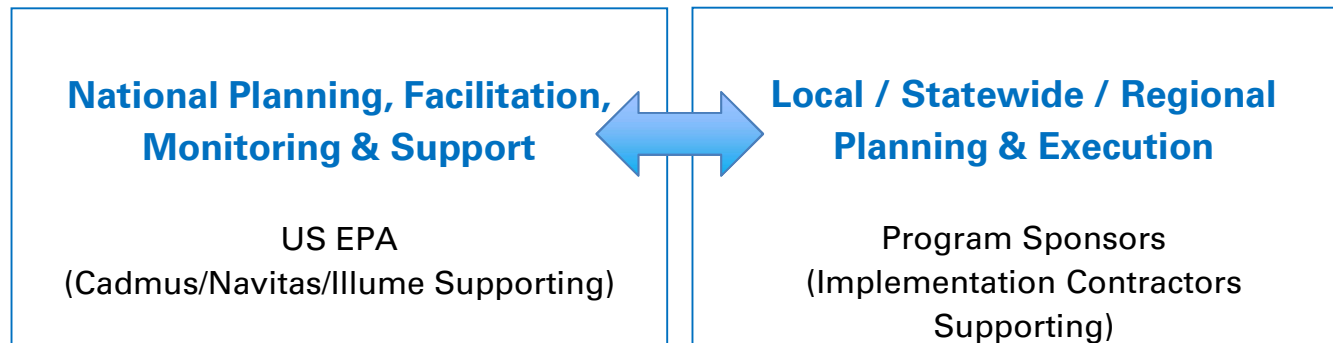
- **Overview:** 2019 Progress Report, 1-pager, Pitch Deck, and Sample Filing Language
- **EM&V:** Evaluation Approaches Guidance, FAQs, and Data Resources
- **Data:** Data Management Services Procurement Guidance
- **Products:** Product Savings Analysis, Product Transition and Introduction Guidance
- **Marketing/Field Services:** Signage Templates, Field Services Toolkit, Letters of Authorization
- **Legal:** Participation Agreements

All resources are available on the ESRPP Google Drive. For access, please contact esrpp@energystar.gov.

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ESRPP Basic Structure



- At the start of the initiative, in September 2014, the core stakeholder group defined critical aspects of a successful and innovative nationally coordinated market transformation-based energy efficiency program.
- Special consideration was given to how to engage stakeholders in the design of this new platform to help the group realize the significant efficiencies of scale, energy savings, and environmental benefits promised by this approach.
- Volunteers lead efforts in each key area, and rely on EPA to help lead some aspects of the planning and provide overall facilitation to help the group stay focused on delivering on their long term vision.



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ESRPP Roles, Responsibilities & Working Structure

Task Force	Lead(s)	Goal
1. EM&V/ Regulatory	P. Banwell, EPA D. Lawlor, Cadmus S. Conzemius, Illume	To develop “new” approach to EM&V, create guidance to serve as foundation of individual EM&V plans.
2. Data	B. Littlehales, NEEA	To manage secure, centralized, machine-to-machine data exchange infrastructure and processes. Retailers use data portal as a central repository for sales data; Sponsors use as central source for program management & EM&V.
3. Products	E. Olson, NEEA	To coordinate product portfolio management, including product additions and retirement, tiers, relationship to ENERGY STAR specifications, etc.
4. Outreach	D. Lawlor, Cadmus	To educate the broad stakeholder community about the ESRPP. Outreach includes EEPS, program implementers, retailers, manufacturers, and the EM&V/regulatory community. Channels include recruiting sponsors and retailers, facilitating group presentations at industry meetings and conferences, developing white papers, etc.
5. Marketing	S. Duffy, Cadmus	To build a consistent core look & feel for EEPS program materials, including key messaging and design elements and retailer pre-approved POP templates. (Includes field services and implementation: objective to create a consistent set of resources for EEPS to use with field implementers, and to build in important field to program feedback loop for the group’s future planning.)
6. Retail & Legal	P. Kilroy, Navitas	To ensure retailers experience streamlined interactions with EEPS from the beginning of the pilot by serving as the single point of contact for the retailers. This role is envisioned to diminish as the platform is scaled and infrastructure built to be more “self-service.” Also creates master agreement templates for ESRPP, and address other legal issues of concern to the group. Facilitates the ENERGY STAR Retail Action Council (ESRAC).



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Additional Key Roles & Activities

Area	Lead(s)	Goal/Scope
ENERGY STAR Retail Action Council (ESRAC)	Best Buy The Home Depot Lowe's Nationwide	To ensure that program sponsor get the benefit of strategic insights from the market in the planning, implementation, evaluation, and continuous improvement of ESRPP, which is designed to fully leverage the power of key market actors to secure the most cost-effective, persistent, energy savings in the retail sector.
Standing Meetings	P. Banwell H. Tomlinson	<ul style="list-style-type: none"> • Task force updates <ul style="list-style-type: none"> ○ bi-weekly with all interested stakeholders ○ Quarterly retailer marketing reports • Products task force—monthly • EM&V task force—monthly • Data task force—monthly • ENERGY STAR RAC, other task force, and individual sponsor meetings—scheduled as needed
Overarching	H. Tomlinson	To provide a centralized infrastructure for planning and coordination among sponsors as platform is developed. Manage key milestones, program documents, communication with sponsor group, and cross-cutting tasks.

Executive Summary

The ENERGY STAR® Retail Products Platform (ESRPP) is an energy efficiency program design targeting energy savings opportunities related to consumer products, such as electronics and appliances, sold through retailers.

Utilities and other energy efficiency Program Sponsors around the country (collectively referred to as the “Collaborative”) leverage their combined incentive budgets to motivate retailers to change their buying and assortment decisions toward more energy efficient models of each product category in the ESRPP portfolio. Qualifying specifications are based on ENERGY STAR certification criteria and incentives will typically be directed towards both a “basic” and “advanced” qualification tier for each product category.

To achieve lasting impacts and progressively increase the efficiency of these products, the Collaborative intends to build market share for highly efficient products over time and lock in energy savings by working with the U.S. Environmental Protection Agency (EPA) to increase the stringency of ENERGY STAR specifications.

ESRPP program design is based on market transformation theory and policy. Market transformation programs typically employ a mix of incentives, program tools, and policy engagement to achieve lasting impacts. Where market transformation policy is not yet in place, ESRPP programs can operate within a resource acquisition framework, but cost-effectiveness may be constrained if long-term, market transformation benefits resulting from this program design cannot be counted.

Therefore, Program Sponsors are encouraged to work within local policy constraints to enable the effective deployment and appropriate evaluation of market transformation activities. Developing a market transformation framework, adopting logic models that allow for longer term savings potentials, and setting an evaluation framework that takes into account market transformation objectives are common activities to build regulatory support for ESRPP.

An important ESRPP success measure is program scale. The higher the coverage of the U.S. market – more Program Sponsors and more retail stores – the more influence Program Sponsors have to shift retailers and manufacturers to producing and selling more efficient products. Voluntary collaboration of Program Sponsors allows the ESRPP community to work together to establish energy efficiency goals and achieve true market transformation. The Collaborative has much more influence together than any individual Program Sponsor can have alone.

While ESRPP Program Sponsors implement their own programs individually, each Program Sponsor works with core program elements to maintain operational consistency and has a common point of contact with retailers for a collective voice to the market. Collaboration also allows Program Sponsors to share best practices and resources. Consistency among ESRPP participants allows evaluators and regulators to assess an individual program within the national structure and document the benefits of the collaboration.

ESRPP programs operate at reduced cost and with enhanced integrity by leveraging the ENERGY STAR program. Through their partnerships with ENERGY STAR, Program Sponsors, retailers and product manufacturers have previously committed to ENERGY STAR as a common platform for marketing energy efficient products to consumers. ENERGY STAR performance specifications offer a turn-key basis for defining highly efficient products in a way that has broad market acceptance. Products that earn the ENERGY STAR label are independently certified through a process recognized and overseen by EPA and subject to off-the-self verification testing.

This document provides a high-level overview of ESRPP core program elements, operating processes and references to resources and tools to support ESRPP program management. Information in this document includes guidance for program managers to effectively implement ESRPP and to get the greatest benefits from the collaboration with other ESRPP Program Sponsors, participating retailers and ENERGY STAR.

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1. The ESRPP Collaborative

ESRPP is a voluntary collaboration between Program Sponsors (“the Collaborative”). The combined efforts and influence of the Collaborative help move retailers’ buying and marketing decisions towards qualifying ESRPP models and shapes EPA’s plans for new and enhanced ENERGY STAR specifications. In 2020, there are 16 efficiency program sponsors participating in ESRPP, covering 18% of the U.S. market. This collective influence is facilitated by consistent program design and implementation¹, and active communication among program participants.

Communication among ESRPP participants occurs in regularly scheduled structured meetings and in ESRPP task forces. ESRPP task forces have been active in developing, assessing and implementing major components of ESRPP since its inception. These groups meet to review progress, resolve issues or questions, share best practices, support process improvements, and plan for the future of ESRPP. ESRPP is a collaborative effort, so all decisions are made at the task force level once a consensus is reached among participants. This ensures that all participants have a voice in the national program. ESRPP includes the following activities and task forces:

- **ESRPP Update Call:** This call of the full Collaborative provides a summary of all relevant activity that occurs within each ESRPP task force. Retailers also give a quarterly presentation on program progress and marketing plans at this meeting. The Collaborative holds this call at least monthly.
- **Products Task Force:** This group is responsible for the development and execution of product-specific strategies, including adding, removing, or updating product categories and their qualifying levels. Additionally, this group coordinates on ENERGY STAR specification input to EPA as appropriate. Product portfolio management process documentation adopted by the Products Task Force are available on the ESRPP shared file site². The task force meets monthly.
- **Data Task Force:** This group addresses all data-specific issues related to the upload and processing of retail sales data as well as related data requirements and needs of the Collaborative. It also is responsible for guiding and supporting database updates and reporting requirements for all sponsors. Data guidelines adopted by the Data Task Force are on the ESRPP shared file site. The task force meets quarterly.

¹ The initial group of Program Sponsors and key stakeholders have been sensitive to anti-trust considerations during the early development of the ESRPP. Accordingly, preserving the ability for participants to choose product categories at their discretion and to set incentive levels independently are important elements of the platform. It is recommended that each participant conduct their own legal due diligence.

² Contact EPA for access to the ESRPP Shared File Site.

- **EM&V Task Force:** This group deals with evaluation, measurement, and verification (EM&V) strategies and market transformation approaches, challenges, and best practices relevant to the Collaborative's ESRPP efforts. The task force also coordinates the national retailer interviews conducted on behalf of the Collaborative. Market transformation whitepapers and completed evaluations are available on the ESRPP shared file site. The taskforce meets quarterly.
- **Outreach Task Force:** This group focuses on recruiting and onboarding new sponsors with an objective to increase program scale. While not all members of the Collaborative regularly participate in recruitment, all Program Sponsors are encouraged to contribute to recruitment activities. The task force meets as needed.
- **Marketing Task Force:** This group focuses on the annual development of marketing material and signage templates that are aligned with ENERGY STAR program strategy. Retailers preapprove Program Sponsor signage based on ESRPP templates for placement in participating retail stores. Signage not adhering to templates requires retailers' approval through a separate process. Signage templates, field service guidelines and formal retailer letters of authorization are on the ESRPP shared file site. The task force meets as needed.

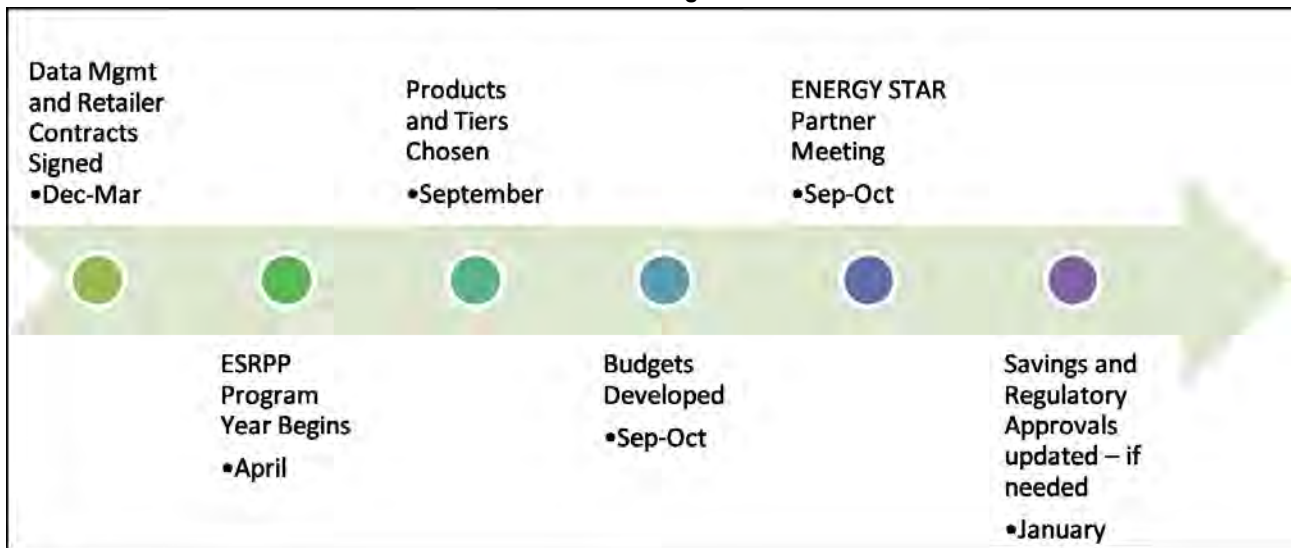
2. ESRPP Calendar and Key Dates

A common ESRPP calendar identifying program start and end dates, time dependent activities and deadlines is essential for running a unified program. While market transformation is a multi-year process with long term baselines, ESRPP budgeting and program decisions follow an annual calendar. The ESRPP calendar is designed to align with retailers' merchandizing calendar and ENERGY STAR's schedule for national promotions.

- **ESRPP Calendar:** The ESRPP program year begins April 1st each calendar year and ends March 31st in the following calendar year. This timing accounts for the peak holiday season for retailers and their buying timeframes for appliances and electronics. National ENERGY STAR promotions also follow this cadence.
- **Product Selection:** Product categories and tiers are finalized by the September before the start of each program year. This allows Sponsors to get necessary regulatory, budget, and savings calculations approvals in advance of the April 1 program start date. This timing is critically important to the success of ESRPP's market transformation approach, as it ensures that this information is available to retailers in time to influence assortment decisions for the new year. Product categories, tiers, and incentive rates are mandatory information for retailer contracts.
- **Contracting:**
 - **Retailer Contracts:** Each Program Sponsor executes a standardized contract – the ESRPP Universal Participation Agreement, or UPA – with each participating retailer. Once the pre-negotiated UPA is in place, it does not change but is updated annually with a simple amendment for each new program year. The initial UPA and annual amendments must be executed prior to the initial April 1 program start date. However, efforts to finalize annual contract documents earlier than the start date – closer to December – can produce a more meaningful influence on retailers' assortment and marketing decisions related to ESRPP.
 - **Data Management Contracts:** Data management contracts must be executed before the start of the program. After both the data management and retailer contracts are in place, retailers will provide one year of historical data to the data management provider for new products or new Program Sponsors.
- **Incentive Budgets:** Program Sponsors have varying budget approval cycles, but generally begin their individual and independent budgeting process before September each year. Sponsors' incentive budgets are generally submitted to retailers and the data management provider during January or February prior to program start, although earlier submittal is ideal for retailer assortment planning purposes.
- **Regulatory Approvals:** Every jurisdiction has different regulatory requirements and deadlines, but regulatory and annual budget approvals are generally required before contracts can be signed.
- **ENERGY STAR Products Partner Meeting:** Held annually in September, this meeting is a good time to interact with other Program Sponsors, retailers, manufacturers, consultants, and the EPA. Information on current and past meetings is maintained at www.energystar.gov/partnermeeting.

- **Collaborative meetings:** ESRPP is a collaboration among stakeholders. Sponsors and task forces regularly meet to strategize, plan, and discuss best practices as needed.

ESRPP Program Timeline



3. Budgeting and Forecasting

An ESRPP budget typically encompasses incentives as well as other implementation costs including data management, product and savings analysis, evaluation, marketing and field services.

Incentives are the largest program cost and need to be appropriately forecast and tracked. Most Program Sponsors operate on a financial year from January 1st through December 31st and begin their budgeting cycles during the third quarter of the calendar year. Budgeting and forecasting must account for the ESRPP calendar and retailer contracts, which span the twelve months from April 1st to March 31st in the next calendar year. Financial and sales data in the ESRPP data portal allow ESRPP program managers to create annual budget forecasts, track actual performance against budgets and update forecasts as necessary.

- **Budgeting:** The annual ESRPP program budget for incentives is based on trends for retailer sales in the sponsor's service territory and the incentive rates for products and tiers in the portfolio. Since participating retailers do not supply actual sales data until contracts are in place, Program Sponsors prepare a first year incentive budget based on an annual qualified product sales estimate using the number of stores by retailer in a service area and national sales trends.³ While each Program Sponsor will have different budgeting needs and guidelines, the following are some common items to keep in mind while preparing a forecast and managing a budget:
 - Incentive budgets can be constructed at different levels of detail. The most detailed level looks at monthly incentives paid by product tier and by retailer. Many ESRPP program managers find it acceptable to forecast and track budgets by product tier only.
 - Retailers provide a forecast of incentives that they expect to receive during the program year after they sign their contract. Retailer forecasts can be a confirmation of a sponsor's budget and a benchmark for forecast revisions.
 - Each program year, Program Sponsors independently determine incentive rates for their selected products and product tiers, considering budget constraints and the ability to influence retailers.
 - When using sales data from the ESRPP portal for budgeting, Program Sponsors keep in mind that sales trends vary monthly and by product category, and that retailers may open or close stores over the course of a year.

³ Contact EPA for assistance.

- Most incentive budgets follow a calendar year and will have to align with the program calendar. Product tiers and incentive rates for the first quarter of the calendar year will likely be different than the tiers and incentives for the second through fourth quarters.
- When tracking budgets and updating forecasts, it is important to note that there is a one to two-month delay between qualified products sales and the invoice for incentives.
- Forecasting and tracking sales by tier also allows program managers to estimate energy savings.
- **Forecasting:** Forecasting upcoming sales relative to the available budget is a critical program management activity. Most Program Sponsors review financial information on a monthly basis, monitoring variances between forecasts and actual results. Revisions to forecasts take into account sales to date, the seasonality of sales, the number of participating retailers, and the lag-time between the date of sales data reporting and date of payment to retailers.
 - The ESRPP data management portal offers reports to track budgets and provides advance notification to Program Sponsors so they can manage within budget. Incentives are paid to retailers on qualified products sold on a first come basis, up to the budget allocated by the Program Sponsor.
 - Budget tracking identifies any potential shortage or excess of funds for a product category. The ability to shift funds between product categories varies by jurisdiction. Program Sponsors monitor these budget tracking reports on an ongoing basis to ensure they meet the contractual requirement to notify retailers 60 days before available funding will be exhausted.

4. Data Management

Access to retailer sales data is one of the most important aspects of ESRPP. Retailers upload full category sales data for program-qualified and non-qualified sales into the ESRPP data portal. The data processes used by the ESRPP data administration firm⁴ identify qualified sales and create invoices that the Program Sponsors use to pay retailers.

- **Data Portal:** Retailers upload sales data monthly into a centralized data management system. The ESRPP data administration firm processes sales data each month no later than 20th of the month. For example, January sales are processed before February 20th. Each Sponsor executes a separate contract with the data administration firm for access to the data portal and data management services.
- **Data access and confidentiality:** As part of ESRPP, retailers agree to provide full-category sales data for all incentivized products, pursuant to the confidentiality restrictions detailed in the Participation Agreement. Program Sponsors have full access to qualified sales data for products and tiers in their portfolio. Program Sponsors can view non-qualified sales reports that aggregate data and do not identify retailers or brands. The confidential nature of this data requires that Program Sponsors and their contractors adhere to rigorous data security requirements as outlined in their Data Management contract.
- **Data Quality and Consistency:** To ensure accuracy of both program incentive payments and energy savings claims, the ESRPP data administration firm ensures that model matching and other key steps in the data management process are executed to a prescribed degree of accuracy. The data management system removes ineligible models by matching each sale against a qualified store list, against the sponsor's list of incented products and tiers, and against the ESRPP Program qualified products list (QPL), which in turn is based on the ENERGY STAR QPL (<https://www.energystar.gov/productfinder/advanced>). Accurate model matching against the QPL ensures that the program correctly reflects ENERGY STAR market share.
- **How the Data are Used:**
 - **Program Management:** Program Sponsors use the data to pay incentives. Data in the portal allow program managers to check that the incentives are billed correctly and to monitor trends for forecasting and future budgeting.
 - **Product Portfolio Management:** The Products Task Force uses the data to track market share over time and determine if the current products and tiers are set correctly. Data provide guidance to timing and levels of tiers when they are updated as the market responds to ESRPP's interventions.
 - **EM&V:** Each Program Sponsor's evaluation team uses ESRPP sales data to track the success of program interventions by program category and tier, and to calculate savings. Data quality is one key to successful evaluations.

⁴ Contact EPA for more information.

- **ENERGY STAR specification setting/revision:** The ESRPP Collaborative can use sales and market penetration trends to support their advocacy for new and/or more stringent ENERGY STAR specifications. ESRPP's total category sales data provides a unique view of the market for energy efficient products and enables data analysis and feedback on the following:
 - ENERGY STAR market share trends over time for existing and proposed levels
 - National average gross energy savings of more efficient technology
 - Test methods used to measure unit energy consumption
 - Emerging technologies that may improve efficiency
 - Gaps in qualification criteria for current and/or proposed product specifications.
- **Resources:** More information about data management is available through the ESRPP Data Task Force and in the data guidelines on the ESRPP shared file site.

5. Portfolio Management

The ESRPP portfolio is the collection of all the approved products and tiers on which a Program Sponsor may pay incentives. ESRPP portfolio management is the overall process of evaluating product options, adding and removing products, and setting eligible tiers. The process is consensus-based to provide flexibility to individual Program Sponsors while maintaining the consistency required to provide value to retailer partners. ESRPP portfolio management is the responsibility of the Products Task Force with the guidance and approval of all Program Sponsors. The task force maintains a portfolio management process document for governance purposes, which is accessible through the ESRPP shared file site.

- **Product Selection:** Each year, through the Products Task Force, Program Sponsors and participating retailers review the existing portfolio and determine whether they would like to add, modify, or remove existing product categories. The process begins in March with discussions on what is working, what is not, and what items might be good candidates to add or remove from the portfolio. Market and technical analysis of the products leads to recommendations for the next year's portfolio, which are presented to Program Sponsors in September. Program Sponsors reach a consensus on the product portfolio and the Products Task Force approves final product and tier selection. Program Sponsors strive to finalize product plans and incentive rates during the fourth quarter of the calendar year to enable timely contracting and retailer engagement for the next program year.
- **Consistency among Program Sponsors:** Product portfolios of each sponsor are consistent in order to leverage the power of the Collaborative and shift retailer buying decisions towards efficient products. At the same time, preserving the ability for participants to choose product categories at their discretion and to set incentive tiers and levels independently are important elements of the platform. Accordingly, Program Sponsors use a "menu approach" to select their targeted products and tiers from the approved ESRPP portfolio. For example: a Program Sponsor may choose to not include dryers in their program or to include only one tier of dryers; however, if they include the advanced tier for dryers in their program, for consistency, their advanced tier specification must match the tier defined in the approved ESRPP portfolio.

6. Retailer Engagement and In-Store Marketing

Retailers are important partners in ESRPP. They provide a channel for energy efficient products to reach consumers in Program Sponsors' service territories and exert influence with manufacturers on energy efficiency improvements of products currently in the market, as well as on the development of new products. The midstream program design element is that ESRPP program incentives are paid to the retailer. In turn, the retailer uses the incentives to stock and market the targeted more efficient products, and provides valuable full category sales data that support program implementation strategies, evaluation, and the development of future targeted interventions. Consumers benefit directly from ESRPP through increased availability of energy efficient products, and may see price reductions if a retailer's marketing strategy for a product includes passing some or all of a Program Sponsor's ESRPP incentives to customers.

- **Retailer Contracts:** A retailer executes a contract (known as the ESRPP Universal Participation Agreement, or UPA) with each participating Program Sponsor at the start of a program and annually signs a simple amendment that extends the period of performance and includes qualification information and product incentive rates for the new program year.

- **Retailer Engagement:** A representative of the ESRPP provides a single point of contact with retailers and leads all aspects of retailer engagement including contracting facilitation, communication of qualifying levels, incentive rates, and product category selection. This single point of contact helps facilitate discussion and action on other partnership opportunities and questions as they arise.
- **Retailer Contract Obligations:** Program Sponsors can expect the following from retailers:
 - **ESRPP Marketing Plan:** At the start of each program year following the execution of the UPA or amendment, retailers will provide a marketing plan outlining annual activities to promote the sale of the targeted efficient products. Retailers deliver quarterly updates during Collaborative meetings describing marketing activities during the previous quarter as well as marketing plans for the current period and the next quarter. This plan and updates provide evidence for program attribution.
 - **12 months of historical baseline data for all product categories:** Historical data files are submitted to the data management portal immediately after a new retailer signs contracts to join the program and when products are considered for inclusion in future program years. These data are available to Program Sponsors under the terms of the UPA and data management agreement.
 - **Program year retail sales projections:** Retailers provide qualifying product sales forecasts to help with Program Sponsor budgeting and incentive allocation.
 - **Monthly uploads of total category sales data:** Retailers provide data, including model number, sales date, sales location, quantity and other fields, as specified by the UPA and data management agreement. Retailers submit monthly sales data files no later than the 15th of the following month.
 - **Evaluation Interviews:** Retailers will make key staff available for national evaluation interviews each year. These evaluation interviews are done by EPA ESRPP support team, and include merchants, sustainability staff, or other decision makers at each retailer.
- **In-Store Marketing (for Program Attribution):** Retailers conduct most of the in-store marketing activities related to ESRPP. As a market transformation program⁵, ESRPP does not require Program Sponsors to do any marketing or promotion in the store. However, to meet jurisdictional program attribution requirements, some Program Sponsors use in-house or contracted field services teams to place retailer pre-approved ESRPP point of purchase (POP) signage. Program Sponsors also work with retailers to support store associate training.
- **Field Teams:** Some Program Sponsors have field teams that place retailer pre-approved POP signage on qualified products, trains retail staff, and/or conduct field shelf surveys of which qualified products are on shelves. Shelf surveys assist with individual program evaluations and help meet resource acquisition program requirements for attribution.
- **Marketing and Field Service Resources:** The Marketing Task Force coordinates the development and approval of all POP signage. ESRPP POP signage templates and Letters of Authorization (LOAs) from retailers to allow Program Sponsors' in-store activities are in the ESRPP shared file site.

7. Evaluation, Measurement, & Verification (EM&V)

Evaluation is key to every Program Sponsor's ongoing success in ESRPP. Traditional evaluation approaches that have been developed around standard utility resource acquisition programs will likely not be sufficient when applied to market transformation programs. As defined in the below footnote, market transformation programs like ESRPP require an evaluation framework that accounts for market interventions beyond incentive payment, longer horizons for cost-effectiveness, and baselines that capture the energy savings benefits of the entire product category. Evaluation guidance documents are available on the ESRPP shared file site.

⁵ Market transformation is "a strategy that intends to induce long-lasting, sustainable changes in the structure or functioning of a market. This is achieved through a program or policy design that reduces barriers to the adoption of energy-efficient technologies, or markets that sell, distribute, install, or manufacture those technologies to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. These programs and policies also must move forward to bring the next generation of even more efficient technologies, processes, and design solutions to the market." SEEAAction EM&V Working Group

- **Regulatory Engagement:** It is the Program Sponsor’s responsibility to work with their regulator and evaluator on this topic. Early evaluations have shown that the earlier a Program Sponsor engages with their stakeholders the more successful their program will be in their jurisdiction.
- **Logic Model:** Developing an ESRPP Logic Model is critical if a program is to eventually be credited for long-term market transformation effects even if a Program Sponsor is initially offering ESRPP within a resource acquisition framework. ESRPP resources include examples of logic models.
- **Program Design Transition:** Market transformation is the basis for the ESRPP design. However, most Program Sponsors begin working with ESRPP within a resource acquisition framework, as market transformation policies are still new or emerging in most jurisdictions. ESRPP programs only show their full cost-effectiveness potential when they are evaluated over the long-term, as intended by their design as long-term market transformation programs. Shifting from a year-to-year resource acquisition policy (and cost-effectiveness) framework to one centering on long-term market transformation is a fundamental policy change that requires an ongoing and concerted effort on the part of Program Sponsors to effect systemic change.
- **Accelerating Advances in Energy Efficiency:** One of the long-term impacts of the ESRPP program design is the acceleration of market-wide efficiency advances. While there are ongoing and incremental increases in voluntary efficiency standards over time, ESRPP provides opportunities for Program Sponsors to directly contribute to ENERGY STAR specification setting processes to help accelerate specification setting. ESRPP impact requires ongoing involvement by individual Program Sponsors, who submit formal comments during the specification revision process. These comments are compiled and submitted to EPA by the ESRPP Products Task Force on behalf of the Collaborative.
- **Resources:** The EM&V Task Force is a resource to assist with these discussions and can provide best practices, lessons learned, draft logic models, and copies of completed evaluations. Members are also available to help Program Sponsors with EM&V strategies and support as needed.

8. Summary

ESRPP provides a community for Program Sponsors to cost-effectively address the remaining energy savings opportunities for their residential customers. ESRPP process, guidance documents and Task Forces enable Sponsors to support each other in reaching individual energy efficiency goals. ESRPP contacts include:

ESRPP Contact	First Name	Last Name	Email
U.S. EPA – ENERGY STAR	Peter	Banwell	Banwell.Peter@epa.gov
	Hewan	Tomlinson	Tomlinson.Hewan@epa.gov
Navitas Partners	Patrick	Kilroy	pkilroy@navitas-partners.com
	Michael	Lukasiewicz	mlukasiewicz@navitas-partners.com
The Cadmus Group	Daniel	Lawlor	Daniel.Lawlor@cadmusgroup.com
Evaluation Task Force	Daniel	Lawlor	Daniel.Lawlor@cadmusgroup.com
Data Task Force	Beth	Littlehales	BLittlehales@neea.org
Products Task Force	Eric	Olson	EOlson@neea.org
	Nick	Leritz	NLeritz@neea.org
Marketing Task Force	Sarah	Duffy	Sarah.Duffy@cadmusgroup.com

THE ENERGY STAR® RETAIL PRODUCTS PLATFORM

The simple
choice for
energy
efficiency.



June 2020

Executive Summary

Transforming the way energy efficient products and messages are delivered through a coordinated national retail platform.

The landscape of energy efficiency programs is shifting due to the success of ENERGY STAR-focused programs, the evolution of products, dramatic changes in the way products are used and sold, as well as other factors. The energy efficiency community is calling for a new approach to traditional retail-based energy efficiency programs that reflect these new dynamics to effectively capture remaining energy savings and continue to advance energy efficiency.

The ENERGY STAR Retail Products Platform

The ENERGY STAR® Retail Products Platform (ESRPP) is a collaborative midstream initiative of ENERGY STAR, energy efficiency program sponsors, retailer partners, and other key stakeholders, facilitated by the U.S. Environmental Protection Agency.

The ESRPP is based on the concept of developing a national-level structure for the design of program delivery and engagement with retailers. The ESRPP gives program sponsors new access to a low-cost retail-based program through national coordination. The goal of the ESRPP is to transform markets by streamlining and harmonizing energy efficiency programs with retailers, making them less complex and more cost-effective. Increasing the availability of ENERGY STAR products will generate energy savings as utility customers purchase and install these more efficient models in their homes.

ESRPP: 2020 Program Year*

- Program sponsors:
 - Adopted a common set of products for promotion – clothes dryers, clothes washers, freezers, refrigerators, room air conditioners, and smart thermostats.
 - Refined the universal participation agreement.
 - Created templates for in-store signage tailorable to sponsor's local market.
 - Continued task group meetings to support program planning, develop ESRPP tools and resources, and share best practices.
 - Implemented coordinated programs in 11 states.
- Retailers:
 - Signed universal participation agreements with all program sponsors.
 - Delivered critical total category sales data, including historical sales, for targeted product categories.
 - Collaborated with sponsors and ENERGY STAR to design marketing templates and allowed store access to place this signage.
 - Designed ENERGY STAR promotions to support ESRPP.
- ENERGY STAR
 - Coordinated surveys of retailers to help data collection for ESRPP evaluation.
 - Continued to adapt ENERGY STAR product specification setting, including Most Efficient designation, to include ESRPP feedback.
 - Coordinated ENERGY STAR product marketing strategy and promotion calendar with ESRPP plans.
 - Updated dedicated web page: www.energystar.gov/ESRPP.

“The typical household spends about \$2,000 a year on energy bills. With ENERGY STAR, you can save 30% or about \$575 on your household energy bills, while helping reduce pollution.”

-- U.S. EPA, 2017

* ESRPP Program Year: April 1– March 31

THE ENERGY STAR® RETAIL PRODUCTS PLATFORM

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June 2020

Progress

Sixteen program sponsors are participating and coordinating efforts in program year 2020, encompassing more than 18% of the U.S. market. ENERGY STAR certified models in five product categories are being promoted by program sponsor-labeled signage in more than 1,000 stores. Going forward, the goal for large-scale market participation – to serve more than 30% of the US population – is a key milestone in the ESRPP vision to transform the market for energy efficient consumer products.

Retailers Approve

Retailers are the most important channel for delivering energy efficient products to residential consumers, selling almost 2 billion energy consuming products that use 80 million MWh per year.

Retailers are becoming less interested in participating in traditional energy efficiency programs—they are not core to their business, they introduce cost and complexity, and consumer incentives offer reduced value and efficacy as a tool for driving sales.

Members of the ENERGY STAR Retail Action Council – Best Buy, The Home Depot, Lowe's and Nationwide Marketing Group – are participating in ESRPP, with more than 1,000 stores in current program sponsors' service areas:

- ✓ "We support EPA's efforts to build scale and be more effective and efficient with the ENERGY STAR Retail Products Platform."
- ✓ "We believe this is the future of energy efficiency programs, and the future is now!"

Getting Involved

- Contact EPA to discuss the program and potential role.
- Join the current team, take advantage of tools and templates, and develop a pilot.
- Participate in discussions with regulators and evaluators.
- Prepare for full program launch post-pilot period.

Current Participants

2020 Participants

- CA: PG&E and SMUD
- CT: Eversource CT, UIL Holdings
- ID, MT, OR & WA: NEEA
- IL: ComEd
- MD: BGE, PEPCO, SMECO, Delmarva Power, Potomac Edison-FirstEnergy
- MN: Xcel Energy
- NY: Con Ed, NYSEG, RG&E
- VT: Efficiency Vermont

Discussions Regarding 2020/2021

- CA: SCE and SDG&E
- DC: DC SEU
- IL: Ameren
- MA: Eversource
- RI: Eversource

Other Key Stakeholders

- NEEP, SWEEP

Participating Retailers

- Best Buy
- The Home Depot
- Nationwide Marketing Group
- Lowe's

Questions or Comments? Contact:

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CEESM Strategic Energy Management Minimum Elements

Purpose

The CEESM Strategic Energy Management (SEM) Minimum Elements describe, from the energy efficiency program perspective, the minimum conditions that an industrial company or facility should have in place in order to effectively and continuously improve their energy performance. The Elements do not describe efficiency program strategies or delivery approaches; these are detailed in the CEE SEM Program Case Studies. SEM has been effectively applied to many types of organizations and end uses; these Minimum Elements refer to the application of SEM to industrial businesses.

SEM as it is being practiced today is a relatively new approach to industrial energy efficiency. There is confusion currently regarding what exactly SEM is, which is intensified by the proliferation of program names and terms different market actors are using to describe similar ideas, including CEI, SEP, and ISO 50001. Additionally, because the term “energy management” has been used for more than 25 years in the US to describe audits and classic retrofit projects, there is a real need to be able to intelligently speak to all audiences about the differences between SEM and the more common, less strategic, project centered approach to energy efficiency.

By establishing a simple, clear description of what it means for an industrial site to be practicing SEM, these minimum elements provide a basis for consistent communication about SEM with industrial end users, which will improve market awareness and acceptance of SEM and help bring it to scale. For that objective to be achieved, program administrators, program implementers, and energy management service providers, who often are the communicators of the business case for SEM, need to come together around relatively straightforward language to describe what it is.

Definition

Strategic Energy Management can be defined simply as taking a holistic approach to managing energy use in order to continuously improve energy performance, by achieving persistent energy and cost savings over the long term. It focuses on business practice change from senior management through shop floor staff, affecting organizational culture to reduce energy waste and improve energy intensity. SEM emphasizes equipping and enabling plant management and staff to impact energy consumption through behavioral and operational change. While SEM does not emphasize a technical or project centric approach, SEM principles and objectives may support capital project implementation.

SEM Minimum Elements

1. Customer Commitment

In an industrial organization, clear commitment is vital for SEM to succeed. This commitment consists of the following activities by senior management:

- a. **Policy and Goals** Set, frame, and communicate long-range energy performance objectives through an energy policy and energy reduction goals.
- b. **Resources** Ensure that SEM initiatives are properly resourced for goal attainment, including assigning responsibility or accountability to an individual energy champion, energy team, or supporting employee engagement activities.

2. Planning and Implementation

Planning provides the starting point or foundation for the customer to strategically manage energy. Implementation is the translation of planning into actions that improve efficiency or reduce energy consumption. Planning and implementation consists of the following activities by the energy champion or team:

- a. **Energy Management Assessment** Assess current energy management practices by using a performance scorecard or facilitated energy management assessment (EMA)¹.
- b. **Energy Map** Develop a breakdown or map of energy end uses and costs across the company. This should include all significant end use systems, as well as other relevant variables of energy consumption such as production, weather, and product mix.
- c. **Metrics and Goals** Establish clear, measurable goals for energy performance improvement according to one or more Energy Performance Indicators (EnPIs). EnPIs should be based on an analysis of the baseline energy consumption along with any relevant variables of energy consumption.
- d. **Project Register** Describe the actions to be undertaken over the course of one or more years. These actions can include capital projects, improvements to operations and maintenance practices, and execution of awareness programs and procurement procedures for energy efficient equipment. Each project identified in the project register should include estimated energy savings and costs, and the project register should include relative priority of actions and an implementation timeline.
- e. **Employee engagement** Develop and implement a plan to educate employees about the energy impacts of their activities, empower individuals to take energy improvement actions within their work areas, and encourage ideas for solutions beyond their own work areas.
- f. **Implementation** Complete measures documented in the project register. Improve business processes, such as standard operating procedures, and then ensure that operational changes persist by engaging employees affected by these processes.
- g. **Reassessment** Periodically review energy performance by comparing actual energy consumption to expected energy consumption. Reassess goals, metrics, and planned projects to ensure that these align with business and energy performance priorities.

¹ Examples of energy management practices score cards and energy management assessments are available from ENERGY STAR® for Industry, The Carbon Trust, and from EnVinta.

3. System for Measuring and Reporting Energy Performance

By regularly measuring and analyzing energy inputs and production outputs, companies can better manage their operations and improve their energy performance over time. Industrial organizations should monitor and report energy performance according to EnPIs and regularly analyze actual consumption against estimated consumption.

- a. **Measurement** Regularly collect—via automated or manual means—robust performance data to understand energy use. While utility billing meter data are often used, where necessary, facilities may consider purchase and installation of permanent submetering of key processes. Systematic measurement should capture all relevant variables of energy consumption, such as production and weather.
- b. **Data Collection and Availability** Collect and store energy performance measurements and improvements versus EnPIs and goals in commonly available formats, to facilitate data availability over time.
- c. **Analysis** Conduct analyses of energy data, and data for relevant variables of energy consumption. A baseline can be established based on consistency of energy consumption and relevant variables of energy consumption. With the baseline set, a model can be created that will predict energy consumption based on changes in the significant energy consumption drivers. This baseline should be reestablished when changes occur that are outside of the norm of the model. There are several analysis methodologies currently used by programs and evaluators to establish models, and to determine savings based on comparisons of actual energy consumption with estimated energy consumption values from the model. These methodologies and approaches will be discussed in detail in 2013 CEE SEM Case Studies.
- d. **Reporting** Regularly communicate the results of energy performance improvements and achievements in terms of agreed upon EnPIs to internal and external stakeholders, such as senior management, operations, energy team, and shareholders, as necessary.

CHALLENGES ASSOCIATED WITH EVALUATING STRATEGIC ENERGY MANAGEMENT PROGRAMS

Moderator: Arlene Lanciani, Consortium for Energy Efficiency

PANELISTS:

Nate Altfeather, Leidos for Wisconsin Focus for Energy
Don Boza, DTE
Erika Kociolek, ETO
Daniel Ouellet, BC Hydro
Robert Stephenson, EVT
Steve Warkentin, Xcel Energy

SUMMARY DESCRIPTION:

Strategic Energy Management (SEM) is a holistic approach to managing large commercial and industrial energy use to continuously improve energy performance and achieve persistent energy and cost savings over the long term. With policy driving the need to achieve deeper savings, utilities are turning towards customer engagement through Strategic Energy Management (SEM) to fill the gap. SEM changes business practices, starting with senior management and emanating throughout organizational culture to reduce energy waste and reduce energy intensity. SEM emphasizes enabling and equipping plant management and staff to impact energy consumption through behavioral and operational change in addition to capital project implementation. If program administrators can only claim savings for capital improvements, then the benefits of SEM are undervalued and savings from behavioral and O&M improvements are lost. Every Program Administrator's program is run differently and subject to different regulatory evaluation requirements. During this session, several experienced program administrators will provide examples of what their SEM programs look like in practice and why evaluating them can be so challenging.

Features and Performance of Energy Management Programs

Ethan Rogers, Andrew Whitlock, and Kelly Rohrer
January 2019
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Executive Summary

KEY TAKEAWAYS

- Strategic energy management (SEM) energy efficiency programs provide customers with a structure and methodology for saving energy. Originally focused on industrial customers, these programs are increasingly targeting commercial and institutional facilities. SEM drives energy savings through operations and maintenance (O&M) actions and increased capital project activity. It also increases participation in other utility programs.
- Energy management information systems (EMISs) can increase energy savings by automating data collection; integrating energy and manufacturing processes or building variables; reporting; and analysis.
- We have identified 27 SEM programs serving commercial, industrial, and institutional customers in the United States and Canada. Eleven program administrators offer programs that focus on EMIS systems and 14 more have SEM programs that support EMIS installations. More programs are coming.
- Integrating EMIS into SEM programs can boost the effectiveness of both approaches and maximize energy savings.
- SEM programs are a platform on which utilities can build long-term relationships with their larger customers and through which they can introduce these customers to other programs.
- Once program implementers get customers to make a commitment to continuous improvement, the discussion becomes what to do rather than whether to do something.
- To encourage the growth of SEM, regulators and policymakers should evaluate SEM program performance at the portfolio level and avoid requiring every program component to be cost effective or show positive results every year. Programs should get credit for the increased persistence of the savings they facilitate.

STRATEGIC ENERGY MANAGEMENT PROGRAMS

Strategic energy management (SEM) is a method of managing energy that uses techniques for continual improvement and takes a systematic approach to energy performance. SEM involves at a minimum the following three elements: commitment, energy management planning and implementation, and a system for measuring and reporting performance. We have identified 27 utilities and third-party administrators in the United States and Canada that offer SEM programs to their larger commercial, institutional, and industrial customers. SEM participants establish clear metrics to identify energy-saving opportunities and track reductions in energy use. Energy coaches help customers implement these changes. Many programs also provide incentives for operational improvements and capital investments.

SEM programs across the United States and Canada have reduced both electricity and natural gas usage. They can achieve 6-10% energy savings in the first year of program

engagement and more persistent energy savings than many conventional programs offering technical and financial assistance. SEM programs can also yield many nonenergy benefits such as raw material and water savings, and waste and pollution reductions.

Evaluators of SEM programs often use a whole-facility approach to measurement and verification (M&V). In addition to measuring energy savings, they may use such metrics as customer satisfaction, continued program engagement, and participation in subsequent energy efficiency programs. Evaluations indicate that program participants implement more projects than their nonparticipating counterparts do and are more likely to take advantage of financial incentives. Program recruiters may leverage the positive experiences of participants to encourage other organizations to join their programs.

