
2021 INTEGRATED RESOURCE PLANNING

PUBLIC SUMMARY

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An **AEP** Company

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I&M 2021 IRP Public Summary

This 2021 Integrated Resource Plan (IRP, Plan, or Report) is submitted by Indiana Michigan Power Company (I&M or Company) based upon the best information available at the time of preparation. The purpose of the IRP is to develop a set of supply- and demand-side resources that guides how I&M generates and supplies electricity in a way that balances affordability, sustainability, and reliability.

This Plan is not a firm commitment to specific resource additions or other courses of action over the period of the plan, as the future is uncertain. The Plan provides the basis for a short-term course of action and strives to maintain optionality in meeting I&M's resource obligations in order for the Company to take advantage of market opportunities and technological advancements. Accordingly, this IRP includes a near-term plan, 2022 – 2028, and a long-term-indicative plan, 2029 – 2041, based on a number of assumptions that are subject to change as new information becomes available or as circumstances warrant.

I&M is on the brink of a major generation transformation as Rockport Unit 1 and Unit 2 will retire by the end of 2028. These coal-fired resources represent nearly one-half of the Company's generation fleet and the retirement of these units provides a significant opportunity for I&M to transition to more renewable resources, further diversify I&M's generation portfolio, and reduce its carbon emissions¹. At the core of this transformation must be reliability, resiliency and affordability. To assess this, during the IRP development I&M established a Balanced Scorecard that evaluated a wide range of potential portfolios against metrics that included: affordability, rate stability, sustainability impact, market risk minimization, reliability, and resource diversity. Additionally, I&M's Preferred Portfolio was developed with the understanding that significant resource decisions will need to be made in the future regarding the possibility to extend the operating life of the Cook Nuclear Plant.

¹ I&M is part of American Electric Power (AEP), and AEP has set carbon emission reduction goals to achieve 80% reduction by 2030 from a 2000 baseline and net zero emissions by 2050. See [AEPs-Climate-Impact-Analysis-2021.pdf \(aepsustainability.com\)](#).

Indiana Michigan Power Company (I&M or Company) customers consist of both retail and sales-for-resale (wholesale) customers located in the states of Indiana and Michigan (Figure 1). Currently, I&M serves approximately 471,000 and 130,000 retail customers in the states of Indiana and Michigan, respectively. The peak load requirement of I&M's total retail and wholesale customers is seasonal in nature, with distinctive peaks occurring in the summer and winter seasons. I&M's all-time highest recorded peak demand was 4,837MW, which occurred in July 2011; and the highest recorded winter peak was 3,952MW, which occurred in January 2015. The most recent (summer 2020 and winter 2020/21) actual I&M summer and winter peak demands at the time this process began were 3,970MW and 3,365MW, occurring on July 19, 2020 and February 17, 2021, respectively.

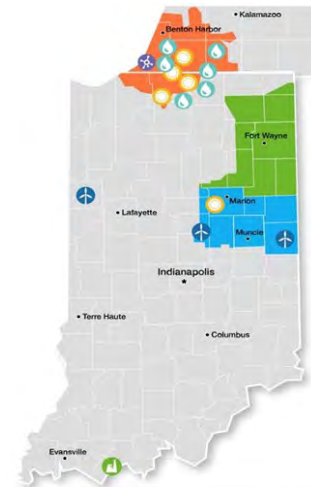


Figure 1: I&M Service Territory and Generating Locations

Over the next 20-year period (2022-2041), I&M's service territory is expected to see population and non-farm employment growth of 0.0% and 0.4% per year, respectively. Not surprisingly, I&M is projected to see customer count growth at a similar rate of 0.1% per year. Over the same forecast period, I&M's retail sales are projected to grow at 0.3% per year with stronger growth expected from the industrial class (+0.46% per year) while the residential class experiences 0.3% CAGR and the commercial class remains relatively flat over the forecast horizon. Finally, I&M's internal energy and peak demand are expected to decrease at an average rate of 0.5% and 0.3% per year, respectively, through 2041.

Indiana IRP Stakeholder Process

For this IRP, I&M considered multiple sources of feedback, including comments in the Director's report, Stakeholder feedback, internal suggestions, as well as recommendations from the Siemens PTI consulting team. The Company engaged an experienced outside consultant, Siemens PTI, to bring their own experience, expertise, and collaboration tools to the stakeholder process. Both Siemens PTI and I&M promoted Stakeholder engagement during Stakeholder meetings despite the fact that all Stakeholder meetings had to be held virtually during this process due to the COVID pandemic.