PROGRAMS INCORPORATING AN ENERGY MANAGEMENT INFORMATION SYSTEM

A number of SEM programs support energy management information systems (EMISs). EMIS software and hardware systems help organizations manage their energy use. The software is often provided through a software-as-a-service (SaaS) arrangement. EMISs can integrate advanced sensors, connected devices, networks, data analytics, and predictive modeling to harvest, analyze, and display energy data. EMISs are attractive to managers of large manufacturing concerns because they enable data-driven energy management.

We have identified 11 administrators that offer EMIS-only programs. Fourteen others offer some level of assistance for EMIS installations as part of their SEM offerings. A few EMIS programs target only the commercial sector or the industrial sector, while others welcome participants from both.

As with SEM programs, evaluators of EMIS often use a whole-facility approach. Attribution of energy savings is a key challenge. For example, should the savings an EMIS makes possible through superior control of a heating, ventilating, and air-conditioning (HVAC) system be attributed to the EMIS program or to a financial incentive program that helped cover the cost of purchasing the HVAC?

COMBINED SEM AND EMIS PROGRAMS

A study done by the Consortium for Energy Efficiency (CEE) found that SEM, EMIS, and combined programs saved a total of close to 324 gigawatt-hours and 9 million therms in 2016.¹ Combining SEM and EMIS in one program has the potential to produce greater customer energy savings through the synergies of the two tools while also decreasing administrative costs.

Some programs are already taking this approach. Several SEM programs have integrated technical and financial support of EMIS audits into their services. A couple of EMIS programs are helping customers implement energy management systems such as ISO 50001.

¹ J. Burgess, *CEE 2017 Strategic Energy Management Program Summary* (Boston: Consortium for Energy Efficiency, 2018). library.cee1.org/system/files/library/13619/CEE_2017SEMProgramSummary.pdf.

Programs are serving: commercial, institutional, and industrial customers. Many use a cohort approach that combines trainees from multiple locations and leverages group learning. Some also engage larger customers one-on-one with tailored services. The trend is to get program participants to start using a systematic approach to energy management and then take them as far along the path to full implementation and certification as they are willing to go, and as far as makes economic sense to them and the program.

Not all customers are prepared to invest and implement technologies like EMIS. Implementing an EMIS takes a level of comfort with technology and a willingness to invest the time and resources to exploit its benefits. For customers prepared to make the commitment, programs can perform EMIS audits to identify available data streams and data needs, and then develop plans and business cases for connecting the two with technology appropriate to the customer's capabilities.

Programs should have staff expertise appropriate to their customer base. Several existing SEM programs (for example, those offered by Energy Trust of Oregon and Bonneville Power Administration) have recruiters and energy coaches with expertise in areas like metal casting, fabrication, and food processing. At a minimum, dedicated teams should be formed to engage commercial and industrial customers.

The potential for SEM programs is considerable. In 2015 ACEEE performed a top-down analysis of the potential energy savings from SEM programs nationally. It found that savings could reach 7 terawatt-hours per year for the commercial sector and 24 terawatt-hours for the industrial sector by 2030. That is equivalent to the all electricity sales in Nebraska in 2017. The current trend in the growth of such programs, both in number and in scope, will achieve less than one-tenth of this volume of savings by 2030. There is ample opportunity for more administrators to offer SEM programs and for existing programs to expand in scope.

RECOMMENDATIONS

- Utilities and third-party energy efficiency program administrators should continue to expand SEM offerings to commercial, industrial, and institutional customers, using them as a platform for customer engagement. They should offer programs that engage customers over longer periods of time or continually.
- Program designers should integrate data management technologies like EMIS into their programs, meeting customers where they are in terms of their familiarity with management systems and their technical expertise.
- Evaluators should assess the energy savings from program participants using whole-facility methodologies. Regulators should consider the performance of SEM programs not in isolation, but as an integral contributor to the performance of their larger portfolio of technical, financial, and market transformation programs targeting the same customers.
- Electric, natural gas, and water utilities should seek opportunities to collaborate in the delivery of SEM programs.
- Policymakers should encourage multi-utility collaboration.

Introduction

Large customers, those with annual energy costs in the hundreds of thousands or millions of dollars, represent some of the biggest cost-effective opportunities for utility-sector energy efficiency programs. However they are often a challenging customer segment to serve. Decision makers may not see energy efficiency as a priority, they may be located outside a program's service territory, and they may have preconceived notions that programs are bureaucratic and unresponsive to their needs. They may also be unfamiliar with the benefits of efficiency programs and therefore reluctant to participate.

Many efficiency programs aimed at industrial, commercial, and institutional customers focus on installing particular energy-saving measures such as efficient lighting; heating, ventilating, and air-conditioning (HVAC); and industrial equipment. Program elements may include technical assistance, financial incentives, and trade ally networks.² In recent years, a new kind of program has emerged that takes a systematic approach to saving energy rather than offering individual hardware measures. Called strategic energy management (SEM), these programs help companies map their energy use, establish standard practices for energy management, teach workers to identify and quantify energy-saving opportunities, and set up data review and reporting systems. Most important, they aim to change the company's culture of energy use and to place the responsibility for energy savings not so much on equipment and processes as on all the people in the enterprise. To achieve this, SEM programs require organizational commitment from program participants, engage them in energy management planning and implementation, and help them develop a system for measuring and reporting performance.

Another set of large-customer efficiency programs focus on hardware and software systems that automate the collection and analysis of energy data. These systems include sensors, connected devices, networks, and data analytics. When they are advanced enough to anticipate future conditions and offer optimal energy-saving solutions, they are called "smart" technologies. A familiar example from the residential sector is the learning thermostat. They save energy through observation, analysis, and prediction. In the industrial, commercial, and institutional sectors, some efficiency programs offer a data management and analysis technology called an energy management information system (EMIS), a broad family of hardware and software systems that help organizations manage their energy use. The overarching motivation is that better management of energy data can lead to more energy savings.

This report investigates these two emerging focuses of energy efficiency programs, SEM and EMISs. It is intended to help program stakeholders – utilities, third-party administrators, evaluators, and policymakers – understand SEM and EMIS and the programs that leverage them to save energy. It explores the prevalence, features, and reported savings of SEM and EMIS programs along with the challenges they face, with a view to encouraging stakeholders to facilitate their offering, refine their components, and increase their prevalence. It also considers a third avenue. Both SEM, a workforce development tool, and

² Trade allies are vendors and trade associations that help promote programs and deliver services.

EMIS, an automation tool, are promising models, and the two practices are complementary. Some utilities and third-party program administrators have combined them. This report examines the additional benefits these combination programs provide and discusses additional challenges they face.

Methodology and Report Outline

This study attempts to answer several questions:

- Which states and utilities are currently implementing SEM programs? What practices are yielding the greatest success, and what has been their impact to date?
- How common is the use of technologies like EMIS in efficiency programs?
- What does it take to have a successful SEM or EMIS implementation?
- What program activities drive energy savings?
- Which new sectors are programs targeting?
- Which policies encourage program administrators to include SEM and EMIS in their portfolios?
- What results might be possible with greater investments in SEM and EMIS by efficiency programs?

To answer these questions, we conducted a literature review, interviews with program stakeholders, and a survey of experts. Much of the data on SEM program performance comes from research by the Consortium for Energy Efficiency (CEE).³ It surveyed its members about their SEM programs in 2015 and 2017 and summarized its findings in two subsequent reports (Burgess 2016, 2018). We augmented the CEE data with data from program evaluation reports and information from conference papers and presentations.

We interviewed more than two dozen program stakeholders, including program administrators, implementers, evaluators, and designers. We also talked with other researchers who have studied industrial energy efficiency programs in general and continual improvement programs such as SEM in particular. Many of our interviews were guided by our research questions, though we also talked with interviewees about issues they thought were important to understanding the performance of a program.

Most interviews were done over the phone, but a few participants responded by answering a list of questions in writing. Not all interviewees answered all questions. We shared our initial findings on SEM and EMIS program performance with more than a dozen SEM program experts, presenting them in a questionnaire and asking for their responses. Both the questionnaire and the experts' tabulated responses are presented in Appendix B.

Our analysis of the potential energy savings and the value of saved energy is an update of an analysis we conducted in 2015 as part of our study of emerging program models (York et al. 2015). We used the data we gathered in our literature review and from the responses to

³ CEE is a US and Canadian consortium of electricity and natural gas energy efficiency program administrators. It focuses on the development and deployment of energy efficiency programs.

our questionnaire to update the assumptions made in the 2015 analysis. Then we repeated the analysis.

This report presents our findings. It begins with an examination of the background and components of SEM-focused energy efficiency programs. This section continues with case studies of four SEM programs, a summary of SEM program results, and a discussion of the challenges and rewards of these programs.

The next section focuses on programs that incorporate EMISs, beginning with a description of typical EMIS features. This section continues with the features of programs that offer EMISs, several case studies, a summary of program results, and a discussion of challenges.

The third part of the report discusses programs that combine SEM and EMIS. After describing a few current offerings, we discuss the challenges and advantages of an integrated approach. Then we address future possibilities for SEM program design; evaluation, measurement, and verification (EM&V); participant recruitment; the policy context; and potential program results. The report concludes with recommendations for energy efficiency program stakeholders.

A note on terminology: An organization can, and many organizations do, implement their own SEM systems without the assistance of an energy efficiency program. These independent initiatives are often called programs. In this report, however, we generally use the term *program* to refer specifically to an energy efficiency initiative sponsored by a utility or third-party administrator.

Strategic Energy Management

Industrial facilities have utilized continual improvement practices for many years as a systematic way to enhance and refine facility operations. Strategic energy management is a subset of continual improvement practices that focuses on energy savings. Some companies implement SEM on their own, while others take advantage of programs offered by utility ratepayer- and taxpayer-funded programs. We begin this section with a discussion of the concepts of SEM. Then we examine energy efficiency programs, offered by utilities and other program administrators across North America, that help companies implement SEM. Figure 1 illustrates these relationships.

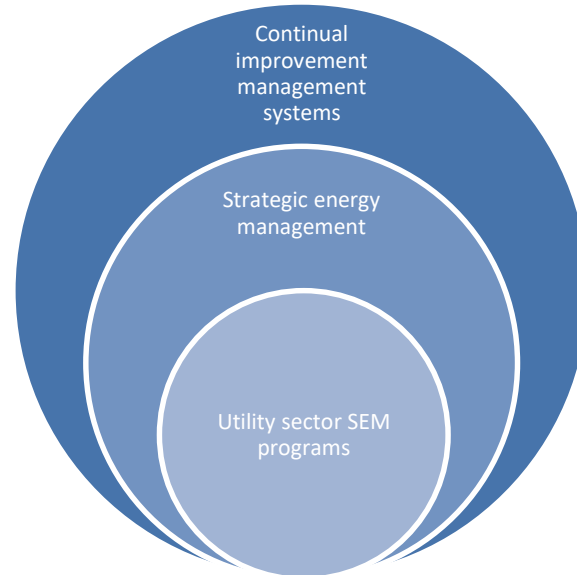


Figure 1. Strategic energy management as a subset of continual improvement

CONTINUAL IMPROVEMENT

Continual improvement is a term for a variety of systematic methods that help manufacturers raise the quality of their products, reduce waste and production costs, and build their long-term sustainability. Continual improvement programs change how problems are solved within a company. Instead of top-down problem solving in which management is expected to understand all aspects of a manufacturing process and how they might be made better, continual improvement charges all workers with identifying and advocating for beneficial changes. Continual improvement involves cultural change. The company trains its employees to look for opportunities to improve their work and gives them a process to bring their ideas to management. It supports them in evaluating a project and developing solutions. Suggestions can be small or large. All are encouraged to contribute and often are rewarded.

Compared with companies using more traditional management systems, the workers at facilities that have fully embraced continual improvement are more productive, work in a safer environment, tend to feel more valued, and are generally more satisfied. Their companies are, on average, more profitable and stable than their more traditional competitors (Soliman 2017).

Popular continual improvement systems include Total Product Quality, Total Quality Management, and Six Sigma. Subaru of America (SOA) operates a manufacturing plant in Lafayette, Indiana, using a system called the Kaizen philosophy, which engages all employees in a continual effort to improve vehicle quality, worker safety, and environmental stewardship. SOA offers cash and other rewards for suggestions resulting in projects that reduce costs and waste. As a result, the plant has cut its waste generation by 60% since 2000 and no longer sends anything to landfills (Guynup 2017).

The most common framework for managing product quality is the ISO 9001 Quality Management Standard, developed by the International Organization for Standards (ISO).

ISO 9001 was originally intended for manufacturing, but health-care and hospitality companies now embrace the standard as well. Companies using ISO 9001 have specific procedures for all steps of a manufacturing process, parameters for tracking the quality of components and final products, and processes for identifying and resolving instances when a part or product is out of specification.

The ISO 9001 standard transformed the US manufacturing sector beginning in the 1980s. It was especially important to the major US automobile manufacturers and their suppliers as it enabled them to compete on quality with European and Japanese carmakers after years of lagging behind. The story of their adoption of quality management systems and their subsequent resurgence is well known in the private sector. It is both a reference point and a driver for companies to embrace new management systems when attempting to control costs and risks.

Many companies have also adopted the ISO 14001 environmental management standard. It applies the same methodology to tracking environmental variables and reducing associated risks as the ISO 9001 standard applies to quality. It includes tracking the key performance indicators – such as solid waste, emissions, and energy consumption – that determine a facility's environmental impacts. It also includes establishing standard operating procedures for measuring, documenting, and reporting. The ISO 50001 energy management standard provides a similar framework for managing energy. As we discuss later in this report, many SEM programs are including some or all aspects of the ISO 50001 standard in their engagement.

As explained above, we see SEM as a subset of continual improvement. In this report we use SEM as an umbrella term for a range of continual improvement strategy that take a systematic approach to managing energy. Organizations using SEM continually improve energy performance and achieve persistent energy and cost savings over the long term (Burgess 2018). Industrial facilities at hundreds of sites across North America have been applying SEM to their operations for many years to reduce their energy consumption. These programs not only have saved many gigawatt hours and therms but have been successful in changing the way organizations manage their energy. It is against this backdrop that the relatively recent SEM offerings of utility sector energy efficiency programs are perceived favorably.

SEM ENERGY EFFICIENCY PROGRAMS

It is not surprising that over the past 20 years, many federal agencies and energy efficiency program administrators have found continual improvement methods to be useful in engaging the industrial sector. They have come to realize that many companies are already familiar with the concepts and can easily roll energy management into existing management systems. Companies have also been receptive to this type of program because they recognize the methodology and have had positive experiences with continual improvement efforts in the past.

The first SEM program, launched in 2005, leveraged many continual improvement concepts and implementation practices (Ochsner et al. 2015). Since then, more than two dozen program administrators have launched SEM programs. However, until CEE published its

minimum elements in 2014, there was no standard definition for SEM (Burgess 2014; CEE 2014; Ochsner et al. 2015). Even today, there is not universal agreement on what constitutes a SEM engagement or a SEM energy efficiency program.

Our conversations with professionals in the field indicate that some perceive SEM to be a path rather than a defined set of tasks and actions. They would consider any set of activities that points an organization toward systematic management of energy to be SEM, and any program that guides them on that path to be a SEM program. Others have adopted the CEE definition and its three minimum elements: commitment through policies, goals, and allocation of resources; energy management planning and implementation; and a system for measuring and reporting performance. They would consider any program that has these elements a SEM program. (Of course, a program with more than these three elements would also be a SEM program.) With this definition in mind, we begin our discussion of SEM programs with a list of the essential components and optional additions.

Customer Commitment

The company sets, frames, and communicates energy performance policy and goals. A signed commitment by a member of senior management attests that the organization will set goals and allocate the resources necessary to implement projects to meet those goals (Burgess 2016). A company engaged in a SEM program has one or more energy teams whose members look for energy inefficiency and develop solutions to reduce energy use. Teams are often made up of people from many parts of the organization: engineering, operations, maintenance, purchasing, human resources, etc. They are empowered and expected to implement projects that save energy (Burgess 2014).

Each energy team has a leader, often referred to as the energy champion. If the facility has a dedicated energy manager, that person is usually designated the energy champion. He or she is the primary contact for the program and organizes the team for training. The energy champion also leads the collection and analysis of energy data. This person is usually different from the corporate champion, who is often a c-suite executive who advocates for allocating resources and funding capital projects.

Planning and Implementation

Most SEM programs require participants to conduct treasure hunts in which the energy team and program implementers walk through a plant looking for energy management opportunities.⁴ They create a project register of operational and maintenance (O&M) and capital project opportunities. They analyze the costs and benefits of each opportunity and prioritize the list. Registers enable teams to document new opportunities and track existing ones.

⁴ SEM program implementers are subcontractors who ensure that energy management systems are successfully put into place at customer facilities; they also assist with the installation and monitoring of energy-saving measures. Implementers may be state-run organizations, energy efficiency utilities, energy service companies, or others.

Most opportunities identified in a treasure hunt are O&M actions that team members often have the authority to implement directly – and therefore quickly. Other projects require capital and management authorization and therefore take longer to implement.

The planning and implementation element highlights the responsibility of the energy champion or team to understand current energy consumption, to develop goals for future energy consumption, and to implement plans for reaching these goals. In an energy management assessment, a company develops an energy map that captures key energy sources and uses (Therkelson et al. 2013).

Measuring and Reporting

Multiple parties are interested in the energy savings of a program participant. The implementer wants to know if it has effectively engaged the participant; the administrator and utility are interested in how much energy the program has saved and at what cost; the company wants to see whether it is reducing its costs and making progress toward its goals. The respective analyses of energy savings inform future actions by participants and program stakeholders alike.

The implementer works with the customer to develop an energy model to track energy usage and determine energy savings. The model is a regression analysis that takes into consideration energy consumption; weather; and facility operations variables such as production and maintenance activities, changes in behavior, and efficiency measures. A key part of an energy model is the baseline of energy use prior to the implementation of energy-saving measures. The model enables the determination of savings not only for customers but for program reporting as well (NEEP 2017).

The implementer and energy team identify key energy performance indicators (KPIs) that drive a facility's energy use. For each KPI, they establish clear, measurable metrics and goals that they can use to track their progress and report to management. Energy team members continuously monitor energy use and correlate it with production information to track the relationship between the energy they consume and what they produce. This relationship is often called energy productivity and is frequently used as a KPI. A good metric enables one to gauge energy productivity when production at the plant changes.

SEM Program Options

A full-fledged SEM program may involve a number of additional components. Some are program features intended to help participants fulfill the minimum elements. Others are extensions of the minimum elements. Natural progressions from doing the minimum to adopting rigorous practices will increase the likelihood of additional energy savings.

Worker education and skills training. Program workshops teach workers how to identify and quantify opportunities and to develop cost-benefit analyses to justify investments. Some programs engage their customers facility by facility, while others create cohorts made up of representatives from multiple facilities (sometimes in the same industry, sometimes not) who go through training as a unit. This aids learning by encouraging group problem solving and solution sharing. Attendees learn from each other and share non-competitive best practices such as compressed air system optimization.

Energy manager. Several large customer programs co-fund an energy manager, whose job is to drive the implementation of projects and ideally to lead a company's efforts to implement a SEM system. Energy managers often organize the team that helps identify and implement projects (Kolwey 2013; Russell 2013; Burgess 2016). In this report, we do not consider programs that only fund energy managers to be SEM programs. However some utilities offer co-funding of energy managers within their SEM programs or in addition to SEM programs in separate funding streams. Independent Electric System Operator (IESO) of Canada takes a different approach. While it does not have a stand-alone SEM program, the Energy Manager Initiative provides incentives for a full-time energy manager who will help implement SEM components (Russell 2013).

Energy efficiency incentives. It is not always necessary to include financial incentives in SEM programs to make them effective at energy savings. When financial resources are available, however, they can amplify the savings companies achieve. Incentives may be offered through the SEM or through companion programs. Some programs offer annual volumetric (\$/kWh) incentives based on energy savings and may offer bonuses when savings goals are met (Ochsner et al. 2015); others are prescriptive, with fixed incentives for prescribed energy measures.

Standard practice. Everything described so far can be specific to a program and its participants. Adherence to standard protocols is not required. However there is value in following a standard protocol for managing energy. Standard practices are easily transferred between participants, programs, and service territories. Outside stakeholders are more likely to accept savings claims when a company uses a standard protocol for managing its energy. In addition, standard practices provide a structure that endures if a champion leaves the company or the membership of an energy team changes. Adherence to standard practice is not dependent upon the will of a single individual, but is instead part of the company's management systems. Companies that adopt SEM require employees to perform certain tasks and to perform them in precise ways. This is different from behavior change, in that these modifications are conditions of employment.

The ISO 50001 Energy Management System Standard is a particular form of continual energy improvement system set forth in an internationally recognized protocol. The standard has requirements for measuring and tracking energy use and consumption; design and procurement practices for equipment, systems, processes, and the personnel that contribute to energy management; and documentation and reporting (ISO 2018). Thousands of companies around the world have implemented energy management systems that follow the ISO 50001 standard and have had their compliance with the protocol certified by independent third parties. Many SEM programs now include technical assistance to help companies adopt the ISO 50001 standard and prepare for certification (Burgess 2014).

The US Department of Energy (DOE) created the 50001 Ready Program to provide organizations a self-guided approach to establishing an energy management system that adheres to ISO 50001. Organizations complete 25 tasks in the 50001 Ready Navigator software tool, measure and document their performance, and self-attest to their completion of the tasks (DOE 2018a). Several SEM programs have integrated the 50001 Ready Program into their offerings.

Finally, some programs are helping companies implement the DOE's Superior Energy Performance (SEP) protocol. It builds on the ISO 50001 framework to provide a more rigorous approach to goal setting and measurement and verification (M&V) of energy savings. It requires third-party audits of energy savings and performance improvement claims (Therkelson et al. 2013). SEP is the most comprehensive approach to energy management and continual improvement.

SEM PROGRAM EXAMPLES

SEM programs initially focused on energy-intensive industrial facilities. It remains true that industrial customers account for a large proportion of energy demand and that programs need to take advantage of this opportunity for large efficiency savings. At the same time, SEM programs are expanding their focus to include large commercial property concerns, hospitals, educational institutions, and water and wastewater treatment facilities. All are energy intensive and have staff appropriate to adopting and implementing the key principles of SEM.

The design of a program and the nature of an implementer's engagement can vary by customer type. Manufacturing companies will generally implement SEM at the facility level, while commercial and institutional operations often implement it at the organizational level. The reason for this is related to how energy expenses are managed and how technical experts are organized. In manufacturing, energy costs are usually managed and paid at the plant level. Engineering and maintenance staff, the people most likely to form the backbone of an energy team, are located at the plant level. For these reasons, programs usually engage manufacturing companies at the plant level.

On the other hand, commercial users, such as retail stores, and institutions, such as hospitals, often have multiple locations within a utility service territory. Utility expenses are often paid at the regional or corporate level. Technical staff may have multiple buildings to maintain and may be spread across multiple locations. To accommodate this reality, programs will often engage institutional and commercial customers at the organizational level.

SEM programs have been well received by commercial and industrial (C&I) customers. Many programs have surveyed participants and received positive reviews. The number of programs has increased every year, and the inclusion of commercial customers has substantially increased the number of potential participants. At the beginning of 2018 we identified 31 program administrators that collectively offer 13 SEM-only, 11 EMIS-only, and 19 SEM-with-EMIS-option programs in North America. Their locations are shown in figure 2. The programs described in the following case studies have different features. This is because each program administrator develops its program to meet the needs of its customer base, and because state regulations affect which features an administrator can and cannot include.

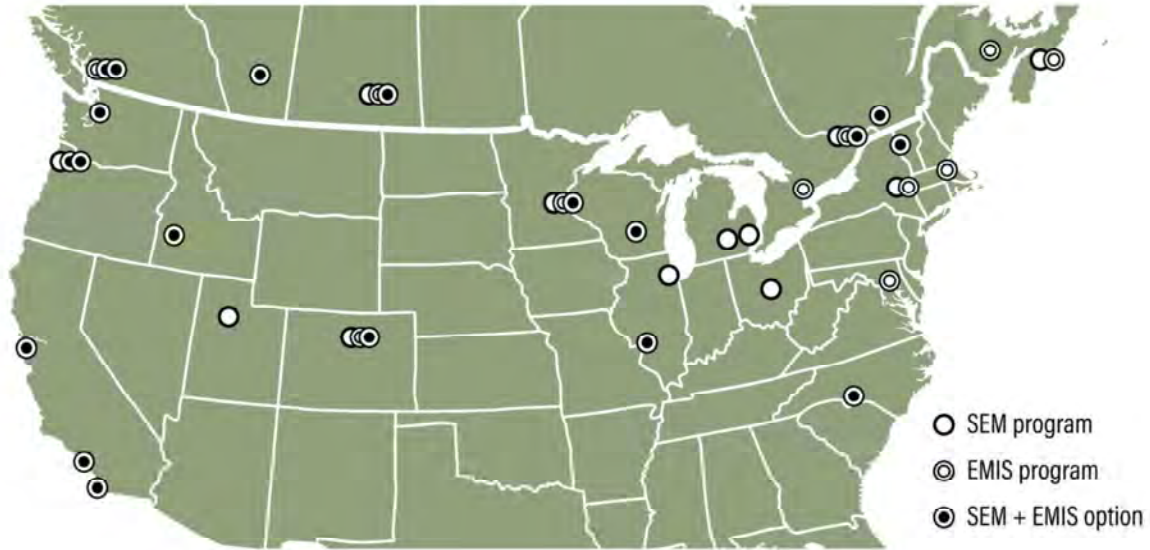


Figure 2. SEM and EMIS programs in North America. Additional detail is provided in Appendix A.

Energy Trust of Oregon

The commercial and industrial SEM programs offered by Energy Trust of Oregon are useful examples of typical SEM offerings. Since 1999 Energy Trust has, at the direction of the Oregon Public Utility Commission, brought energy savings and renewable energy to its constituent investor-owned utilities by providing technical and financial assistance to its customers (ETO 2014). Energy Trust’s SEM programs are nested within its Production Efficiency Program and its Existing Buildings Program. The first targets industrial and agricultural companies as well as water treatment facilities and takes a facility-level approach; the second is for commercial and institutional buildings and facilities and works at the organization level (ETO 2018c; Volkman et al. 2014). Energy Trust has two separate teams of implementers to work with companies in the two sectors.

Energy Trust recognized that not all industrial customers are equally prepared to implement continual improvement systems, and therefore it needed to offer customers options. It created two SEM programs for industry, one for companies to test the waters, the other for those willing to make a multiyear commitment. The first of these, titled First Year SEM, began in 2009. The second program, Continuous SEM, was launched in 2016.

Energy Trust designed First Year SEM to engage companies through a series of activities over a 14-month period. The program comprises three stages: implementation, reporting, and report completion. After a site has completed First Year SEM, it is eligible for enrollment in Continuous SEM.

Continuous SEM is a two- to five-year program that is based on a repeated yearlong process similar to First Year SEM. Energy Trust trains participants using either a cohort or individual organization engagement in the First Year SEM program. Continuous SEM training is provided only on an individual-company basis (Burgess 2018). Key activities required of participants include attending training workshops, forming an energy team,

appointing an onsite energy champion and energy data manager, and collecting and analyzing production and energy consumption data (ETO 2018b).

The Commercial SEM program is similarly organized. Commercial and institutional customers start with the First Year SEM program and then enroll in Commercial SEM. Energy Trust has engaged more than two dozen property management, retail, health-care, and other institutional organizations so far.

Participating companies do not pay for any of the training. They are, however, required to sign a memorandum of understanding (MOU) that commits them to undertake certain acts such as documenting management commitment, developing an energy plan, having staff attend training, creating an energy team, and reporting energy savings. After completing First Year SEM, companies can earn additional incentives by implementing O&M projects that save energy. Incentives are tied to the volume of electricity (kilowatt-hours) or natural gas (therms) saved as well as for achieving milestone targets (ETO 2018b).

The two programs have been quite successful at helping companies reduce their energy consumption and have served more than 200 customers since 2009. They have saved more than 20 gigawatt-hours (GWh) and 1 million therms throughout the 2015 and 2016 program years. These savings represent a substantial portion of the energy savings achieved by the Production Efficiency and Existing Buildings programs (ETO 2018a).

SEM programs are particularly popular in the Pacific Northwest. In addition to Energy Trust, the Bonneville Power Administration (serving public utilities in the region), BC Hydro, Idaho Power, and Puget Sound Energy also have active programs (Burgess 2018). The Northwest Energy Efficiency Alliance (NEEA) was involved in the development of a continual energy improvement program, which served as the model upon which many of the current programs are based (Kolwey 2013).

ComEd and Nicor Gas

The Premium Commercial and Industrial SEM program jointly run by Commonwealth Edison and Nicor Gas shows how two utilities can work together to simultaneously achieve electricity and natural gas savings. ComEd is a subsidiary of Exelon and the largest electric utility in Illinois, serving customers in and around Chicago. Nicor Gas is the largest natural gas distributor in Illinois, with a service territory that overlaps much of ComEd's. The partnership of these two utilities means customers deal with only one program instead of two, and program implementers can focus on all types of energy savings projects.

The pilot SEM program in 2014 required annual consumption of 750,000 therms and 10 GW to participate. In its second year the requirement was reduced to annual consumption of 150,000 therms and 5 GW of electricity, enabling hospitals and universities to participate (Baily and Rokke 2018). Customers are required to sign an MOU that expresses their commitment to allocate resources and establish SEM policies or goals (Burgess 2018). The program runs for a year, with the option of a second year. Customers must have an executive sponsor, an energy champion, and an energy team to support the SEM program (Baily and Rokke 2016).

Implementers train participants in how to structure an energy management system, how to create and maintain an energy model, and how to engage employees in energy management. Educational workshops are conducted both in cohorts and individually onsite. This program provides site reviews, technical resources, coaching, and mentoring (Burgess 2018). At the customer’s request, support may be provided to help participants pursue certifications such as ISO 50001 and SEP (Burgess 2018).

In addition to technical assistance to help customers identify low-cost and no-cost opportunities, the program provides incentives to encourage project implementation. Incentives are tied to the volume of electricity or natural gas saved. Additional incentives are available for capital projects completed in the first year.

Since its launch, the program has served three rounds of cohorts. The first cohort spanned two years and was composed entirely of industrial facilities; seven of the ten customers in the group continued into the second year. Table 1 summarizes the industrial and nonindustrial facilities engaged between 2014 and 2017. Companies that complete the cohort phase can enter the practitioner phase and receive more individualized attention from the implementer.

Table 1. Facility engagement

Participant group	Customers	Time period
Cohort 1	10 industrial	November 2, 2014–October 31, 2015
Cohort 1	7 industrial	January 2, 2016–December 31, 2016
Cohort 2	2 industrial 3 hospital 4 university	June 1, 2016–May 31, 2017
Practitioner group	7 industrial 3 commercial	Began in August 2017 with rolling enrollment. The practitioner participants’ usage will be re-baselined each year with savings calculated on the previous 12-month usage.

Source: Baily and Rokke 2018

Efficiency Nova Scotia

Efficiency Nova Scotia has a SEM program within its industrial portfolio that engages industrial companies on a one-on-one basis with the program implementer. It helps companies implement the energy management structure needed for their energy-intensive operations and improve performance over the long term; it also provides employee training. The program begins with a 12-month engagement during which the contracted implementer helps companies adopt continual improvement practices, set up an energy management structure, and develop energy teams. The implementer works with those teams to create energy maps that identify their facilities’ key energy-consuming processes and opportunities to reduce energy consumption. This information is used to develop a regression model that customers can employ to track their energy savings and energy productivity over time.

Teams conduct treasure hunts to find low-cost and no-cost opportunities to save energy. They may also do more formal and detailed energy audits that identify potential capital projects. Then they develop project lists and set goals for energy reduction. The implementer sometimes installs submeters to get customers used to harvesting and using data.

If companies have existing management structures such as ISO 14001 for environmental management, they integrate energy management into those structures. Otherwise, implementers get customers started with an ISO 50001-inspired system to help them document and analyze energy use, projects, and performance. If customers are interested, the program can help them progress toward ISO 50001 certification in a subsequent year of SEM that is offered to all participants as a customized plan to assist them in furthering their energy management objectives and achieving greater energy savings.

Each participating company is required to sign an MOU that commits it to a scope of work and a financial contribution of \$10,000. At the beginning of each additional year that a company participates in the program, it is required to sign a new MOU that outlines the expected outcomes of the year's engagement. The program has served 15 customers since 2015 and has been successful in helping them reduce their consumption, with a collective energy savings of 6.139 GWh (Econoler 2017; Andrea Henwood, program manager, Efficiency Nova Scotia, pers. comm., November 13, 2018).

New York State Energy Research and Development Authority

While West Coast organizations like the Energy Trust and the Bonneville Power Administration (BPA) have been implementing SEM programs for years, some energy efficiency players, like the New York State Energy Research and Development Authority (NYSERDA), are just getting started. Over the next few years, NYSERDA intends to implement several pilot programs for both its On-Site Energy Manager initiative and its Strategic Energy Management initiative (NYSERDA 2018e). The two new continual energy improvement programs are aimed at increasing energy efficiency and adoption of energy management practices by companies in the industrial sector (NYSERDA 2016).

NYSERDA hopes that data collected from the pilot programs can inform the design of future programs. The Authority also hopes to build the trust of private sector entities. This will lead to greater participation in programs and increased savings through the adoption of continual improvement practices (NYSERDA 2017a).

The first of the Strategic Energy Management industrial cohort pilots involved eight customers and ran through September 2018. Registration for the second cohort closed in June 2018 (NYSERDA 2018a). Industrial SEM participants develop energy maps, participate in treasure hunts, perform onsite energy management assessments, and participate in group workshops, best-practices trainings, and webinars. Training sessions are provided by Energy Coaches.

Though the Strategic Energy Management initiative itself does not provide funding for an energy manager, the separate On-Site Energy Manager initiative is available to interested

participants. The purpose of this initiative is to explore the potential for improvements and savings delivered by a full-time energy manager (NYSERDA 2018c).

NYSERDA’s Strategic Energy Management program is still in its early stages, and the new SEM program is the organization’s first attempt at a market transformation program for the industrial sector. The program structure incorporates many aspects of successful SEM programs, such as identifying an energy champion, developing an energy team, training workers through a cohort approach, and developing regression models. The future of NYSERDA SEM looks promising, with program efforts projected to save an average of \$12.9 million per year and reduce carbon emissions in the next 15 years by 1.2 million metric tons (NYSERDA 2016).

SEM PROGRAM RESULTS

SEM programs across North America have reduced both electric and natural gas consumption. SEM success has been documented using several metrics including energy savings, customer satisfaction, continued program engagement and improvement, and participation in subsequent energy efficiency programs. As more programs come online and existing ones mature, we can expect that implementation will become more efficient, the cost of saved energy will decrease, and SEM will be a reliable source of energy savings for many years to come.

SEM programs have evolved and spread across North America. According to the most current CEE summary of SEM programs, by 2016 more than 1,000 industrial sites had implemented SEM programs. The study found that aggregate electric energy and natural gas annual savings for reporting sites in 2016 were upward of 324 GWh and 9 million therms, respectively (Burgess 2018). Of these savings, 78.9 GWh and 3.1 million therms came from O&M projects (Burgess 2018). The balance came from capital projects. Programs calculate energy savings differently; some include savings from capital projects and others do not, so the totals CEE arrived at reflect multiple measuring methodologies. Table 2 captures the cumulative performance of the SEM programs that responded to the 2017 CEE surveys. These programs are identified in Appendix A.

Table 2. CEE members’ SEM programs performance, 2016

Savings type	Number of programs reporting	Energy savings	Number of customers	Average savings per customer
Total electricity savings	12	324.2 GWh	372	0.87 GWh
O&M electricity savings	7	78.9 GWh		
Total natural gas savings	6	9.21 million therms	185	0.05 million therms
O&M natural gas savings	3	3.1 million therms		

The CEE survey of 2016 program performance was conducted in 2017 and reported in 2018. Some programs report only O&M savings; some report O&M and capital project savings. *Source:* Burgess 2018.

Total annual savings from existing programs are approximately 0.01% of the C&I electricity and 0.02% of the natural gas consumption in the United States and Canada. So, although existing programs are having success, there is, as we will discuss later, potential for much greater savings from SEM programs.

Trends in SEM Programs

CEE also tracked the number of SEM programs offered by its members since 2002. The number of offerings added each year has varied, but the overall number continues to grow, as shown in figure 3. This is indicative of the popularity of the program model. There are programs offered by utilities that are not CEE members, so figure 3 does not capture all SEM programs.

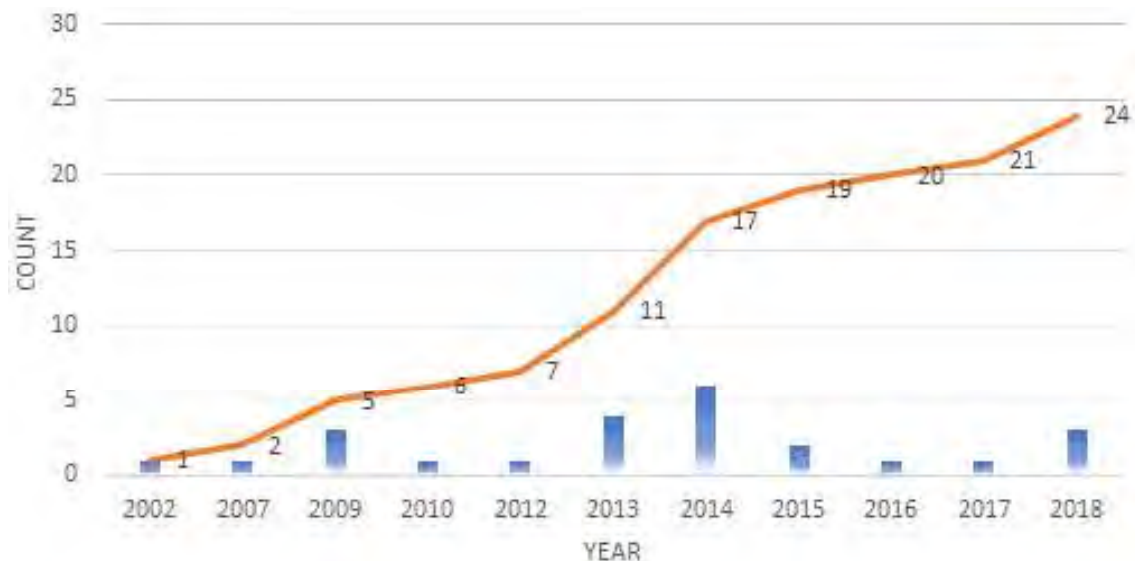


Figure 3. Number of SEM programs added by year and total to date. The blue bars indicate the number of programs launched in that year; the red line represents the total number of programs in place. Source: CEE 2014; Burgess 2014, 2016, 2018.

Several new programs were launched in the past year. NYSERDA rolled out its pilot programs, as discussed above. Each of the four investor-owned utilities in California launched a new program as well. Two of them, Southern California Edison and Southern California Gas, are collaborating on a combined program with a single administrator and set of implementers.

With more programs coming online, the number of customers each year increases. CEE members reported 886 customers served prior to 2015, 282 in 2015, and 376 in 2016. More than 1,500 organizations have participated in some type of SEM program in the past decade. The average number of customers engaged by a SEM program increased from 23 in 2015 to 27 in 2016. Participation ranged from 4 to 83 customers, however, so it is unlikely this is indicative of a trend. As SEM programs in more populous states like California and New York come online, we expect to see considerably more customers served and greater overall energy savings.

Persistence of Savings

Energy savings are a function of time, so the persistence of savings from an energy measure is an important variable to program administrators. Persistence is the stream of benefits over time from an energy measure or program. When programs adjust savings claims for persistence, they factor in an energy measure's life, a savings persistence factor, and the initial estimate of savings. Measure life studies identify the median number of years that a measure remains functional. In a project with multiple measures, the measure life is defined as the time until 50% of the installed measures, in terms of predicted savings, are no longer operable or in place (Stewart 2017). Measure life and persistence factors are determined by engineering judgment, field studies, or statistical analysis (Vetromile et al. 2018).

SEM programs were created in part to drive actions that save energy. The cost effectiveness of SEM programs is dependent in part upon the persistence of savings. For capital expenditures (CapEx) this is tied to the length of time the equipment operates as intended. If the equipment is not maintained or operating conditions change, savings may degrade. The persistence of savings for O&M measures is tied to the persistence of the practices. Fixing compressed air leaks saves energy but only so long as a maintenance practice is in place to continue to repair the leaks (Vetromile et al. 2018).

Analyses to date indicate that SEM programs can extend the persistence of energy savings. In 2017, BPA's SEM programs were evaluated by a third party, and savings were found to persist over the engagement period. Specifically, SEM savings from BPA's High Performance Energy Management program were found to persist over three to four years of program engagement and increase during the final year. BPA did find that maintaining focus on SEM savings throughout engagement and the years following is important to prevent backsliding on savings (SBW and Cadmus 2017).

Energy Trust started its First Year SEM program with an estimated three-year average measure life for savings. For participants that go on to the Continuous SEM program, Energy Trust credits a measure life of up to five years. The longer engagement periods are enabling Energy Trust to gather considerable information on the persistence of savings from individual energy measures (B. Crumrine, senior SEM coach and northwest SEM manager, and L. Belmont, SEM specialist, Cascade Energy, pers. comms., May 8 and November 11, 2018). After several years of program activity, Energy Trust worked with its evaluator to conduct a review. They found that three years was a reasonable estimate of measure life and that for some measures, a longer period would be acceptable (Vetromile et al. 2018).

Our interviews and surveys of people involved in SEM program delivery and evaluation indicate that many believe participation in a SEM program can extend the savings of numerous O&M measures (see Appendix B). This is not yet a consensus, however. One concern is backsliding, the degradation of savings over time. Program evaluation reports and interviews indicate that backsliding on savings has occurred with some customers after program engagement periods ended because the customers lost their focus and commitment to systematic energy management. These observations make sense; the more consistently an organization tracks its energy use and reports trends to decision makers, the more likely it is to stay on top of maintenance issues and avoid degradation of savings.

In its most recent survey, CEE found that programs are using many assumptions for persistence of savings in their analyses. Twenty percent are using less than two years, 60% two to six years, and 20% more than six years (Burgess 2018). The determination of the persistence of savings is in its infancy. Methods for determining persistence vary among programs. In summary, the community has not reached consensus on whether SEM programs extend the persistence of savings. More analysis is needed, but early indications are that many SEM programs are seeing and claiming savings that are more persistent.

Increased Project Activity

One motivation of administrators to invest in SEM programs is that they create more activity for other programs, thereby driving greater savings. The people we interviewed and surveyed were almost unanimous on this point. They felt that SEM programs drive more O&M and CapEx projects (see Appendix A).

Recent research has confirmed this impression. An analysis of Energy Trust's industrial SEM program found that average savings for participants came to 4,400 MWh/year, which is 3,100 MWh greater than the average savings of Energy Trust industrial customers participating in other programs. Energy Trust customers were four times more likely to complete a new capital project annually after participating in a SEM program than those that did not participate. Customers saved on average 200 MWh more per year (from capital projects and O&M measures) following SEM engagement than did other customers during the same 2009–2012 time frame (Rubado, Batmale, and Harper 2015).

SEM program participation has also been linked to participation in subsequent energy efficiency programs, increasing the potential for energy savings and efficiency beyond the initial program's prescribed measures. Research on Energy Trust program data compared the rate of participation among SEM customers in other energy efficiency programs at Energy Trust with that of non-SEM customers. SEM participants were found to be more likely to have completed project activities before SEM engagement, reporting an 80% participation rate in previous efficiency programs. The study also found that after SEM, participants were even more likely to participate in at least one subsequent energy efficiency program per year and had a greater rate of change in program participation than the 917-site control group (Rubato, Batmale, and Harper 2015). While it is likely that self-selection bias skews the findings upward, it is true that participants in SEM programs are contributing more to utility goals for programs.

Program Participation

Another indication of success for SEM programs can be found in customer satisfaction. At Energy Trust of Oregon, about 70% of SEM program participants were willing to show support for their programs by helping with SEM marketing, recruitment, or other efforts (Kolwey 2013). This behavior indicates good customer satisfaction among SEM participants, providing another benefit of industrial customer participation.

Conclusions

The key conclusions from these data are that programs are helping customers reduce their energy consumption. The number of SEM programs is increasing, as is the number of companies seeking assistance from the utilities. SEM program participants achieve greater

savings and have a much higher rate of project activity than non-SEM participants. Participation in SEM programs is driving capital investments and extending the persistence of energy savings (Kolwey 2013; Rubato, Batmale, and Harper 2015).

CHALLENGES AND REWARDS OF SEM PROGRAMS

This section describes a number of challenges faced by SEM energy efficiency programs, suggests ways forward, and discusses some of the benefits these programs can provide to utilities and program administrators.

SEM systems can address all of a company's energy issues: electricity, natural gas, fuels for vehicles, and any other fuels it uses in production. They can also include other utilities such as water and wastewater as well as raw materials and wastes. However only 7 of the 14 programs responding to the most recent CEE survey took on both electricity and natural gas. Seven were electricity only (Burgess 2018). A piecemeal programmatic approach that has one program for electricity, another for natural gas, and maybe a third for production inputs and outputs is less attractive and likely unworkable for many companies. They need a single point of contact that can help them address all their energy and material management issues.

Some public utility commissions (PUCs) and utilities categorize SEM as a behavior change or market transformation program. Behavior change programs, as the name indicates, attempt to persuade customers to be more thoughtful about their use of energy (Sussman and Chikumbo 2016). Market transformation programs engage market participants like manufacturers, project developers, wholesalers, and retailers to make, recommend, and sell equipment that is more efficient. Interviewees indicated that some PUCs are resistant to behavior change programs because of concerns that savings may not be real or lasting. Some PUCs do not support market transformation programs because of their long-term nature and the need for substantial up-front investments before producing savings (York et al. 2017).

Some utilities worry that their PUCs may not allow them to claim O&M savings. For example, Xcel Energy and Arizona Public Service had to go to their respective PUCs and provide testimony that proved the legitimacy of the O&M savings they claimed (N. Kolwey, senior associate, Southwest Energy Efficiency Project, pers. comm., November 5, 2018). Since many of the savings from SEM programs come from O&M projects, the risk that such savings will not count toward their goals can make utilities reluctant to pursue them.

A challenge brought up in our interviews is whether or not utilities have sufficiently ambitious savings goals to drive them to pursue energy savings from energy management programs. Administering energy management programs requires a set of resources different from those needed by a rebate program. It also requires a long-term approach to customer engagement. The additional costs involved amount to additional risks for utilities. If they can achieve their goals with conventional prescriptive and custom programs, they are less motivated to take on more complicated program models. Bigger goals and financial rewards for exceeding them may be what is necessary to motivate utilities to consider energy management programs.

EM&V

DOE recommends three protocols for estimating energy savings from utility SEM programs. The first is IPMVP Option C, developed by the Efficiency Valuation Organization.⁵ It applies to comprehensive energy management programs affecting multiple energy-using systems. It is the most common method for quantifying SEM program participant energy savings (Ochsner et al. 2015). Option C requires analysis of metered energy consumption at the whole-facility or sub-facility level (EVO 2012; Violette 2013). The second protocol is the Superior Energy Performance Measurement and Verification Protocol for Industry (DOE 2018b). It defines procedures for determining compliance with the energy performance requirements of DOE's SEP program. The third protocol, the 50001 Ready Protocol, is based on the SEP M&V protocol.⁶ It allows determination of energy savings (and carbon emissions reductions) for single or multiple energy types consumed by a facility. The 50001 Ready program includes a website that DOE hopes will become a platform for SEM programs to develop a framework for their energy savings and emissions reductions (DOE 2018a; Violette 2013).

Many SEM program evaluators use the Option C, whole-facility approach. They start by developing a baseline for the facility using interval energy data and production information. Then they develop a model that ties energy consumption to production (or another set of variables) and perform a regression analysis. Energy savings are determined by checking where post-implementation energy use (ex-post) falls on the regression curve (EVO 2012; Ochsner et al. 2015).

There are two challenges for evaluators using regression analysis to quantify savings from SEM programs. The savings must be large enough to be separated out from the normal variability in a facility's energy consumption, and evaluators must be able to account for nonroutine events that alter a facility's operations. The first challenge might be raised by a school that experiences considerable variation in use throughout the year. The second challenge could be presented by a manufacturing facility that changes its product mix or adds a shift (Ochsner et al. 2015).

Another issue is how to treat savings from capital projects that customers identify and implement as a result of their SEM program participation. Evaluators usually credit O&M project savings to the energy management program, but their treatment of savings from capital projects varies.

Capital projects range from simple equipment replacement to redesigns of production processes. In the absence of SEM programs, the former is often addressed by a prescriptive

⁵ IPMVP Option C uses meters (usually the ones used for utility billing) to measure the energy use of an entire building, facility, or a subset of the facility. It compares energy consumption during the reporting and baseline periods, usually using 9 to 12 months of monthly data for each. In addition, evaluators monitor all independent variables that affect energy consumption during the performance period, including weather, occupancy, throughput, and operating schedules. Multivariate regression analysis factors these variables into the savings determination.

⁶ The 50001 Ready program is a self-guided approach for facilities to establish an energy management system and self-attest to the structure of ISO 50001 standard. See www.energy.gov/eere/amo/50001-ready-program.

rebates for specific types of equipment such as high-efficiency motors, and the latter is often addressed by custom programs that provide incentives based on the volume of energy savings. However, since many projects are identified as a result of team participation in a SEM program, there is some debate about which program should get the credit for the savings.

While it makes sense to give credit to the program that provided the incentive, it also makes sense to recognize that the project would likely not have been implemented without the SEM program. A common solution has been to determine the total energy savings for a facility using the top-down, whole-facility approach, and then subtract the savings of capital projects using a bottom-up, project-specific approach. The SEM program gets credit for the balance. The downside of this approach is that it does not recognize the contributory impact of the SEM program on the capital projects. There is also the risk that the savings determination for the capital projects may overestimate or underestimate actual savings, thereby hurting or benefiting the savings attributed to the SEM program. This is a significant risk when using deemed savings values derived from industry averages or equipment label data. A solution to this last concern is for programs to collect more field data and update their deemed savings values.

As we discuss in the next section, taking a program portfolio approach to program evaluation addresses many of these concerns.

Another evaluation issue facing SEM programs is the treatment of nonenergy benefits. Continual improvement practices help companies become more competitive, contribute to workforce development, and often reduce waste and environmental impacts. Program administrators should try to assign a monetary value to these gains so they can be included in cost-benefit analyses.

The decisions made regarding the treatment of cost savings from SEM programs affect the cost effectiveness analysis of these programs and, by extension, how they are perceived by regulators and other stakeholders.

Cost Effectiveness

Some policymakers see SEM as a type of market transformation (MT) program. The protracted participant engagement and lagging impacts of SEM are typical of MT programs. The up-front costs of MT can be substantial, while the benefits are often diffuse and take several years to materialize. Consequently, MT programs in general, and some SEM programs in particular, have had difficulty passing commonly used cost-effectiveness tests (York et al. 2017).

This issue can be addressed in part by taking a different approach to assessing cost effectiveness. Some of the more significant barriers to widespread deployment of market transformation programs like SEM stem from utility regulation such as restrictive cost-effectiveness screening focused on single-year results and short funding periods (three years or less). Extending the period over which SEM programs are evaluated would do much to address this issue.

As previously discussed, SEM programs were created to drive energy performance improvement largely through O&M projects. Therefore the cost effectiveness of SEM programs is dependent in part on the persistence of O&M improvements. Research to date and the responses to our interviews and surveys indicate that SEM programs generate O&M projects that produce energy savings for multiple years. Programs should get credit for the persistence of the savings they facilitate. They should track savings and update models as more information is gathered.

Low-cost, high-impact O&M actions can be a stepping-stone for larger capital projects. The issue here is how to treat savings from capital projects. Whether or not savings from capital projects initiated by SEM program activity are attributed to a SEM program is often dictated by program structure rather than set policy. As long as a utility's entire portfolio of C&I programs can be evaluated as a unit, attribution at the program level is not problematic. However, if there is no visibility by policymakers of these relationships and if there is not recognition in program evaluation that SEM programs drive other activities, SEM is at risk of not being properly valued. Assessing cost effectiveness based on year-by-year savings, such as is common with resource acquisition programs, is akin to using a yardstick where a tape measure is more appropriate.

Another issue, although one that may not affect many programs for some time to come, is that the long-term viability of any program requires a continuous pipeline of energy savings opportunities. Within any given utility service territory, there is a finite number of viable candidates for a given type of program, and there is a limited number of organizations with sufficiently large energy usage to warrant participation in an energy management program. This creates a twofold challenge: If a program offering SEM uses the conventional approach of a limited customer engagement, it could over time exhaust its best opportunities. One interviewee expressed an additional concern: A SEM program must engage a sufficiently diverse set of customers every year so that it can consistently meet its energy savings goals. The interviewee observed that a new SEM program might sign up all the companies with the greatest potential to save energy in its first year. This could result in a successful first cohort (with performance periods typically in years 2 and 3 in addition to part of year 1) with great cost-of-saved-energy numbers, but it might be impossible to sustain that performance with subsequent cohorts when the pool of available candidates has less opportunity. As customers recruited for the SEM program get smaller in size, the cost effectiveness of the program will tend to drop. At some point, the viability of the program may be questioned and it will be at risk of being discontinued.

Program implementers can avoid this issue by seeking a mix of program participants in each program cycle so that the potential for savings is consistent year after year. They can also address the issue by reducing training and other soft costs associated with delivering program services. Extending the engagement period or turning the program into a platform for long-term customer engagement increases the likelihood of a continuous supply of projects from participants. Part of an extended engagement philosophy is encouraging capital projects. They will increase overall savings for the program, which will have a positive effect on the cost of saved energy.

The issue of cost effectiveness and the issue of savings attribution have a common basis and a common solution. The needs of customers and the benefits from the services of a utility and its efficiency programs are all considered in isolation rather than as parts of a business-to-business relationship. Examples of a holistic approach do exist. Many municipal utilities and rural electric co-ops do not think in terms of cost-effective savings but in terms of cost-effective customer service. To the degree that they measure impacts, all benefits – energy and nonenergy – are valuable to them in the name of effective customer service. This cost effectiveness model is similar to practices in the private sector where companies grow their businesses through expanded service offerings and relationship building.

Customer Recruitment

Utilities often find it challenging to engage industrial customers and recruit them into energy efficiency programs. It is often difficult to get the attention of decision makers, many of whom are located outside the utility's service territory. Program recruiters must overcome any perception customers have that programs are bureaucratic and unresponsive to their needs. A related concern is that many customers are unfamiliar with how public sector programs work. They are more familiar with and thus more comfortable with private sector vendors, and they are accustomed to service providers that tailor offerings to meet their schedules and their unique needs. By contrast, public sector programs are constrained by fixed budgets, funding cycles, and requirements to offer uniform services. Not only do these structures inhibit recruiting customers, they also inhibit establishing long-term relationships with them.

SEM programs can address some of these challenges and help utilities engage their larger customers. Many companies and institutions are familiar with continual improvement systems, so they understand the value of a management system and of hiring a vendor to help them implement one. They also have management systems in place that can accommodate the additional metrics and standard practices of a SEM program; participation in a program adds value to these systems. Most companies are interested in developing their workforces, another key feature of SEM programs. Many understand the value of data-driven decision making, and the regression models that implementers develop are a compelling benefit to many plant managers. A SEM program functions in a manner similar to a conventional vendor providing a consultative service, so the MOU required by a program is a familiar framework for working together. All of these features make SEM programs responsive to many organizations' needs. As a result, their value is understandable to executive-level decision makers.

A number of tactics for marketing SEM programs have proved successful. Publicity and outreach approaches include websites, emailing, promotional videos, and solicitation. NYSERDA collaborates with several utilities that have their own promotional activities. Other success strategies include BPA's collaboration with its distribution utility customers and BC Hydro's use of customer experiences in its promotional materials. The common themes among these marketing and recruitment efforts is that they attempt to convey the value of SEM program participation and they target companies that are likely to sign up, participate fully, and realize energy savings.

In terms of first-time customer recruitment, the more established programs like Wisconsin's Focus on Energy and BPA's Energy Smart Industrial (ESI) program have found pursuing multiple avenues to attract customers to be the most successful approach. Energy Trust uses program delivery contractors to cultivate relationships with companies in specific territories. ESI uses its analogous Energy Smart Industrial Partners (ESIPs) to achieve the same thing. NYSERDA and Focus on Energy also use contractors.

A common practice of mature programs is to leverage the relationships program representatives have established with customers through past activities. Reps seek out companies with existing energy teams, energy champions, and leadership-level champions. All of these are predictors of successful participation in a SEM program. Program staff can also leverage their own relationships with account managers and customers for targeted recruitment efforts. The easiest way to ensure customers are aware of all opportunities is to have account representatives who are familiar with all program offerings. Having knowledgeable staff with responsibility for connecting customers to all program resources simplifies the customer experience and enhances the service provided by a program. Energy Trust attributes much of its success to experienced account managers, energy coaches, and delivery contractors, as well as an initial assessment of customer goals and rolling program enrollment.

SEM programs provide a platform for introducing other programs. Once a company starts a project register, it can start identifying projects that are eligible for any prescriptive and custom rebate programs the utility has to offer. The forecasting aspect of energy management is also useful to utilities. They can learn of customers' plans for future investment and determine how these plans will increase or decrease their energy demand. The programs also create a reason for routine interaction between a utility and its largest customers. Large-customer representatives have a framework for engaging their clients. The discussion changes from one of providing a commodity to one about offering customer service, delivering solutions, and driving customer satisfaction.

Energy Management Information Systems

Whereas companies look to management systems like SEM to organize their human activities in their efforts to manage energy, they also often look to computer systems to organize their energy data gathering and analysis. Sometimes pursued separately, sometimes in a coordinated way, both types of systems are helping companies manage their energy usage, and efficiency program administrators are accelerating the adoption of both.

SMART TECHNOLOGIES

Recent advances in information and communication technologies are adding a new dimension to what programs offer and how companies can save energy. In commercial, institutional, and industrial facilities, smart technologies are enabling entirely new levels of system and process control at the facility level and throughout enterprises. Building automation systems (BASs) are capable of accomplishing in large buildings what learning thermostats do in homes. The most advanced BASs track outside weather conditions, space occupancy, and indoor air quality, and they correlate these with the energy use of building systems to optimize energy consumption and building performance (ACEEE 2018).

The integration of data collection and analysis systems with production control systems in the industrial sector is often referred to as smart manufacturing. Smart manufacturing can help companies reduce costs by enabling people throughout an organization to access the information they need, when they need it, where they need it, and in a context that aids their decision making (Rogers 2014). Workers operate their equipment more efficiently, supervisors manage their processes more effectively, and executives utilize their resources more dynamically. Productivity is increased. Waste and defective parts decrease. All of this saves energy.

Smart manufacturing has garnered interest from both the DOE and the National Institute of Standards and Technology (NIST). These federal agencies are funding projects and partnerships in smart manufacturing that focus on advanced sensors, controls, platforms, and modeling across value and supply chain enterprises and are addressing operational interoperability, interconnected system cybersecurity, and more (Rogers 2018; NIST 2018a, 2018b). The Clean Energy Smart Manufacturing Innovation Institute (CESMII), under the auspices of the Manufacturing USA project, is working toward broader acceptance and implementation of smart manufacturing business practices, technologies, and shared infrastructure.^{7,8} It focuses on development of a workforce skilled and trained in using advanced data technologies to optimize manufacturing operations. CESMII's research is examining how data and information from devices, when combined with advanced controls, a smart manufacturing software platform, and process simulation models, can lead to reduced energy consumption (CESMII 2018).

In 2008 the European Commission launched an initiative to create a single digital market for all of Europe to address IT and communications issues affecting all businesses. Within the Single Digital Market initiative are programs to accelerate smart manufacturing, also known in Europe as Industrie 4.0, virtual design, and artificial intelligence (Rogers 2017).⁹ Smart manufacturing and Industrie 4.0 (originally Smart Factory in Germany) are similar in that they focus on data connectivity, contextualization, and modeling to drive energy and materials usage as economic business opportunities.

Companies can also use data analytics to identify optimal operating conditions that maximize productivity and reduce waste. The first step is to create a mathematical model of the building or facility, sometimes referred to as a digital twin. The software runs multiple operating scenarios on this model and then compares them. Smart manufacturing can also include a feedback loop that continuously compares current operating conditions with historical operating data. Such a system can achieve levels of efficiency that have never been possible before. The Smart Manufacturing Leadership Coalition, the organization that

⁷ CESMII serves the manufacturing sector by providing technical capacity and capability to members to help them accelerate their adoption of advanced process sensing, control, and modeling. See www.cesmii.org.

⁸ Manufacturing USA brings together private sector companies, academia, and federal resources in a network of advanced manufacturing institutes. Its research and development projects innovate new technologies and practices that increase the competitiveness of US manufacturers. See www.manufacturingusa.com.

⁹ Industrie 4.0 is a strategic initiative to establish Germany as a lead market and provider of advanced manufacturing solutions. See www.gtai.de/GTAI/Navigation/EN/Invest/industrie-4-0.html.

created CESMII, estimates that additional energy savings of 10–25% are possible (Davis 2017).

EMIS FEATURES

Energy management information systems (EMISs) are software and hardware systems that help organizations manage their energy use. The software is often provided through a software-as-a-service (SaaS) arrangement, but not always. Hardware can include additional sensors, meters, and computers. These systems, which allow users to view the performance of their facilities online, are commercially available from such companies as ABB, Cascade Energy, Emerson, Energent, Siemens, and Schneider Electric. The features of EMISs vary by intended user: Commercial building EMISs are different from those designed for industrial facilities. EMISs are distinct from building and industrial systems that control facility equipment. An EMIS may monitor and display equipment parameters that affect energy use, but it does not control those systems. Rather, it uses sophisticated analytics to enable data-driven energy management and process control decision making (Crowe, Kramer, and Effinger 2014; ACEEE 2018).

An EMIS for a commercial facility can stand on its own or be an application within a BAS. In an industrial facility, an EMIS can be part of a larger smart manufacturing platform that leverages existing data management systems. Existing systems can include sensors and meters that collect data, process data management systems that analyze production data, historians that store production data, and dashboards that provide operators contextualized information about operations. In the future, we are likely to see integration of these data management and analysis components and the manufacturing process control systems (ACEEE 2018).

NEEA's taxonomy for commercial EMISs divides the software tools into two categories: building-level EMISs and system-level EMISs. Building-level EMISs focus on whole-building M&V, while system-level EMISs focus on optimization of specific systems such as a building's HVAC system (Kramer et al. 2013). The parallel for an industrial EMIS is whole-facility level and process level.

EMISs take a variety of data inputs and simplify them for easy decision making by operators, supervisors, engineers, and management. They include dashboards that provide a visual representation of a facility's energy consumption and display this information in contexts that facilitate easier and more informed decision making and energy management actions. When operating conditions are outside of established parameters, the EMIS may directly display that information visually or may send alerts to operators, either through a visual cue on the dashboard or through email or text messages. Operators then respond by making adjustments, taking into consideration information provided by the EMIS and their own knowledge of the facility. Connecting to EMIS data via mobile devices is becoming more common and expanding how operators communicate with and receive communications from EMIS.

A key EMIS function is measuring energy savings. An advanced EMIS can support development of predictive energy savings models using building simulation software to create a computer model that captures energy flows through a building and building

performance. Skilled users can determine energy savings by simulating the performance of the building or facility with and without an energy measure. The simulation involves an energy-consumption multivariate regression analysis that typically includes the weather, day and time, and any other relevant variables such as building occupancy or production schedule. Operators can also use an EMIS to predict the impact that changes in building equipment or production might have on energy consumption. By modeling those changes within a simulation, operators can understand the implications and act accordingly (Kramer et al. 2013).

Advanced EMISs may also:

- Use utility meter or equipment-level data to track energy consumption on a daily or more frequent basis
- Disaggregate loads by analyzing energy data
- Develop benchmarks against which future performance can be compared
- Analyze monthly utility bills
- Enable the set-up of key performance indexes (KPIs)
- Perform energy savings cost analysis
- Automatically quantify savings from projects
- Include data security and data quality assurance
- Include integrated M&V
- Include a platform for organizing the implementation of projects

The most advanced of these systems include a continuous commissioning feature that routinely reassesses operating set points for building mechanical systems operations and suggests new ones. Such systems continuously collect and store energy consumption data in data historians, use data analytics to analyze current activities, and compare the two to provide operators with insights that can guide their efforts to improve performance (DOE 2015; Crowe, Kramer, and Effinger 2014; Kramer et al. 2013; Rogers 2014).

Some EMISs allow users to document projects in time-series charts to indicate times of actions taken so that energy managers can track associated changes in energy consumption. Advanced project-tracking features can also be used to document actions so that savings can be attributed to program-related efforts. Such features are very popular with program implementers and evaluators.

Programs like Efficiency Nova Scotia's EMIS and NYSERDA's Real-Time Energy Management (RTEM) programs will perform a needs assessment or audit that results in a custom EMIS plan and business case for each facility and organization. This gap analysis includes examining existing energy data streams, assessing how to harvest other needed energy data, and determining which EMIS hardware and software resources are required to properly manage a facility's energy use. Then program implementers think through the details of the EMIS analysis and come up with an implementation plan.

Participants have found these to be important preliminary steps. The use of simulations enables pre-implementation estimates of EMIS operational energy savings in order to support the business case for the required expenditure. Program participants can use the

EMIS business case to obtain management approval for funding and resource commitments (Henwood and Bassett 2015).

Some EMIS products are suitable for both industrial and commercial applications; however most of them are intended for only one sector. The EMIS products for industrial facilities tend to be more complex than those for commercial buildings. They must be able to incorporate more variables into regression analyses, accept a greater diversity of inputs from production systems, and contend with greater variability in operations (Crowe, Kramer, and Effinger 2014).

In a commercial building, the number of people with responsibility for maintaining mechanical systems and optimizing energy consumption can be less than one. It is not uncommon for a property management firm to have dozens of buildings in a city. The firm may centralize the monitoring of its buildings and dispatch maintenance staff as needed. In such instances, the technology is the primary tool for managing energy. In contrast, a manufacturing facility is likely to have onsite engineering and maintenance staff to implement projects as well as accounting and finance professionals interacting with the utilities.

EMIS IN ENERGY EFFICIENCY PROGRAMS

The key benefit of EMIS programs to manufacturing companies is improving the use of data to drive process control. Most manufacturing companies are accustomed to using time-series data to identify production trends, correlations among production variables, and cost-saving opportunities. Therefore additional information in a similar format from EMIS is something that many customers can immediately relate to and use. Setting up a system to collect and analyze production and energy data is one of the early steps in implementing smart manufacturing or creating a smart building.

Recognizing this opportunity, many utilities are incorporating EMISs into their program portfolios. By offering an EMIS program, the administrator is encouraging companies to use data to save energy through improved control over energy use in day-to-day operations. Programs are seeking system-level savings that they believe is not obtainable without customers routinely analyzing their energy data. In many cases, this is a reasonable assumption. Energy management may not be a priority for a company that is not aware of its opportunities to save energy. In addition, not all customers are convinced that smart technologies are worth their costs or that they have the capacity to install them. An incentive from an efficiency program may be enough to encourage customers to install an energy management system and to use it.

Several types of programs encourage customers to invest in sensors, networks, and automation so they can better control their energy use. The use of EMIS in industrial programs is emerging. One reason that programs are interested in including EMISs in their industry offerings is that interval meter and device-level data can increase everyone's confidence in savings claims and reduce evaluation costs (Crowe, Kramer, and Effinger 2014). Even though the tracking of energy savings is a key activity of all types of industrial programs, few companies take advantage of the newer technologies that are available. Monthly utility bills and Excel spreadsheets are still what is typically used to track savings.

In the commercial space, existing building commissioning and retrocommissioning programs often include financial assistance for building automation systems that have EMIS applications. Some programs incentivize only investments in building automation software that can collect and analyze information about energy use in buildings. Others have a broader focus that includes hardware and software for manufacturing process data collection, analysis, and display (ACEEE 2018).

Programs may fund all or part of an EMIS audit, all or part of an EMIS system, EMIS infrastructure installations, service provider training and support, and some fraction of EMIS software subscription fees.¹⁰ An example of the last option is the NYSERDA RTEM program described below. In some instances, the focus of a program is retrofitting existing commercial and institutional buildings. In addition to upgrading the building's shell and mechanical components, such programs can include installing advanced building management systems to provide operators superior control of energy consumption. Some programs cover worker training because of how important it is to the success of an EMIS implementation.

A customer could include an EMIS in a project receiving incentives from a custom program. The difference between leveraging a custom program to pay for an EMIS and an EMIS-focused program is that custom programs provide incentives tied to the volume of energy savings and tend to be less concerned with the specifics of equipment installed by customers. They give customers greater flexibility in designing systems but can require extensive engineering analysis of energy savings. Within such a program, a company can include all types of sensors, connected devices, networks, and energy data analysis equipment. Technology is part of a bigger project and not singled out. For example, a project to upgrade a production line might include dozens of motors, drives, fans, pumps, and conveyors. It will very likely also include some new sensors, add to an existing communication network, and incorporate new or improved controls.

It is likely that more than a few projects funded by custom energy efficiency programs have included the installation of an EMIS or other data management and analysis technologies. But since little to no data exist on the types or volumes of technologies custom programs have funded, we did not include such programs in our analysis. We mention it here to alert program stakeholders that custom programs are a viable programmatic tool to drive customers' investments in energy-saving EMIS-like technologies.

EM&V

The evaluation of EMIS programs often involves determining the savings from O&M projects that are attributable to the EMIS, and savings from capital investment projects that are attributable to other programs. As with SEM programs, the evaluators of EMIS often follow the IPMVP Option C, whole-facility approach to M&V. A few EMISs support IPMVP Option D, which includes a calibrated whole-facility simulation informed by meter data.

¹⁰ EMIS software is often provided in a subscription format, also known as software as a service (SaaS), in which the customer has access to continually updated software but does not own it.

The more granular the data, the better the simulation. Analysis of large capital projects is done using a bottom-up analysis method (IPMVP Options A or B) on the savings from each of the capital investment projects and subtracting these savings from those of the top-down analysis.¹¹ The balance of savings is attributed to the EMIS.

A common approach to M&V is to gather 12 months of post-implementation data. When an EMIS has access to higher-resolution data, such as from an interval meter taking measurements every 15 minutes, it can detect savings that normally would be missed because they are small; this can also decrease the amount of time needed to develop an annualized savings estimate (Kramer et al. 2013; Crowe, Kramer, and Effinger 2014).

EXAMPLES OF EMIS PROGRAMS

We have identified 10 energy efficiency programs that include EMISs among their offerings (see Appendix A). As the following case studies illustrate, some of these programs focus on industrial facilities, some on commercial, and some include both. Though EMIS-focused programs are relatively new, a few are already showing results.

Efficiency Nova Scotia

Efficiency Nova Scotia's EMIS program provides financial assistance to companies to purchase hardware and software capable of collecting, analyzing, and displaying information on energy consumption and its relationship to production. The program also trains workers and engineers in how to operate the system and teaches management how to use it to improve their facilities' energy performance. Implementers help company technicians set up the EMIS, put in place data collection and reporting processes, and establish operating parameters. They also set up dashboards that simplify monitoring, aid operators' decision making, and alert technicians when equipment is not functioning properly.

The bulk of the EMIS program is executed in four key steps, with funding provided at each: audit, implementation planning, implementation, and ongoing operations. The EMIS audit is an exercise in scoping and seeks to outline budget constraints, identify current energy usage and costs, and determine training needs (Econoler 2017; Henwood and Bassett 2015). During the implementation planning stage, final cost estimates, schedules, information and technology training plans, and communication channels are established (Henwood and Bassett 2015). Once the EMIS is set up and workers are trained, companies can use energy data to set targets for production and downtime modes and develop KPIs that operators can use to make process control decisions.

¹¹ IPMVP Option A and Option B use engineering models to calculate energy consumption for a project end use, like a lighting system or a ventilation system, and estimate savings by changing the model parameters that are affected by an energy efficiency program. Parameters include operating characteristics of the systems or facilities where the measures are installed and equipment operating hours and loads. Option A requires the direct measurement of only one of the key parameters during the baseline and reporting periods; the others are stipulated on the basis of assumptions or analysis of historical data. In Option B, all the parameters affecting energy savings are measured rather than stipulated. Both options involve short-term or continuous measurement of both baseline and reporting-period energy use.

After training and engagement are completed, the implementer will continue to provide technical assistance related to the EMIS for one year. The program collects performance information throughout the engagement and monitoring period. During this time, efforts are focused on progress in reporting, O&M, and energy management culture. Post-implementation, the program continues to support its customers for one to five years (Henwood and Bassett 2015).

New York State Energy Research and Development Authority

NYSERDA's RTEM program claims customers can achieve energy savings of 15–30% per year (NYSERDA 2017b). Though EMIS programs often involve only software, RTEM supports up to 30% of all software, hardware, Internet connectivity, and cloud-based metering costs. Many of the systems funded by RTEM have fault detection diagnostic capabilities, and some enable facilities to participate in automated demand response programs (NYSERDA 2017b, 2018f). RTEM systems analyze site performance data and make adjustments in order to provide more responsive, comfortable, and energy-efficient environments (NYSERDA 2018b).

RTEM systems work with customer BASs and over time amass more and more data. Data collected from program participants' buildings, useful for benchmarking the performance of various building types, are stored in the cloud and can be accessed from anywhere. This enables program participants and their vendors to troubleshoot any problems remotely. NYSERDA covers the cost of maintaining the cloud-based infrastructure as part of the RTEM program (NYSERDA 2018d, 2018f).

Xcel Energy Colorado

Xcel Energy Colorado offers an energy efficiency program called Energy Information Systems (EIS) that aims to achieve greater savings in commercial and industrial buildings by allowing customers to harness the benefits of intelligent building controls such as EMISs. The EIS program is offered as a standalone but also can be an additional module within Xcel's Process Efficiency program. The EIS dashboards enable operators to visualize building performance, and this helps them identify low- or no-cost behavioral measures they can take to reduce their energy usage (Xcel 2015, 2016). Xcel offers coaching and consultative services to help customers select the EIS solution, identify energy-saving opportunities, and verify savings. The program provides a 30% incentive for qualifying installation costs and an additional incentive of \$0.02/kWh on O&M savings (Burgess 2018).

FortisBC

The EnerTracker Program offered by FortisBC in partnership with BC Hydro provided customers access to an EMIS. It was a subset of FortisBC's Continuous Optimization program targeting commercial building owners. FortisBC designed this program to give customers unable or unwilling to participate in the full Continuous Optimization program insights into their natural gas usage and to identify gas conservation measures. The software provided fault detection in near real time, avoiding wasted gas consumption. The program covered the cost of the annual EMIS subscription and saved an average of 2% of annual natural gas consumption. However FortisBC deemed the program ineffective and discontinued it after 2016 (Fortis 2017).

EMIS PROGRAM RESULTS

Most of the EMIS programs listed in Appendix A are relatively new and have yet to demonstrate a history of energy savings. We do not have a sufficiently large data set to calculate any averages or trends. In lieu of data analysis, we cite the performance of specific programs with the thought that their results could be representative.

The Efficiency Nova Scotia EMIS program splits implementation costs with the customer. A portion of the implementation incentive is awarded after customers complete quarterly reporting requirements. In 2015, when the program was launched, the average cost of program participation per customer was \$142,600 (US), and Efficiency Nova Scotia provided an average of \$102,500. The utility also provides incentives to program participants at milestones along the way (Henwood and Bassett 2015). In 2016, participating customers saved 2.02 GWh, and net program cumulative savings reached 4.66 GWh (Econoler 2017). As of 2018, a total of seven participants have benefited from the program (P. Bassett, president, Energy Performance Services, pers. comm., January 18, 2018).

Xcel Energy Colorado reports that the EMIS program has typically come close to or met its energy savings goals and has been cost effective. In 2016 the program achieved 100% of its electric energy savings target and 170% of its natural gas savings target and came in under budget. Participation in the program has increased in recent years, allowing the utility to achieve even greater savings. Xcel cites the following benefits beyond energy savings (Xcel 2017):

- Integrated equipment monitoring and control
- Centralized building system operations
- Enhanced tenant comfort and increased customer satisfaction
- Reduced nuisance calls
- Reduced energy waste and operating expenses

As indicated by Xcel's claims, EMIS programs produce many benefits in addition to reducing customers' energy consumption. NEEA's 2014 survey of industrial EMIS found that the ability of many EMISs to track project performance is a valuable feature. Some project tracking applications include project management features, which can also be valuable to some businesses. The most important feature is perhaps the ability to quantify energy savings automatically. In order to do this, the EMIS must be able to incorporate production data into the energy regression analysis, so the ability to connect to third-party devices and networks is critical. Evaluation of energy savings from an energy efficiency project requires the ability to track energy data at daily or more frequent resolution.

Fault detection and alerts reduce downtime and support product quality efforts. Team leaders are able to use outputs to drive discussions and task assignments in routine meetings. Managers with more than one facility can keep track of the progress of multiple projects at multiple facilities (Crowe, Kramer, and Effinger 2014).

EMIS PROGRAM CHALLENGES

A challenge that many companies have with any advanced technology is getting the full value out of it. For example, Energy Performance Services, Inc. (EPS), the implementer for

several programs across Canada, has routinely found EMISs in place but not in use, or not used to their full potential. Often only one person knows how to use the software. This discovery caused EPS to shift its delivery model. It started working with companies to integrate their EMIS into the rest of the company's business systems. This involved worker engagement and training, management commitment, and building energy performance metrics into the production reports that management used (P. Bassett, EPS, pers. comm., January 11, 2018).

Utilities were initially reluctant to include EMIS in their programs. The proprietary software programs were essentially black boxes; there was no visibility into the embedded analytics and therefore no way to validate the energy savings claims. Vendors realized this was a problem and started providing their model equations and specifications, which users can now download and view. Many EMISs now report precision and accuracy statistics such as R^2 and the coefficient of variation of the root mean square error. This type of statistical reporting gives programs the opportunity to assess the EMIS M&V algorithms.

A key step in developing a regression analysis is characterizing the facility's energy consumption relative to variables such as occupancy or product mix and volume. For manufacturing facilities, it can take up to six months and require multiple facility visits for a program to develop a baseline energy regression model. This type of analysis requires a considerable amount of manual input, filtering of data, and experimenting with different sets of variables.

A barrier to authorization in some states has been regulators' perception that EMIS programs are market transformation or behavior programs. Some regulators have a bias toward resource acquisition programs that provide incentives for the purchase of physical assets. Some EMISs are SaaS products that companies purchase on a subscription basis. The annual subscription fees can represent more than half of the cost of implementing an EMIS. There is no physical asset that could be repossessed or transferred to another facility if the company went out of business.

Illinois recently saw resistance to allowing utilities to recover costs on SaaS. The Attorney General's Office did not agree with a proposal by state regulators to let utilities get cost recovery on their cloud computing investments. The Office argued that a rule change was not necessary because outlays for cloud computing are operational costs, not capital investments (Stark 2018). Though this issue was related to direct investment by utilities, the same thinking can transfer to the items for which efficiency programs provide incentives. Regulators or policymakers may be resistant to programs providing funds to purchase SaaS subscriptions they perceive to be operating costs.

A challenge with SaaS investments is how to measure and verify energy savings. Program evaluators must verify that the SaaS was purchased and installed and is being used, a much more challenging task than verifying the installation of a piece of production equipment. Including subscription fees in a program and requiring multiyear reporting both address this issue. Some programs, like NYSERDA's RTEM, cover subscription fees for a few years to make sure the company uses the software and develops a habit of making decisions based on the analysis provided. This also ensures that the program will continue to receive performance updates.

Some of the experts we talked with thought that the costs of EMISs might be a barrier for some companies. Software for a commercial building can run to tens of thousands of dollars. For a manufacturing facility, an EMIS can cost \$100,000 to \$200,000. This is a barrier for companies that need a quick return on investment and for utility programs concerned with cost effectiveness.

Others stated that compared with other capital projects, EMIS costs are on the low end. Their EMIS audits gather the information needed to develop cost-effective energy savings strategies and convincing business cases.

Programs Combining SEM and EMIS

What is apparent in analyzing existing programs and listening to stakeholders is that SEM and EMIS programs do not exist in isolation. Whether it is a SEM program offering an EMIS audit or an EMIS program integrating the ISO 50001 standard into its engagement, these two sets of energy management tools are organically merging. They may have been conceived separately, but many implementers are finding success by bringing them together.

In this section, we examine programs that combine the workforce development and organizational culture change benefits of SEM with EMIS programs that provide more automated data management and system-level savings from superior control. Referring back to our earlier definition of SEM, such programs, whether they be SEM plus EMIS or EMIS plus SEM, fall within the broader set of what are considered SEM programs.

After looking at existing examples, we contemplate what programs could look like in the future. Our discussion examines how these two important energy management tools, when combined in one program offering, might affect program features, benefits, barriers, participants, structures, and results. We also consider any trade-offs that programs might face. Program developers can use this information to guide them in their creation of new SEM programs.

EXISTING PROGRAMS

SEM Plus EMIS

Our conversations with people involved in SEM and EMIS programs indicate that in most cases, it makes sense to start with SEM and then integrate EMIS. The former creates the structure and the culture to get the most out of the latter. One implementer thought it easier to convince some customers, those with an existing focus on automation and data-driven process control, of the value of an EMIS than of a SEM program. The consensus was that regardless of where you start, in the end it makes sense for most customers to have both.

More than half of the existing SEM programs provide some sort of EMIS assistance (see Appendix A). The range of assistance for EMIS is not binary: It extends from just providing a list of EMIS vendors to technical and financial assistance to determine EMIS needs followed by installation and setup. Typically, programs will include some sort of cost-sharing or co-funding option. This may mean providing funding for all or part of an EMIS audit, for all or part of an EMIS system, or for SaaS subscription fees.

Of the 14 SEM programs examined in the 2018 CEE report, 10 include some support of EMIS (Burgess 2018). They may not require installation of an EMIS, but if the customer is interested and capable of integrating one into its operations, programs will support the installation. Some programs provide assistance on an ad hoc, as-needed basis. Others provide all or nearly all funding for EMIS (Burgess 2018). A review of a few existing programs that combine some or all aspects of SEM and EMIS implementation can provide insights into what future SEM programs might look like.

BONNEVILLE POWER ADMINISTRATION

BPA has offered a SEM program to its customer base in the Pacific Northwest since 2009. It falls within BPA's Energy Smart Industrial program (ESI), which also includes its Energy Project Managers program. ESI implementers often encourage use of EMIS and provide up to 100% of funding for EMIS systems. Additional incentives are available for other performance tracking and energy savings technologies (BPA 2017).

CALIFORNIA INVESTOR-OWNED UTILITIES

California's investor-owned utilities (IOUs) are investing \$4 million to provide SEM programs that started in 2018 (Tufts 2017).¹² They are all participating in a standardized program that follows the features recommended by a program design guide and an M&V guide developed for the California Energy Commission (Therkelson and Dias 2017). The California SEM program pulls key elements from CEE's minimum elements, the ISO 50001 standard, and existing SEM programs (Tufts 2017; Dias 2017)

Under the standardized program, industrial participants attend a number of workshops and site-specific activities throughout the two-year engagement period. Over the first year, utilities and participants collect the information needed to develop a baseline and produce a regression model. Cohorts share an implementation contractor or coach responsible for communicating program progress between sites and utilities. Some cohorts are composed of organizations from many industries, while others may be specific to a particular industry, such as food processing.

In the second year, program participants focus on M&V and companies are eligible to request help implementing an EMIS. The program provides incentives at several milestones to drive continued participation and energy savings (Dias 2017).

FOCUS ON ENERGY (WISCONSIN)

Focus on Energy, the statewide efficiency utility for the state of Wisconsin, has a SEM program that serves industrial facilities and other large customers like hospitals and universities. The program can provide comprehensive services to larger customers with the capacity to seek ISO 50001 certification or introductory services to get companies started on

¹² California's IOUs include Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison, and Southern California Gas.

energy management. The utility is implementing the 50001 Ready tool to guide customers along their energy management journey.

Focus on Energy provides most of the training on an individual basis, although about one-tenth is done through cohorts. If a customer has an EMIS or other system such as enterprise resource planning (ERP) in place, the utility helps customers use it to analyze and report energy data.¹³ It has found that many manufacturers already have an ERP in place that can give them enough information to satisfy the needs of the SEM engagement activities. Using customers' existing hardware and software also avoids additional investments that can negatively affect cost effectiveness (N. Altfeather, program design engineer, J. Nicol, energy program director, T. Dantoin, engineering manager, and M. Stover, program operations manager, Leidos, pers. comms., May 25, 2018).

EMIS Plus SEM

XCEL ENERGY

Xcel Energy, which focused on technology in its EIS program, will launch a new program in 2019, offering two tracks, the EIS path and the Process path. The EIS track consists of EMIS and SEM components. The Process track has only SEM components, but customers will be able to switch or combine tracks. Throughout participation, the program will provide companies with a SEM consultant (SEMC) to help identify capital equipment improvements, system-level operational changes, and opportunities for cultural change (Xcel 2018).

There are three main phases within the program. The first is a standardized energy management assessment followed by the scoping of an EMIS solution. In the second phase, the SEMC will help the customer identify opportunities for energy savings and employee engagement, create and document a project register, and determine submetering and data logging needs. The third phase consists of an analysis of energy savings achieved and the awarding of incentives. The project register and implementation plan will be reviewed and reprioritized annually (Xcel 2018).

EFFICIENCY NOVA SCOTIA

Efficiency Nova Scotia's EMIS program implementer found that to get the most out of an EMIS, companies needed a structure for using energy data and deploying their workers in energy management. This drove Efficiency Nova Scotia to offer assistance to help companies implement systems such as ISO 50001.

This is unusual for an EMIS program as they most often focus on technology and leave workforce development and management systems to SEM programs. Efficiency Nova Scotia also has a SEM program, so there is some potential for overlap of services. Both programs focus on O&M savings. Neither program gets credit for savings from capital projects identified by energy teams; these are attributed to separate incentive programs.

¹³ ERP systems integrate business processes through information technologies. They are tools to share common processes and data models across multiple business operations.

Initially, the EMIS and SEM programs did not coordinate their engagement activities and did not share clients. Recognizing the opportunity to realize program delivery efficiencies and achieve greater results, the programs started coordinating and are now managed by the same implementer. Efficiency Nova Scotia also offers a program that co-funds an onsite energy manager. Eligible customers have the option to utilize one, two, or all three programs.

As Efficiency Nova Scotia plans for the future of its industrial programs, it is now considering an even more coordinated effort. It is also looking at a longer (three-year) engagement period, with SEM in the first year, EMIS in the second, and ISO 50001 in the third. With a more coordinated approach, ENS can combine the organizational development and energy management structure that comes from SEM and the data gathering and analysis automation that is possible with EMIS. As companies become increasingly dependent on data analysis to identify cost-saving opportunities, this combination will help companies maximize their energy performance.

Bringing several programs under one umbrella also addresses energy savings attribution issues. Savings from a customer participating in multiple programs are evaluated at the program portfolio level rather than for each program, where attribution is not always clear-cut. Such an approach has the potential to reduce administrative and evaluation costs.

CHALLENGES FACING COMBINED PROGRAMS

Energy management programs have unique challenges to overcome. Not all customers are ideally suited to adopting new technologies while also attempting to incorporate new practices.

Policy challenges for both types of programs can become amplified when they are combined. Regulatory policies and jurisdictional issues often make it difficult to offer incentives for workforce development and technology implementation – and, by extension, make it difficult to help companies implement continual improvement systems.

If providing an EMIS to customers as an additional SEM program feature does not result in greater energy savings, the additional expense could negatively impact the SEM program's cost effectiveness. Some of the program implementers we interviewed felt that getting data from a customer's existing hardware is often enough to make a SEM program successful. Others felt that cost effectiveness will not be affected if a program uses EMISs to drive additional energy savings through data-driven process control. They said that additional energy savings will balance the cost of the additional investment.

ADVANTAGES OF COMBINING SEM AND EMIS

There are two mechanisms for detecting a change in energy consumption: people and technology, both directed by standard procedures and continual improvement. If properly implemented, neither is dependent on one individual; instead, both are innate to the company so that even if there are shifts in personnel, changes in energy consumption – indicative of a change in savings – will be identified and addressed.

Through SEM, customers continually improve their EMIS platform so they can identify new opportunities to save energy. They start with energy management training and embedding a culture of continual improvement. After some quick wins, they evaluate more opportunities and invest in more projects, such as an EMIS. Those investments generate more savings and the cycle continues. The integration of smart technologies like EMIS into continual improvement programs like SEM has an intuitive appeal. A common barrier for companies to implement SEM is the time it takes to collect, analyze, and report energy data. EMISs are useful tools for accomplishing this task. But by themselves, they may not be enough to ingrain proper energy management practices within an organization. A technician's use of a tool is only as good as his or her understanding of its capabilities and operation. When paired with a management system, the full value of an EMIS can be realized.

An integrated program model appears to be the direction in which many administrators are heading. A number of combined programs are already in operation. Efficiency Nova Scotia will offer a single program in the future. The new California SEM programs include EMIS implementation options. And Xcel Energy is combining its EIS and Process Efficiency offerings into a new SEM program that features two tracks for participants to pursue.

Combining SEM and EMIS in one program could produce greater customer energy savings while eliminating any overlapping administration functions. An integrated program approach may maximize short-term and long-term energy savings, increase savings persistence, and optimize energy productivity. Customers may realize additional nonenergy benefits including workforce development, waste reduction, pollution prevention, and improved competitiveness.

What does EMIS add to SEM? SEM gives companies standard practices and approaches to improve their operations. These cover a broad range of tasks such as preventive maintenance, documenting consumption of energy and raw materials, and routine analysis of operating conditions. An EMIS provides the data, often automatically, to track many variables. Adding energy management technology to a conventional SEM program allows operators to use data to make adjustments to operating practices to achieve more energy savings. In addition, the EMIS simplifies data gathering, analysis, and use. EMISs automate these activities and provide contextualized energy data that aid decision making by operators, supervisors, and engineers. The likely result is less degradation of savings over time.

What does SEM add to EMIS? An EMIS can collect and report all kinds of information. SEM tells a company what information it really needs and directs the use of this information to positive effect. Frameworks like ISO 50001 can provide a system for identifying and prioritizing projects and KPIs. And by knowing its energy data analysis needs, the company is more likely to invest in hardware and software appropriate to those needs. Once an EMIS is in place, the SEM program can help the company set up standard practices to get the most out of its system.

Adding SEM to EMIS programs may also result in more sustainable programs and longer-term energy savings. If a program adopts SEM as a customer engagement platform and anticipates routine engagement with its customers indefinitely, the number of O&M and

CapEx projects should increase. With more projects comes a greater need to collect and analyze data. This activity increases the value of the EMIS to the customer and program evaluators.

Providing customers with a robust and timely analysis of their energy performance can also produce a positive feedback loop that ultimately benefits all program activity. For example, multiple interviewees reported that their customers found great value in the regression analysis programs developed to model their energy use. In addition to helping them understand their energy use, regression analysis shed light on some of their production issues. Account representatives, realizing that these analyses were a key feature of SEM programs, started including them in their marketing targeting small and medium-size companies. That helped them recruit more companies into their SEM programs, producing more savings and yielding more success.

Evolving SEM Program Design

Programs that are comprehensive in scope and integrated in design can help industrial, commercial, and institutional organizations manage their energy with energy management systems and data-driven decision making. We anticipate that many more SEM programs in the future will be able to address the needs of organizations in all sectors. Programs may have dedicated teams to focus on specific sectors like commercial, institutional, wastewater treatment, and food processing. The Energy Trust experience indicates a need to address commercial customers at the corporate level and industrial programs at the facility level. This supports the need for two implementation teams at a minimum.

Some institutional and government facilities, such as wastewater treatment plants, have the same training and technology needs as industrial facilities. Others, like government office buildings, have more in common with property management firms. Program administrators like Energy Trust and Focus on Energy have already adapted their programs to account for this reality. We anticipate many more will in the future.

Many programs are taking a tiered approach to how they engage customers, using a light touch (such as with 50001 Ready) for small customers, a cohort approach for medium-size companies, and individual engagement for the largest. Some customers may want to start with the simplest program and then progress to more complex programs. It is probably better to start some companies with something simple, like conducting a treasure hunt and developing a project register. After some initial success, they can progress to a more comprehensive SEM program that leads to implementation of an ISO 50001-compliant energy management system.

Another early and valuable step is helping program participants develop a regression model so they can understand the drivers of their energy usage. As participants identify major energy-consuming systems and the metrics they will use for KPI, implementers help them assess what additional sensors, meters, and technologies might aid their energy information gathering and support their data analysis needs.

Several implementers observed that it is important for them to meet clients where they are along the curve of technology adoption if they are to maximize results. If clients are tech-

savvy, then there is an opportunity for implementers to help them get the most out of their existing technology and then help them advance to more integrated and powerful systems. If customers are not tech-savvy, implementers can still help them use what they have and, if appropriate, help them evaluate options for additional sensor, network, and control investments.

An EMIS audit builds the business case for EMIS with both the scope and costs for the system as well as the strategy for using it to generate energy savings and an estimate of target energy savings. EMIS audits outline budget constraints, identify current energy usage and costs, and formulate an energy management and training plan.

Selection of EMIS and other smart technologies can be a complex and time-consuming processes as decision makers need to educate themselves before they can start to evaluate multiple solutions. The aid of a neutral third party to help them understand the pros and cons of various technologies can accelerate the process and give decision makers more confidence in their choices. The third-party model is familiar to most larger organizations' leadership, who use it when approaching complex technology decisions.

Programs will continue to utilize coaches to help companies implement. They have found them very effective with customers of all sizes. For very large customers, programs may offer onsite energy managers who lead SEM implementation, as BC Hydro and BPA programs do. Implementers engage customers one-on-one or in a cohort. The former is well suited for larger customers that can dedicate multiple staff members to training and engagement activities, while the latter is more appropriate for companies that cannot.

Companies that have participated in cohorts and other workshops may want any new staff they hire to receive the same training. We are not aware of any programs currently offering this, but allowing participating organizations to send new hires to workshops will accelerate their learning and ability to contribute to the team. It will also expose them to the experiences of people from other companies. It may make sense for past cohort and workshop participants to go to trainings and act as mentors. The presence of veteran program participants could improve the training by contributing to the sharing of experiences and best practices.

DESIGN CONSIDERATIONS

What if, rather than engagements of limited duration, programs engaged their customers on an ongoing basis, with the purpose of continually improving their energy performance and moving them toward the goal of systematic energy management? We are already seeing several programs extend the length of their engagement periods. What if programs stayed continually engaged with their most energy-intensive customers?

We suggest that programs consider engaging their key accounts for a minimum of two years, anticipate more limited engagement for twice that, and monitor for an additional two years. In such a scenario, that monitoring is essentially a matter of checking in with customers to see what they have accomplish, what they are planning on doing, and if the program can help. Otherwise, programs are likely to miss energy resource acquisition opportunities and customers may not get the full benefit of program resources.

The monitoring will also involve continued coaching and access to workshops. Key account managers and energy coaches will stay in touch with clients, keeping them aware of financial assistance and training opportunities and helping them stay on track with their energy management activities. This continued engagement should address the risk of backsliding and result in greater persistence of savings as well as more projects implemented.

In a continual engagement scenario, the level of engagement by each customer will ebb and flow as customer needs change. Should a company expand, it may want to take advantage of a cohort to train its new employees. Once a company has a SEM system in place, it may seek out program experts to help with internal M&V. The advantage to the program of continued engagement is the ability to claim savings year after year. While it would be appropriate to incorporate an attrition factor to such savings, the contributions of multiple customers will add up each year.

Extended SEM program engagements can start with commitment by participant leadership and an understanding that they are entering into a business relationship. Several existing SEM programs, such as those offered by Energy Trust and Efficiency Nova Scotia, require companies to sign contracts or MOUs that lay out in detail the obligations of the company and the services that the program will provide. Interviewees indicated that this is an important step because it ensures management awareness of the engagement and reinforces commitment to the process. The number one feature programs seek in a potential participant is the willingness to commit resources to the training and implementation activities. The other key feature is long-term commitment to the process. Energy management is a journey, not a destination.

Program implementers can integrate the 50001 Ready protocol using internal resources or direct customers to third parties that can help them achieve SEP certification. The 50001 Ready tool has the advantages of availability across service territories as well as technical support and endorsement by DOE. It also allows companies to be consistent with an established standard.

All sectors can benefit from a standardization of practice.¹⁴ Aligning practice with the standard will benefit all program participants as they interact with people outside the program service territory. Using established and universally recognized protocols will help companies replicate activities across multiple facilities that may also be in multiple program service territories. It will avoid the potential risk of confusion caused by inconsistent documentation and M&V practices. ISO standards include procedures for documentation. Proper documentation leads to greater credibility of savings estimates within an organization and among external program stakeholders (Vetromile and Collins 2017).

¹⁴ We recommend leveraging the 50001 Ready tool and ISO 50001 standard. Whereas the ISO standard is not appropriate for every customer, the 50001 Ready tool is designed to accommodate a broad range of customer types and sizes.

A move from a program model of limited engagement to one of continual engagement will require additional consideration by administrators and regulators on how energy savings are measured and how program performance is evaluated.

EM&V CONSIDERATIONS

The long-term viability of a program is tied to its cost effectiveness. Program administrators have many options for how to achieve energy savings, so SEM programs compete with many other program types for limited financial and staffing resources. The type of analysis an evaluator uses to assess the efficacy of a SEM program, and the variables allowed in the analysis, have a direct bearing on how it stacks up against other programs and other energy resources a utility might invest in.

One approach is to consider SEM programs to be components of a large-customer engagement portfolio and to perform the benefit-cost analysis at the portfolio level. Intuitively, we understand that administrators and implementers are likely to achieve greater results when programs coordinate their activities. If we treat SEM as a platform for all programmatic engagement, it becomes less important where the savings from individual projects come from. Although it is possible to separate out the savings of capital projects from O&M projects, doing so does not tell a more accurate story of the impact of SEM engagement. Workforce development, culture change, O&M improvements, and capital projects are all part of a larger effort to continually improve the use of labor, capital, and raw materials to make products or deliver services. Utilities are allowed to operate as monopolies in exchange for serving the common good. We should be careful not to let accounting issues prevent them from fulfilling that mission.

In the interest of minimizing the reporting requirements imposed on customers, we suggest that SEM programs take a whole-facility approach to M&V, following IPMVP Option C, to track performance for program reporting purposes. Taking a top-down, whole-facility approach to M&V captures the full impact of program activity while also being the least intrusive. It provides program stakeholders the information they need to assess program effectiveness. Program participants may want more granular information, but if they do, that is a burden they place on themselves, not one that is placed on them.

If customers are interested in more exacting M&V, they may want to consider the Superior Energy Performance (SEP) M&V protocol, which also uses top-down modeling. The approach is more rigorous, but it provides methods and options for unusual situations. It also requires documentation for bottom-up savings. It is a useful resource for developing regression models that can model energy consumption, as several methods are provided. SEP certification is a separate option for customers who want to fully incorporate ISO 50001 and demonstrate their energy performance improvement in a rigorous way.

It is also important to be patient with energy management programs. The benefits develop over time, and programs should keep this in mind in measuring results. One of the fundamental reasons for using ratepayer funds to secure future energy efficiency resources is that utilities have more patient money (that is, they can accept a lower rate of return) than private companies. Given this foundational concept, it makes sense to evaluate energy

savings over longer periods. If the goal is to transform a company and make it more sustainable, then the M&V practices should reflect that.

Finally, a key output of data management tools such as EMISs is the determination of energy savings. M&V is an important activity of efficiency programs and one that program administrators think SEM and EMIS programs can simplify. Program administrators and evaluators should seek out new ways to leverage information and communications technologies to track participant energy savings and simplify their reporting requirements.

PROGRAM MARKETING AND PARTICIPANT RECRUITMENT

Conveying the value of a SEM program to customers can be challenging if they are not already familiar with continual improvement practices. However many businesses are used to employing operations data to drive their decision making. Hotel operators collect occupancy data and identify weekly, monthly, and annual trends to help them schedule their workers. Manufacturers collect all kinds of production data to drive their process control. An EMIS provides energy data in a similar format, so some customers may recognize the benefits of data management and analysis more readily than others.

The inclusion of technical and financial support for EMIS could be a key selling point for a SEM program. Some customers will already have EMISs or other IT systems in place but may not be getting the full value out of them. In such instances, program representatives can focus on the implementers' ability to train workers in how to set up and use the systems as well as implement a management system that connects energy data with operational decision making.

Another feature for representatives to highlight is that the combination of SEM structure and EMIS data management enables companies to document in a systematic way the history of company actions and associated results. This is useful for retaining institutional knowledge over the long term, but more important, in the short term, is that it improves the evaluation, measurement, and verification of energy savings.

Programs administrators may find it valuable to use implementers with existing connections to target market segments. For example, SEM programs on the West Coast are using this approach to engage hospitals, food processors, and metal fabricators. Potential participants will likely find a program featuring experts in their field more attractive. This addresses a concern we have heard in prior analysis that many programs targeting the industrial sector lack the sector-specific expertise that is needed (Chittum 2011).

POLICY AND REGULATORY CONSIDERATIONS

The role of utilities in many parts of the country is changing from a provider of a commodity to a platform for providing a variety of energy services. In this new paradigm, energy efficiency programs can be useful platforms themselves for engaging large customers. Energy management programs are well suited to frame the conversations between utilities and their most energy-intensive customers. For this to be possible, however, regulators and policymakers may need to remove barriers and provide incentives.

SEM programs generate many benefits, not all of which are germane to the mission of energy utilities or their regulators, though they are important to the economy. Workforce development, worker safety, and pollution prevention are a few examples. The challenge is that a single utility may not have the regulatory obligation, let alone the resources, to maximize the value of its SEM program to customers. It may not get credit for all the benefits of a SEM program and therefore be less inclined to pursue one.

One type of organization that can treat energy efficiency as a form of economic development is the efficiency utility, exemplified by Energy Trust of Oregon, Efficiency Vermont, and Wisconsin's Focus on Energy. Such organizations can pursue goals related to energy, environment, or the economy.

Another type of organization that can do this is municipal government. City and county governments are interested in growing their workforces, improving the environment, increasing the competitiveness of their businesses, and growing their economies. Municipal governments are also interested in improving the effectiveness and value to residents of all the utilities they own.

In the absence of a statewide organization, utilities can collaborate to operate a program together and help customers save electricity, natural gas, water, and other expenses as needed. For example, Commonwealth Edison and Nicor Gas in Chicago collaborate on program implementation to help their customers participate in both electricity and natural gas savings projects. Southern California Edison and Southern California Gas are collaborating on implementation of a new SEM program in Southern California.

Regulators and policymakers should identify and remove policy barriers to such collaborations. They may also want to encourage collaboration between utilities, as the California Public Utilities Commission did when it authorized the state's investor-owned utilities to launch SEM programs (Dias 2017). Authorizing analysis of the issue and inviting public comments and suggestions could be first steps toward removing barriers and advancing progress on this issue.

Generally, utilities track and report program savings annually to satisfy regulatory requirements. It would be better to go for longer periods because it can take time for the savings from some energy measures to materialize. Allowing for fewer and less frequent analyses will lower evaluation costs.

The claiming of O&M and CapEx savings that result from SEM programs is something that regulators and administrators need to resolve. Programs should be able to claim the savings from O&M improvements and get recognition for their ability to catalyze and accelerate the implementation of CapEx projects. One solution would be for regulators to allow program administrators to take a portfolio approach to program evaluation. If a utility can consider its SEM program to be a platform for all of its large-customer engagement, that eliminates the need for each component of its portfolio of programs – prescriptive rebate, custom incentive, SEM, EMIS, and others – to stand on its own. It can engage each of its customers with the resources that will help each achieve the greatest results. This argues for a top-down, whole-facility approach to evaluation across an entire program portfolio. Customer

savings are measured not at the project level but at the facility level. Program performance is evaluated at the portfolio level.

There are two main barriers to utilities adopting this approach: inconsistent incentive rates and measure lives between programs. Integration of programs will require harmonization of these. Utilities will be concerned about cost recovery for a program that treats SEM as a customer engagement platform. If SEM programs are services that they provide their larger customers, then they will likely ask to recover those costs and earn a rate of return. Such a position aligns with the concept of energy efficiency as a resource, and so it may be a viable policy approach in some states.

Existing SEM programs provide training and coaching for defined periods. Turning a program from a model predicated on generating savings through limited engagements into a platform for continual customer engagement could involve additional resources and drive up costs. In such a model, the SEM program is performing multiple functions for the utility: resource acquisition, technical assistance, and customer service. The administrative and regulatory question is this: Could any additional costs be allocated respectively to those other cost centers? Also, since SEM programs include considerable worker skill-building, would state workforce development agencies be interested in supporting them? If so, such collaborations could reduce implementation costs to utilities.

Some utilities have a policy of reporting zero savings from SEM programs when non-programmatic events – such as economic downturns or requirements for new pollution-control equipment – impact a facility, increasing the facility’s energy intensity and perhaps invalidating the baseline energy model in the reporting period (SBW and Cadmus 2017). While energy intensity is an important performance metric, it should not be the only one used to determine savings from program participation. It is more appropriate to evaluate the performance of implementers using variables that are within their control.

Businesses and institutions routinely seek out vendors that can address multiple issues simultaneously rather than through piecemeal requisitions, thereby lowering acquisition costs and enabling integrated solutions. This often applies to companies’ interest in energy management. If a utility program cannot meet all of their needs, they are likely to prefer to use their own vendor. If this is not allowed, they may consider the programs unresponsive to their needs and object to paying into a public benefit fund (PBF) that supports the programs.

One way to address this is through MOUs specifying energy savings targets and reporting requirements. MOUs may be suitable vehicles for companies that pay into a PBF but do not want to be limited to existing program features and those that do not pay PBF fees. The former arrangement is often referred to as self-direct and the latter as opt-out. Two New England utilities, Eversource and National Grid, have had success with self-direct programs built around MOUs that commit their largest customers to continually improving their use of energy resources.

Self-direct programs, such as the ones run by Eversource and National Grid, allow customers to take most of the public benefit charges they would pay and instead allocate them to projects of their own design. These customers are then required to provide

performance information so that the utilities can adjust their projections accordingly. One challenge of this approach has been determining how self-direct customers should determine and report their savings. How can utilities trust the values provided by self-direct customers?

The legislatures of several states have passed bills requiring PUCs and regulated utilities to allow larger customers to opt out of paying into PBFs and participating in programs supported by these funds. The motivations for such legislation and the ramifications are covered in other ACEEE reports (Chittum 2011, 2012) and so will not be revisited here. It is, however, important to note that when large energy users opt out of utility programs, in the absence of energy savings and demand reduction information on projects implemented by those large customers, the utilities are still on the hook to ensure sufficient capacity is available to meet future customer needs. Therefore it is important to require companies not participating directly in programs to report their energy savings. Requiring companies not participating in programs to sign MOUs that include reporting requirements is a way to address this issue.

The ISO 50001 standard is a solution to the reporting challenge of self-direct and opt-out. Because of its standardized and internationally accepted framework, and because of the requirement for third-party auditing of a company's implementation, a utility could trust the savings values that an ISO 50001-certified facility provides it. States with or contemplating self-direct programs could ensure proper accounting of energy savings by requiring that any company requesting to self-direct be ISO 50001 certified or possess government acknowledgement of conformance to the ISO 50001 standard, which is what the 50001 Ready tool provides. The same should be required of companies that opt out of participation in programs. Only then can utilities accurately forecast future resource needs. The advantage of this approach is that companies can seek out service delivery providers of their own choosing while also contributing to utility resource acquisition efforts.

POSSIBLE RESULTS

Proving that a systematic approach to energy management will save more energy than a non-systematic approach is challenging. Seldom is there an opportunity to have a control group for comparison. It is therefore doubly challenging to determine if including an EMIS in a SEM program will increase program energy savings. To answer this question, we asked people associated with SEM programs and looked at a couple of case studies. We also revisited a market potential analysis ACEEE conducted in 2015 (York et al. 2015) and examined how the combined benefits of SEM and EMIS might change that analysis.

More Energy Projects

Our survey of program stakeholders, although limited in scope, indicates a consensus that having both tools at a customer's disposal will increase the number of O&M and capital projects, decrease backsliding, and lengthen the persistence of energy savings (Appendix B). The analysis by Energy Trust of its SEM programs, covered earlier, indicates that participation in a SEM program leads to implementing more projects and greater participation in other Energy Trust programs (Rubado, Batmale, and Harper 2015).

A recent analysis by Johnson Controls, Inc. (JCI) addressed this issue in part. JCI has 13 plants in the United States and 13 plants in Europe that manufacture or recycle batteries. The plants in Europe have implemented ISO 50001 and have some type of EMIS in place. In its analysis, JCI set up a matrix that compared the US plants with those in Europe and the plants that had implemented two or more projects with those that had implemented fewer than two. They found that the number of projects drove energy savings, which is what one might expect. They also found the savings of plants with ISO 50001 and EMIS were 4% greater than those without. The ultimate finding was that the plants that saved the most energy were the ones that were ISO 50001 certified, had an EMIS in place, and implemented two or more projects. The plants with the least energy savings were the ones that had none of these attributes (C. Nesler, vice president of global sustainability and industrial initiatives, Johnson Controls, Inc., pers. comm., September 18, 2018). The JCI case study does not conclusively answer the question of whether a SEM program that includes EMIS implementation will produce more savings than SEM alone, but it is indicative of the greater results possible when management structure and energy data analysis technology are combined.

Persistence of Savings

The management structure and data analysis afforded by an integrated implementation of an energy management system and data management technology should also extend the persistence of savings. As SEM programs like those offered by Energy Trust and BPA collected more information, they extended the persistence of savings claimed in their program evaluations. EMIS programs like NYSERDA's RTEM require customers to report savings for several years after initial engagement. They do this to ensure customers will continue to use data provided by their EMIS, and they anticipate that this will positively affect the persistence of savings from O&M types of projects (Katie Dooley, assistant project manager, NYSERDA, pers. comm., May 21, 2018). Management commitment, worker training, and automated notifications and alarms all contribute to creating within participant facilities a culture of continual monitoring, analyzing, and acting that will result in less degradation of savings over time. Survey respondents agreed, suggesting that savings might be extended more than two years longer (Appendix B, question 13a).

Market Trends

At the beginning of 2018, we can identify 31 program administrators that offer 13 SEM-only, 11 EMIS-only, and 19 SEM-with-EMIS-option programs in North America. These programs are administered by utilities and state and provincial organizations that cover 20–25% of the commercial, institutional, and industrial load of the United States and Canada (EIA 2018b; ISED Canada 2018). Collectively, they served about 400 customers in 2018, which means there is potential for many more programs to serve many more customers.

CEE has tracked the growth of SEM programs among its members, and the trend that is apparent from their data, captured in figure 3, is that the number of programs increases at a rate of one or two per year. If the trend continues, there will be around 30 programs in 2020 and 40 in 2025. There are about 200 large utilities in the United States and Canada serving about three-fourths of the total electric load of the two countries (Statista 2018). These are the most likely candidates for SEM program administration.

Although there is growth in the number of organizations participating in SEM programs, there is considerable potential for programs to serve more facilities. CEE members reported 886 customers served prior to 2015, 282 in 2015, and 376 in 2016. More than 1,500 organizations have participated in some type of SEM program in the past decade.

There are around 350,000 manufacturing facilities in the United States and Canada (Census, 2012; ISED Canada 2018). Facilities with more than 100 employees represent 8% of that total but over half of all industrial sector energy use (Census Bureau 2016; ISED Canada 2018; Trombly 2014). These 27,500 plants are the most likely candidates for SEM program engagement. This is considerably more companies than can be served by existing programs.

Program administrators are likely interested in knowing how much of this opportunity they can realistically address. To answer that question, we can look to recent trends and do a bottom-up calculation to determine how many companies programs might engage and how much energy those companies might save.

On average, SEM programs engage around two dozen companies per year. At 24 participants per program, a conservative prediction based on recent history of two or three new programs per year yields 30 active programs in 2020 engaging 720 participants. Projecting further, 40 programs will engage 960 organizations in 2025, and 50 programs will serve 1,200 in 2030 (table 3).

We can also imagine a more rapid increase in the number of programs. Table 3 captures the potential impacts of more accelerated growth rates: Our moderate scenario assumes an early-on growth rate of five programs per year tapering to three per year; our aggressive prediction assumes a very rapid increase in the number of programs before slowing to a growth rate of four programs per year. Beyond 2030 the number of programs and associated number of participants plateaus in all scenarios. The scenarios range from covering one-fourth to more than half of all major utilities, and half to three-fourths of C&I loads in the United States and Canada.

Table 3. Future program activity

		Program growth	2020	2025	2030
Number of programs	Conservative		30	40	50
	Moderate		35	50	65
	Aggressive		45	70	90
Number of participants	Conservative		720	960	1,200
	Moderate		840	1,200	1,560
	Aggressive		1,080	1,680	2,160

Future Performance

The past performance of existing programs can give us an idea of what their performance might be in the future. It can also help us estimate what might be possible when SEM programs are treated as a platform for all large customer engagement. In 2015, ACEEE analyzed the performance of several emerging program types and projected future energy savings. One of those program types was SEM. The analysis used Energy Information

Administration (EIA) *Annual Energy Outlook* projection data and determined national energy reduction potential by making assumptions for the ratio of load covered by programs, participation rates in programs, and average savings rates (York et al. 2015).

The 2015 study was a top-down analysis using macro EIA data. With the data gathered for this report, we can perform a bottom-up analysis based on average energy savings per customer and average customers per program. Some assumptions will remain the same between the analyses.

Total electricity savings by a program vary from 600 MWh for Idaho Power's program to 46,000 MWh for Bonneville Power's ESI program portfolio. Likewise, the energy savings per customer have a wide range: Some programs have realized savings as high as 1,200 MWh per customer, while for others the per-customer savings are only 400 MWh. Similar variability is observed of natural gas savings. Commercial facilities are not as energy intensive as industrial facilities, and so the mix of commercial and industrial facilities served will affect the values for average savings per customer.

In the 2015 analysis of SEM programs, potential energy savings per customer were projected to be 500 MWh/year for commercial customers and 1,600 MWh/year for industrial customers. The CEE survey of 2015 SEM program performance (Burgess 2016) provided much of the data for our 2015 analysis. The more recent CEE survey results as well as other reports and our survey results indicate that many of the underlying assumptions of our 2015 analysis are still valid. Therefore we continue to use the 500 MWh and 1,600 MWh values in this report.

The 2015 analysis also assumed that 20% of the commercial load and 50% of the industrial load could be addressed in SEM programs. There was no consensus among our survey respondents regarding the percentage of customers or load that their programs might address. Nor was there agreement on the fraction of eligible customers that might participate. It is likely that these metrics depend on the details of a particular program's customer base. The assumptions used in 2015 for participation rates were 23–50% for commercial and 38–75% for industrial by 2030. We do not assume a participation rate in our bottom-up analysis; rather, we use the capacity of the programs – the number of organizations that could participate in a given year.

The 2015 analysis did not make any projections for natural gas savings, so in this analysis we look to the more recent work of CEE. The average per customer from the six programs reporting savings to CEE in 2017 was nearly 9,500 decatherms (Dth) in 2016. The median energy savings was 2,558 Dth. That most programs do not report natural gas savings is not surprising. There are not as many natural gas utilities involved in SEM programs as electric utilities because not as many are subject to energy savings performance targets; moreover, many large users purchase their natural gas on the wholesale market and require only transmission services from their local utility.

We use values of 9,500 and 2,500 Dth as placeholders for the gas savings from industrial and commercial facilities, respectively, and we assume in our analysis that one-fourth of SEM

programs capture natural gas savings. These assumptions feed into the analysis reflected in table 4.

On the basis of current program offerings and participation rates, we assume that one-third of SEM program participants are commercial and the remaining two-thirds industrial.¹⁵ We use the number of customers to calculate potential energy savings for a program serving two dozen customers (table 4). Larger programs and programs serving larger customers are likely to see greater savings than smaller programs or those focused on smaller customers.

Table 4. Possible future SEM program performance, conservative scenario

	Commercial (8)	Industrial (16)	Typical program savings (est. 24 customers)
Electricity savings per customer (MWh/year)	500	1,600	29,600
Natural gas savings per customer (Dth/year)	2,500	9,500	172,000

By multiplying the number of programs in table 3 with the average savings per program in table 4, we extrapolate the potential electricity and natural gas savings for future years. Conservative, moderate, and aggressive estimates are listed in tables 5 and 6.

Table 5. Potential electricity savings (MWh) from SEM programs in United States and Canada

Scenario	2020	2025	2030
Conservative	888,000	1,184,000	1,480,000
Moderate	1,036,000	1,480,000	1,924,000
Aggressive	1,332,000	2,072,000	2,664,000

Table 6. Potential natural gas savings (Dth) from SEM programs in United States and Canada

Scenario	2020	2025	2030
Conservative	12,600,000	16,800,000	21,000,000
Moderate	14,700,000	21,000,000	27,300,000
Aggressive	18,900,000	29,400,000	37,800,000

In our 2015 top-down analysis, we estimated that SEM programs would save an additional 2–3% by initiating new capital investments. We modeled low-, mid-, and high-range scenarios. The low-range scenario counted O&M projects only and assumed a 5% energy reduction per facility. The midrange included some capital projects and assumed an 8%

¹⁵ It is likely that the ratio of industrial to commercial participants will change as the number of programs targeting commercial facilities increases. For simplicity's sake, we did not factor this likely change into our analysis.

energy reduction. The high-range scenario included more CapEx measures, greater persistence of savings, and a 10% savings per facility. Conceivably, a SEM program that functions as a platform for all programmatic engagement and that gets credit for all O&M and capital project savings could achieve this level of savings.

On a national level, the midrange scenario of the 2015 analysis estimated that strategic energy management programs would reduce 2030 electricity consumption in the commercial sector by 7 million MWh, or 0.2% of projected electricity consumption. The savings projection for the industrial sector was 24 million MWh, or 0.6% of projected consumption. 31 million MWh equals the total electricity sales in Nebraska in 2017 (EIA 2018a).

The midrange projections of the top-down 2015 analysis are substantially higher than those of the bottom-up analysis of table 6. Even the low-range scenario projections, which were half of the midrange, are higher than the 2.7 million MWh reduction for both sectors of the bottom-up analysis. The reason for this difference is the assumptions about participation rates. The top-down analysis assumed 30% of all commercial and 50% of all industrial facilities would participate in SEM programs, while in the new analysis, as mentioned above, we use program capacity. Even the high-range program scenario in the bottom-up analysis does not provide sufficient capacity to achieve such participation rates.

Nevertheless, we can conclude from these two analyses that there is ample opportunity for growth in the number of programs, the size of individual programs, and the potential for savings. There is also sufficient opportunity for programs covering large service territories to increase the number of customers engaged each year and for the introduction of new programs in regions of the country that do not already have them.

The 2015 analysis also estimated the current cost of saved energy to be \$0.059/kWh for commercial and \$0.018/kWh for industrial SEM programs. We projected those costs to decrease to \$0.014/kWh and \$0.044/kWh, respectively, as programs became more effective. Analysis of the most recent program data indicates that the cost of program delivery has not noticeably changed, and so we are comfortable sticking with these numbers. As more programs come online and more data become available in the next two years, this issue will be ready for additional research.

Recommendations

Utilities, regulators, and third-party energy efficiency program administrators should embrace SEM programs for large customers. SEM programs have a proven ability to lengthen the persistence of energy savings, increase the number of O&M and CapEx projects, and boost participation in other program offerings. All of these features lead to greater energy savings per customer during and after program participation.

Where possible, utilities and third-party administrators should offer programs that engage customers over longer periods of time or continually. Programs can become trusted partners in a company's energy management journey. This changes the discussion from whether or not to implement projects to which projects to implement.

Utilities and third-party administrators should continue to expand SEM offerings to commercial and institutional customers. There is considerable unmet need for energy management training and technical assistance in these sectors, as well as continuing opportunities with industrial customers. It will likely be necessary to have multiple delivery teams in order to address the differences in how organizations in each sector manage energy.

Program designers should create programs that can meet customers where they are in terms of familiarity with management systems and their technical expertise with data management. The program design should be flexible to accommodate customers of different sizes and structures, different types of projects, and different types of energy resources. The staff of such programs should have sufficient expertise to take participants from creating regression analyses to implementing standard practices to preparing for ISO 50001 certification.

Program administrators should leverage SEM programs to forge long-term relationships with their customers. They should use SEM programs as a platform from which to manage other programmatic engagements. In certain jurisdictions, this may require treating SEM programs as technical assistance rather than resource acquisition.

Program recruiters should be familiar with the organizations in their territories, understand their prospects' likely energy savings opportunities, and know all the programs available to those prospects. This will enable them to identify the best candidates for SEM programs and then work with them to leverage other program offerings.

Evaluators should assess the energy savings from program participants using whole-building methodologies. The evaluation of an engagement should take into consideration performance over multiple years. This approach will capture the ability of SEM programs to produce sustained energy savings and avoid misleading cost-effectiveness values that may result from narrower evaluation periods.

Program regulators should consider the performance of SEM programs a piece of the portfolio of technical, financial, and market transformation programs offered by a program administrator. While it is appropriate to analyze the performance of individual programs, it is equally important to see how the performance of each program contributes to the performance of the entire portfolio.

Electric, natural gas, and water utilities should seek opportunities to collaborate in the delivery of SEM programs. A coordinated approach to program delivery can lead to greater savings per customer and lower administrative costs per program.

Policymakers should encourage multi-utility collaboration. They should also encourage other organizations such as economic development agencies to work with utilities to reach more organizations and realize all the benefits of SEM programs.

Continual improvement programs like SEM should also undergo continual improvement. Administrators should work with all stakeholders to evaluate what is working within their programs and in the programs of other utilities. Implementers can share information on training practices that have and have not worked. Evaluators can continue to refine models for predicting future energy savings and tracking the persistence of savings.

We close with a call for more research on the cost effectiveness of SEM programs, the persistence of energy savings for O&M improvements, and the cost of saved energy.

Conclusion

Industrial, commercial, and institutional customers represent many of the biggest opportunities for utility sector energy efficiency programs to meet their goals for energy savings and cost effectiveness. However securing savings from these customers year after year is challenging. Programs that reduce energy use through discrete measures will find it increasingly difficult to meet their goals as those savings are subsumed in standards for equipment such as lighting, motors, pumps, and fans. That is why programs that secure system-level energy savings are becoming all the more important. At the same time, such projects are often complex and expensive, and they can require dedication of program resources for extended periods.

SEM programs are effective at addressing these challenges. The best of them combine the features of resource acquisition, market transformation, workforce development, behavior change, and economic development. They help workers and company decision makers understand complex issues and technologies, evaluate options, and integrate new practices. They teach managers to treat energy costs like all other variable costs and manage them on a continual basis. They can also change the culture of an organization by helping leadership realize that the responsibility for energy management lies with its people and not its equipment; improving the use of energy is everyone's responsibility. SEM gives organizations the tools to identify opportunities, implement solutions, and track results, all of which improve their competitiveness.

Many utilities have found their relationship with smaller customers interrupted by third parties that provide smart devices and energy management services. Some third parties are working to become the retail face the customer sees and a broker of customer data analysis back to the utilities. SEM programs are a mechanism for utilities to reassert themselves as a primary source of energy services with their larger customers. The more services a utility can provide its customers, the more valuable the utility will be to them.

A key step is getting customers to agree that continual improvement is the goal, so that discussions each year can focus on what to do rather than whether to do something. This will keep the conversation going between utility and customer year after year. The conversation should take customers along a path toward comprehensive energy management that combines SEM with smart technologies like EMIS.

At the same time, as we heard from many program implementers, smart technologies are not appropriate for all customers. It is important to meet customers where they are in terms of technology adoption. Some will see the value and have the ability to implement smart technologies. Others will not yet have the vision or the capacity. In many cases, simple is better. In continual improvement system thinking, an organization should avoid adding costs that customers will not value. In data management and analysis, the corollary is that tools should work for the operator; the operator should not be working to satisfy the needs of a tool.

However, while not all companies will want to go the distance, and for some it may not make economic sense to do so, programs should have the ability to help customers progress from project-based energy efficiency to systematic energy management supported by smart technology. For companies that are ready, the integration of SEM and EMIS in a comprehensive SEM program will fulfill most or all of their energy management needs while continuing to engage them year after year.

SEM programs may ultimately become a platform for all larger-customer engagement. Should this happen, it will represent a fundamental change in how utilities interact with these customers and the structure of C&I programs. In the future we may see a shift from a passive offering of incentives to a proactive engagement predicated on providing customers with comprehensive energy management solutions. Such a change would be certain to decrease the energy intensity of thousands of facilities across North America and reduce their collective demand for energy.

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Appendix A. List of SEM and EMIS Programs

Table A1. Program offerings, types, and locations

Program administrator	SEM program	EMIS program	SEM with EMIS option	City	State/Province
Ameren Illinois			✓	Collinsville	Illinois
Baltimore Gas & Electric (Exelon)		✓		Baltimore	Maryland
BC Hydro			✓	Vancouver	British Columbia
Bonneville Power Administration			✓	Portland	Oregon
Commonwealth Edison & Nicor Gas (Exelon)	✓			Chicago	Illinois
Consumers Energy Co.	✓			Jackson	Michigan
DTE Energy	✓			Detroit	Michigan
Duke Energy—Carolinas			✓	Charlotte	North Carolina
Efficiency Nova Scotia	✓	✓		Dartmouth	Nova Scotia
Efficiency Vermont			✓	Burlington	Vermont
Enbridge Gas			✓	Calgary	Alberta
Energy Trust of Oregon			✓	Portland	Oregon
Focus on Energy Wisconsin			✓	Madison	Wisconsin
Fortis BC		✓	✓	Vancouver	British Columbia
Hydro Quebec			✓	Montreal	Quebec
Idaho Power			✓	Boise	Idaho
IESO		✓		Toronto	Ontario
National Grid		✓		Waltham	Massachusetts
New Brunswick Power		✓		Fredericton	New Brunswick
New York State Energy Research Development Authority (NYSERDA)	✓	✓		Albany	New York
Northern States Power Co.—Minnesota (Xcel Energy)	✓	✓	✓	Minneapolis	Minnesota
Natural Resources Canada	✓	✓	✓	Ottawa	Ontario
Ohio Power Co (AEP)	✓			Columbus	Ohio
Pacific Gas & Electric Company			✓	San Francisco	California
PacifiCorp—Pacific Power (Berkshire Hathaway Energy)	✓			Portland	Oregon
PacifiCorp—Rocky Mountain Power (Berkshire Hathaway Energy)	✓			Salt Lake City	Utah

Program administrator	SEM program	EMIS program	SEM with EMIS option	City	State/Province
Public Service Company of Colorado (Xcel Energy)	✓	✓	✓	Denver	Colorado
Puget Sound Energy	✓		✓	Bellevue	Washington
San Diego Gas & Electric Company (Semptra)			✓	San Diego	California
SaskPower	✓	✓	✓	Regina	Saskatchewan
Southern California Edison & Southern California Gas Company			✓	Los Angeles	California
Totals	13	11	19		

Appendix B. Questionnaire

Table B1. Questionnaire responses

Question	Responses (n=11)	Summary of results
1. Our research has shown that SEM programs on average can help companies reduce their energy consumption in the first year of program engagement by 6 to 10%. Based on your experience, would you expect to see similar results, or would you expect the values to be lower or higher?	<ul style="list-style-type: none"> a. <3% (3) b. 3–5% (3) c. 6–10% (5) d. 11–20% (0) e. >20% (0) 	Respondents tended to agree with our research findings that SEM programs could save 6–10% in their first year, but all respondents agreed that first-year savings would be expected to save no more than 10%.
2. Our research has shown that EMIS programs on average can help companies reduce their energy consumption in the first year of program engagement by 6 to 10%. Based on your experience, would you expect to see similar results, or would you expect the values to be lower or higher?	<ul style="list-style-type: none"> a. <3% (3) b. 3–5% (2) c. 6–10% (2) d. 11–20% (1) e. >20% (0) 	Most indicated that savings would be no more than 5%. This could be due in part to EMIS programs lacking the needed organizational structure to capitalize on the opportunities that it helps identify.
3. Our review of vendor publications and case studies indicates that closed-loop control can yield an additional 10–15% energy savings. In your experience, is this a reasonable expectation?	<ul style="list-style-type: none"> a. <10% (2) b. 10–15% (3) c. >15% (0) 	Respondents agreed that a closed-loop system would not generate more than 15% energy savings. It was suggested by one respondent that vendors might overestimate the savings generated from these controls.
4. In your experience, would you expect a facility that participates in a SEM or an EMIS program to implement more O&M projects than one that does not?	<ul style="list-style-type: none"> a. Yes, more O&M projects (11) b. No, same number of O&M projects (0) 	100% of our respondents expected SEM or EMIS programs to lead to the implementation of more O&M projects.
5. Would you expect that company to implement more capital expense projects?	<ul style="list-style-type: none"> a. Yes, more CapEx projects (8) b. No, same number of CapEx projects (2) 	The majority of respondents expected SEM or EMIS programs to lead to the implementation of more CapEx projects.
6. What values are you using in your analysis of energy savings persistence from O&M projects implemented as part of SEM program participation?	<ul style="list-style-type: none"> a. Same as for other programs (2) b. 1 year longer than for other programs (1) c. 2 years longer (0) d. 3 or more years longer (4) 	While some respondents indicated that they use the same O&M savings persistence for SEM projects as for other programs (typically 1 year), many have increased the savings persistence to 3 or more years.
7. What values are you using in determining O&M project savings for EMIS programs?	<ul style="list-style-type: none"> a. Same as for other programs (4) b. 1 year longer than for other programs (0) 	Conversely, all respondents indicated that for EMIS projects, they used the same O&M savings persistence as other programs. It

Question	Responses (n=11)	Summary of results
	c. 2 years longer (0) d. 3 or more years longer (0)	should be noted that there were few responses to this question.
8. What share of <u>customers</u> do you anticipate would be receptive to SEM?	a. <10% (4) b. 10–20% (2) c. >20% (2)	The responses show no clear consensus on the share of customers that would be receptive to SEM programs.*
9. What share of your <u>load</u> do you anticipate would be receptive to SEM?	a. <10% (4) b. 10–20% c. >20% (2)	The responses show no clear consensus on the share of load that would be receptive to SEM programs.*
10. What share of <u>customers</u> do you anticipate would be receptive to EMIS?	a. <10% (5) b. 10–20% (3) c. >20% (0)	Respondents expect no more than 20% of their customers to be receptive to EMIS.
11. What share of your <u>load</u> do you anticipate would be receptive to EMIS?	a. <10% (4) b. 10–20% (0) c. >20% (2)	The responses show no clear consensus on the share of load that would be receptive to EMIS programs.*
12. Would you recommend that a company start with SEM first and then add energy data management technologies like EMIS, or start with the technology first and then add the management structure second?	a. SEM first (10) b. EMIS first (1)	10 of 11 respondents recommended that a SEM program should be implemented first and followed by an EMIS rather than the other way around. Most respondents indicated they believed the culture change and organizational foundation of the SEM program was imperative for an effective EMIS program. One respondent suggested implementation of an EMIS first because it could establish the business case for implementing a SEM program.

Question	Responses (n=11)	Summary of results
<p>13. We are interested in answering the question, Will the combination of SEM and EMIS produce greater savings than just SEM or EMIS? To answer this question, we ask that you imagine a company that already has one (an energy management system in place or an EMIS in place) and plans to add the other.</p>		
<p>a. Would you anticipate energy savings from O&M projects to persist even longer? If so, how much longer?</p>	<p>a. No change (1) b. Savings last <1 year longer (0) c. Savings last 1–2 years longer (4) d. Savings last more than 2 years longer (3)</p>	<p>Most respondents anticipated that the combination of a SEM and EMIS program would produce greater savings persistence from O&M projects than either program individually.</p>
<p>b. Would you expect the company to implement more O&M and/or CapEx projects?</p>	<p>a. No, same number of projects (1) b. Yes, likely to implement more projects (7)</p>	<p>Respondents tended to agree that a combination of SEM and EMIS programs would result in more O&M and/or CapEx projects.</p>

* A few factors may have contributed to the disparity of responses to these questions. Possible explanations include regional differences (e.g., weather, types of industry, customer base) and the expansion of programs from commercial to industrial or vice versa. The responses may indicate markets where the respondents are active; it may be inappropriate to assume an average level of penetration of customer base and load.

Indiana Michigan Power Company
C&I Program
2023 C&I Program Measures

IRP Bundle Selection 2023	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023 Total Rebate Cost	2023 Energy Savings [MW]	2023 IRP Peak Demand Savings [kW]	
Work Station	Advanced Retrofit Controls	Cooling	Education	Refrigerant	Retro	10.0	16,479	72,897	73,730
				Food Sales	Retro	10.0	545	321	0.23
				Health	Retro	10.0	3777	10,336	7,075
				Health	Retro	10.0	83,383	40,000	20,000
				Health	Retro	10.0	5900	5,900	3,584
				Health	Retro	10.0	17,315	10,245	17,107
				Other	Retro	10.0	113,282	173,288	111,481
				Retail	Retro	10.0	352	11,079	5,179
				Warehouse	Retro	10.0	97,211	97,211	0
				Warehouse	Retro	10.0	1,459	15,544	0.000
Air Side Economizer	Cooling	Health	Food Service	Refrigerant	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
				Health	Retro	5.0	1,121	4,175	0.000
Bare Section Line	Refrigeration	Health	Food Sales	Refrigerant	Retro	5.0	11,224	16,278	0.000
				Health	Retro	15.0	278	2,864	0.417
				Health	Retro	15.0	474	1,174	0.114
				Health	Retro	15.0	933	7,089	0.802
				Health	Retro	15.0	1,127	1,086	0.391
				Health	Retro	15.0	441	961	0.197
				Health	Retro	15.0	1,017	3,242	0.895
				Health	Retro	15.0	1,486	4,445	0.729
				Health	Retro	15.0	429	3,826	0.880
				Health	Retro	15.0	3576	7,837	0.864
Central Air - Average WWTen = 0.228	Cooling	Health	Food Sales	Refrigerant	Retro	20.0	81,830	273,370	12,198
				Health	Retro	20.0	11,820	21,816	9,723
				Health	Retro	20.0	11,201	16,820	7,420
				Health	Retro	20.0	285	733	3,208
				Health	Retro	15.0	1,319	4,231	0.822
				Health	Retro	15.0	33	7	0.012
				Health	Retro	15.0	664	1,178	0.776
				Health	Retro	15.0	127	405	0.037
				Health	Retro	15.0	17,424	8,924	0.299
				Health	Retro	15.0	13,407	45,432	8,788
Comprehensive Retrofit Unit Quality Maintenance (AC Tune-up)	Cooling	Warehouse	Education	Refrigerant	Retro	1.0	11,307	17,426	2,771
				Health	Retro	1.0	80,264	70,102	70,000
				Health	Retro	3.0	559	779	0.349
				Health	Retro	3.0	2,013	13,822	29,003
				Health	Retro	3.0	4,437	4,414	1,444
				Health	Retro	3.0	36,386	87,711	38,499
				Health	Retro	3.0	113,368	184,570	105,874
				Health	Retro	3.0	1,127	1,086	0.391
				Health	Retro	3.0	13,949	12,583	38,788
				Health	Retro	3.0	524	225	0.000
Compressor Controls	Refrigeration	Warehouse	Education	Refrigerant	Retro	8.0	3,390	28,749	0.007
				Health	Retro	8.0	1,844	1,384	0.000
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
				Health	Retro	15.0	1,844	1,384	0.001
Computer Room Air Conditioner Economizer	Plug/Loss_Office	Warehouse	Education	Refrigerant	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
Data Center Hot/Cold Aisle Configuration	Plug/Loss_Office	Warehouse	Education	Refrigerant	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
				Health	Retro	15.0	11,379	17,373	0.000
Efficient Air Compressor Controls	Compressed Air	Industrial	Industrial	Refrigerant	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
				Health	Retro	3.0	136,588	765,412	133,632
Efficient Air Compressor Equipment	Compressed Air	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient HVAC	HVAC	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient HVAC Equipment	HVAC	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient Lighting C&I	Lighting	Industrial	Industrial	Refrigerant	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
				Health	Retro	3.0	1,121	4,175	0.000
Efficient Motor Controls	Motors	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient Motor Pkg Equipment - C1 Cost	Motors	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient Motor Pkg Equipment - C2 Cost	Motors	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient Other Facility Process O&M	Other Process	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,121	4,175	0.000
Efficient Process Heat	Process Heat	Industrial	Industrial	Refrigerant	Retro	15.0	1,121	4,175	0.000
				Health	Retro	15.0	1,12		

Indiana Michigan Power Company
 EE Plan
 2023 C&I Program Measures

Indiana Michigan Power Company
 Create No. 650
 Exhibit No. 90-X (JCW-6)
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 Witness: J.C. Water

IMP Bundle Selection 2023	1									
IMP Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023 Total Rebate Cost	2023 Energy Savings (MWh)	2023 Demand Savings (kW)	2023 IMP Peak Demand Savings (\$/yr)	
Saturated Section Controls	Snow Collector - Average kWh/ton = 0.875		Refrigeration	Warehouse	Revo	15.0	\$1,179	13,595	0.898	0.000
			Locking	ROB	Revo	20.0	\$351	3,344	1.235	0.014
			Other	ROB	Revo	20.0	\$61	844	0.814	0.014
Server Virtualization		Plug/Leak/Office	Education	Warehouse	Revo	15.0	\$1,272	16,507	1.333	0.000
			Health	Warehouse	Revo	15.0	\$524	6,621	0.818	0.000
			Office	Warehouse	Revo	15.0	\$2,323	33,820	3.811	0.000
Smart Power Strip - Commercial Use		Plug/Leak/Office	Warehouse	Warehouse	Revo	15.0	\$557	7,831	0.883	0.000
			Education	Warehouse	Revo	5.0	\$15,094	\$97,694	14,499	0.000
			Food Sales	Warehouse	Revo	5.0	\$517	6,897	0.870	0.000
			Food Service	Warehouse	Revo	5.0	\$2,228	31,027	2,962	0.000
			Health	Warehouse	Revo	5.0	\$15,047	\$96,678	14,477	0.000
			Locking	Warehouse	Revo	5.0	\$3,658	49,120	4,882	0.000
			Office	Warehouse	Revo	5.0	\$52,881	835,742	69,070	0.000
			Other	Warehouse	Revo	5.0	\$46,752	623,328	51,210	0.000
			Retail	Warehouse	Revo	5.0	\$4,526	60,200	4,988	0.000
			Warehouse	Warehouse	Revo	5.0	\$14,566	194,609	16,081	0.000
			Warehouse	Warehouse	Revo	5.0	\$2,640	35,206	3,164	0.000
			Strip Curtains		Refrigeration	Education	Warehouse	Revo	4.0	\$1,100
Food Sales	Warehouse	Revo				4.0	\$1,547	16,784	1,844	0.000
Food Service	Warehouse	Revo				4.0	\$505	18,171	1,866	0.000
Health	Warehouse	Revo				4.0	\$926	14,710	1,511	0.000
Locking	Warehouse	Revo				4.0	\$1,694	19,478	2,197	0.000
Office	Warehouse	Revo				4.0	\$4,624	139,240	14,290	0.000
Other	Warehouse	Revo				4.0	\$2,063	22,888	2,438	0.000
Vending Machine Controller - Refrigerated		Miscellaneous	Retail	Warehouse	Revo	4.0	\$8,066	108,170	20,200	0.000
			Education	Warehouse	Revo	10.0	\$1,353	18,044	0.847	0.000
			Food Sales	Warehouse	Revo	10.0	\$25	461	0.204	0.000
			Food Service	Warehouse	Revo	10.0	\$381	5,083	0.267	0.000
			Health	Warehouse	Revo	10.0	\$281	3,684	0.414	0.000
Water Supply & Wastewater treatment pumps and process efficiency		Water/Waste/Water	Locking	Warehouse	Revo	10.0	\$38	512	0.200	0.000
			Locking	Warehouse	Revo	10.0	\$38	512	0.200	0.000
			Office	Warehouse	Revo	10.0	\$2,740	36,234	1,818	0.000
			Office	Warehouse	Revo	10.0	\$2,289	30,228	1,503	0.000
			Retail	Warehouse	Revo	10.0	\$1,895	24,170	1,202	0.000
			Warehouse	Warehouse	Revo	10.0	\$17,677	232,323	8,264	0.000
			Industrial	Warehouse	Revo	11.0	\$23,211	154,740	26,497	0.000

Indiana Michigan Power Company
EE Plan
2023 C&I Program Measures

Indiana Michigan Power Company
Credit No. 6500
Exhibit No. 80-X (JCW-19)
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Witness: J.C. Weller

IRP Bundle Selection 2023	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023 Total Rebate Cost	2023 Energy Savings MWh	2023 IRP Peak Demand Savings			
Work Direct Install	Bi-Level Lighting Fixture - Stairwells, Hallways, and Garages	Interior Lighting	Retail	Rebate	15.0	\$201	720	0.003			
				Rebate	15.0	\$2,482	17,700	2.010			
				DeLighting Controls	Interior Lighting	Retail	Rebate	12.0	\$8,726	14,727	3.130
							Rebate	12.0	\$46,314	68,870	14,720
				Dual Lamp Fluorescent Fixture Average Lamp Wattage 20W	Interior Lighting	Retail	Rebate	15.0	\$10,500	4,700	0.045
							Rebate	15.0	\$1,350	20,760	6.545
				LED Downlight fixture	Interior Lighting	Retail	Rebate	4.0	\$1,800	30,780	8.754
							Rebate	4.0	\$3,763	63,267	15,200
				LED Downlight, downlight, 1-2W, Interior Average 12 Watts	Interior Lighting	Retail	Rebate	4.0	\$200	2,400	0.007
							Rebate	4.0	\$271	10,885	1,969
				LED Downlight, downlight, 4-20W, Interior Average 11 Watts	Interior Lighting	Retail	Rebate	4.0	\$700	8,400	0.010
							Rebate	4.0	\$1,774	27,618	4,741
				LED High bay fixture	Interior Lighting	Retail	Rebate	15.0	\$2,609	17,746	2,031
							Rebate	15.0	\$2,609	10,484	2,031
				LED low bay fixture	Interior Lighting	Retail	Rebate	12.0	\$1,115	9,311	2,049
							Rebate	12.0	\$1,170	18,263	4,014
				LED High-bay HD Lamp Replacing High Bay HID	Interior Lighting	Retail	Rebate	12.0	\$600	18,000	4,000
							Rebate	12.0	\$4,200	50,400	12,794
				LED High-bay HD Lamp Replacing Low Bay HID	Interior Lighting	Retail	Rebate	15.0	\$4,200	50,400	12,794
							Rebate	15.0	\$7,977	97,777	21,911
LED Troffer, 2'X2' and 2'X4'	Interior Lighting	Retail	Rebate	15.0	\$7,377	24,179	6,276				
			Rebate	15.0	\$47,071	201,864	49,296				
Occupancy Sensors	Interior Lighting	Retail	Rebate	15.0	\$4,961	19,497	4,177				
			Rebate	15.0	\$1,154	18,700	0,737				
Work Midstream	Air Conditioner - 17 SEER (4-20 Tons)	Cooling	Education	Rebate	8.0	\$8,263	85,000	2,486			
				Rebate	15.0	\$91	951	1,006			
				Rebate	15.0	\$11	164	0,128			
				Food Service	Rebate	15.0	\$277	2,760	2,020		
					Rebate	15.0	\$283	2,822	2,020		
				Health	Rebate	15.0	\$2,423	24,627	24,027		
					Rebate	15.0	\$548	3,480	2,519		
				Warehouse	Rebate	15.0	\$1,441	14,433	16,440		
					Rebate	15.0	\$41	\$41	0,000		
				Air Conditioner - 16 SEER (4-20 Tons)	Cooling	Education	Rebate	15.0	\$239	2,354	2,036
Rebate	15.0	\$764	7,644				6,471				
Food Service	Rebate	15.0	\$2,160				21,588	21,511			
	Rebate	15.0	\$206				2,060	2,138			
Warehouse	Rebate	15.0	\$1,224				12,226	13,075			
	Rebate	15.0	\$339				3,388	5,221			
Food Sales	Rebate	15.0	\$4				\$8	0,028			
	Rebate	15.0	\$23				233	0,068			
Health	Rebate	15.0	\$28				280	1,814			
	Rebate	15.0	\$76				767	6,941			
Other	Rebate	15.0	\$62	620	2,986						
	Rebate	15.0	\$737	7,366	7,034						
Air Conditioner - 16 SEER (8-20 Tons)	Cooling	Warehouse	Rebate	15.0	\$255	2,546	2,007				
			Rebate	15.0	\$255	3,748	6,932				
			Food Sales	Rebate	15.0	\$7	\$8	0,046			
				Rebate	15.0	\$107	1,072	1,131			
			Health	Rebate	15.0	\$486	4,857	3,427			
				Rebate	15.0	\$44	444	6,442			
			Office	Rebate	15.0	\$739	7,341	5,428			
				Rebate	15.0	\$739	12,400	12,408			
			Retail	Rebate	15.0	\$73	728	8,000			
				Rebate	15.0	\$421	4,312	4,824			
Air Conditioner - 17 SEER (20+ Tons)	Cooling	Food Sales	Rebate	15.0	\$3	\$8	0,020				
			Rebate	15.0	\$47	472	0,400				
			Health	Rebate	15.0	\$100	1,007	1,496			
				Rebate	15.0	\$20	207	0,196			
			Office	Rebate	15.0	\$316	3,185	2,247			
				Rebate	15.0	\$287	3,075	3,001			
			Retail	Rebate	15.0	\$54	\$64	0,303			
				Rebate	15.0	\$101	1,050	2,181			
			Air Conditioner - 17 SEER (8-20 Tons)	Cooling	Education	Rebate	15.0	\$432	4,323	6,778	
						Rebate	15.0	\$3	\$6	0,033	
Food Service	Rebate	15.0				\$8	\$8	0,044			
	Rebate	15.0				\$338	3,384	2,387			
Health	Rebate	15.0				\$33	324	2,333			
	Rebate	15.0				\$44	440	1,416			
Office	Rebate	15.0				\$41	\$41	0,008			
	Rebate	15.0				\$1,019	10,148	10,107			
Warehouse	Rebate	15.0				\$92	923	6,068			
	Rebate	15.0				\$324	3,243	3,203			
Air Conditioner - 16 SEER (20+ Tons)	Cooling	Education	Rebate	15.0	\$950	6,929	10,003				
			Rebate	15.0	\$4	\$7	0,020				
			Food Service	Rebate	15.0	\$129	1,287	1,363			
				Rebate	15.0	\$242	2,374	2,625			
			Health	Rebate	15.0	\$5	\$5	0,033			
				Rebate	15.0	\$67	659	6,116			
			Office	Rebate	15.0	\$28	280	16,188			
				Rebate	15.0	\$124	1,441	1,111			
			Warehouse	Rebate	15.0	\$72	720	6,038			
				Rebate	15.0	\$784	7,844	12,207			
Air Conditioner - 16 SEER (8-20 Tons)	Cooling	Food Sales	Rebate	15.0	\$1	\$1	0,000				
			Rebate	15.0	\$1	\$1	0,000				
			Health	Rebate	15.0	\$146	1,467	1,543			
				Rebate	15.0	\$202	2,024	4,447			
			Office	Rebate	15.0	\$81	800	0,804			
				Rebate	15.0	\$984	9,841	6,842			
			Other	Rebate	15.0	\$181	1,812	1,837			
				Rebate	15.0	\$36	360	6,712			
			Warehouse	Rebate	15.0	\$88	888	8,719			
				Rebate	15.0	\$107	1,068	1,116			
Air Conditioner - 16 SEER (4-20 Tons)	Cooling	Food Service	Rebate	15.0	\$208	2,078	3,381				
			Rebate	15.0	\$428	4,176	4,194				
			Other	Rebate	15.0	\$2,648	26,482	26,370			
				Rebate	15.0	\$267	3,874	2,820			
			Warehouse	Rebate	15.0	\$1,804	18,043	18,321			
				Rebate	15.0	\$662	6,820	13,433			
			Food Sales	Rebate	15.0	\$10	\$10	0,008			
				Rebate	15.0	\$164	1,639	1,726			
			Health	Rebate	15.0	\$901	8,907	4,872			
				Rebate	15.0	\$24	240	2,009			
Air Conditioner - 21 SEER (4-20 Tons)	Cooling	Office	Rebate	15.0	\$2	\$2	0,000				
			Rebate	15.0	\$1	\$1	0,000				
			Health	Rebate	15.0	\$1,104	11,040	7,788			
				Rebate	15.0	\$271	2,711	20,627			
			Warehouse	Rebate	15.0	\$662	6,619	7,458			
				Rebate	15.0	\$200	6,502	13,454			
			Food Sales	Rebate	15.0	\$11	\$6	0,006			
				Rebate	15.0	\$139	1,394	1,688			
			Health	Rebate	15.0	\$972	9,718	4,730			
				Rebate	15.0	\$61	603	0,800			
Office	Rebate	15.0	\$1,074	10,736	7,075						
	Rebate	15.0	\$2,014	20,144	20,003						
Air Conditioner - 21 SEER (6-20 Tons)	Cooling	Retail	Rebate	15.0	\$183	1,833	1,328				
			Rebate	15.0	\$644	6,436	7,702				
			Warehouse	Rebate	15.0	\$88	888	8,916			
				Rebate	15.0	\$107	1,068	1,116			
			Food Service	Rebate	15.0	\$28	\$28	0,000			
				Rebate	15.0	\$208	2,078	3,381			
			Other	Rebate	15.0	\$2,648	26,482	26,370			
				Rebate	15.0	\$267	3,874	2,820			
			Geothermal HP - SEER 20.3 (4-20 Tons)	Heating	Warehouse	Rebate	15.0	\$6	\$6	0,018	
						Rebate	15.0	\$7	\$7	0,017	
Food Service	Rebate	15.0				\$14	\$14	0,030			
	Rebate	15.0				\$21	\$21	0,030			
Other	Rebate	15.0				\$18	\$18	0,200			
	Rebate	15.0				\$23	\$23	0,271			
Warehouse	Rebate	15.0				\$47	\$47	0,512			
	Rebate	15.0				\$101	1,010	1,011			
Food Sales	Rebate	15.0				\$4	\$4	0,113			
	Rebate	15.0				\$7	\$7	0,080			
Health	Rebate	15.0	\$11	\$11	0,119						
	Rebate	15.0	\$4	\$4	0,060						
Office	Rebate	15.0	\$95	\$95	1,332						
	Rebate	15.0	\$16	\$16	0,235						
Geothermal HP - SEER 21.3 (20+ Tons)	Heating	Warehouse	Rebate	15.0	\$8	\$8	0,127				
			Rebate	15.0	\$8	\$8	0,127				
			Food Sales	Rebate	15.0	\$6	\$6	0,027			
				Rebate	15.0	\$4	\$4	0,044			
			Health	Rebate	15.0	\$10	\$10	0,088			
				Rebate	15.0	\$3	\$3	0,027			
			Other	Rebate	15.0	\$65	\$65	0,884			
				Rebate	15.0	\$13	\$13	0,112			
			Warehouse	Rebate	15.0	\$6	\$6	0,053			
				Rebate	15.0	\$6	\$6	0,027			
Food Sales	Rebate	15.0	\$15	\$15	0,042						
	Rebate	15.0	\$23	\$23	0,103						
Health	Rebate	15.0	\$35	\$35	0,387						
	Rebate	15.0	\$28	\$28	0,086						
Warehouse	Rebate	15.0	\$24	\$24	0,066						
	Rebate	15.0	\$4	\$4	0,058						
Food Sales	Rebate	15.0	\$4	\$4	0,058						
	Rebate	15.0	\$11	\$11	0,161						
Health	Rebate	15.0	\$5	\$5	0,072						
	Rebate	15.0	\$7	\$7	0,103						
Office	Rebate	15.0	\$11	\$11	0,119						
	Rebate	15.0	\$4	\$4	0,060						
Warehouse	Rebate	15.0	\$95	\$95	1,332						
	Rebate	15.0	\$16	\$16	0,235						
Geothermal HP - SEER 21.3 (8-20 Tons)	Heating	Warehouse	Rebate	15.0	\$8	\$8	0,127				
			Rebate	15.0	\$8	\$8	0,127				
			Food Sales	Rebate	15.0	\$6	\$6	0,027			
				Rebate	15.0	\$4	\$4	0,044			
			Health	Rebate	15.0	\$10	\$10	0,088			
				Rebate	15.0	\$3	\$3	0,027			
			Other	Rebate	15.0	\$65	\$65	0,884			
				Rebate	15.0	\$13	\$13	0,112			
			Warehouse	Rebate	15.0	\$6	\$6	0,053			
				Rebate	15.0	\$6	\$6	0,027			
Food Sales	Rebate	15.0	\$15	\$15	0,042						
	Rebate	15.0	\$23	\$23	0,103						
Health	Rebate	15.0	\$35	\$35	0,387						
	Rebate	15.0	\$28	\$28	0,086						
Warehouse	Rebate	15.0	\$24	\$24	0,066						
	Rebate	15.0	\$4	\$4	0,058						
Food Sales	Rebate	15.0	\$4	\$4	0,058						
	Rebate	15.0	\$11	\$11	0,161						
Health	Rebate	15.0	\$5	\$5	0,072						
	Rebate	15.0	\$7	\$7	0,103						
Office	Rebate	15.0	\$11	\$11	0,119						
	Rebate	15.0	\$4	\$4	0,060						
Geothermal HP - SEER 21 (4-20 Tons)	Heating	Warehouse	Rebate	15.0	\$10	\$10	0,140				
			Rebate	15.0	\$10	\$10	0,140				
			Food Sales	Rebate	15.0	\$6	\$6	0,027			
				Rebate	15.0	\$4	\$4	0,044			
			Health								

Indiana Michigan Power Company
EE Plan
2023 C&I Program Measures

Indiana Michigan Power Company
Circuit No. 6504
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IRP Bundle Selection	2023	2023	2023	IRP Peak Demand Savings										
IRP Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023 Total Reliab. Cost	2023 Energy Savings (MW)	2023 Demand Savings (kW)						
Heat Pump - 17 SEER (15 Tons)	Geothermal HP - SEER 20.3 (20 Tons)	Heating	Education	Food Sales	ROD	150	547	118	0.421					
					ROD	150	54	60	0.235					
					ROD	150	56	102	0.080					
					ROD	150	56	106	0.089					
					ROD	150	54	36	0.037					
					ROD	150	55	1,525	0.864					
					ROD	150	288	288	0.084					
					ROD	150	515	205	0.151					
					ROD	150	511	100	0.033					
					ROD	150	51	83	0.032					
					ROD	150	171	71	0.004					
					ROD	150	2070	2,030	0.035					
					ROD	150	540	207	0.133					
					ROD	150	531	308	0.030					
					ROD	150	111	107	0.030					
					ROD	150	55	77	0.028					
					ROD	150	223	244	0.037					
					ROD	150	44	41	0.004					
					ROD	150	2,038	2,030	0.143					
					ROD	150	238	270	0.117					
					Heat Pump - 16 SEER (20+ Tons)	Heat Pump - 16 SEER (20+ Tons)	Heating	Warehouse	Food Sales	ROD	150	171	177	0.004
										ROD	150	530	540	0.006
										ROD	150	52	29	0.006
										ROD	150	52	117	0.012
ROD	150	55	89	0.014										
ROD	150	52	58	0.007										
ROD	150	552	874	0.141										
ROD	150	208	1,221	0.100										
ROD	150	55	50	0.005										
ROD	150	55	120	0.015										
ROD	150	51	14	0.004										
ROD	150	51	42	0.004										
ROD	150	54	43	0.011										
ROD	150	51	72	0.009										
ROD	150	542	418	0.111										
ROD	150	503	208	0.108										
ROD	150	57	43	0.019										
ROD	150	54	43	0.009										
Heat Pump - 17 SEER (20+ Tons)	Heat Pump - 17 SEER (20+ Tons)	Heating	Education	Food Sales						ROD	150	535	1,129	0.003
										ROD	150	52	84	0.005
										ROD	150	56	104	0.012
										ROD	150	44	107	0.011
										ROD	150	548	1,052	0.129
										ROD	150	144	148	0.004
					ROD	150	58	104	0.023					
					ROD	150	53	104	0.014					
					ROD	150	235	341	0.040					
					ROD	150	52	17	0.004					
					ROD	150	54	59	0.008					
					ROD	150	52	32	0.010					
					ROD	150	52	30	0.004					
					ROD	150	503	503	0.000					
					ROD	150	59	92	0.017					
					ROD	150	523	250	0.005					
					ROD	150	541	1,876	0.204					
					ROD	150	52	63	0.004					
					ROD	150	44	74	0.004					
					ROD	150	58	104	0.030					
					ROD	150	53	120	0.014					
					ROD	150	567	3,043	0.206					
					ROD	150	110	345	0.062					
					Heat Pump - 18 SEER (5-20 Tons)	Heat Pump - 18 SEER (5-20 Tons)	Heating	Warehouse	Food Sales	ROD	150	56	277	0.031
ROD	150	529	163	0.007										
ROD	150	55	103	0.014										
ROD	150	44	111	0.004										
ROD	150	55	111	0.004										
ROD	150	548	1,052	0.129										
ROD	150	144	148	0.004										
ROD	150	58	104	0.023										
ROD	150	53	104	0.014										
ROD	150	235	341	0.040										
ROD	150	52	17	0.004										
ROD	150	54	59	0.008										
ROD	150	52	32	0.010										
ROD	150	52	30	0.004										
ROD	150	503	503	0.000										
ROD	150	59	92	0.017										
ROD	150	523	250	0.005										
ROD	150	541	1,876	0.204										
ROD	150	52	63	0.004										
ROD	150	44	74	0.004										
ROD	150	58	104	0.030										
ROD	150	53	120	0.014										
ROD	150	567	3,043	0.206										
ROD	150	110	345	0.062										
Heat Pump - 18 SEER (5-20 Tons)	Heat Pump - 18 SEER (5-20 Tons)	Heating	Warehouse	Food Sales	ROD	150	56	277	0.031					
					ROD	150	529	163	0.007					
					ROD	150	55	103	0.014					
					ROD	150	44	111	0.004					
					ROD	150	55	111	0.004					
					ROD	150	548	1,052	0.129					
					ROD	150	144	148	0.004					
					ROD	150	58	104	0.023					
					ROD	150	53	104	0.014					
					ROD	150	235	341	0.040					
					ROD	150	52	17	0.004					
					ROD	150	54	59	0.008					
					ROD	150	52	32	0.010					
					ROD	150	52	30	0.004					
					ROD	150	503	503	0.000					
					ROD	150	59	92	0.017					
					ROD	150	523	250	0.005					
					ROD	150	541	1,876	0.204					
					ROD	150	52	63	0.004					
					ROD	150	44	74	0.004					
					ROD	150	58	104	0.030					
					ROD	150	53	120	0.014					
					ROD	150	567	3,043	0.206					
					ROD	150	110	345	0.062					
Heat Pump - 21 SEER (20+ Tons)	Heat Pump - 21 SEER (20+ Tons)	Heating	Warehouse	Food Sales	ROD	150	59	305	0.035					
					ROD	150	529	163	0.007					
					ROD	150	55	103	0.014					
					ROD	150	44	111	0.004					
					ROD	150	55	111	0.004					
					ROD	150	548	1,052	0.129					
					ROD	150	144	148	0.004					
					ROD	150	58	104	0.023					
					ROD	150	53	104	0.014					
					ROD	150	235	341	0.040					
					ROD	150	52	17	0.004					
					ROD	150	54	59	0.008					
					ROD	150	52	32	0.010					
					ROD	150	52	30	0.004					
					ROD	150	503	503	0.000					
					ROD	150	59	92	0.017					
					ROD	150	523	250	0.005					
					ROD	150	541	1,876	0.204					
					ROD	150	52	63	0.004					
					ROD	150	44	74	0.004					
					ROD	150	58	104	0.030					
					ROD	150	53	120	0.014					
					ROD	150	567	3,043	0.206					
					ROD	150	110	345	0.062					
Heat Pump - 21 SEER (5-20 Tons)	Heat Pump - 21 SEER (5-20 Tons)	Heating	Warehouse	Food Sales	ROD	150	59	305	0.035					
					ROD	150	529	163	0.007					
					ROD	150	55	103	0.014					
					ROD	150	44	111	0.004					
					ROD	150	55	111	0.004					
					ROD	150	548	1,052	0.129					
					ROD	150	144	148	0.004					
					ROD	150	58	104	0.023					
					ROD	150	53	104	0.014					
					ROD	150	235	341	0.040					
					ROD	150	52	17	0.004					
					ROD	150	54	59	0.008					
					ROD	150	52	32	0.010					
					ROD	150	52	30	0.004					
					ROD	150	503	503	0.000					
					ROD	150	59	92	0.017					
					ROD	150	523	250	0.005					
					ROD	150	541	1,876	0.204					
					ROD	150	52	63	0.004					
					ROD	150	44	74	0.004					
					ROD	150	58	104	0.030					
					ROD	150	53	120	0.014					
					ROD	150	567	3,043	0.206					
					ROD	150	110	345	0.062					
Mini Split Ductless Heat Pump Cold Climate (Three & side TBD)	Mini Split Ductless Heat Pump Cold Climate (Three & side TBD)	Heating	Warehouse	Food Sales	ROD	120	1,033	1,030	1.814					
					ROD	120	676	700	0.528					
					ROD	120	171	741	7.774					
					ROD	120	3432	4,316	3,644					
					ROD	120	51,804	13,268	18,294					
					ROD	120	3,009	3,004	2,814					
					ROD	120	5315	3,152	3,000					
					ROD	120	534	338	0.130					
					ROD	120	537	300	0.249					
					ROD	120	536	330	0.337					
					ROD	120	44	46	0.004					
					ROD	120	33	35	0.010					
					ROD	120	20	20	0.000					
					ROD	200	171	171	0.000					
					ROD	200	171	171	0.000					
					ROD	200	527	748	0.792					
					ROD	200	523	644	0.450					
					ROD	200	511	530	0.328					
					ROD	200	8214	9,990	4,225					
					ROD	200	5450	12,007	12,789					
					ROD	200	529	1,089	0.788					
					ROD	200	525	1,104	0.789					
					ROD	200	503	2,331	2,456					
					ROD	200	503	11,304	12,000					
ROD	120	41,171	44,171	7,941										
ROD	120	3012	10,311	10,841										
ROD	120	5105	4,132	0.484										
ROD	120	41,171	37,947	0.841										
Anti-Seal Heat Controls MT	Anti-Seal Heat Controls MT	Refrigeration	Warehouse	Food Sales	Revo	120	51,564	30,108	4,302					
					Revo	120	52,103	52,960	3,420					
					Revo	120	51,464	37,107	4,082					
					Revo	120	52,800	66,982	0.000					
					Revo	120	51,410	30,202	0.000					
					Revo	120	51,224	30,110	0.000					
					Revo	120	51,837	40,521	0.000					
					Revo	120	4,441	11,100	0.000					
					Revo	120	52,341	41,100	0.000					
					Revo	120	54,093	117,375	0.000					
					Revo	120	54,146	144,011	0.000					
					Revo	120	54,453	111,200	0.000					
					Revo	8.0	50	207	0.000					
					Revo	8.0	50	197	0.014					
					Revo	8.0	51	23	0.000					
					Revo	8.0	51	122	0.018					
					Revo	8.0	51	23	0.000					
					Revo	8.0	50	216	0.000					
					Revo	8.0	51	213	0.045					
					Revo	8.0	51	245	0.000					
					Revo	8.0	51	245	0.000					
					Revo	8.0	512	297	0.043					
					Revo	8.0	55	141	0.019					
					Revo	8.0	55	141	0.019					
Revo	8.0	52	52	0.007										
Revo	8.0	514	338	0.045										
Revo	8.0	520	460											

Indiana Michigan Power Company
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Indiana Michigan Power Company
 Create No. 608
 Exhibit No. 608 (JCW-6)
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IPB Bundle Section 2023	1							
IM Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023 Total Rebate Cost	2023 Energy Savings (MW)	2023 IPF Peak Demand Savings (kW)
Daylighting Controls	Interior Lighting	Education	Health	Replacement	120	12 803	89 146	14 034
				Health	120	2 027	3 034	1 834
				Office	120	32 522	60 294	13 076
				Other	120	3 320	7 463	1 841
				Retail	120	86 312	149 500	31 383
				Warehouse	120	11 517	22 200	5 500
				Warehouse	120	27 227	174 888	37 001
				Warehouse	120	11 517	47 939	8 758
				Warehouse	120	4 111	14 111	3 111
				Warehouse	120	11 588	28 474	7 853
Demand Controlled Ventilation	Ventilation	Warehouse	Education	Replacement	150	11 095	16 726	17 790
				Health	150	32 328	63 254	12 292
				Office	150	54 200	99 191	18 210
				Other	150	38 320	117 987	21 461
				Retail	150	3 520	4 121	1 474
				Retail	150	82 419	32 252	3 699
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
Dishwasher Low Temp Door (Energy Star)	Cooking	Warehouse	Education	Replacement	150	11 019	11 009	4 471
				Health	150	1 524	4 014	0 230
				Office	150	1 524	4 014	0 230
				Other	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
Dishwasher High Temp Door (Energy Star)	Cooking	Warehouse	Education	Replacement	150	11 019	11 009	4 471
				Health	150	1 524	4 014	0 230
				Office	150	1 524	4 014	0 230
				Other	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
				Retail	150	1 524	4 014	0 230
Display Case Door Retrofit, Low Temp	Refrigeration	Education	Health	Replacement	120	5 205	4 252	1 185
				Health	120	1 150	3 382	6 813
				Office	120	8 500	21 290	3 339
				Other	120	3 292	1 059	0 796
				Retail	120	351	1 381	5 216
				Retail	120	4 907	4 514	4 416
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
Display Case Door Retrofit, Medium Temp	Refrigeration	Education	Health	Replacement	120	5 205	4 252	1 185
				Health	120	1 150	3 382	6 813
				Office	120	8 500	21 290	3 339
				Other	120	3 292	1 059	0 796
				Retail	120	351	1 381	5 216
				Retail	120	4 907	4 514	4 416
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
Efficient Lighting	Lighting	Warehouse	Agriculture	Replacement	120	25	24 241	2 708
				Health	120	11 739	43 483	2 481
				Office	120	49 999	49 999	99 999
				Office	120	5 008	18 220	2 204
				Office	120	11 170	16 744	4 749
				Office	120	82 211	89 123	10 187
				Office	120	5 470	11 747	1 283
				Office	120	2 427	6 177	8 275
				Office	120	3 322	33 629	3 895
				Office	120	3 322	8 847	3 895
Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Refrigeration	Education	Health	Replacement	150	88	2 177	0 237
				Health	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
				Office	150	88	2 177	0 237
Electronically Commutated (EC) Walk-In Evaporator Fan Motor	Refrigeration	Education	Health	Replacement	150	11 095	16 726	17 790
				Health	150	32 328	63 254	12 292
				Office	150	54 200	99 191	18 210
				Other	150	38 320	117 987	21 461
				Retail	150	3 520	4 121	1 474
				Retail	150	82 419	32 252	3 699
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
Energy Efficient Electric Fryer	Cooking	Warehouse	Education	Replacement	120	11 095	16 726	17 790
				Health	120	32 328	63 254	12 292
				Office	120	54 200	99 191	18 210
				Other	120	38 320	117 987	21 461
				Retail	120	3 520	4 121	1 474
				Retail	120	82 419	32 252	3 699
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
ENERGY STAR Commercial Washing Machines	HotWater	Education	Health	Replacement	70	3 971	23 996	0 599
				Health	70	1 173	3 299	0 108
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
Energy Star Ice Machine	Refrigeration	Education	Health	Replacement	70	3 971	23 996	0 599
				Health	70	1 173	3 299	0 108
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
				Office	70	3 299	6 626	0 179
Energy Star Reach-In Freezer, Glass Doors	Refrigeration	Education	Health	Replacement	120	5 205	4 252	1 185
				Health	120	1 150	3 382	6 813
				Office	120	8 500	21 290	3 339
				Other	120	3 292	1 059	0 796
				Retail	120	351	1 381	5 216
				Retail	120	4 907	4 514	4 416
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
				Retail	120	3 700	17 493	2 765
Energy Star Reach-In Freezer, Solid Doors	Refrigeration	Warehouse	Education	Replacement	120	11 095	16 726	17 790
				Health	120	32 328	63 254	12 292
				Office	120	54 200	99 191	18 210
				Other	120	38 320	117 987	21 461
				Retail	120	3 520	4 121	1 474
				Retail	120	82 419	32 252	3 699
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
Energy Star Reach-In Refrigerator, Glass Doors	Refrigeration	Warehouse	Education	Replacement	120	11 095	16 726	17 790
				Health	120	32 328	63 254	12 292
				Office	120	54 200	99 191	18 210
				Other	120	38 320	117 987	21 461
				Retail	120	3 520	4 121	1 474
				Retail	120	82 419	32 252	3 699
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
Energy Star Reach-In Refrigerator, Solid Doors	Refrigeration	Warehouse	Education	Replacement	120	11 095	16 726	17 790
				Health	120	32 328	63 254	12 292
				Office	120	54 200	99 191	18 210
				Other	120	38 320	117 987	21 461
				Retail	120	3 520	4 121	1 474
				Retail	120	82 419	32 252	3 699
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
				Retail	120	150	150	150
Evaporator Fan Motor Controls	Refrigeration	Education	Health	Replacement	130	5 205	4 252	1 185
				Health	130	1 150	3 382	6 813
				Office	130	8 500	21 290	3 339
				Other	130	3 292	1 059	0 796
				Retail	130	351	1 381	5 216
				Retail	130	4 907	4 514	4 416
				Retail	130	3 700	17 493	2 765
				Retail	130	3 700	17 493	2 765
				Retail	130	3 700	17 493	2 765
				Retail	130	3 700	17 493	2 765
Faucet Aerator	HotWater	Warehouse	Education	Replacement	150	11 095	16 726	17 790
				Health	150	32 328	63 254	12 292
				Office	150	54 200	99 191	18 210
				Other	150	38 320	117 987	21 461
				Retail	150	3 520	4 121	1 474
				Retail	150	82 419	32 252	3 699
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
Fluating Head Pressure Controls	Refrigeration	Warehouse	Education	Replacement	150	11 095	16 726	17 790
				Health	150	32 328	63 254	12 292
				Office	150	54 200	99 191	18 210
				Other	150	38 320	117 987	21 461
				Retail	150	3 520	4 121	1 474
				Retail	150	82 419	32 252	3 699
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
				Retail	150	150	150	150
Grow Lighting	Lighting	Warehouse	Agriculture	Replacement	150	11 095	16 726	17 790
				Health	150	32 328	63 254	12 292
				Office	150	54 200	99 191	18 210
				Other	150	38 320	117 987	21 461
				Retail	150	3 520	4 121	1 474
				Retail	150	82 419	32 252	3 699
				Retail				

Indiana Michigan Power Company
EE Plus
2023 C&I Program Measures

Indiana Michigan Power Company
CIS-000-0000
Exhibit No. 90-X (JCW-19)
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Witness: J.C. Weber

I&M Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023	2023	2023
						Total	Energy Savings	Peak Demand Savings
						Reliable Cost	(MW)	(kW)
LED Exit Sign - 4 Watt Fixture (2 lamp)	Interior Lighting	Office	Warehouse	Other	15.0	\$1,304	32,855	6,919
					12.0	\$1,361	47,710	5,437
LED foot pump canopy fixture (existing W-200)	Exterior Lighting	Other	Warehouse	Other	15.0	\$2,204	35,002	6,304
					12.0	\$11,861	280,514	0,000
LED foot pump canopy fixture (existing W-200)	Exterior Lighting	Other	Warehouse	Other	15.0	\$10,340	203,509	0,000
					12.0	\$200	9,324	0,113
LED high bay fixture	Interior Lighting	Office	Warehouse	Other	12.0	\$9	225	0,049
					12.0	\$106	4,839	1,075
LED low bay fixture	Interior Lighting	Office	Warehouse	Other	12.0	\$611	10,207	2,238
					12.0	\$200	3,200	3,277
LED low bay fixture	Interior Lighting	Food Sales	Warehouse	Health	12.0	\$1,806	47,454	11,447
					12.0	\$10	10,120	2,227
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$10	245	0,054
					12.0	\$454	11,366	2,487
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$31	797	0,189
					12.0	\$1,802	28,541	5,836
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$11,861	280,514	0,000
					12.0	\$57	2,421	0,000
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,119	19,414	4,199
					12.0	\$968	14,602	0,000
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,119	19,414	4,199
					12.0	\$3,224	50,586	0,000
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$11,861	280,514	0,000
					12.0	\$1,114	27,842	0,000
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$4,189	104,719	0,000
					12.0	\$3,227	83,109	0,000
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$10	245	0,054
					12.0	\$214	12,849	0,000
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,073	26,227	0,000
					12.0	\$1,119	19,414	4,199
LED Mogul-base HD Lamp Replacing Exterior HD (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,119	19,414	4,199
					12.0	\$10,340	203,509	0,000
LED Mogul-base HD Lamp Replacing High Bay HD	Interior Lighting	Office	Warehouse	Other	12.0	\$996	17,409	3,828
					12.0	\$17	421	0,023
LED Mogul-base HD Lamp Replacing High Bay HD	Interior Lighting	Office	Warehouse	Other	12.0	\$372	8,289	2,046
					12.0	\$21	1,318	0,202
LED Mogul-base HD Lamp Replacing Low Bay HD	Interior Lighting	Office	Warehouse	Other	12.0	\$781	18,526	4,204
					12.0	\$10	245	0,054
LED Mogul-base HD Lamp Replacing Low Bay HD	Interior Lighting	Office	Warehouse	Other	12.0	\$1,802	46,827	10,328
					12.0	\$18,526	463,937	100,000
LED Mogul-base HD Lamp Replacing Low Bay HD	Interior Lighting	Office	Warehouse	Other	12.0	\$18,526	463,937	100,000
					12.0	\$771	19,077	4,194
LED Mogul-base HD Lamp Replacing Low Bay HD	Interior Lighting	Health	Warehouse	Other	12.0	\$386	8,656	2,123
					12.0	\$16	408	0,097
LED Mogul-base HD Lamp Replacing Low Bay HD	Interior Lighting	Health	Warehouse	Other	12.0	\$811	20,275	4,439
					12.0	\$1,802	47,246	10,421
LED outdoor pole decorative fixture (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$3,311	83,272	20,021
					12.0	\$3,327	83,109	0,000
LED outdoor pole decorative fixture (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$81	2,077	0,000
					12.0	\$114	12,849	0,000
LED outdoor pole decorative fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,073	26,227	0,000
					12.0	\$473	14,643	0,000
LED outdoor pole decorative fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$2,389	74,176	0,000
					12.0	\$1,540	263,529	0,000
LED outdoor pole decorative fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$3,311	83,272	20,021
					12.0	\$3,327	83,109	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Office	Warehouse	Other	6.0	\$100	1,747	0,000
					6.0	\$202	14,827	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	6.0	\$1,228	30,985	0,000
					6.0	\$484	12,007	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	6.0	\$3,302	84,793	0,000
					6.0	\$1,013	264,953	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	6.0	\$1,172	29,296	0,000
					6.0	\$4,407	111,179	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	6.0	\$361	2,207	0,000
					6.0	\$114	12,849	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	6.0	\$1,074	19,417	4,199
					6.0	\$476	10,463	0,000
LED parking garage fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	6.0	\$2,939	74,176	0,000
					6.0	\$10,340	203,509	0,000
LED parking lot fixture (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$3,311	83,272	20,021
					12.0	\$3,327	83,109	0,000
LED parking lot fixture (existing W-200)	Exterior Lighting	Office	Warehouse	Other	12.0	\$81	2,077	0,000
					12.0	\$114	12,849	0,000
LED parking lot fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,073	26,227	0,000
					12.0	\$1,119	19,414	4,199
LED parking lot fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,119	19,414	4,199
					12.0	\$10,340	203,509	0,000
LED parking lot fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,073	26,227	0,000
					12.0	\$1,119	19,414	4,199
LED parking lot fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$10,340	203,509	0,000
					12.0	\$3,311	83,272	20,021
LED parking lot fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$3,327	83,109	0,000
					12.0	\$3,311	83,109	0,000
LED parking lot fixture (existing W-200)	Exterior Lighting	Health	Warehouse	Other	12.0	\$1,114	19,417	4,199
					12.0	\$11,861	280,514	0,000
LED street lighting	Exterior Lighting	Office	Warehouse	Other	20.0	\$128,283	6,878,438	0,000
					12.0	\$14,183	1,901,493	14,183
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,716	67,865	8,281
					15.0	\$33,251	844,465	103,122
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,532	63,205	7,719
					15.0	\$85,102	2,129,142	259,622
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$73,070	1,820,743	222,774
					15.0	\$97,238	1,180,268	285,971
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$12,461	311,273	57,160
					15.0	\$11	8,326	0,000
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$20	1,318	0,202
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$754	18,829	3,463
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$21,880	542,012	99,532
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$20,482	542,012	116,629
					15.0	\$7,914	199,644	44,414
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,532	63,205	7,719
					15.0	\$92,233	1,558,829	28,020
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$484	12,007	2,149
					15.0	\$15,833	393,973	61,771
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$10,340	203,509	0,000
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$46	1,414	0,199
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$1,114	19,417	4,199
					15.0	\$1,114	19,417	4,199
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$128,283	6,878,438	0,000
					15.0	\$14,183	1,901,493	14,183
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,716	67,865	8,281
					15.0	\$33,251	844,465	103,122
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,532	63,205	7,719
					15.0	\$85,102	2,129,142	259,622
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$73,070	1,820,743	222,774
					15.0	\$97,238	1,180,268	285,971
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$12,461	311,273	57,160
					15.0	\$11	8,326	0,000
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$20	1,318	0,202
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$754	18,829	3,463
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$21,880	542,012	99,532
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$20,482	542,012	116,629
					15.0	\$7,914	199,644	44,414
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,532	63,205	7,719
					15.0	\$92,233	1,558,829	28,020
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$484	12,007	2,149
					15.0	\$15,833	393,973	61,771
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$10,340	203,509	0,000
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$10,340	203,509	0,000
					15.0	\$46	1,414	0,199
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$1,114	19,417	4,199
					15.0	\$1,114	19,417	4,199
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$128,283	6,878,438	0,000
					15.0	\$14,183	1,901,493	14,183
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,716	67,865	8,281
					15.0	\$33,251	844,465	103,122
LED T5 Tube Replacement	Interior Lighting	Food Sales	Warehouse	Health	15.0	\$2,532	63,205</	

Indiana Michigan Power Company
 EE Plan
 2023 C&I Program Measures

Indiana Michigan Power Company
 Exhibit No. 95-X (JCW-19)
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 Witness: J.C. Weller

IIP Bundle Selection 2023								
IMM Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2023 Total Rebate Cost (\$K)	2023 Energy Savings (MWh)	2023 IIP Peak Demand Savings (kW)
Work Strategic Energy Mgmt	WhiteBldg: Com.MKT	Wholesale	Warehouse	Revo	12.0	\$2,302	146,202	27,000
Overall Total						\$2,188,471	28,822,242	1,975,401

Indiana Michigan Power Company
EE Plan
2024 C&I Program Measures

Indiana Michigan Power Company
Circuit No. 0204
Estimote No. 88-3 (JCW-9)
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Witness: J.C. Walter

IRP Bundle Selection 2024	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2024 Rebate Cost	2024 Energy Savings (kWh)	2024 DER Peak Demand Savings (kW)
Work Custon	Advanced Roofing Controls	Cooling	Education	Reto	18.0	18,858	91,229	0.269
			Food Sales	Reto	18.0	1,841	537	0.001
			Health	Reto	18.0	18,727	48,274	22.589
Air Side Economizer	Cooling	Health	Reto	18.0	1,496	1,599	4,245	0.000
		Other	Reto	18.0	1,496	1,599	4,245	0.000
		Food Sales	Reto	18.0	11,242	10,088	122,381	0.000
		Health	Reto	18.0	11,242	10,088	122,381	0.000
		Other	Reto	18.0	11,242	10,088	122,381	0.000
		Food Sales	Reto	18.0	11,242	10,088	122,381	0.000
		Health	Reto	18.0	11,242	10,088	122,381	0.000
		Other	Reto	18.0	11,242	10,088	122,381	0.000
		Food Sales	Reto	18.0	11,242	10,088	122,381	0.000
		Health	Reto	18.0	11,242	10,088	122,381	0.000
		Other	Reto	18.0	11,242	10,088	122,381	0.000
		Bare Section Line	Refrigeration	Food Sales	Reto	18.0	11,022	13,883
Health	Reto			18.0	11,022	13,883	0.000	0.000
Other	Reto			18.0	11,022	13,883	0.000	0.000
Food Sales	Reto			18.0	11,022	13,883	0.000	0.000
Health	Reto			18.0	11,022	13,883	0.000	0.000
Other	Reto			18.0	11,022	13,883	0.000	0.000
Food Sales	Reto			18.0	11,022	13,883	0.000	0.000
Health	Reto			18.0	11,022	13,883	0.000	0.000
Other	Reto			18.0	11,022	13,883	0.000	0.000
Food Sales	Reto			18.0	11,022	13,883	0.000	0.000
Health	Reto			18.0	11,022	13,883	0.000	0.000
Controlled Chiller - Average kW/Ton + 0.25	Cooling			Warehouse	ROB	18.0	5,546	7,239
		Health	ROB	20.0	18,055	24,753	11.023	0.000
		Other	ROB	20.0	18,055	24,753	11.023	0.000
		Warehouse	ROB	18.0	5,546	7,239	0.815	0.000
		Health	ROB	18.0	5,546	7,239	0.815	0.000
		Other	ROB	18.0	5,546	7,239	0.815	0.000
Copper V-Box	Motors	Warehouse	ROB	18.0	1,571	4,547	0.057	0.000
		Health	ROB	18.0	1,571	4,547	0.057	0.000
		Other	ROB	18.0	1,571	4,547	0.057	0.000
		Warehouse	ROB	18.0	1,571	4,547	0.057	0.000
		Health	ROB	18.0	1,571	4,547	0.057	0.000
		Other	ROB	18.0	1,571	4,547	0.057	0.000
Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	Cooling	Warehouse	ROB	18.0	18,261	20,277	3,225	0.000
		Health	ROB	18.0	18,261	20,277	3,225	0.000
		Other	ROB	18.0	18,261	20,277	3,225	0.000
		Warehouse	ROB	18.0	18,261	20,277	3,225	0.000
		Health	ROB	18.0	18,261	20,277	3,225	0.000
		Other	ROB	18.0	18,261	20,277	3,225	0.000
Compressed Air - Custom	Compressed Air	Warehouse	ROB	18.0	13,185	42,213	30.981	0.000
		Health	ROB	18.0	13,185	42,213	30.981	0.000
		Other	ROB	18.0	13,185	42,213	30.981	0.000
		Warehouse	ROB	18.0	13,185	42,213	30.981	0.000
		Health	ROB	18.0	13,185	42,213	30.981	0.000
		Other	ROB	18.0	13,185	42,213	30.981	0.000
Compress Refurb	Refrigeration	Warehouse	ROB	18.0	3,339	3,283	0.001	0.000
		Health	ROB	18.0	11,765	23,798	10.384	0.000
		Other	ROB	18.0	11,765	23,798	10.384	0.000
		Warehouse	ROB	18.0	3,339	3,283	0.001	0.000
		Health	ROB	18.0	3,339	3,283	0.001	0.000
		Other	ROB	18.0	3,339	3,283	0.001	0.000
Computer Room Air Conditioner Economizer	PlugLeads_Office	Warehouse	ROB	18.0	16,471	49,747	14.448	0.000
		Health	ROB	18.0	16,471	49,747	14.448	0.000
		Other	ROB	18.0	16,471	49,747	14.448	0.000
		Warehouse	ROB	18.0	16,471	49,747	14.448	0.000
		Health	ROB	18.0	16,471	49,747	14.448	0.000
		Other	ROB	18.0	16,471	49,747	14.448	0.000
Data Center Hot/Cold Aisle Configuration	PlugLeads_Office	Warehouse	ROB	18.0	11,551	15,353	0.000	0.000
		Health	ROB	18.0	11,551	15,353	0.000	0.000
		Other	ROB	18.0	11,551	15,353	0.000	0.000
		Warehouse	ROB	18.0	11,551	15,353	0.000	0.000
		Health	ROB	18.0	11,551	15,353	0.000	0.000
		Other	ROB	18.0	11,551	15,353	0.000	0.000
Efficient Air Compressor Controls	Compressed Air	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Air Compressor Equipment	Compressed Air	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Air Compressor	Compressed Air	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient HVAC	HVAC	Agriculture	ROB	18.0	1,104	1,088	0.000	0.000
		Food Sales	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Food Sales	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
Efficient HVAC Equipment	HVAC	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Lighting O&M	Lighting	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Motor Pkg Equipment - OI Cast	Motors	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Motor Pkg Equipment - OI Cast	Motors	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Motor Pkg Equipment - OI Cast	Motors	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Other Facility Process O&M	Other Process	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Process Heat Equipment	Process Heat	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Process Heat O&M	Process Heat	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Efficient Refrigeration Equipment	Refrigeration	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
Energy Recovery Ventilator	Cooling	Warehouse	ROB	18.0	1,104	1,088	0.000	0.000
		Health	ROB	18.0	1,104	1,088	0.000	0.000
		Other	ROB	18.0	1,104	1,088	0.000	0.000
		Warehouse	ROB					

Indiana Michigan Power Company
 EE Plan
 2024 C&I Program Measures

Indiana Michigan Power Company
 Circuit No. 0265
 Exhibit No. 86-19 (JCW-19)
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 Witness: J.C. Walter

IRP Bundle Selection 2024	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2024 Rate/Cost	2024 Energy Savings (MMWh)	2024 DRP Peak Demand Savings (MW)
Work Custom	Advanced Section Controls Server Chiller - Average kWh/ton = 0.875	Refrigeration	Warehouse	Retro	15.0	\$1,110	14,793	0.340
				LED	20.0	\$114	1,227	1,471
				ROB	20.0	\$72	937	0.923
	Server Virtualization	Plug/Loads_Office	Office	ROB	20.0	\$2,168	26,166	28,123
				Education	15.0	\$1,203	16,065	1,821
				Health	15.0	\$177	2,128	372
	Smart Power Strip - Commercial Use	Plug/Loads_Office	Office	Retro	15.0	\$2,388	31,028	3,826
				Warehouse	15.0	\$536	7,419	0.846
				Education	5.0	\$366	491,696	46,679
				Food Service	5.0	\$582	8,025	0.663
Health				5.0	\$2,709	36,114	3,985	
Other				5.0	\$11,424	151,160	15,266	
Office				5.0	\$72,324	972,455	93,268	
Other				5.0	\$24,327	326,249	39,842	
Retail				5.0	\$1,267	17,222	1,923	
Warehouse				5.0	\$16,653	226,444	18,714	
Strip Curtains	Refrigeration	Warehouse	Education	4.0	\$2,845	39,206	6,164	
			Food Service	4.0	\$3,320	45,145	6,920	
			Food Service	4.0	\$1,124	15,164	2,366	
			Health	4.0	\$582	7,811	1,265	
			Logging	4.0	\$492	6,612	1,011	
			Office	4.0	\$1,464	19,816	3,101	
			Other	4.0	\$4,024	53,240	8,269	
			Retail	4.0	\$2,383	32,088	4,938	
			Warehouse	4.0	\$8,268	109,170	16,260	
			Education	10.0	\$1,023	14,040	0,737	
Vending Machine Controller - Refrigerated	Miscellaneous	Warehouse	Food Service	10.0	\$27	355	0,019	
			Food Service	10.0	\$207	2,850	0,209	
			Health	10.0	\$462	6,134	0,362	
			Logging	10.0	\$208	2,805	0,209	
			Office	10.0	\$2,122	28,427	1,492	
			Other	10.0	\$1,162	15,765	1,267	
			Retail	10.0	\$1,774	23,671	1,404	
			Warehouse	10.0	\$8,203	110,668	8,221	
			Industrial	11.0	\$20,943	179,623	20,737	

Indiana Michigan Power Company
EE Plan
2024 C&I Program Measures

IRP Bundle Selection 2024	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2024 Rebate Cost	2024 Energy Savings (kWh)	2024 \$/kWh Demand Savings (\$/kW)
Work Prescriptions	Daylighting Controls	InteriorLighting	Health	Reno	12.8	13,053	14,145	15,956
			Lodging	Reno	12.8	1,206	1,220	1,625
			Office	Reno	12.8	57,462	101,301	38,955
	DLamp Fluorescent Fixture Average Lamp Wattage 20W	InteriorLighting	Warehouse	Reno	12.8	50,752	212,073	45,225
			Other	Reno	12.8	508,330	77,220	13,258
			Food Sales	Reno	15.8	1,182	4,497	6,868
			Health	Reno	15.8	52,381	57,982	16,641
			Lodging	Reno	15.8	4,162	4,162	7,163
			Office	Reno	15.8	16,263	146,750	28,729
			Other	Reno	15.8	18,742	126,122	22,811
			Education	Reno	15.8	10,140	146,491	77,426
			Food Service	Reno	15.8	13,028	48,370	4,529
			Health	Reno	15.8	15,826	128,340	28,319
			Lodging	Reno	15.8	21,850	4,326	4,326
			Office	Reno	15.8	524,525	326,090	10,351
Other	Reno	15.8	508,330	377,813	77,426			
Dishwasher Low Temp Dost (Energy Star)	Cooking	Retail	Reno	15.8	10,768	69,416	4,416	
		Warehouse	Reno	15.8	53,153	42,039	6,787	
		Food Service	ROB	15.8	1,116	3,846	3,766	
		Health	ROB	15.8	1,317	10,899	6,667	
		Lodging	ROB	15.8	1,116	2,854	2,854	
		Office	ROB	15.8	1,116	5,182	3,448	
		Other	ROB	15.8	1,116	8,776	5,448	
		Retail	ROB	15.8	1,116	3,394	3,347	
		Warehouse	ROB	15.8	1,116	2,100	2,100	
		Food Service	ROB	15.8	2,201	7,207	5,158	
		Health	ROB	15.8	1,116	28,204	1,760	
		Lodging	ROB	15.8	1,116	7,466	6,116	
		Office	ROB	15.8	1,116	4,880	3,201	
		Other	ROB	15.8	1,116	11,111	6,111	
		Display Case Door Retrofit, Low Temp	Refrigeration	Education	Reno	12.8	1,236	5,890
Food Service	Reno			12.8	1,116	3,100	4,660	
Health	Reno			12.8	1,116	10,978	2,684	
Lodging	Reno			12.8	1,116	4,028	6,628	
Office	Reno			12.8	1,116	1,000	6,172	
Retail	Reno			12.8	1,116	1,125	1,256	
Warehouse	Reno			12.8	1,116	10,115	1,256	
Food Service	Reno			12.8	1,116	11,497	1,496	
Health	Reno			12.8	1,116	11,497	1,496	
Lodging	Reno			12.8	1,116	11,497	1,496	
Office	Reno			12.8	1,116	11,281	1,783	
Other	Reno			12.8	1,116	32,218	5,140	
Education	Reno			12.8	1,116	7,720	1,220	
Lodging	Reno			12.8	1,116	2,587	3,330	
Office	Reno			12.8	1,116	19,725	3,125	
Retail	Reno	12.8	1,116	28,769	4,221			
Warehouse	Reno	12.8	1,116	18,145	2,965			
Food Service	Reno	12.8	1,116	21,068	2,726			
Health	Reno	12.8	1,116	18,348	2,888			
Lodging	Reno	12.8	1,116	362,460	41,331			
Office	Reno	12.8	1,116	64,427	9,223			
Education	Reno	15.8	1,116	11,714	1,416			
Food Service	Reno	15.8	1,116	3,950	6,007			
Health	Reno	15.8	1,116	20,440	3,326			
Lodging	Reno	15.8	1,116	2,424	3,761			
Office	Reno	15.8	1,116	1,356	5,213			
Other	Reno	15.8	1,116	12,773	1,966			
Retail	Reno	15.8	1,116	18,469	2,021			
Warehouse	Reno	15.8	1,116	20,066	2,726			
Food Service	Reno	15.8	1,116	49,458	4,419			
Health	Reno	15.8	1,116	3,211	3,168			
Lodging	Reno	15.8	1,116	6,411	4,191			
Office	Reno	15.8	1,116	3,301	1,011			
Other	Reno	15.8	1,116	8,817	2,817			
Retail	Reno	15.8	1,116	25,728	2,811			
Warehouse	Reno	15.8	1,116	30,800	7,724			
Food Service	Reno	15.8	1,116	28,950	3,301			
Health	Reno	15.8	1,116	105,801	10,928			
Lodging	Reno	15.8	1,116	1,462	1,123			
Office	Reno	15.8	1,116	1,765	0,126			
Other	Reno	15.8	1,116	22,254	1,320			
Retail	Reno	15.8	1,116	1,494	2,260			
Warehouse	Reno	15.8	1,116	1,494	0,119			
Food Service	Reno	15.8	1,116	3,727	3,230			
Health	Reno	15.8	1,116	1,494	0,116			
Education	ROB	7.8	11,274	26,469	9,662			
Food Service	ROB	7.8	1,116	6,261	8,460			
Health	ROB	7.8	1,116	4,760	6,119			
Lodging	ROB	7.8	1,116	2,937	6,119			
Office	ROB	7.8	1,116	20,269	6,622			
Other	ROB	7.8	1,116	21,889	8,267			
Retail	ROB	15.8	1,116	2,697	2,281			
Warehouse	ROB	15.8	1,116	4,44	0,114			
Food Service	ROB	15.8	1,116	1,116	0,114			
Health	ROB	15.8	1,116	1,666	0,110			
Lodging	ROB	15.8	1,116	1,116	0,114			
Office	ROB	15.8	1,116	3,823	3,368			
Other	ROB	15.8	1,116	2,872	0,750			
Retail	ROB	15.8	1,116	3,727	0,230			
Warehouse	ROB	15.8	1,116	4,377	0,260			
Food Service	ROB	15.8	1,116	2,306	0,261			
Health	ROB	15.8	1,116	1,441	0,261			
Lodging	ROB	15.8	1,116	3,101	0,262			
Office	ROB	15.8	1,116	1,020	0,262			
Other	ROB	15.8	1,116	7,665	0,875			
Retail	ROB	15.8	1,116	1,44	1,44			
Warehouse	ROB	15.8	1,116	2,272	0,821			
Food Service	ROB	15.8	1,116	1,821	0,821			
Health	ROB	15.8	1,116	1,725	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	2,272	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945	0,821			
Health	ROB	15.8	1,116	1,945	0,821			
Lodging	ROB	15.8	1,116	1,945	0,821			
Office	ROB	15.8	1,116	1,945	0,821			
Other	ROB	15.8	1,116	1,945	0,821			
Retail	ROB	15.8	1,116	1,945	0,821			
Warehouse	ROB	15.8	1,116	1,945	0,821			
Food Service	ROB	15.8	1,116	1,945</				

Indiana Michigan Power Company
EE Plan
2024 C&I Program Measures

Indiana Michigan Power Company
Client No. 0166
Estimate No. 86-1 (JCW-19)
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Witness: J.C. Walter

IRP Bundle Selection 2024	Measure Name	End Use	Building Type	Replacement Type	Measure Life	2024 Rebate Cost	2024 Energy Savings (MMWh)	2024 BIP Peak Demand Savings (kW)		
Work Prescriptions	LED high bay fixture	InteriorLighting	Office	Ratio	12.0	5309	5,727	2,139		
				Warehouse	Ratio	12.0	11,759	46,987	9,893	
				Education	Ratio	12.0	1204	5,820	2,198	
				Food Sales	Ratio	12.0	59	233	0.057	
				Health	Ratio	12.0	2220	11,147	1,127	
				Lighting	Ratio	12.0	238	120	0.160	
				Office	Ratio	12.0	5430	10,759	2,386	
				Other	Ratio	12.0	16,969	26,146	4,416	
				Warehouse	Ratio	12.0	11,960	48,760	10,942	
				Education	Ratio	12.0	12,793	69,526	19,993	
				Food Service	Ratio	12.0	174	1,847	0.000	
				Health	Ratio	12.0	2597	22,427	0.000	
LED Mogul-base HID Lamp Replacing Exterior HID (existing W-20)	ExteriorLighting	Warehouse	Ratio	12.0	220,823	8,423	0.000			
			Other	Ratio	12.0	2,646	21,221	0.000		
			Education	Ratio	12.0	10,103	18,813	0.000		
			Food Sales	Ratio	12.0	597	1,892	0.000		
			Food Service	Ratio	12.0	1414	9,447	0.000		
			Health	Ratio	12.0	614	9,447	0.000		
			Lighting	Ratio	12.0	5320	1,992	0.000		
			Office	Ratio	12.0	10,240	58,002	0.000		
			Other	Ratio	12.0	12,024	228,843	0.000		
			Retail	Ratio	12.0	2774	19,348	0.000		
			Warehouse	Ratio	12.0	12,011	77,772	0.000		
			LED Mogul-base HID Lamp Replacing Exterior HID (existing W230)	ExteriorLighting	Education	Ratio	12.0	599	17,409	3,828
Warehouse	Ratio	12.0				117	423	0.000		
Health	Ratio	12.0				317	1,056	2,861		
Lighting	Ratio	12.0				533	1,216	0.290		
Food Service	Ratio	12.0				1,105	1,256	0.000		
Other	Ratio	12.0				11,816	49,816	10,016		
Warehouse	Ratio	12.0				12,612	69,307	18,830		
Education	Ratio	12.0				1712	18,077	3,975		
Food Sales	Ratio	12.0				191	476	0.000		
Health	Ratio	12.0				336	8,506	2,123		
Lighting	Ratio	12.0				550	1,060	0.301		
Office	Ratio	12.0				2,811	20,275	4,429		
LED outdoor pole decorative fixture (existing W230)	ExteriorLighting	Warehouse	Ratio	12.0	11,865	47,386	10,421			
			Education	Ratio	12.0	10,751	57,772	20,621		
			Warehouse	Ratio	12.0	597	60,360	0.000		
			Food Sales	Ratio	12.0	1,400	1,194	0.000		
			Food Service	Ratio	12.0	1,400	28,447	0.000		
			Health	Ratio	12.0	5320	7,960	0.000		
			Lighting	Ratio	12.0	10,224	20,843	0.000		
			Other	Ratio	12.0	2774	23,348	0.000		
			Warehouse	Ratio	12.0	12,311	72,772	0.000		
			Education	Ratio	6.0	379	1,182	0.000		
			Food Service	Ratio	6.0	1,441	1,920	0.000		
			LED parking garage fixture (existing W-230)	ExteriorLighting	Warehouse	Ratio	6.0	2,594	24,059	0.000
Education	Ratio	6.0				2,217	6,413	0.000		
Health	Ratio	6.0				2,028	69,075	0.000		
Other	Ratio	6.0				28,464	236,608	0.000		
Warehouse	Ratio	6.0				12,420	60,720	0.000		
Food Service	Ratio	6.0				2,762	30,760	0.000		
Health	Ratio	6.0				1,407	1,407	0.000		
Lighting	Ratio	6.0				1,332	1,692	0.000		
Office	Ratio	6.0				5,110	20,447	0.000		
Other	Ratio	6.0				12,240	58,002	0.000		
Retail	Ratio	6.0				10,224	228,843	0.000		
LED parking lot fixture (existing W230)	ExteriorLighting	Warehouse				Ratio	6.0	2,774	19,348	0.000
			Education	Ratio	6.0	2,211	72,772	0.000		
			Warehouse	Ratio	6.0	597	1,892	0.000		
			Food Sales	Ratio	6.0	1,414	9,447	0.000		
			Food Service	Ratio	6.0	1,414	9,447	0.000		
			Health	Ratio	6.0	614	9,447	0.000		
			Lighting	Ratio	6.0	5320	1,992	0.000		
			Office	Ratio	6.0	10,240	58,002	0.000		
			Other	Ratio	6.0	12,024	228,843	0.000		
			Retail	Ratio	6.0	2774	19,348	0.000		
			Warehouse	Ratio	6.0	12,011	77,772	0.000		
			LED parking lot fixture (existing W-230)	ExteriorLighting	Education	Ratio	12.0	599	69,208	0.000
Warehouse	Ratio	12.0				117	1,847	0.000		
Health	Ratio	12.0				317	10,741	0.000		
Lighting	Ratio	12.0				533	1,216	0.000		
Food Service	Ratio	12.0				1,105	1,256	0.000		
Other	Ratio	12.0				11,816	49,816	0.000		
Warehouse	Ratio	12.0				12,612	69,307	0.000		
Education	Ratio	12.0				1712	18,077	3,975		
Food Sales	Ratio	12.0				191	476	0.000		
Health	Ratio	12.0				336	8,506	2,123		
Lighting	Ratio	12.0				550	1,060	0.301		
Office	Ratio	12.0				2,811	20,275	4,429		
LED Streetlighting LED T8 Tube Replacement	ExteriorLighting	Warehouse	Ratio	20.0	504,157	1,268,795	0.000			
			Education	Ratio	20.0	674,786	888,410	100,804		
			Food Sales	Ratio	18.0	12,243	50,078	6,839		
			Health	Ratio	18.0	1,271,828	897,711	80,887		
			Lighting	Ratio	18.0	1,400	1,194	6,375		
			Other	Ratio	18.0	2,217	120,868	214,389		
			Warehouse	Ratio	18.0	10,751	150,808	103,972		
			Food Service	Ratio	18.0	97,044	1,401,068	116,844		
			Health	Ratio	18.0	2,217	24,059	49,897		
			Lighting	Ratio	18.0	1,400	18,201	2,975		
			Other	Ratio	18.0	1,011	10,068	2,767		
			Warehouse	Ratio	18.0	1,011	528,811	82,323		
LED troffer, 2'x2' and 2'x4'	InteriorLighting	Warehouse	Ratio	18.0	117,322	433,061	79,225			
			Education	Ratio	18.0	220,623	318,327	149,815		
			Warehouse	Ratio	18.0	10,220	10,123	27,653		
			Food Sales	Ratio	18.0	2,201	1,792	1,788		
			Education	Ratio	18.0	19,800	127,251	22,220		
			Warehouse	Ratio	18.0	1,400	1,194	6,375		
			Other	Ratio	18.0	11,218	30,020	38,880		
			Warehouse	Ratio	18.0	110,457	281,421	48,004		
			Education	Ratio	18.0	12,664	67,329	0.000		
			Food Sales	Ratio	18.0	971	1,792	0.000		
			Food Service	Ratio	18.0	1,414	10,411	0.000		
			Health	Ratio	18.0	1,400	21,521	0.000		
Low Flow Pesticide Sprayers	Hullifier	Warehouse	Ratio	6.0	1,100	2,400	0.521			
			Health	Ratio	6.0	523	568	0.114		
			Office	Ratio	6.0	523	568	0.114		
			Other	Ratio	6.0	4,119	1,414	0.419		
			Warehouse	Ratio	6.0	1,100	2,400	0.521		
			Education	Ratio	6.0	10,133	110,220	20,262		
			Food Service	Ratio	6.0	11,488	19,329	3,575		
			Health	Ratio	6.0	10,568	97,232	17,784		
			Lighting	Ratio	6.0	1,992	10,162	2,229		
			Other	Ratio	6.0	114,485	228,089	41,355		
			Retail	Ratio	6.0	11,248	220,427	11,811		
			LED troffer, 2'x2' and 2'x4'	InteriorLighting	Warehouse	Ratio	6.0	18,555	30,562	16,478
Education	Ratio	6.0				1,011	21,808	31,218		
Warehouse	Ratio	6.0				14,907	101,907	4,748		
Food Sales	Ratio	6.0				3,300	1,524	0.306		
Health	Ratio	6.0				14,300	164,427	4,113		
Lighting	Ratio	6.0				14,441	15,960	6,114		
Office	Ratio	6.0				110,720	280,888	10,276		
Other	Ratio	6.0				103,178	287,880	8,752		
Warehouse	Ratio	6.0				112,497	330,890	11,862		
Education	Ratio	6.0				103,646	428,274	18,419		
Food Sales	Ratio	6.0				1,997	10,100	2,842		
Food Service	Ratio	6.0				28,792	128,388	21,173		
Health	Ratio	6.0	18,274	426,010	10,688					
Lighting	Ratio	6.0	16,761	19,179	4,404					
Other	Ratio	6.0	16,761	158,213	24,468					
Retail	Ratio	6.0	188,837	1,291,193	21,238					
Pump and Fan Variable Frequency Drive Controls (Pumps)	Motors	Warehouse	Ratio	15.0	108,549	127,522	26,747			
			Education	Ratio	15.0	108,228	120,778	25,491		
			Warehouse	Ratio	15.0	57	50	0.019		
			Food Service	Ratio	15.0	112,224	100,389	34,445		
			Health	Ratio	15.0	1794	10,264	2,221		
			Lighting	Ratio	15.0	10,071	76,865	10,759		
			Other	Ratio	15.0	12,778	20,348	10,211		
			Office	Ratio	15.0	2,095	1,405	0.718		
			Warehouse	Ratio	15.0	12,787	36,897	7,778		
			Food Sales	Ratio	15.0	211	1,174	0.205		
			Food Service	Ratio	15.0	1,100	1,716	1,123		
			Health	Ratio	15.0	1,111	1,111	0.797		
Smart Thermostat	Cooling	Warehouse	Ratio	15.0	536	584	0.072			
			Health	Ratio	15.0	1,103	4,070	0,471		
			Office	Ratio	15.0	1,236	3,003	0,862		
			Retail	Ratio	15.0	1,330	2,786	0,924		
			Warehouse	Ratio	15.0	1,224	1,603	0,647		
			Education	Ratio	15.0	1,107	3,830	0,000		
			Food Sales	Ratio	15.0	31	41	0,000		
			Food Service	Ratio	15.0	1,400	14,000	0,000		
			Health	Ratio	15.0	597	3,170	0,000		
			Lighting	Ratio	15.0	512	300	0,000		
			Office	Ratio	15.0	666	46,193	0,000		
			Retail	Ratio	15.0	10,720	107,211	0,000		
Variable Speed Condenser Fan	Refrigeration	Warehouse	Ratio	15.0	1,107	12,243	0,000			
			Education	Ratio	15.0	10,071	23,446	0,000		
			Warehouse	Ratio	15.0	12,548	20,520	0,000		
			Food Sales	Ratio	15.0	10,005	27,472	0,000		
			Health	Ratio	15.0	1,561	1,520	0,000		
			Lighting	Ratio	15.0	1,368	1,378	0,000		
			Office	Ratio	15.0	1,363	16,185	0,000		
			Other	Ratio	15.0	1,400	49,899	0,000		
			Retail	Ratio	15.0	11,100	19,618	0,000		
			Warehouse	Ratio	15.0	1,368	11,011	0,000		
			Education	Ratio	15.0	12,075	34,338	8,524		
			Whole-Bldg - Com NC	Whole Building_NC	Food Sales	Ratio	12.0	11,147	16,288	2,906
Health	Ratio	12.0				11,864	24,715	4,686		
Lighting	Ratio	12.0				3,300	3,196	0,997		
Office	Ratio	12.0				14,663	62,039	11,788		
Other	Ratio	12.0				16,167	82,227	15,623		
Retail	Ratio	12.0				13,262	16,122	3,445		
Warehouse	Ratio	12.0				12,033	19,358	7,180		
Education	Ratio	12.0				11,100	44,966	11,100		
Food Sales	Ratio	12.0				1,721	17,884	8,658		
Food Service	Ratio	12.0				1,414	10,000	16,443		
Health	Ratio	12.0				1,254	6,310	3,029		
Lighting	Ratio	12.0				12,243	85,438	28,121		
Work Strategic Energy Mgmt	Building Operator Certification	Warehouse	Ratio	18.0	12,112	100,800	92,205			
			Education	Ratio	18.0	10,071	20,348	9,817		
			Warehouse	Ratio	18.0	10,071	20,300	9,975		
			Food Sales	Ratio	3.0	530	1,071	1,660		
			Health	Ratio	3.0	1,104	6,820	0,726		
			Lighting	Ratio	3.0	1,224	10,072	1,250		
			Other	Ratio	3.0	547	3,321	0,235		
			Warehouse	Ratio	3.0	1,400	14,000	0,000		
			Food Service	Ratio	3.0	1,742	36,485	4,012		
			Retail	Ratio	3.0	1,504	1,603	0,863		
			Whole-Bldg - Com IET	WholeBldg	Warehouse	Ratio	3.0	1,400	14,000	1,400
						Industrial	Ratio	3.0	103,093	1,124,101
Education	Ratio	3.0				10,071	100,500	37,895		
Food Sales	Ratio	3.0				1,400	22,169	4,189		
Food Service	Ratio	3.0				12,112	88,418	18,589		
Health	Ratio	3.0				12,268	143,728	27,348		
Lighting	Ratio	3.0				10,071	30,195	6,739		
Office	Ratio	3.0				10,262	203,145	84,427		
Other	Ratio	3.0				11,100	49,100	11,100		
Retail	Ratio	3.0				12,111	105,400	20,028		
Warehouse	Ratio	3.0				14,400	21,900	9,176		

Indiana Michigan Power Company
EE Plan
2025 C&I Program Measures

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IRP Bundle Selection 2025	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025 Resource	2025 Energy Savings	2025 kW Peak Demand Savings
Workstation	Advanced Heating Controls	Cooling	Education	Refr	10.0	\$8,304	110,416	111,820
			Food Sales	Refr	10.0	855	725	6,323
			Food Service	Refr	10.0	\$1,178	15,088	10,722
			Health	Refr	10.0	\$4,800	\$2,214	28,204
			Health	Refr	10.0	\$621	\$2,214	\$5,311
			Other	Refr	10.0	\$17,024	233,183	153,118
			Retail	Refr	10.0	\$1,201	18,790	7,849
			Warehouse	Refr	10.0	\$1,993	24,966	6,416
			Warehouse	Refr	5.0	\$1,043	13,867	6,000
			Food Sales	Refr	5.0	533	371	0,000
			Food Service	Refr	5.0	\$101	1,366	0,000
Health	Refr	5.0	\$1,439	12,372	6,000			
Longing	Refr	5.0	\$200	1,194	0,000			
Office	Refr	5.0	\$248	3,264	0,000			
Other	Refr	5.0	\$272	3,273	0,000			
Retail	Refr	5.0	\$284	3,264	0,000			
Base Building Line	Refrigeration	Warehouse	Refr	5.0	\$609	11,549	0,000	
		Warehouse	Refr	15.0	\$237	3,144	0,386	
		Food Sales	Refr	15.0	\$411	4,741	0,741	
		Food Service	Refr	15.0	\$454	6,048	0,884	
		Health	Refr	15.0	\$496	6,430	0,963	
		Longing	Refr	15.0	\$64	961	0,000	
		Motors	Refr	15.0	\$414	5,302	0,822	
		Other	Refr	15.0	\$254	4,878	0,823	
		Warehouse	Refr	15.0	\$401	6,320	0,737	
		Education	Refr	20.0	\$2,174	34,324	15,007	
		Health	Refr	20.0	\$2,032	27,339	12,139	
Office	Refr	20.0	\$1,380	22,834	8,224			
Retail	Refr	20.0	\$600	9,100	4,008			
Warehouse	Refr	15.0	\$412	5,496	1,063			
Food Sales	Refr	15.0	\$191	2,601	0,516			
Food Service	Refr	15.0	\$111	1,417	0,314			
Health	Refr	15.0	\$167	2,167	0,460			
Longing	Refr	15.0	\$22	297	0,000			
Office	Refr	15.0	\$1,470	19,761	6,476			
Other	Refr	15.0	\$435	58,732	11,300			
Motors	Refr	15.0	\$223	2,920	0,843			
Warehouse	Refr	15.0	\$1,000	22,328	3,383			
Education	Refr	15.0	\$1,810	4,432	9,280			
Food Sales	Refr	15.0	\$1,303	25,087	10,862			
Motors	Refr	15.0	\$1,322	25,204	8,224			
Health	Refr	15.0	\$360	4,908	2,120			
Longing	Refr	15.0	\$166	1,366	1,111			
Motors	Refr	15.0	\$186	13,444	3,867			
Other	Refr	15.0	\$239	37,338	16,233			
Warehouse	Refr	15.0	\$1,198	15,366	6,416			
Food Sales	Refr	15.0	\$432	5,335	23,114			
Education	Refr	15.0	\$1,100	28,397	10,000			
Health	Refr	15.0	\$108	134,768	0,000			
Office	Refr	15.0	\$423	564,656	0,000			
Warehouse	Refr	15.0	\$935	131,794	0,000			
Education	Refr	15.0	\$1,000	14,480	1,448			
Health	Refr	15.0	\$215	6,865	0,763			
Motors	Refr	15.0	\$240	7,487	2,487			
Warehouse	Refr	15.0	\$211	6,818	0,311			
Food Service	Refr	15.0	\$144,324	962,181	964,734			
Compressed Air	Refr	15.0	\$5,900	72,181	12,274			
Compressed Air	Refr	15.0	\$284	4,474	0,281			
Warehouse	Refr	15.0	\$119	1,426	1,426			
Agriculture	Refr	15.0	\$100	2,237	6,400			
Industrial	Refr	15.0	\$503	788	0,000			
Industrial	Refr	15.0	\$722	963,833	964,638			
Warehouse	Refr	15.0	\$640,919	8,566,584	1,463,280			
Agriculture	Refr	15.0	\$220	36,650	12,203			
Motors	Refr	15.0	\$220	12,218	4,164			
Motors	Refr	15.0	\$220	4,296	2,296			
Warehouse	Refr	15.0	\$1,166	15,366	6,416			
Industrial	Refr	15.0	\$193,791	2,543,863	436,158			
Process Heat	Refr	15.0	\$108,728	1,488,702	248,297			
Industrial	Refr	15.0	\$101,999	1,094,764	147,174			
Process Heat	Refr	15.0	\$143	1,840	1,463			
Warehouse	Refr	15.0	\$169	55,546	12,791			
Agriculture	Refr	20.0	\$22,000	302,170	13,753			
Food Service	Refr	20.0	\$305	5,235	0,495			
Food Service	Refr	20.0	\$6,136	86,481	6,172			
Health	Refr	20.0	\$13,064	202,637	24,819			
Health	Refr	20.0	\$2,240	21,746	2,181			
Other	Refr	20.0	\$32,187	431,043	48,734			
Other	Refr	20.0	\$70,055	923,810	88,132			
Warehouse	Refr	20.0	\$13,166	141,495	11,761			
Health	Refr	20.0	\$153	2,043	0,233			
Office	Refr	15.0	\$460	6,917	1,477			
Warehouse	Refr	15.0	\$149	1,887	0,227			
Education	Refr	15.0	\$3	31	0,006			
Food Service	Refr	15.0	\$1	12	0,002			
Health	Refr	15.0	\$1	24	0,006			
Longing	Refr	15.0	\$1	14	0,002			
Office	Refr	15.0	\$28	302	0,003			
Other	Refr	15.0	\$1	396	0,048			
Retail	Refr	15.0	\$1	6	0,000			
Warehouse	Refr	15.0	\$1	24	0,000			
Education	Refr	15.0	\$337	3,423	0,888			
Food Sales	Refr	15.0	\$1	1	0,000			
Health	Refr	15.0	\$6	80	0,020			
Longing	Refr	15.0	\$1	17	0,004			
Office	Refr	15.0	\$13	177	0,044			
Other	Refr	15.0	\$2	400	0,100			
Dual room energy management system High Efficiency CRAC unit	Whole Building HVAC	Education	Refr	10.0	\$2	44	0,011	
		Longing	Refr	8.0	\$1,000	\$3,373	17,274	
		Education	Refr	10.0	\$610	6,516	0,867	
		Education	Refr	10.0	\$2,171	121,028	16,806	
		Office	Refr	10.0	\$817	121,028	16,806	
		Warehouse	Refr	10.0	\$2,254	30,000	3,849	
		Food Sales	Refr	10.0	\$2	164	0,000	
		Food Service	Refr	10.0	\$2	468	0,218	
		Health	Refr	10.0	\$2	6,826	3,638	
		Health	Refr	10.0	\$16	47,136	49,476	
		Longing	Refr	10.0	\$0	4,376	1,681	
Office	Refr	10.0	\$10	72,736	24,460			
Other	Refr	10.0	\$22	128,847	49,007			
Warehouse	Refr	10.0	\$2	12,440	4,185			
Warehouse	Refr	10.0	\$40	45,850	0,000			
Education	Refr	10.0	\$4,000	22,100	2,200			
Health	Refr	10.0	\$86	1,464	6,433			
Health	Refr	10.0	\$1,148	44,176	4,476			
Longing	Refr	10.0	\$438	5,884	0,218			
Food Sales	Refr	10.0	\$432	5,833	0,179			
Other	Refr	10.0	\$1,100	13,000	1,869			
Warehouse	Refr	10.0	\$1,942	52,538	9,725			
Food Sales	Refr	10.0	\$144	1,820	0,265			
Food Service	Refr	10.0	\$637	12,487	2,312			
Health	Refr	10.0	\$1,607	75,564	13,978			
Longing	Refr	10.0	\$624	10,986	2,033			
Office	Refr	10.0	\$23,128	232,035	41,878			
Retail	Refr	10.0	\$21,028	232,035	44,176			
Warehouse	Refr	10.0	\$2,309	30,791	5,586			
Warehouse	Refr	10.0	\$2,008	26,564	5,000			
Health	Refr	10.0	\$19	476	0,000			
Longing	Refr	10.0	\$13	409	0,000			
Retail	Refr	10.0	\$12	1,487	0,000			
Office	Refr	8.0	\$1,400	119,496	0,000			
Food Sales	Refr	8.0	\$411	1,873	0,000			
Food Service	Refr	8.0	\$624	4,486	0,000			
Health	Refr	8.0	\$411	54,813	0,000			
Longing	Refr	8.0	\$1,000	13,338	0,000			
Office	Refr	8.0	\$17,183	226,307	0,000			
Other	Refr	8.0	\$1,771	10,276	0,000			
Retail	Refr	8.0	\$1,244	16,433	0,000			
Warehouse	Refr	8.0	\$4,404	41,436	0,000			
Food Sales	Refr	8.0	\$33,449	447,968	98,188			
Food Service	Refr	10.0	\$342	52,538	9,725			
Health	Refr	10.0	\$244	1,820	0,265			
Longing	Refr	10.0	\$624	10,986	2,033			
Office	Refr	10.0	\$23,128	232,035	41,878			
Retail	Refr	10.0	\$2,309	30,791	5,586			
Warehouse	Refr	10.0	\$2,008	26,564	5,000			
Health	Refr	10.0	\$19	476	0,000			
Longing	Refr	10.0	\$13	409	0,000			
Retail	Refr	10.0	\$12	1,487	0,000			
Office	Refr	8.0	\$1,400	119,496	0,000			
Food Sales	Refr	8.0	\$411	1,873	0,000			
Food Service	Refr	8.0	\$624	4,486	0,000			
Health	Refr	8.0	\$411	54,813	0,000			
Longing	Refr	8.0	\$1,000	13,338	0,000			
Office	Refr	8.0	\$17,183	226,307	0,000			
Other	Refr	8.0	\$1,771	10,276	0,000			
Retail	Refr	8.0	\$1,244	16,433	0,000			
Warehouse	Refr	8.0	\$4,404	41,436	0,000			
Food Sales	Refr	8.0	\$33,449	447,968	98,188			
Food Service	Refr	10.0	\$342	52,538	9,725			
Health	Refr	10.0	\$244	1,820	0,265			
Longing	Refr	10.0	\$624	10,986	2,033			
Office	Refr	10.0	\$23,128	232,035	41,878			
Retail	Refr	10.0	\$2,309	30,791	5,586			
Warehouse	Refr	10.0	\$2,008	26,564	5,000			
Health	Refr	10.0	\$19	476	0,000			
Longing	Refr	10.0	\$13	409	0,000			
Retail	Refr	10.0	\$12	1,487	0,000			
Office	Refr	8.0	\$1,400	119,496	0,000			
Food Sales	Refr	8.0	\$411	1,873	0,000			
Food Service	Refr	8.0	\$624	4,486	0,000			
Health	Refr	8.0	\$411	54,813	0,000			
Longing	Refr	8.0	\$1,000	13,338	0,000			
Office	Refr	8.0	\$17,183	226,307	0,000			
Other	Refr	8.0	\$1,771	10,276	0,000			
Retail	Refr	8.0	\$1,244	16,433	0,000			
Warehouse	Refr	8.0	\$4,404	41,436	0,000			
Food Sales	Refr	8.0	\$33,449	447,968	98,188			
Food Service	Refr	10.0	\$342	52,538	9,725			
Health	Refr	10.0	\$244	1,820	0,265			
Longing	Refr	10.0	\$624	10,986	2,033			
Office	Refr	10.0	\$23,128	232,035	41,878			
Retail	Refr	10.0	\$2,309	30,791	5,586			
Warehouse	Refr	10.0	\$2,008	26,564	5,000			
Health	Refr	10.0	\$19	476	0,000			
Longing								

Indiana Michigan Power Company
 EE Plan
 2025 C&I Program Measures

Indiana Michigan Power Company
 Case No. 656
 Exhibit No. 84-X (JCW-6)
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 Witness: J.C. Weller

IRP Bundle Selection 2025	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025 Rebate Cost	2025 Energy Savings	2025 IRP Peak Demand Savings (kW)	
Work Direct Install	LED Influx ZKZ and ZXK	Interior Lighting	Retail	Food Service	Repl	18.0	\$4,481	14,847	2,730
				Retail	Repl	18.0	\$28,820	90,106	17,836
Work Midstream	Air Conditioner - 17 SEER (15 Tons)	Cooling	Warehouse	Education	ROB	15.0	\$120	1,205	1,889
				Food Service	ROB	15.0	\$23	231	6,361
Air Conditioner - 17 SEER (15 Tons)	Air Conditioner - 17 SEER (15 Tons)	Cooling	Warehouse	Food Service	ROB	15.0	\$247	3,468	3,874
				Other	ROB	15.0	\$236	3,383	3,797
				Other	ROB	15.0	\$3,086	30,803	30,728
				Retail	ROB	15.0	\$436	4,364	3,159
				Warehouse	ROB	15.0	\$1,496	14,994	29,941
				Education	ROB	15.0	\$102	1,023	1,404
				Food Service	ROB	15.0	\$20	196	0,196
				Food Service	ROB	15.0	\$400	4,000	4,344
				Office	ROB	15.0	\$467	4,670	3,264
				Other	ROB	15.0	\$2,739	27,385	29,976
				Retail	ROB	15.0	\$211	2,106	2,882
				Warehouse	ROB	15.0	\$1,039	10,347	17,028
Air Conditioner - 16 SEER (20 Tons)	Air Conditioner - 16 SEER (20 Tons)	Cooling	Warehouse	Education	ROB	15.0	\$48	4,286	6,873
				Food Service	ROB	15.0	\$1	14	0,033
				Food Service	ROB	15.0	\$75	760	0,847
				Health	ROB	15.0	\$144	1,410	7,344
				Health	ROB	15.0	\$33	329	0,328
				Other	ROB	15.0	\$333	3,324	3,387
				Other	ROB	15.0	\$696	6,946	6,944
				Retail	ROB	15.0	\$81	860	0,864
				Warehouse	ROB	15.0	\$319	3,193	3,846
				Education	ROB	15.0	\$221	2,208	11,201
				Food Service	ROB	15.0	\$5	63	0,067
				Food Service	ROB	15.0	\$14	139	1,418
Air Conditioner - 16 SEER (20 Tons)	Air Conditioner - 16 SEER (20 Tons)	Cooling	Warehouse	Health	ROB	15.0	\$609	6,091	4,207
				Lighting	ROB	15.0	\$56	607	0,600
				Lighting	ROB	15.0	\$609	6,095	6,364
				Other	ROB	15.0	\$1,002	10,020	16,032
				Retail	ROB	15.0	\$100	1,046	1,119
				Warehouse	ROB	15.0	\$141	1,407	4,174
				Education	ROB	15.0	\$319	3,192	6,064
				Food Service	ROB	15.0	\$4	35	0,025

Indiana Michigan Power Company
 EE Plan
 2025 C&I Program Measures

Indiana Michigan Power Company
 Case No. 656
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 Witness: J.C. Walker

IRP Bundle Selection 2025	IRP Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025			2025 Demand Savings (kW)
							Renewable Cost	Energy Savings	Peak Savings	
Workstation	Air Conditioner - 17 SEER (20+ Tons)	Health	ROB	Food Service	ROB	15.0	\$59	293	0.028	1.83
		Education	ROB	Food Service	ROB	15.0	\$25	267	0.246	0.46
		Health	ROB	Food Service	ROB	15.0	\$209	2,284	2.818	1.12
		Other	ROB	Food Service	ROB	15.0	\$19	743	7.463	7.463
		Health	ROB	Food Service	ROB	15.0	\$23	82	0.21	0.43
		Warehouse	ROB	Food Service	ROB	15.0	\$239	2,395	2.714	1.08
		Education	ROB	Food Service	ROB	15.0	\$542	5,421	6.303	2.47
		Food Service	ROB	Food Service	ROB	15.0	\$5	1	0.01	0.01
		Food Service	ROB	Food Service	ROB	15.0	\$101	1,027	1.027	0.26
		Health	ROB	Food Service	ROB	15.0	\$24	494	2.064	0.83
		Other	ROB	Food Service	ROB	15.0	\$47	470	4.417	1.76
		Other	ROB	Food Service	ROB	15.0	\$173	17,720	12.674	4.98
Air Conditioner - 18 SEER (20+ Tons)	Warehouse	ROB	Food Service	ROB	15.0	\$15	138	0.033	0.13	
	Warehouse	ROB	Food Service	ROB	15.0	\$407	4,087	4.644	1.82	
	Education	ROB	Food Service	ROB	15.0	\$69	6,889	13.622	5.24	
	Food Sals	ROB	Food Service	ROB	15.0	\$11	37	0.007	0.03	
	Health	ROB	Food Service	ROB	15.0	\$61	1,614	1.708	0.67	
	Health	ROB	Food Service	ROB	15.0	\$44	491	4.194	1.66	
	Health	ROB	Food Service	ROB	15.0	\$67	671	0.689	0.27	
	Other	ROB	Food Service	ROB	15.0	\$1,687	16,872	7.689	3.00	
	Warehouse	ROB	Food Service	ROB	15.0	\$1,148	11,148	11.141	4.34	
	Education	ROB	Food Service	ROB	15.0	\$361	3,610	7.443	2.90	
	Education	ROB	Food Service	ROB	15.0	\$852	8,518	15.422	5.91	
	Food Sals	ROB	Food Service	ROB	15.0	\$11	109	0.076	0.29	
Air Conditioner - 19 SEER (20+ Tons)	Warehouse	ROB	Food Service	ROB	15.0	\$133	1,837	1.933	0.74	
	Health	ROB	Food Service	ROB	15.0	\$70	7,005	5.577	2.15	
	Education	ROB	Food Service	ROB	15.0	\$76	701	0.707	0.27	
	Health	ROB	Food Service	ROB	15.0	\$1,244	12,441	8.700	3.33	
	Other	ROB	Food Service	ROB	15.0	\$2,308	23,088	22.096	8.48	
	Health	ROB	Food Service	ROB	15.0	\$20	2,001	1.500	0.56	
	Warehouse	ROB	Food Service	ROB	15.0	\$714	7,170	4.277	1.61	
	Education	ROB	Food Service	ROB	15.0	\$361	3,361	2.302	0.88	
	Food Sals	ROB	Food Service	ROB	15.0	\$26	257	0.179	0.07	
	Food Service	ROB	Food Service	ROB	15.0	\$484	4,484	4.084	1.55	
	Office	ROB	Food Service	ROB	15.0	\$599	5,591	4.227	1.60	
	Other	ROB	Food Service	ROB	15.0	\$2,323	23,230	33.076	12.58	
Air Conditioner - 21 SEER (20+ Tons)	Warehouse	ROB	Food Service	ROB	15.0	\$486	4,838	3.516	1.34	
	Warehouse	ROB	Food Service	ROB	15.0	\$2,122	21,119	22.676	8.67	
	Education	ROB	Food Service	ROB	15.0	\$1,106	11,060	17.347	6.59	
	Food Sals	ROB	Food Service	ROB	15.0	\$22	22	0.001	0.00	
	Health	ROB	Food Service	ROB	15.0	\$209	2,095	2.717	1.04	
	Health	ROB	Food Service	ROB	15.0	\$466	4,463	4.114	1.57	
	Health	ROB	Food Service	ROB	15.0	\$44	444	0.444	0.17	
	Office	ROB	Food Service	ROB	15.0	\$1,384	13,845	9.787	3.66	
	Other	ROB	Food Service	ROB	15.0	\$1,148	11,148	11.141	4.34	
	Retail	ROB	Food Service	ROB	15.0	\$236	2,363	1.710	0.65	
	Warehouse	ROB	Food Service	ROB	15.0	\$920	9,200	8.479	3.21	
	Education	ROB	Food Service	ROB	15.0	\$1,076	10,762	16.873	6.36	
Food Service	ROB	Food Service	ROB	15.0	\$12	120	0.083	0.03		
Health	ROB	Food Service	ROB	15.0	\$200	2,000	2.117	0.80		
Health	ROB	Food Service	ROB	15.0	\$642	6,425	5.843	2.21		
Health	ROB	Food Service	ROB	15.0	\$81	822	0.828	0.31		
Health	ROB	Food Service	ROB	15.0	\$1,347	13,466	15.108	5.71		
Other	ROB	Food Service	ROB	15.0	\$2,326	23,226	25.108	9.48		
Retail	ROB	Food Service	ROB	15.0	\$230	2,298	1.483	0.56		
Warehouse	ROB	Food Service	ROB	15.0	\$714	7,170	4.277	1.61		
Education	ROB	Food Service	ROB	15.0	\$361	3,361	2.302	0.88		
Food Sals	ROB	Food Service	ROB	15.0	\$26	257	0.179	0.07		
Food Service	ROB	Food Service	ROB	15.0	\$484	4,484	4.084	1.55		
Office	ROB	Food Service	ROB	15.0	\$599	5,591	4.227	1.60		
Other	ROB	Food Service	ROB	15.0	\$2,323	23,230	33.076	12.58		
Geothermal HP - SEER 23.1 (5 Tons)	Warehouse	ROB	Food Service	ROB	15.0	\$2,434	24,338	28.205	10.73	
	Education	ROB	Food Service	ROB	15.0	\$8	81	0.023	0.01	
	Food Sals	ROB	Food Service	ROB	15.0	\$8	78	0.021	0.01	
	Food Service	ROB	Food Service	ROB	15.0	\$18	176	0.242	0.09	
	Health	ROB	Food Service	ROB	15.0	\$16	16	0.004	0.00	
	Other	ROB	Food Service	ROB	15.0	\$108	1,037	0.488	0.18	
	Warehouse	ROB	Food Service	ROB	15.0	\$76	767	0.767	0.29	
	Food Sals	ROB	Food Service	ROB	15.0	\$5	117	0.073	0.03	
	Food Service	ROB	Food Service	ROB	15.0	\$9	172	0.128	0.05	
	Health	ROB	Food Service	ROB	15.0	\$12	282	0.173	0.06	
	Health	ROB	Food Service	ROB	15.0	\$6	114	0.084	0.03	
	Office	ROB	Food Service	ROB	15.0	\$115	2,729	1.672	0.63	
Other	ROB	Food Service	ROB	15.0	\$22	2,687	1.911	0.72		
Retail	ROB	Food Service	ROB	15.0	\$7	74	0.200	0.07		
Warehouse	ROB	Food Service	ROB	15.0	\$11	105	0.160	0.06		
Food Sals	ROB	Food Service	ROB	15.0	\$6	10	0.014	0.00		
Health	ROB	Food Service	ROB	15.0	\$7	68	0.074	0.03		
Health	ROB	Food Service	ROB	15.0	\$11	128	0.082	0.03		
Health	ROB	Food Service	ROB	15.0	\$6	48	0.077	0.03		
Office	ROB	Food Service	ROB	15.0	\$110	1,249	0.798	0.30		
Other	ROB	Food Service	ROB	15.0	\$112	1,120	0.803	0.30		
Retail	ROB	Food Service	ROB	15.0	\$19	210	0.140	0.05		
Warehouse	ROB	Food Service	ROB	15.0	\$7	74	0.087	0.03		
Education	ROB	Food Service	ROB	15.0	\$19	180	0.027	0.01		
Food Sals	ROB	Food Service	ROB	15.0	\$7	77	0.026	0.01		
Food Service	ROB	Food Service	ROB	15.0	\$8	219	0.033	0.01		
Health	ROB	Food Service	ROB	15.0	\$41	411	0.178	0.07		
Other	ROB	Food Service	ROB	15.0	\$190	1,931	0.489	0.18		
Retail	ROB	Food Service	ROB	15.0	\$39	393	0.198	0.07		
Warehouse	ROB	Food Service	ROB	15.0	\$76	767	0.767	0.29		
Education	ROB	Food Service	ROB	15.0	\$81	1,328	1.286	0.48		
Food Sals	ROB	Food Service	ROB	15.0	\$5	144	0.085	0.03		
Health	ROB	Food Service	ROB	15.0	\$10	281	0.135	0.05		
Health	ROB	Food Service	ROB	15.0	\$13	305	0.022	0.01		
Health	ROB	Food Service	ROB	15.0	\$9	106	0.100	0.04		
Office	ROB	Food Service	ROB	15.0	\$27	4,430	1.568	0.59		
Other	ROB	Food Service	ROB	15.0	\$144	3,465	2.224	0.83		
Health	ROB	Food Service	ROB	15.0	\$22	201	0.161	0.06		
Warehouse	ROB	Food Service	ROB	15.0	\$12	111	0.111	0.04		
Education	ROB	Food Service	ROB	15.0	\$50	497	0.450	0.17		
Food Sals	ROB	Food Service	ROB	15.0	\$6	6	0.004	0.00		
Food Service	ROB	Food Service	ROB	15.0	\$9	100	0.089	0.03		
Health	ROB	Food Service	ROB	15.0	\$12	83	0.086	0.03		
Health	ROB	Food Service	ROB	15.0	\$9	86	0.064	0.02		
Office	ROB	Food Service	ROB	15.0	\$21	1,085	0.837	0.31		
Other	ROB	Food Service	ROB	15.0	\$131	1,474	1.015	0.38		
Retail	ROB	Food Service	ROB	15.0	\$21	273	0.184	0.07		
Warehouse	ROB	Food Service	ROB	15.0	\$10	106	0.080	0.03		
Education	ROB	Food Service	ROB	15.0	\$12	130	0.036	0.01		
Food Sals	ROB	Food Service	ROB	15.0	\$9	92	0.033	0.01		
Food Service	ROB	Food Service	ROB	15.0	\$7	92	0.068	0.03		
Health	ROB	Food Service	ROB	15.0	\$11	111	0.066	0.02		
Other	ROB	Food Service	ROB	15.0	\$44	444	0.444	0.17		
Other	ROB	Food Service	ROB	15.0	\$187	2,241	0.373	0.14		
Warehouse	ROB	Food Service	ROB	15.0	\$45	455	0.455	0.17		
Education	ROB	Food Service	ROB	15.0	\$76	767	0.767	0.29		
Food Sals	ROB	Food Service	ROB	15.0	\$6	185	0.104	0.04		
Food Service	ROB	Food Service	ROB	15.0	\$12	248	0.185	0.07		
Health	ROB	Food Service	ROB	15.0	\$15	469	0.249	0.09		
Health	ROB	Food Service	ROB	15.0	\$7	211	0.125	0.05		
Office	ROB	Food Service	ROB	15.0	\$143	4,244	2.411	0.91		
Other	ROB	Food Service	ROB	15.0	\$78	2,205	2.614	1.00		
Retail	ROB	Food Service	ROB	15.0	\$21	199	0.428	0.16		
Warehouse	ROB	Food Service	ROB	15.0	\$14	300	0.238	0.09		
Food Sals	ROB	Food Service	ROB	15.0	\$6	61	0.047	0.02		
Health	ROB	Food Service	ROB	15.0	\$10	147	0.088	0.03		
Health	ROB	Food Service	ROB	15.0	\$14	216	0.139	0.05		
Health	ROB	Food Service	ROB	15.0	\$7	89	0.094	0.04		
Office	ROB	Food Service	ROB	15.0	\$137	2,110	1.136	0.43		
Other	ROB	Food Service	ROB	15.0	\$145	2,647	1.228	0.46		
Retail	ROB	Food Service	ROB	15.0	\$24	268	0.203	0.08		
Warehouse	ROB	Food Service	ROB	15.0	\$12	109	0.101	0.04		
Education	ROB	Food Service	ROB	15.0	\$9	93	0.024	0.01		
Food Sals	ROB	Food Service	ROB	15.0	\$7	75	0.024	0.01		

Indiana Michigan Power Company
EE Plan
2025 C&I Program Measures

Indiana Michigan Power Company
Case No. 06
Exhibit No. B&X (JCW-19)
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Witness: J.C. Walter

IRP Bundle Selection 2025	IRP Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025 Rebate Cost	2025 Energy Savings (\$/yr)	2025 IRP Peak Demand Savings (\$/yr)																																					
										2025 Rebate Cost	2025 Energy Savings (\$/yr)	2025 IRP Peak Demand Savings (\$/yr)																																		
Work Midstream	Heat Pump - 18 SEER (20+ Tons)	Heat Pump - 18 SEER (20+ Tons)	Heating	Warehouse	Heat Pump - 18 SEER (20+ Tons)	Heat Pump	15.0	53	79	0.015																																				
		Health			15.0	53	79	0.015																																						
		Food Service			15.0	53	79	0.015																																						
		Office			15.0	53	79	0.015																																						
		Other			15.0	53	79	0.015																																						
		Warehouse			15.0	53	79	0.015																																						
		Health			15.0	53	79	0.015																																						
		Food Service			15.0	53	79	0.015																																						
		Office			15.0	53	79	0.015																																						
		Other			15.0	53	79	0.015																																						
		Heat Pump - 18 SEER (5-20 Tons)			Heat Pump - 18 SEER (5-20 Tons)	Heat Pump - 18 SEER (5-20 Tons)	Heating	Warehouse	Heat Pump - 18 SEER (5-20 Tons)	Heat Pump	15.0	53	79	0.015																																
						Health			15.0	53	79	0.015																																		
						Food Service			15.0	53	79	0.015																																		
						Office			15.0	53	79	0.015																																		
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						Warehouse			15.0	53	79	0.015																																		
						Health			15.0	53	79	0.015																																		
						Food Service			15.0	53	79	0.015																																		
						Office			15.0	53	79	0.015																																		
						Other			15.0	53	79	0.015																																		
						Heat Pump - 18 SEER (5 Tons)			Heat Pump - 18 SEER (5 Tons)	Heat Pump - 18 SEER (5 Tons)	Heating	Warehouse	Heat Pump - 18 SEER (5 Tons)	Heat Pump	15.0	53	79	0.015																												
										Health			15.0	53	79	0.015																														
										Food Service			15.0	53	79	0.015																														
										Office			15.0	53	79	0.015																														
										Other			15.0	53	79	0.015																														
										Warehouse			15.0	53	79	0.015																														
										Health			15.0	53	79	0.015																														
										Food Service			15.0	53	79	0.015																														
										Office			15.0	53	79	0.015																														
										Other			15.0	53	79	0.015																														
										Heat Pump - 21 SEER (20+ Tons)			Heat Pump - 21 SEER (20+ Tons)	Heat Pump - 21 SEER (20+ Tons)	Heating	Warehouse	Heat Pump - 21 SEER (20+ Tons)	Heat Pump	15.0	53	79	0.015																								
														Health			15.0	53	79	0.015																										
														Food Service			15.0	53	79	0.015																										
														Office			15.0	53	79	0.015																										
														Other			15.0	53	79	0.015																										
														Warehouse			15.0	53	79	0.015																										
														Health			15.0	53	79	0.015																										
														Food Service			15.0	53	79	0.015																										
														Office			15.0	53	79	0.015																										
														Other			15.0	53	79	0.015																										
														Heat Pump - 21 SEER (5-20 Tons)			Heat Pump - 21 SEER (5-20 Tons)	Heat Pump - 21 SEER (5-20 Tons)	Heating	Warehouse	Heat Pump - 21 SEER (5-20 Tons)	Heat Pump	15.0	53	79	0.015																				
																		Health			15.0	53	79	0.015																						
																		Food Service			15.0	53	79	0.015																						
																		Office			15.0	53	79	0.015																						
																		Other			15.0	53	79	0.015																						
																		Warehouse			15.0	53	79	0.015																						
																		Health			15.0	53	79	0.015																						
																		Food Service			15.0	53	79	0.015																						
																		Office			15.0	53	79	0.015																						
																		Other			15.0	53	79	0.015																						
																		Heat Pump - 21 SEER (5 Tons)			Heat Pump - 21 SEER (5 Tons)	Heat Pump - 21 SEER (5 Tons)	Heating	Warehouse	Heat Pump - 21 SEER (5 Tons)	Heat Pump	15.0	53	79	0.015																
																						Health			15.0	53	79	0.015																		
																						Food Service			15.0	53	79	0.015																		
																						Office			15.0	53	79	0.015																		
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																						Warehouse			15.0	53	79	0.015																		
																						Health			15.0	53	79	0.015																		
																						Food Service			15.0	53	79	0.015																		
																						Office			15.0	53	79	0.015																		
																						Other			15.0	53	79	0.015																		
																						Misc Oil/Gas Heat Pump Cold Climate (Tank & Heat TWD)			Misc Oil/Gas Heat Pump Cold Climate (Tank & Heat TWD)	Misc Oil/Gas Heat Pump Cold Climate (Tank & Heat TWD)	Heating	Warehouse	Misc Oil/Gas Heat Pump Cold Climate (Tank & Heat TWD)	Heat Pump	15.0	53	79	0.015												
																										Health			15.0	53	79	0.015														
																										Food Service			15.0	53	79	0.015														
																										Office			15.0	53	79	0.015														
																										Other			15.0	53	79	0.015														
																										Warehouse			15.0	53	79	0.015														
																										Health			15.0	53	79	0.015														
																										Food Service			15.0	53	79	0.015														
																										Office			15.0	53	79	0.015														
																										Other			15.0	53	79	0.015														
																										FFAC - 17 SEER Blue - Lodging			FFAC - 17 SEER Blue - Lodging	FFAC - 17 SEER Blue - Lodging	Cooling	Warehouse	FFAC - 17 SEER Blue - Lodging	FFAC	15.0	53	79	0.015								
																														Health			15.0	53	79	0.015										
																														Food Service			15.0	53	79	0.015										
																														Office			15.0	53	79	0.015										
																														Other			15.0	53	79	0.015										
																														Warehouse			15.0	53	79	0.015										
																														Health			15.0	53	79	0.015										
																														Food Service			15.0	53	79	0.015										
																														Office			15.0	53	79	0.015										
																														Other			15.0	53	79	0.015										
																														FFAC - 16 SEER Blue - Lodging			FFAC - 16 SEER Blue - Lodging	FFAC - 16 SEER Blue - Lodging	Cooling	Warehouse	FFAC - 16 SEER Blue - Lodging	FFAC	15.0	53	79	0.015				
																																		Health			15.0	53	79	0.015						
																																		Food Service			15.0	53	79	0.015						
																																		Office			15.0	53	79	0.015						
																																		Other			15.0	53	79	0.015						
																																		Warehouse			15.0	53	79	0.015						
																																		Health			15.0	53	79	0.015						
																																		Food Service			15.0	53	79	0.015						
																																		Office			15.0	53	79	0.015						
																																		Other			15.0	53	79	0.015						
																																		FFAC - 15 SEER Blue - Lodging			FFAC - 15 SEER Blue - Lodging	FFAC - 15 SEER Blue - Lodging	Cooling	Warehouse	FFAC - 15 SEER Blue - Lodging	FFAC	15.0	53	79	0.015
																																						Health			15.0	53	79	0.015		
																																						Food Service			15.0	53	79	0.015		
																																						Office			15.0	53	79	0.015		
																																						Other			15.0	53	79	0.015		
																																						Warehouse			15.0	53	79	0.015		
																																						Health			15.0	53	79	0.015		
																																						Food Service			15.0	53	79	0.015		
																																						Office			15.0	53	79	0.015		
																																						Other			15.0	53	79	0.015		
FFAC - 14 SEER Blue - Lodging	FFAC - 14 SEER Blue - Lodging		FFAC - 14 SEER Blue - Lodging	Cooling																																		Warehouse			FFAC - 14 SEER Blue - Lodging	FFAC	15.0	53	79	0.015
			Health																																						15.0	53	79	0.015		
			Food Service																																						15.0	53	79	0.015		
			Office																																						15.0	53	79	0.015		
			Other																																						15.0	53	79	0.015		
			Warehouse																																						15.0	53	79	0.015		
			Health																																						15.0	53	79	0.015		
			Food Service																																						15.0	53	79	0.015		
			Office																																						15.0	53	79	0.015		
			Other																																						15.0	53	79	0.015		
		Variable Refrigerant Flow Heat Pump	Variable Refrigerant Flow Heat Pump		Variable Refrigerant Flow Heat Pump		Cooling	Warehouse																																	Variable Refrigerant Flow Heat Pump	Heat Pump	15.0	53	79	0.015
					Health																																				15.0	53	79	0.015		
					Food Service																																				15.0	53	79	0.015		
					Office																																				15.0	53	79	0.015		
					Other																																				15.0	53	79	0.015		
					Warehouse																																				15.0	53	79	0.015		
					Health																																				15.0	53	79	0.015		
					Food Service																																				15.0	53	79	0.015		
					Office																																				15.0	53	79	0.015		
					Other																																				15.0	53	79	0.015		
					Work Prescriptive	Anti-Seal Heat Controls LT			Anti-Seal Heat Controls LT		Refrigeration	Warehouse																													Anti-Seal Heat Controls LT	Heat Controls	20.0	533	803	0.848
									Health																																20.0	533	803	0.848		
									Food Service																																20.0	533	803	0.848		
									Office																																20.0	533	803	0.848		
									Other																																20.0	533	803	0.848		
									Warehouse																																20.0	533	803	0.848		
									Health																																20.0	533	803	0.848		
									Food Service																																20.0	533	803	0.848		
									Office																																20.0	533	803	0.848		
									Other																																20.0	533	803	0.848		
									Anti-Seal Heat Controls MT	Anti-Seal Heat Controls MT			Anti-Seal Heat Controls MT		Refrigeration	Warehouse																									Anti-Seal Heat Controls MT	Heat Controls	20.0	533	803	0.848
													Health																												20.0	533	803	0.848		
													Food Service																												20.0	533	803	0.848		
													Office																												20.0	533	803	0.848		
													Other																												20.0	533	803	0.848		
													Warehouse																												20.0	533	803	0.848		
													Health																												20.0	533	803	0.848		
													Food Service																												20.0	533	803	0.848		
													Office																												20.0	533	803	0.848		
													Other																												20.0	533	803	0.848		
													Auto Door Closer, Cooler	Auto Door Closer, Cooler			Auto Door Closer, Cooler		Refrigeration	Warehouse																					Auto Door Closer, Cooler	Door Closer	8.0	55	120	0.018
																	Health																								8.0	55	120	0.018		
																	Food Service																								8.0	55	120	0.018		
																	Office																								8.0	55	120	0.018		
																	Other																								8.0	55	120	0.018		
																	Warehouse																								8.0	55	120	0.018		
																	Health																								8.0	55	120	0.018		
																	Food Service																								8.0	55	120	0.018		
																	Office																								8.0	55	120	0.018		
																	Other																								8.0	55	120	0.018		
																	Auto Door Closer, Freezer	Auto Door Closer, Freezer			Auto Door Closer, Freezer		Refrigeration	Warehouse																	Auto Door Closer, Freezer	Door Closer	8.0	55	120	0.018
																					Health																				8.0	55	120	0.018		
																					Food Service																				8.0	55	120	0.018		
																					Office																				8.0	55	120	0.018		
																					Other																				8.0	55	120	0.018		
																					Warehouse																				8.0	55	120	0.018		
																					Health																				8.0	55	120	0.018		
																					Food Service																				8.0	55	120	0.018		
																					Office																				8.0	55	120	0.018		
																					Other																				8.0	55	120	0.018		
																					BEMS	BEMS			BEMS		Behavioral	Warehouse													BEMS	BEMS	3.0	110	270	0.030
																									Health																3.0	110	270	0.030		
																									Food Service																3.0	110	270	0.030		
																									Office																3.0	110	270	0.030		
																									Other																3.0	110	270	0.030		
																									Warehouse																3.0	110	270	0.030		
																									Health																3.0	110	270	0.030		
																									Food Service																3.0	110	270	0.030		
																									Office																3.0	110	270	0.030		
																									Other																3.0	110	270	0.030		
																									B-Level Lighting Fixture - Stairwells, Hallways, and Garages	B-Level Lighting Fixture - Stairwells, Hallways, and Garages			B-Level Lighting Fixture - Stairwells, Hallways, and Garages		Interior Lighting	Warehouse									B-Level Lighting Fixture - Stairwells, Hallways, and Garages	Lighting	15.0	437	504	0.024
																													Health												15.0	437	504	0.024		
																													Food Service												15.0	437	504	0.024		
																													Office												15.0	437	504	0.024		
																													Other												15.0	437	504	0.024		
																													Warehouse												15.0	437	504	0.024		
																													Health												15.0	437	504	0.024		
																													Food Service												15.0	437	504	0.024		
																													Office												15.0	437	504	0.024		
																													Other												15.0	437	504	0.024		
																													Control Lighting Monitoring & Controls (non-worked)	Control Lighting Monitoring & Controls (non-worked)			Control Lighting Monitoring & Controls (non-worked)		Interior Lighting	Warehouse					Control Lighting Monitoring & Controls (non-worked)	Lighting	15.0	437	504	0.024
																																	Health								15.0	437	504	0.024		
																																	Food Service								15.0	437	504	0.024		
																																	Office								15.0	437	504	0.024		
																																	Other								15.0	437	504	0.024		
																																	Warehouse								15.0	437	504	0.024		
																																	Health								15.0	437	504	0.024		
																																	Food Service								15.0	437	504	0.024		
																																	Office								15.0	437	504	0.024		
																																	Other								15.0	437	504	0.024		
																																	Chiller Turn-up	Chiller Turn-up			Chiller Turn-up		Cooling	Warehouse	Chiller Turn-up	Chiller	15.0	117	100	0

Indiana Michigan Power Company
 EE Plan
 2025 C&I Program Measures

Indiana Michigan Power Company
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IRP Bundle Selection 2025	IRP Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025 Peak Demand Savings	2025 Energy Savings	2025 IRP Peak Demand Savings
Work Prescriptions	Electricity	Electricity Communicated Plug Fans in data centers	Plug/Leads_Office	Health	Retire	15.0	\$2,380	78,227	8,524
		Office	Health	Retire	15.0	\$1,025	208,253	37,220	
		Electrically Communicated (EC) Reach-In Evaporator Fan Motor	Warehouse	Health	Retire	15.0	\$2,312	75,007	8,670
			Education	Health	Retire	15.0	\$263	9,287	6,363
			Food Sales	Health	Retire	15.0	\$1,561	4,778	5,322
			Food Service	Health	Retire	15.0	\$1,448	20,166	2,888
			Health	Health	Retire	15.0	\$249	6,224	6,880
			Logistics	Health	Retire	15.0	\$87	1,688	0,183
			Other	Health	Retire	15.0	\$438	15,298	1,736
			Other	Health	Retire	15.0	\$982	21,942	2,365
			Warehouse	Health	Retire	15.0	\$438	15,298	1,736
			Education	Health	Retire	15.0	\$1,307	24,780	2,688
		Electrically Communicated (EC) Walk-In Evaporator Fan Motor	Food Sales	Health	Retire	15.0	\$1,025	40,873	4,442
			Food Service	Health	Retire	15.0	\$1,241	23,468	3,658
			Health	Health	Retire	15.0	\$319	9,021	8,070
			Logistics	Health	Retire	15.0	\$268	6,432	6,703
			Office	Health	Retire	15.0	\$380	22,130	2,417
			Other	Health	Retire	15.0	\$1,448	69,887	6,500
			Warehouse	Health	Retire	15.0	\$144	39,441	1,944
			Warehouse	Health	Retire	15.0	\$3,479	88,500	9,488
			Food Sales	Health	Retire	15.0	\$194	1,941	0,194
			Food Service	Health	Retire	15.0	\$2,490	24,948	1,538
		Energy efficient electric flyer	Health	Health	Retire	15.0	\$502	5,021	0,310
			Logistics	Health	Retire	15.0	\$163	1,629	0,113
			Other	Health	Retire	15.0	\$502	2,822	0,162
			Other	Health	Retire	15.0	\$412	4,122	0,264
			Retail	Health	Retire	15.0	\$185	1,862	0,115
Food Service	Health		Retire	15.0	\$133	1,163	0,080		
Health	Health		Retire	15.0	\$613	20,115	0,200		
Logistics	Health		Retire	15.0	\$508	5,159	0,129		
Other	Health		Retire	15.0	\$110	39,361	0,494		
Other	Health		Retire	15.0	\$585	23,880	0,260		
ENERGY STAR Commercial Washing Machines	Education	Health	Retire	15.0	\$112	2,792	0,288		
	Food Service	Health	Retire	15.0	\$222	5,252	0,533		
	Health	Health	Retire	15.0	\$89	1,725	0,165		
	Logistics	Health	Retire	15.0	\$32	794	0,076		
	Office	Health	Retire	15.0	\$139	2,688	0,380		
	Other	Health	Retire	15.0	\$308	8,152	0,782		
	Warehouse	Health	Retire	15.0	\$111	1,286	0,117		
	Warehouse	Health	Retire	15.0	\$111	4,311	0,317		
	Food Sales	Health	Retire	15.0	\$41	3,944	0,197		
	Food Service	Health	Retire	15.0	\$623	19,869	8,811		
Energy Star Ice Machine	Health	Health	Retire	15.0	\$124	3,108	0,355		
	Logistics	Health	Retire	15.0	\$194	5,479	0,628		
	Other	Health	Retire	15.0	\$217	7,294	0,608		
	Retail	Health	Retire	15.0	\$430	10,731	1,228		
	Warehouse	Health	Retire	15.0	\$128	2,180	0,268		
	Education	Health	Retire	15.0	\$340	6,004	0,688		
	Food Sales	Health	Retire	15.0	\$128	2,180	0,261		
	Food Service	Health	Retire	15.0	\$602	11,308	1,976		
	Health	Health	Retire	15.0	\$268	6,116	0,479		
	Logistics	Health	Retire	15.0	\$44	1,111	0,127		
Energy Star Ice Machine	Other	Health	Retire	15.0	\$260	7,261	0,829		
	Retail	Health	Retire	15.0	\$570	14,246	1,627		
	Warehouse	Health	Retire	15.0	\$361	9,471	1,094		
	Education	Health	Retire	15.0	\$262	12,644	1,433		
	Food Service	Health	Retire	15.0	\$274	68,889	7,845		
	Health	Health	Retire	15.0	\$824	16,241	1,686		
	Logistics	Health	Retire	15.0	\$133	28,823	3,392		
	Office	Health	Retire	15.0	\$1,070	41,738	4,766		
	Warehouse	Health	Retire	15.0	\$212	69,564	6,494		
	Retail	Health	Retire	15.0	\$111	1,111	0,127		
Energy Star Reach-In Freezer, Glass Doors	Warehouse	Health	Retire	15.0	\$114	4,311	0,317		
	Education	Health	Retire	15.0	\$87	3,944	0,197		
	Food Sales	Health	Retire	15.0	\$124	3,108	0,355		
	Food Service	Health	Retire	15.0	\$194	5,479	0,628		
	Health	Health	Retire	15.0	\$217	7,294	0,608		
	Logistics	Health	Retire	15.0	\$430	10,731	1,228		
	Other	Health	Retire	15.0	\$128	2,180	0,268		
	Warehouse	Health	Retire	15.0	\$340	6,004	0,688		
	Food Sales	Health	Retire	15.0	\$128	2,180	0,261		
	Food Service	Health	Retire	15.0	\$602	11,308	1,976		
Energy Star Reach-In Refrigerator, Glass Doors	Health	Health	Retire	15.0	\$268	6,116	0,479		
	Logistics	Health	Retire	15.0	\$44	1,111	0,127		
	Other	Health	Retire	15.0	\$260	7,261	0,829		
	Retail	Health	Retire	15.0	\$570	14,246	1,627		
	Warehouse	Health	Retire	15.0	\$361	9,471	1,094		
	Education	Health	Retire	15.0	\$262	12,644	1,433		
	Food Service	Health	Retire	15.0	\$274	68,889	7,845		
	Health	Health	Retire	15.0	\$824	16,241	1,686		
	Logistics	Health	Retire	15.0	\$133	28,823	3,392		
	Office	Health	Retire	15.0	\$1,070	41,738	4,766		
Energy Star Refrigerator, Solid Doors	Warehouse	Health	Retire	15.0	\$212	69,564	6,494		
	Education	Health	Retire	15.0	\$87	3,944	0,197		
	Food Sales	Health	Retire	15.0	\$124	3,108	0,355		
	Food Service	Health	Retire	15.0	\$194	5,479	0,628		
	Health	Health	Retire	15.0	\$217	7,294	0,608		
	Logistics	Health	Retire	15.0	\$430	10,731	1,228		
	Other	Health	Retire	15.0	\$128	2,180	0,268		
	Warehouse	Health	Retire	15.0	\$340	6,004	0,688		
	Food Sales	Health	Retire	15.0	\$128	2,180	0,261		
	Food Service	Health	Retire	15.0	\$602	11,308	1,976		
Exhaust Fan Motor Controls	Health	Health	Retire	15.0	\$268	6,116	0,479		
	Logistics	Health	Retire	15.0	\$44	1,111	0,127		
	Other	Health	Retire	15.0	\$260	7,261	0,829		
	Retail	Health	Retire	15.0	\$570	14,246	1,627		
	Warehouse	Health	Retire	15.0	\$361	9,471	1,094		
	Education	Health	Retire	15.0	\$262	12,644	1,433		
	Food Service	Health	Retire	15.0	\$274	68,889	7,845		
	Health	Health	Retire	15.0	\$824	16,241	1,686		
	Logistics	Health	Retire	15.0	\$133	28,823	3,392		
	Office	Health	Retire	15.0	\$1,070	41,738	4,766		
Facial Asesor	Warehouse	Health	Retire	15.0	\$430	10,731	1,228		
	Education	Health	Retire	15.0	\$128	2,180	0,268		
	Food Sales	Health	Retire	15.0	\$340	6,004	0,688		
	Food Service	Health	Retire	15.0	\$128	2,180	0,261		
	Health	Health	Retire	15.0	\$268	6,116	0,479		
	Logistics	Health	Retire	15.0	\$44	1,111	0,127		
	Other	Health	Retire	15.0	\$260	7,261	0,829		
	Retail	Health	Retire	15.0	\$570	14,246	1,627		
	Warehouse	Health	Retire	15.0	\$361	9,471	1,094		
	Education	Health	Retire	15.0	\$262	12,644	1,433		
Floating Head Pressure Controls	Food Service	Health	Retire	15.0	\$1,000	62,274	6,889		
	Health	Health	Retire	15.0	\$411	8,441	869		
	Logistics	Health	Retire	15.0	\$149	5,884	6,889		
	Other	Health	Retire	15.0	\$513	20,589	2,888		
	Retail	Health	Retire	15.0	\$1,178	58,546	6,328		
	Warehouse	Health	Retire	15.0	\$1,278	21,280	2,645		
	Education	Health	Retire	15.0	\$1,178	58,546	6,328		
	Food Sales	Health	Retire	15.0	\$430	10,731	1,228		
	Food Service	Health	Retire	15.0	\$340	6,004	0,688		
	Health	Health	Retire	15.0	\$268	6,116	0,479		
Grow Lighting	Warehouse	Health	Retire	15.0	\$430	10,731	1,228		
	Education	Health	Retire	15.0	\$128	2,180	0,268		
	Food Sales	Health	Retire	15.0	\$340	6,004	0,688		
	Food Service	Health	Retire	15.0	\$128	2,180	0,261		
	Health	Health	Retire	15.0	\$268	6,116	0,479		
	Logistics	Health	Retire	15.0	\$44	1,111	0,127		
	Other	Health	Retire	15.0	\$260	7,261	0,829		
	Retail	Health	Retire	15.0	\$570	14,246	1,627		
	Warehouse	Health	Retire	15.0	\$361	9,471	1,094		
	Education	Health	Retire	15.0	\$262	12,644	1,433		
Heat Pump Water Heater	Food Service	Health	Retire	15.0	\$1,000	62,274	6,889		
	Health	Health	Retire	15.0	\$411	8,441	869		
	Logistics	Health	Retire	15.0	\$149	5,884	6,889		
	Other	Health	Retire	15.0	\$513	20,589	2,888		
	Retail	Health	Retire	15.0	\$1,178	58,546	6,328		
	Warehouse	Health	Retire	15.0	\$1,278	21,280	2,645		
	Education	Health	Retire	15.0	\$1,178	58,546	6,328		
	Food Sales	Health	Retire	15.0	\$430	10,731	1,228		
	Food Service	Health	Retire	15.0	\$340	6,004	0,688		
	Health	Health	Retire	15.0	\$268	6,116	0,479		
Hot Water Pipe Insulation	Warehouse	Health	Retire	20.0	\$43	943	0,791		
	Education	Health	Retire	20.0	\$43	682	0,578		
	Food Sales	Health	Retire	20.0	\$44	1,088	0,124		
	Food Service	Health	Retire	20.0	\$140	3,437	0,366		
	Health	Health	Retire	20.0	\$21	2,993	0,343		
	Logistics	Health	Retire	20.0	\$154	68,652	3,144		
	Other	Health	Retire	20.0	\$21	2,993	0,343		
	Retail	Health	Retire	20.0	\$103	4,308	0,494		
	Warehouse	Health	Retire	20.0	\$128	10,308	1,211		
	Education	Health	Retire	20.0	\$43	943	0,791		
HVAC - Energy Management System	Food Service	Health	Retire	15.0	\$430	10,731	1,228		
	Health	Health	Retire	15.0	\$268	6,116	0,479		
	Logistics	Health	Retire	15.0	\$44	1,111	0,127		
	Other	Health	Retire	15.0	\$260	7,261	0,829		
	Retail	Health	Retire	15.0	\$570	14,246	1,627		
	Warehouse	Health	Retire	15.0	\$361	9,471	1,094		
	Education	Health	Retire	15.0	\$262	12,644	1,433		
	Food Sales	Health	Retire	15.0	\$124	3,108	0,355		
	Food Service	Health	Retire	15.0	\$194	5,479	0,628		
	Health	Health	Retire	15.0	\$217	7,294	0,608		
Insulated Holding Cabinets (Full Size)	Logistics	Health	Retire	15.0	\$149	5,884	6,889		
	Other	Health	Retire	15.0	\$513	20,589	2,888		
	Retail	Health	Retire	15.0					

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IRP Bundle Selection	2025	2026	2025									
IRP Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025	2026	2025				
						Relative Cost	Energy Savings	IRP Peak Demand Savings				
Work Prescriptions	LED parking garage return (existing W-250)	ExteriorLighting	Retail	Refr	6.0	\$601	17,373	0.000				
	Education			6.0	\$2,144	65,343	0.000					
LED parking lot return (existing W-250)	LED parking lot return (existing W-250)	ExteriorLighting	Retail	Refr	6.0	\$1,902	47,508	0.000				
				Health	6.0	\$20	282	0.000				
				Food Service	6.0	\$204	7,347	0.000				
				Health	6.0	\$214	14,341	0.000				
				Health	6.0	\$200	5,995	0.000				
				Office	6.0	\$1,681	43,016	0.000				
				Other	6.0	\$4,969	14,969	0.000				
				Retail	6.0	\$581	14,516	0.000				
				Warehouse	6.0	\$2,164	24,907	0.000				
				Education	12.0	\$1,100	47,904	0.000				
				Food Service	12.0	\$204	7,347	0.000				
				Health	12.0	\$214	14,341	0.000				
				Health	12.0	\$200	5,995	0.000				
				Office	12.0	\$1,681	43,016	0.000				
				Other	12.0	\$6,037	19,082	0.000				
				Other	12.0	\$2,164	14,516	0.000				
				Warehouse	12.0	\$1,144	44,947	0.000				
				Education	12.0	\$2,086	52,161	0.000				
				LED parking lot return (existing W-250)	LED parking lot return (existing W-250)	ExteriorLighting	Retail	Refr	12.0	\$81	1,964	0.000
Food Service	12.0	\$497	4,994					0.000				
Health	12.0	\$583	6,575					0.000				
Office	12.0	\$1,443	46,682					0.000				
Other	12.0	\$6,611	193,269					0.000				
Retail	12.0	\$637	15,931					0.000				
Warehouse	12.0	\$2,205	26,881					0.000				
Education	12.0	\$2,274	65,068					0.000				
Food Service	12.0	\$1,702	44,804					5,464				
Health	12.0	\$2,228	29,963					27,268				
Health	12.0	\$1,477	41,764					4,764				
Other	12.0	\$22,164	146,626					171,302				
Other	12.0	\$46,213	1,209,202					146,291				
Warehouse	12.0	\$1,912	49,945					179,495				
Education	12.0	\$7,241	193,516					29,536				
Food Service	12.0	\$264	12,686					2,815				
Health	12.0	\$6,232	156,289					29,700				
Health	12.0	\$463	11,729					2,133				
Office	12.0	\$15,030	391,239					71,645				
LED office, TXZ and TXF	LED office, TXZ and TXF	InteriorLighting	Retail	Refr	18.0	\$18,075	461,798	23,716				
				Food Service	18.0	\$4,419	114,494	11,414				
				Health	18.0	\$268	6,984	1,371				
				Health	18.0	\$3,697	92,418	16,691				
				Office	18.0	\$1,917	188,232	36,534				
				Office	18.0	\$9,234	231,343	42,534				
				Other	18.0	\$7,975	199,252	36,534				
				Warehouse	18.0	\$9,522	237,562	43,677				
				Education	18.0	\$2,021	50,321	9,600				
				Food Service	18.0	\$24	1,241	0.000				
				Health	18.0	\$212	7,805	0.000				
				Health	18.0	\$652	16,296	0.000				
				Office	18.0	\$1,190	44,023	0.000				
				Office	18.0	\$6,403	169,369	0.000				
				Other	18.0	\$6,403	169,369	0.000				
				Warehouse	18.0	\$2,320	57,596	0.000				
				Low Flow Pre-Rinse Sprayer	Low Flow Pre-Rinse Sprayer	Wastewater	Retail	Refr	5.0	\$100	3,300	0.000
								Food Service	5.0	\$61	7,741	4,445
								Health	5.0	\$23	273	0.115
Health	5.0	\$29	358					0.192				
Office	5.0	\$124	2,011					0.810				
Refr	5.0	\$107	2,042					0.528				
Education	5.0	\$15,333	132,227					24,363				
Food Service	5.0	\$160	9,022					1,761				
Food Service	5.0	\$1,115	21,112					4,441				
Health	5.0	\$41	114,164					71,644				
Health	5.0	\$1,133	14,712					2,892				
Office	5.0	\$22,358	191,756					32,880				
Other	5.0	\$71,904	774,969					101,917				
Warehouse	5.0	\$6,423	192,292					19,890				
Warehouse	5.0	\$26,148	336,774					61,632				
Education	5.0	\$2,225	102,307					4,878				
Health	5.0	\$303	8,027					0.352				
Health	5.0	\$4,336	109,514					4,313				
Health	5.0	\$10	132,727					0.541				
Other	5.0	\$1,231	272,545	10,774								
Other	5.0	\$16	294,107	10,037								
Pump and Fan Variable Frequency Drive Controls (Fans)	Pump and Fan Variable Frequency Drive Controls (Fans)	Ventilation	Retail	Refr	6.0	\$13,190	318,533	12,446				
				Food Service	6.0	\$617	11,891	7,904				
				Health	6.0	\$730	116,426	14,460				
				Health	6.0	\$20,454	392,722	52,200				
				Office	6.0	\$4,616	14,747	11,493				
				Office	6.0	\$67,842	1,044,266	224,534				
				Other	6.0	\$91,162	1,162,160	244,138				
				Retail	6.0	\$17,831	237,768	49,044				
				Warehouse	6.0	\$8,292	114,803	24,472				
				Education	6.0	\$8,292	114,803	24,472				
				Food Service	6.0	\$6	66	0.016				
				Health	6.0	\$891	1,326	0.219				
				Health	6.0	\$114,916	144,704	9,911				
				Health	6.0	\$10,607	16,087	2,114				
				Office	6.0	\$5,322	79,997	14,599				
				Office	6.0	\$1,997	47,467	10,991				
				Retail	6.0	\$232	3,358	0.708				
				Warehouse	6.0	\$2,622	24,957	7,280				
				O-Scan Motor for Walk-in and Reach-In Evaporator Fan Motor	O-Scan Motor for Walk-in and Reach-In Evaporator Fan Motor	Refrigeration	Retail	Refr	10.0	\$111	2,781	0.321
Food Service	10.0	\$26	1,465					0.162				
Health	10.0	\$201	8,023					0.927				
Health	10.0	\$76	1,096					0.222				
Health	10.0	\$215	3,315					0.399				
Office	10.0	\$1,100	2,266					0.469				
Office	10.0	\$150	4,414					0.823				
Retail	10.0	\$354	6,026					0.763				
Warehouse	10.0	\$494	4,294					0.744				
Education	10.0	\$108	4,503					0.600				
Food Service	10.0	\$1	\$1					0.000				
Health	10.0	\$677	11,476					0.000				
Health	10.0	\$64	2,993					0.000				
Office	10.0	\$15	691					0.000				
Office	10.0	\$933	60,691					0.000				
Warehouse	10.0	\$4,096	130,018					0.000				
Education	10.0	\$23	15,394					0.000				
Food Service	10.0	\$1,292	35,616					0.000				
Health	10.0	\$1,334	24,964					0.000				
Health	10.0	\$1,004	20,726	0.000								
Office	10.0	\$1,104	24,774	0.000								
Office	10.0	\$442	5,983	0.000								
Office	10.0	\$194	4,794	0.000								
Other	10.0	\$1,201	16,305	0.000								
Other	10.0	\$1,386	44,368	0.000								
Retail	10.0	\$1,320	29,362	0.000								
Warehouse	10.0	\$4,821	83,398	0.000								
Whole Bldg - Com NC	Whole Bldg - Com NC	Whole Building_NC	Retail	Refr	12.0	\$1,645	232,269	44,791				
				Food Service	12.0	\$1,240	25,871	4,824				
				Food Service	12.0	\$7,802	104,823	19,413				
				Health	12.0	\$12,100	169,369	22,170				
				Health	12.0	\$2,070	35,001	6,764				
				Office	12.0	\$3,975	42,964	8,791				
				Office	12.0	\$41,704	671,985	107,644				
				NC	12.0	\$9,316	129,329	23,667				
				Warehouse	12.0	\$19,433	299,372	49,281				
				Education	12.0	\$1,941	44,647	10,932				
				Food Service	12.0	\$40	1,022	0.488				
				Food Service	12.0	\$625	15,388	7,414				
				Health	12.0	\$1,386	34,382	6,172				
				Health	12.0	\$219	5,423	2,637				
				Office	12.0	\$2,794	69,119	33,616				
				Office	12.0	\$6,820	18,318	81,861				
				Retail	12.0	\$999	17,446	8,616				
				Warehouse	12.0	\$911	17,416	4,904				
				Warehouse	12.0	\$4,328	271,979	42,681				
Food Service	12.0	\$300	24,575	4,889								
Food Service	12.0	\$1,916	69,194	18,841								
Health	12.0	\$1,382	169,369	30,322								
Health	12.0	\$863	25,537	6,872								
Office	12.0	\$8,180	389,982	75,097								
Office	12.0	\$15,443	521,927	101,088								
Retail	12.0	\$2,390	110,985	22,229								
Warehouse	12.0	\$4,696	245,341	46,546								
Grand Total			\$4,291,620	12,658,899	11,979,862							

Indiana Michigan Power Company
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 Create No. 6500
 Exhibit No. 847 (JCW-19)
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IRP Bundle Selection 2025

IM Program	Measure Name	End-Use	Building Type	Replacement Type	Measure Life	2025 Retire Cost	2025 Energy Savings (\$/yr)	2025 IRP Peak Demand Savings (kW)
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Residential Customer Engagement Demand Response Program (a.k.a. IM Power Rewards: iControl) - Indiana

Objective:	<p>Offer residential customers a self-action demand response program in the I&M Indiana service territory.</p> <p>Offer a technology solution through the coupling of Automated Metering Infrastructure (AMI) technology and its associated hourly metering data and information to engage customers to take more informed self-action to reduce consumption during demand response events called by the Company.</p> <p>Capture demand response savings from residential customer engagement made possible through timely and detailed end use energy consumption from AMI technology.</p>
Target Market:	<p>I&M Indiana residential customers that are identified and qualified as meeting the following requirements:</p> <ul style="list-style-type: none"> • An AMI meter and telecommunication system installed by I&M sufficient to support the technology needs of this program; • An active I&M AMI data portal account, or otherwise engaged through one of the AMI residential usage information offerings (e.g. Weekly AMI Report, or WAMI); • Primary residence is located within I&M service territory; <ul style="list-style-type: none"> ○ Single family residence that is not electrically served and metered as part of a master metering arrangement; ○ Multi-family residence that is not electrically served and metered as part of a master metering arrangement. <p>And, any of the following:</p> <ul style="list-style-type: none"> • Subscription to broadband internet services with a valid email address capable of receiving email demand response event notification; • Smart cell phone with a valid email address capable of receiving email demand response event notification; • Smart cell phone with an I&M app capable of receiving text and/or push demand response event notification;
Program Duration:	<p>This program will be offered to the specified customer segments as part of I&M's deployment and use of AMI metering and infrastructure.</p>
Program Description:	<p>This program will rely on AMI system connectivity and customer specific, granular usage data and information to:</p> <ol style="list-style-type: none"> 1. Differently engage specific residential customers;

	<p>2. Provide residential customers with a self-action demand response offering that requires customer involvement and action;</p> <p>3. Offer a financial incentive for residential customers to engage in their use of and reliance on AMI usage data and information aimed at self-action to reduce during I&M peak use periods;</p> <p>This program requires no customer or Company ownership of DLC equipment but can augment I&M’s demand response capabilities.</p> <p>Certain segments of residential customers do not want, or cannot have, DLC equipment installed at their home and are inclined to self-engage with their granular AMI usage data and information.</p> <p>Through this program, I&M will offer residential customers an option to manage their own usage during peak periods on the I&M system and will pay an incentive to customers based on how much end use load they reduce during demand response events called by I&M.</p> <p>I&M will send demand response messages to enrolled customers during times of:</p> <ul style="list-style-type: none"> • Predicted utility system peak load conditions (non-system emergency or demand side management (DSM) events); • Predicted high loading on distribution circuits and/or substation distribution equipment (non-system emergency or DSM events); • Predicted correlating high outdoor temperatures (non-system emergency or DSM events); • Utility supply system emergency conditions (PJM emergency events). <p>DSM (i.e. peak reduction, non-emergency) events will be called at the discretion of I&M, with up to 15 events per year. Emergency events will be at the discretion of PJM as defined in PJM Manual 13 – Emergency Operations, with up to 10 events per PJM planning year.</p>
Incentive Strategy:	<p>A qualified residential customer will receive a bill credit of \$1.00 per kWh of load reduced per event called and participated in during the summer months of May, June, July, August and September, for each event called.</p> <p>If the customer does not reduce load as determined by the Company based on their hourly event usage measured at the AMI electric meter for the premise enrolled in this program, that customer will be considered as opt out of the load control event and therefore will not be paid a demand response event bill credit.</p>

Eligible Measures:	Residential customers, served by I&M through a residential tariff, that meet program eligibility requirements set forth above.
Implementation Strategy:	<p>Key elements of the implementation strategy include:</p> <ul style="list-style-type: none"> • Customer outreach, enrollment, and bill credit provisioning. I&M will provide for, support, and perform all customer outreach and enrollment activities. I&M will provision demand response bill credits through its internal billing and customer administration IT systems. • Program Administration. I&M will administer, manage, and house all program-related data through its internal billing, database and customer administration IT systems. • Customer Service. I&M and the program implementation contractor will store and track interactions with the customers, provide trained customer service staff for assisting customers with questions about the program, and provide service-related calls/issues resolution. I&M and its business partner will provide staff sufficient to handle customer’s inquiries, screen customers for eligibility, and explain program rules and benefits in a prompt and courteous manner. <p>I&M will determine when a DSM event is to take place, and will electronically call the event and will then provide notification through appropriate channels to the program enrolled customers of the demand response event.</p>
Marketing Strategy:	<p>I&M will develop a marketing and communications package to successfully communicate and promote the program to qualified customers. As appropriate, I&M will develop, define, and create a segmentation plan that identifies customers targeted for program participation. I&M will provide for the development of marketing materials, the identification of channels and key relationships, and the leveraging of business partners to facilitate timely program enrollment. Targeted marketing to customers located on heavily-load distribution circuits, to possibly defer additional supply side infrastructure investments, may be employed as well.</p> <p>This program will be marketed to customers as the iControl Program under the umbrella IM Power Rewards suite of AMI programs.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform an impact evaluation. The impact evaluation will determine the actual demand and energy reductions achieved, determine individual participant demand response event performance, and will perform a cost/benefit analyses of the program.</p> <p>The program evaluation objectives are expected to include:</p> <ul style="list-style-type: none"> • Determination of the program impacts, including achieved demand reduction (kW),

and net energy impacts.

- Assessment of the program's cost-effectiveness based on various economic tests.

I&M may supplement the evaluation efforts with customer surveys and additional load analyses.

Critical Peak Pricing (CPP) Program (a.k.a. IM Power Rewards: Critical Peak Pricing) – Indiana

Objective:	<p>The CPP Program is designed to motivate, through price response, residential and general service customers to either manage the timing of, or to conserve, usage during I&M and PJM peak and critical peak hour periods.</p> <p>The program offers participants seasonally tiered on peak electricity pricing and Critical Peak period pricing for demand response events to encourage customers to:</p> <ul style="list-style-type: none"> • Reduce usage during these high cost periods (e.g. manage thermostat settings to decrease air conditioner run time), • Shift usage to lower priced periods or to off peak periods set forth in the pricing structure of the CPP tariff, or • Conserve usage during high cost periods (e.g. change appliance settings to ‘off’ to eliminate appliance energy use for the peak or high cost periods).
Target Market:	<p>CPP is available to I&M Indiana certain individual residential customers, including those engaged principally agricultural pursuits, that have an advanced meter (i.e. AMI meter) installed and commercial General Service tariff customers that have an advanced meter (i.e. AMI meter) installed.</p> <p>Customers taking electric service under Rider EDG, Rider NMS, or other AMI based demand response or time of use pilots, programs, or tariffs are not eligible to participate in CPP for the same time period in which they are enrolled in any of these rate schedules.</p>
Duration:	<p>Customers electing to take service under the Critical Peak Pricing Tariff are expected to remain on this schedule for a minimum of one (1) year. If the customer terminates service under this schedule, the customer will not be eligible to receive service under this schedule for a period of one (1) year from termination date.</p>
Program Description:	<p>When considering the importance of planning for I&M’s future supply need, early and ongoing development is beneficial for both I&M customers and the Company to insure the resources are ready, available, and dependable at the time when they are needed.</p> <p>Customers enrolled in the CPP Program are subject to the pricing provisions set forth in the CPP tariff. Customers must determine their own level of engagement in the CPP pricing tiers but can use tools provided by the Company through the AMI Data Portal to educate and inform themselves on their individual usage level and timing.</p>

	<p>When the Company anticipates or experiences high power system loads and/or emergency system conditions, the Company may call Critical Peak events during a specified time period (e.g., 3 p.m. to 6 p.m. on a hot summer weekday). During Critical Peak Events, Critical Peak Hours pricing applies, where the price for electricity during Critical Peak event hours is substantially higher than non-Critical Peak periods (i.e. all other pricing tiers set forth in CPP).</p> <p>Since CPP electricity pricing is peak period focused and inherently encourages customers to take responsive action to reduce Critical Peak Hours usage, higher demand savings result during Critical Peak Events when compared to reductions during other CPP cost tier periods.</p>
Incentive Strategy:	<p>CPP does not offer direct cash incentives or electric bill credits to participating customers.</p> <p>Instead, CPP provides participating customers the opportunity to have more control over their cost of electricity through choice of the CPP pricing tier used to concentrate their energy use.</p>
Implementation Strategy:	<p>I&M will perform, manage, and support all customer outreach and enrollment activities.</p> <p>I&M will monitor, store and track interactions with the customers, provide trained customer service staff for assisting customers with questions about the program, and provide service-related calls/issues resolution.</p> <p>I&M will determine when a Critical Peak Event occurs and will electronically notify participating customers. Such electronic notification may take place through the use of a demand response software platform or other electronic software platform the Company uses to manage customer activities and communications.</p> <p>The Company will offer email notification and may also offer text messaging and/or other technologies approved by the Company. Any customer owned technology equipment utilized for notification shall be subject to Company review and approval.</p>

Marketing Strategy:	<p>I&M will develop a marketing and communications package to successfully communicate and promote the program to qualified customers. I&M will develop, define, and create a segmentation plan that identifies customers targeted for program participation. I&M will provide for the development of marketing materials, the identification of channels and key relationships, and the leveraging of business partners to facilitate timely pilot enrollment. Targeted marketing to customers located on heavily-load distribution circuits, to possibly defer additional supply side infrastructure investments, may be employed as well.</p> <p>I&M will provide a toll-free telephone number where customers can call to receive additional program details, enroll in the program, and ask other program related questions.</p> <p>This program will be marketed to customers as the Critical Peak Pricing Program under the umbrella IM Power Rewards suite of AMI programs.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform an impact evaluation. The impact evaluation will determine the actual demand and energy reductions achieved on a concurrent and for a full program year basis.</p> <p>I&M may supplement the evaluation efforts with customer surveys and additional load analyses.</p>
Estimated Participation & Opt-Out	<p>CPP is offered to customers on an opt-in basis, meaning customers choose to enroll in CPP on their own volition. As CPP customer enrollments and participation evolve, along with the Company's need for Critical Peak resources, the Company may switch to an opt-out enrollment approach where specific customers will be assigned to CPP which provides the Company more certainty in Critical Peak demand reductions.</p>

Residential AMI Electric Water Heat Direct Load Control Program (a.k.a. IM Power Rewards: Water Heater) – Indiana

Objective:	<p>Offer a customer segment-specific residential Income Qualified (IQ), multi-family tenant, electric water heater direct load control (DLC) program in the I&M Indiana service territory.</p> <p>Utilize a technology solution that couples Automated Metering Infrastructure (AMI) technology and its associated telecommunications channels to Wi-Fi connected, smart electric resistance water heater control switches.</p> <p>Capture DLC demand reduction benefits from a specific IQ customer segment that faces barriers to enrollment in other DLC and demand response programs that require broadband internet connectivity and smart, connected in-home control devices such as thermostats.</p>
Target Market:	<p>The target market is comprised of I&M Indiana IQ, multifamily tenant, residential customers with an existing and operational electric resistance element hot water heater. The water heater must be located at the same primary residence and be dedicated to a single dwelling that is individually electric metered and located within a IQ multifamily complex. Eligible participants are those that are identified and qualified as meeting at least one or any combination of the following customer segments:</p> <ul style="list-style-type: none"> • An AMI meter and telecommunication system installed by I&M sufficient to support the technology needs of this program; • Limited availability, or no access to broadband internet services; <ul style="list-style-type: none"> ○ For the purpose of this program, cellular hot spot connectivity is limited availability; ○ Income Qualified according to I&M’s IQ qualification criteria of having household income equal to or less than 200% of federal poverty level; ○ Senior citizen, fixed income; ○ Primary residence is designated rural by I&M.
Program Duration:	<p>This program will be offered to the specified customer segment as part of I&M’s deployment and use of AMI metering and infrastructure.</p>
Program Description:	<p>This program will rely on and utilize AMI system connectivity to:</p> <ol style="list-style-type: none"> 1. Differently engage specific residential customer segments, 2. Provides those customers with a DLC demand response offering that requires little to no customer involvement, 3. Requires no customer ownership of DLC equipment, and 4. Augment I&M’s demand response capabilities. <p>Certain segments of customers do not have access to broadband internet and are therefore not</p>

eligible to participate in I&M's Home Energy Management (HEM) smart thermostat DLC demand response program.

In this program, a two-way communicating load control switch (LCS) will be installed at, near, or on the electric hot water heater in the electrical circuit that powers the electric hot water heater unit. The LCS will have sufficient capability to interrupt power flow to the electric hot water heater at times when the water heater is in operation and will also have the communication capability via a Zigbee wireless communication protocol to communicate to I&M's AMI meter, capable of communicating via the same wireless protocol, or to the I&M AMI network via a Network Interface Card (NIC) installed in the LCS.

I&M will send DLC signals via the AMI communication infrastructure to the LCS located at the customer's electric hot water heater(s). Upon receipt of the specific signal, the LSC will act appropriately to cycle, according to the program's intended cycling strategy, the HVAC units during times of:

- Predicted utility system peak load conditions (non-system emergency or load management events);
- Predicted high loading on distribution circuits and/or substation distribution equipment (non-system emergency or Demand Side Management (DSM) events);
- Predicted correlating high outdoor temperatures (non-system emergency or DSM events);
- Utility supply system emergency conditions (PJM emergency events).

DSM (i.e. peak reduction, non-emergency) events will be called at the discretion of I&M, with up to 15 events per year. Emergency events will be at the discretion of PJM as defined in PJM Manual 13 – Emergency Operations, with up to 10 events per PJM planning year.

Incentive Strategy:

A qualified residential customer with a working electric resistance element hot water heater will receive a bill credit per event called and participated in during the summer months of May, June, July, August and September for each electric hot water heater unit participating in the called events according to the schedule below (Annual Payments are expected maximum annual amounts based on the maximum number of events that can be called):

Form 3 Customer Incentive-Per Event	\$0.80
Form 3 Customer Incentive--Annual Payment	\$12.00
Form 2 Customer Incentive-Per Event	\$1.00
Form 2 Customer Incentive--Annual Payment	\$15.00
Form 1 Customer Incentive-Per Event	\$1.10
Form 1 Customer Incentive--Annual Payment	\$16.50

The customer may opt out of load control event by contacting the third party program

	implementation contractor. A two-year minimum enrollment period is required.
Eligible Measures:	Residential customers, served by I&M through a residential tariff, that meet eligibility requirements set forth above, and having at least one existing electric hot water heater unit are eligible to participate. I&M will contract with a business partner who will install program equipment, including the LCS units, that is supplied by the business partner.
Implementation Strategy:	<p>Key elements of the implementation strategy include:</p> <ul style="list-style-type: none"> • Customer outreach, enrollment, and bill credit provisioning. I&M will provide for, support, and perform all customer outreach and enrollment activities. I&M will provision demand response bill credits through its internal billing and customer administration IT systems. • Contract with and oversee third party Program business partner. I&M's program implementation contractor, will install load control devices at the customer's apartment/dwelling unit. This business partner will provide a DLC demand response software platform capable of LCS communication and interface through I&M's AMI system. • Program Administration. I&M will administer, manage, and house all program-related data through its internal billing, database and customer administration IT systems. • Customer Service. I&M and the program implementation contractor will store and track interactions with the customers, provide trained customer service staff for assisting customers with questions about the program, and provide service-related calls/issues resolution. I&M and its business partner will provide staff sufficient to handle customer's inquiries, screen customers for eligibility, and explain program rules and benefits in a prompt and courteous manner. <p>I&M will determine when a DSM event is to take place, and will electronically call the event through the business partner hosted system demand response software platform which will then initialize the event through the AMI system to the LCS known to be participating in the event.</p> <p>I&M plans to initially utilize a varied control strategy ranging from non-invasive, minimally invasive, and invasive (Form 3, Form 2, and Form 1 respectively) of the electric hot water heater units. However, cycling strategies may be changed to determine the strategy that optimizes load impact without significantly affecting customer experience.</p>
Marketing Strategy:	I&M will develop a marketing and communications package to successfully communicate and promote the program to qualified customers. I&M will develop, define, and create a segmentation plan that identifies customers targeted for participation. I&M will provide for the development of marketing materials, the identification of channels and key relationships, and the leveraging of business partners to facilitate timely enrollment. Targeted marketing to

	<p>customers located on heavily-load distribution circuits, to possibly defer additional supply side infrastructure investments, may be employed as well.</p> <p>Leads generated from these efforts will be provided to the third party installation business partner to determine program eligibility, set appointments (if necessary), secure a signed program agreement from the customer, ensure the equipment can receive the load control signal, provide any additional customer education, and other program implementation requirements.</p> <p>The business partner will also provide a toll-free telephone number where customers can call to receive additional program details, enroll in the program, and ask other program related questions.</p> <p>This program will be marketed to customers as the Water Heater Program under the umbrella IM Power Rewards suite of AMI programs.</p>
<p>Evaluation, Measurement & Verification:</p>	<p>An independent third party program evaluation contractor will perform an impact evaluation for all DLC events called and will report annual system coincident peak demand reductions. The impact evaluation will determine the actual demand and energy reductions achieved and a cost/benefit analyses of the program.</p> <p>The program evaluation objectives are expected to include:</p> <ul style="list-style-type: none"> • Determination of the program impacts, including achieved demand reduction (kW), and net energy impacts. • Assessment of the program’s cost-effectiveness based on various economic tests. <p>I&M may supplement the evaluation efforts with customer surveys and additional load analyses.</p>

Residential AMI HVAC Direct Load Control Program (a.k.a. IM Power Rewards: Home AC) – Indiana

Objective:	<p>Offer a customer segment-specific IQ, rural, and senior citizen residential customer direct load control (DLC) demand response program in the I&M Indiana service territory.</p> <p>Utilize a technology solution that couples of Automated Metering Infrastructure (AMI) technology and its associated telecommunications channels to two way communicating load control switches located at customer central air conditioning or heat pump units.</p> <p>Capture DLC demand reduction benefits from specific customer segments that face barriers to enrollment in other DLC demand response programs that require broadband internet connectivity and smart, connected in-home control devices.</p>
Target Market:	<p>The target market is comprised of I&M Indiana residential customers with at least one existing and operational central air conditioning and/or heat pump units located at the same primary residence that are identified and qualified as meeting at least one or any combination of the following customer segments:</p> <ul style="list-style-type: none"> • An AMI meter and telecommunication system installed by I&M sufficient to support the technology needs of this program; • Limited availability, or no access to broadband internet services; <ul style="list-style-type: none"> ○ For the purpose of this program, cellular hot spot connectivity is limited availability; ○ Income Qualified according to I&M’s IQ qualification criteria of having household income equal to or less than 200% of federal poverty level; ○ Senior citizen, fixed income; ○ Primary residence is designated rural by I&M.
Program Duration:	<p>This program will be offered to the specified customer segments as part of I&M’s deployment and use of AMI metering and infrastructure.</p>
Program Description:	<p>This program will rely on and utilize AMI system connectivity to:</p> <ol style="list-style-type: none"> 1. Differently engage specific residential customer segments, 2. Provides specific customer segments with a DLC offering that requires little to no customer involvement, 3. Requires no customer ownership of DLC equipment, and 4. Augment I&M’s demand response capabilities. <p>Certain segments of customers do not have access to broadband internet and are therefore not eligible to participate in I&M’s Home Energy Management (HEM) smart thermostat DLC demand response program.</p>

	<p>In this program, a two-way communicating load control switch (LCS) will be installed on the outside of the customer’s home in the electrical circuit that powers the central air conditioning unit. The LCS will have sufficient capability to interrupt power flow to the air conditioner at times when the air conditioner is in operation. The LCS will communicate via either a Zigbee wireless communication protocol to I&M’s AMI meter, which would be capable of communicating via the same wireless protocol, or to the I&M AMI network via a Network Interface Card (NIC) installed in the LCS.</p> <p>I&M will send DLC signals via the AMI communication infrastructure to the LCS located at the customer’s central air conditioner(s) or central air source heat pumps(s) (HVAC units). Upon receipt of the specific signal, the LSC will act appropriately to cycle, according to the program’s intended cycling strategy, the HVAC units during times of:</p> <ul style="list-style-type: none"> • Predicted utility system peak load conditions (non-system emergency or Demand Side Management (DSM) events); • Predicted high loading on distribution circuits and/or substation distribution equipment (non-system emergency or DSM events); • Predicted correlating high outdoor temperatures (non-system emergency or DSM events); • Utility supply system emergency conditions (PJM emergency events). <p>DSM (i.e. peak reduction, non-emergency) events will be called at the discretion of I&M, with up to 15 events per year. Emergency events will be at the discretion of PJM as defined in PJM Manual 13 – Emergency Operations, with up to 10 events per PJM planning year.</p>
Incentive Strategy:	<p>A qualified residential customer with a working central air conditioner or heat pump will receive a bill credit of \$1.95 per event called and participated in during the summer months of May, June, July, August and September for each air-conditioning/heat pump unit participating in the called events. In the case where a customer has two or more HVAC units participating in an event, the customer will receive a bill credit, as described above, for each HVAC unit completing the participation in the event.</p> <p>The customer may opt out of load control event by contacting the third party program implementation contractor. A two-year minimum enrollment period is required.</p>
Eligible Measures:	<p>Residential customers, served by I&M through a residential tariff, that meet eligibility requirements set forth above, and having at least one existing HVAC unit are eligible to participate. I&M will install and own all program equipment, including the LCS units.</p>
Implementation Strategy:	<p>Key elements of the implementation strategy include:</p> <ul style="list-style-type: none"> • Customer outreach, enrollment, and bill credit provisioning. I&M will provide for, support, and perform all customer outreach and enrollment activities. I&M will

	<p>provision demand response bill credits through its internal billing and customer administration IT systems.</p> <ul style="list-style-type: none">• Contract with and oversee third party Program LCS installation business partner. I&M's program implementation contractor will install load control devices at the customer's home. To the extent reasonable, this contractor will hire qualified Indiana-based installers / technicians.• Contract with and oversee third party business partner for a DLC demand response software platform capable of AMI network interface. I&M will contract with a third party business partner that will provide a DLC demand response software platform capable of LCS communication and interface through I&M's AMI system.• Administration. I&M will administer, manage, and house all program-related data through its internal billing, database and customer administration IT systems.• Customer Service. I&M and the program implementation contractor will store and track interactions with the customers, provide trained customer service staff for assisting customers with questions about the program, and provide service-related calls/issues resolution. I&M and its business partner will provide staff sufficient to handle customer's inquiries, screen customers for eligibility, and explain program rules and benefits in a prompt and courteous manner. <p>I&M will determine when a Demand Side Management (DSM) event is to take place, and will electronically call the event through the demand response software platform which will then initialize the event through the AMI system to the LCS known to be participating in the event.</p> <p>I&M plans to initially utilize an adaptive control/cycling strategy of the HVAC units. However, other cycling strategies may be employed and evaluated to determine the strategy that optimizes load impact without significantly affecting customer comfort.</p>
Marketing Strategy:	<p>I&M will develop a marketing and communications package to successfully communicate and promote the program to qualified customers. I&M will develop, define, and create a segmentation plan that identifies customers targeted for participation. I&M will provide for the development of marketing materials, the identification of channels and key relationships, and the leveraging of business partners to facilitate timely enrollment. Targeted marketing to customers located on heavily-load distribution circuits, to possibly defer additional supply side infrastructure investments, may be employed as well.</p>

	<p>Leads generated from these efforts will be provided to the third party installation business partner to determine program eligibility, set appointments (if necessary), secure a signed program agreement from the customer, ensure the equipment can receive the load control signal, provide any additional customer education, and other program implementation requirements. The business partner will also provide a toll-free telephone number where customers can call to receive additional program details, enroll in the program, and ask other program related questions.</p> <p>This program will be marketed to customers as the Home AC Program under the umbrella IM Power Rewards suite of AMI programs.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform an impact evaluation for all DLC events called and will report annual system coincident peak demand reductions. The impact evaluation will determine the actual demand and energy reductions achieved and a cost/benefit analyses of the program.</p> <p>The program evaluation objectives are expected to include:</p> <ul style="list-style-type: none">• Determination of the program impacts, including achieved demand reduction (kW), and net energy impacts.• Assessment of the program's cost-effectiveness based on various economic tests. <p>I&M may supplement the evaluation efforts with customer surveys and additional load analyses.</p>

Small Business AMI Direct Load Control Program (a.k.a. IM Power Rewards: Work Thermostat) – Indiana

Objective:	<p>Offer a small business customer direct load control (DLC) program in the I&M Indiana service territory.</p> <p>Utilize Automated Metering Infrastructure (AMI) technology and its availability for hourly end-use consumption data to better identify, with certain precision, smaller demand load reductions resulting from small business customer DLC load reduction events.</p> <p>Improve small business customer segment demand reduction identification through the use of AMI interval meter data, where aggregate monthly meter reading data and information yields limited confirmation ability and load reduction precision for DLC demand response usage reductions.</p>
Target Market:	<p>I&M Indiana small business customers with at least one existing and operational central air conditioning and/or heat pump units located at the same commercial business property that are identified and qualified as meeting the following:</p> <ul style="list-style-type: none"> • A maximum of 40 kW in monthly peak demand usage as measured by the Company’s electric meter; • An AMI meter and telecommunication system installed by I&M sufficient to support the technology needs of this program; • At least one HVAC equipment measure available for demand response control through wireless, remote capability including: <ul style="list-style-type: none"> ○ Compliant Wi-Fi connected thermostats in which the Customer allows the Company to vary the air conditioner compressor motor or heat pump compressor motor run time for demand response events; ○ Complaint Wi-Fi connected variable control air flow motors with carbon dioxide (CO₂) or occupancy sensors in which the Customer allows the Company to vary for demand response events; • Customer-owned broadband internet services; • Customer-owned, Program compliant remote control energy management system (EMS) and/or remote, electronic means of access to program controlled DR measures such as through a Program compliant thermostat manufacturer API arrangement. <ul style="list-style-type: none"> ○ Customer-owned Company business partner EMS DR measure and equipment system preferred • Commercial business hours of operation identified as overlapping with typical Company and PJM summer cooling season peak periods (e.g. weekday, noon to 8 pm) where high probability exists for HVAC system typical operation.

Program Duration:	This program will be offered to the specified customer segment as part of I&M’s deployment and use of AMI metering and infrastructure.
Program Description:	<p>This program will rely on and use AMI system hourly usage data and information to:</p> <ol style="list-style-type: none"> 1. Improve the viability for commercial small business demand response; 2. Improve the precision and resolution for demand response load reduction identification for small commercial HVAC DLC loads as compared to that available from non-AMI metering data and systems; 3. Engage customer-owned DLC equipment through Company preferred business partner systems; and, 4. Augment I&M’s demand response capabilities. <p>Participating small business customers must have compliant DLC DR measures and systems installed, operating, and available for demand response load events to be called according to the terms of the Company’s Work Energy Management (WEM) tariff and as set forth in the Target Market section above.</p> <p>I&M will send DLC signals via its preferred business partner systems. Participating customers must agree to and provide, ongoing for the duration of their participation in the program, Company electronic access to Program DLC DR systems and equipment. DLC systems and measures will control customer’s central air conditioner(s) or central air source heat pumps(s) (HVAC units) or variable HVAC related air flow equipment. Upon receipt of the specific signal, the EMS or DLC measures will act appropriately to cycle, according to the program’s intended cycling strategy, the HVAC units during times of:</p> <ul style="list-style-type: none"> • Predicted utility system peak load conditions (non-system emergency or Demand Side Management (DSM) events); • Predicted high loading on distribution circuits and/or substation distribution equipment (non-system emergency or DSM events); • Predicted correlating high outdoor temperatures (non-system emergency or DSM events); • Utility supply system emergency conditions (PJM emergency events). <p>DSM (i.e. peak reduction, non-emergency) events will be called at the discretion of I&M, with up to 15 events per year. Emergency events will be at the discretion of PJM as defined in PJM Manual 13 – Emergency Operations, with up to 10 events per PJM planning year.</p>
Incentive Strategy:	<p>At the Company’s sole discretion, participating, compliant small business customers may receive the Company’s preferred business partner DLC equipment and systems as a program incentive, which can include:</p> <ul style="list-style-type: none"> • A EMS cell phone app, which will provide the customer and the Company, with the means for remote access control and management for their DLC measures; and, • DR measures (including installation), as determined by the Company’s business partners, that facilitate remote control for DR events;

	<ul style="list-style-type: none"> ○ Wi-Fi connected thermostat connected to customer-owned and provided broadband internet connection; and/or; ○ HVAC related variable air flow control measures. <p>A qualified small business customer with a working central air conditioner or heat pump will receive a bill credit of \$1.95 per event called and participated in during the summer months of May, June, July, August and September for each air-conditioning/heat pump unit/variable air flow motor participating in the called events. In the case where a customer has two or more HVAC units, or measures, participating in an event, the customer will receive a bill credit, as described above, for each HVAC unit or measures completing the participation in the event.</p> <p>The customer may opt out of load control event by contacting the third party program implementation contractor. A two-year minimum enrollment period is required.</p>
Implementation Strategy:	<p>Key elements of the implementation strategy include:</p> <ul style="list-style-type: none"> ● Customer outreach, enrollment, and bill credit provisioning. I&M will provide for, support, and perform all customer outreach and enrollment activities. I&M will provision demand response bill credits through its internal billing and customer administration IT systems. ● Contract with and oversee preferred business partner, third party Program system and measures, as needed and as appropriate. I&M may contract with a preferred business partner to offer and provide for Program systems and measures made available to participating customers at the sole discretion of I&M. I&M will also coordinate, oversee, and manage the DLC DR interface requirements and needs in order to call demand response events through this vendor’s electronic systems to the customer owned, vendor provided EMS’ and DLC DR measures. ● Contract with and oversee third party Program systems and measure installation business partner as needed. I&M’s program implementation contractor may install load control devices at the customer’s business location as determined by the Company. To the extent reasonable, this contractor will hire qualified Indiana-based installers / technicians. ● Contract with and oversee third party business partner, as needed and as appropriate, for a DLC demand response software platform. I&M will contract with a third party business partner that will provide a DLC demand response software platform capable of DLC DR EMS system and measure communication and interface event calling and management. ● Program Administration. I&M will administer, manage, and house all program-related data through its internal billing, database and customer administration IT systems. ● Customer Service. I&M and the program implementation contractor will store and track interactions with the customers, provide trained customer service staff for assisting

	<p>customers with questions about the program, and provide service-related calls/issues resolution. I&M and its business partner will provide staff sufficient to handle customer's inquiries, screen customers for eligibility, and explain program rules and benefits in a prompt and courteous manner.</p> <p>I&M will determine when a DSM event is to take place, and will electronically call the event through the demand response software platform.</p> <p>I&M plans to initially utilize either (or both) a 2 or 4 degree thermostat temperature setback strategy for thermostat controlled HVAC units.</p> <p>I&M plans to cycle directly any controlled variable air flow HVAC related measures (e.g. fan motors) but will coordinate with any coincidence for HVAC thermostat setback also used at each customer business premise.</p> <p>Other cycling strategies may be employed and evaluated to determine the strategy that optimizes load impact without significantly affecting customer business operations.</p>
Marketing Strategy:	<p>I&M will develop a marketing and communications package to successfully communicate and promote the program to qualified customers. I&M will develop, define, and create a segmentation plan that identifies customers targeted for participation. I&M will provide for the development of marketing materials, the identification of channels and key relationships, and the leveraging of business partners to facilitate timely program enrollment. Targeted marketing to customers located on heavily-load distribution circuits, to possibly defer additional supply side infrastructure investments, may be employed as well.</p> <p>Leads generated from these efforts will be provided to the third party installation business partner to determine program eligibility, set appointments (if necessary), secure a signed program agreement from the customer, ensure the equipment can receive the load control signal, provide any additional customer education, and other program implementation requirements.</p> <p>I&M will provide a toll-free telephone number where customers can call to receive additional program details, enroll in the program, and ask other program related questions.</p> <p>This program will be marketed to customers as the Work Thermostat Program under the umbrella IM Power Rewards suite of AMI programs.</p>
Evaluation, Measurement & Verification:	<p>An independent third party program evaluation contractor will perform an impact evaluation for all DLC events called and will report annual system coincident peak demand reductions. The impact evaluation will determine the actual demand and energy reductions achieved and a cost/benefit analyses of the program.</p> <p>The program evaluation objectives are expected to include:</p> <ul style="list-style-type: none"> • Determination of the program impacts, including achieved demand reduction (kW), and net energy impacts. • Assessment of the program's cost-effectiveness based on various economic tests.

	<p>I&M may supplement the evaluation efforts with customer surveys and additional load analyses.</p>
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I&M DSM PLAN
Oversight Process

(a) **Oversight Board Members.** The five voting members of the I&M DSM Oversight Board (OSB) include all Parties to this proceeding: I&M, I&M Industrial Group, Citizens Action Coalition of Indiana (CAC), the City of Fort Wayne and the Indiana Office of Utility Consumer Counselor (OUCC).

(b) **Quarterly OSB Meetings.** I&M will hold meetings with its OSB at least quarterly, with meeting dates determined by the OSB. OSB members can submit agenda items to I&M before each quarterly meeting. I&M will distribute meeting agendas for the quarterly meetings to OSB members no less than 5 business days before each meeting. The quarterly meetings will provide I&M an opportunity to gather feedback from OSB members on performance to date and seek input on upcoming program and budget decisions.

(c) **OSB Voting Rights.** A vote of the five OSB voting members will be taken on the following issues as they arise:

(i) **EM&V:**

- Selection of the EM&V vendor;
- Application of the EM&V results to shared savings, lost revenues and final energy savings;

(ii) **Program Funds:**

- Request by I&M to move approved funds between sectors;
- Any I&M proposal to reassign more than 25% of a sector's total budget to other programs in the same sector;

- Any I&M request to spend up to 10% more than the estimated total budget for each sector, as shown in the DSM Plan;
- Any I&M request to move approved program funds to another program from the low-income program that is being provided despite its inability to score as cost-effective.

(iii) Adding New OSB Members:

- Any request to add new voting members to the OSB. The addition of new OSB members will require a unanimous vote.

(d) Voting Process: I&M will provide five (5) business days advance notice of the need for a vote by the OSB, unless otherwise agreed upon. I&M will provide all pertinent information concerning I&M's program required for the OSB to make informed decisions as soon as it becomes available, but not less than five business days before the vote, unless otherwise agreed by all voting members. The provision of information by the Company should not be read to mean that the Company is required to research or obtain information on behalf of any OSB member(s). OSB members will act in good faith to not use requests for information to unnecessarily delay voting on any issue. If a vote is properly noticed to all voting members of the OSB and a member fails to act by the designated voting deadline, that failure to act will reduce the number of votes on that issue. The vote is determined by a simple majority vote of the voting members participating in the particular vote.

(e) OSB Communication Between Quarterly Meetings. OSB members may communicate one-on-one or in a joint OSB meeting or conference call between quarterly OSB meetings if needed to vote on proposals that require OSB approval, get feedback,

obtain program or budget updates, address questions, or discuss concerns. If a vote is required between quarterly meetings, the voting shall be conducted electronically within a week of the notice, subject to the same advance notice requirements discussed above. I&M will also provide monthly scorecards consistent with current format within 45 days of the end of each month, based on all data available at that time. If any data is missing or needs to be confirmed, I&M will note that on the scorecard. I&M will use its best efforts to ensure that OSB members have all appropriate information to be fully informed on the progress of I&M's DSM Plan. If any information includes trade secrets or other protected confidential information, OSB members will be required to execute appropriate non-disclosure agreements before I&M provides that information.

(f) Advance Notice of Future Filings: I&M will notify OSB members prior to making a future DSM plan or reconciliation filing to provide a reasonable opportunity for discussion and input. I&M will also file periodic updates address questions, or discuss concerns. If a vote is required between quarterly meetings, the voting shall be conducted electronically within a week of the notice, subject to the same advance notice requirements discussed above. I&M will also provide monthly scorecards consistent with current format within 45 days of the end of each month, based on all data available at that time. If any data is missing or needs to be confirmed, I&M will note that on the scorecard. I&M will use its best efforts to ensure that ass members have all appropriate information to be fully informed on the progress of I&M's DSM Plan. If any information includes trade secrets or other protected confidential information, OSB members will be required to execute appropriate non-disclosure agreements before I&M provides that information.

(g) **Dispute Resolution Process**: If there is an issue concerning a pending action by I&M that any voting member of the OSB indicates is in need of further discussion or escalation, I&M will delay implementation of any items that do not require immediate action, so that I&M management and OSB voting members' management can discuss the matter further to ensure a sufficient opportunity for input is provided before action is taken. That management conversation shall happen within 3 business days of a request, unless otherwise agreed. However, if the matter is time sensitive, I&M and management of the concerned OSB member will make every effort to provide management personnel for immediate discussion (within 1 business day or as otherwise agreed). The OSB voting members agree to use this escalation process in good faith, escalating only those matters appropriate for stakeholder management's consideration. This dispute resolution process does not limit or otherwise affect the OSB members' ability to seek relief from the Commission.

(h) **Broader Stakeholder Input**: This process does not limit the ability of I&M to seek other interested stakeholder input beyond the members of the OSB.