The goal was a Stakeholder engagement process focused on promoting transparency in the IRP process, encouraging questions and feedback along the way, and converting feedback to actionable suggestions to incorporate into the IRP process. IRP Stakeholders included, but were not limited to, I&M residential, commercial, and industrial customers, regulators, customer advocacy groups, environmental advocacy groups, fuel suppliers and advocacy groups and elected officials.

At the core of the process was a series of five Stakeholder Meeting Workshops. Stakeholder feedback was also received, and questions were answered via e-mail and with phone

calls/meetings in between each session per request to ensure Stakeholder feedback was considered and incorporated in the development of the plan.

Also as part of the overall Stakeholder Engagement process, the Company reviewed the proposed All-Source RFP response documents with Stakeholders for additional feedback. Additionally a separate engagement process was developed for those “Technical Stakeholders” who desired to examine in more detail the underlying analysis performed during the IRP process.



Figure 2. Topic Covered in Stakeholder Meetings

Planning Process

The I&M 2021 IRP followed a 5-step structured and holistic approach, illustrated in Figure 3 to identify the Preferred Portfolio that best meets I&M’s defined objectives over a wide range of potential future conditions and included an All-Source Informational RFP to include market-based pricing and a Market Potential Study (MPS) to inform the IRP process. This structured approach provided a comprehensive decision support tool to aid I&M in developing a long-term plan based on the current generation portfolio and the anticipated retirements of generation over the next twenty years. This long-term plan evaluates the need for additional resources and provides a resource portfolio that balances I&M’s objectives.

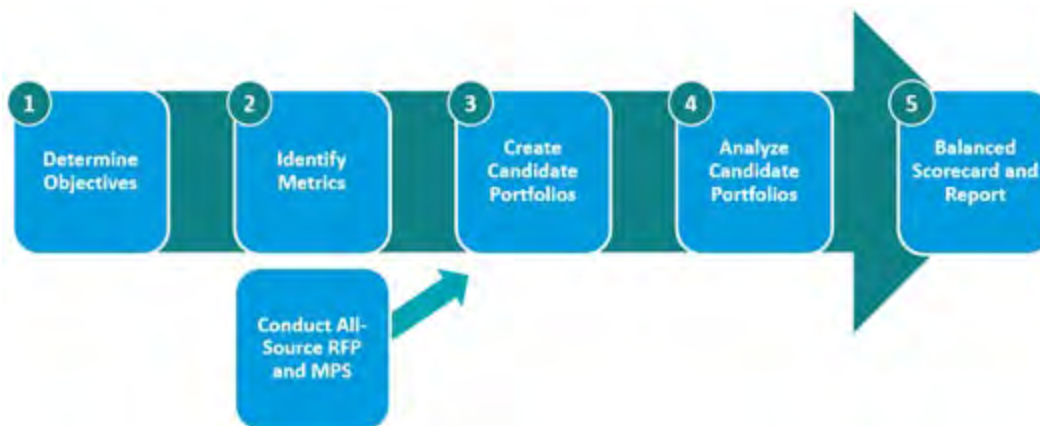


Figure 3: IRP Process

The 2021 IRP is designed to evaluate ongoing changes and uncertainties in the market. As a result, I&M's IRP objectives are based on the need for a resource strategy that provides support for a series of near-term resource decisions while providing important directional insight into the long-term resources needs and key considerations to maximize the long-term potential value to its customers and communities. To that end, I&M identified six objectives for the Preferred Portfolio in the 2021 IRP that align with customer and corporate priorities, including customer affordability, rate stability, market risk minimization, sustainability impact, reliability, and resource diversity. Table 1 provides more detail on these IRP objectives.

Table 1. I&M IRP Objectives

Objective Category	Objective	Objective Description
Affordability	Affordability	Meet energy and demand requirements of customers at an affordable cost that minimizes cost to serve load. Provide all customers with an affordable supply of energy.
	Rate Stability	Meet energy and demand requirements of customers with rate stability by providing a predictable, balanced, and diverse mix of energy resources designed to ensure costs do not vary greatly across alternative future market conditions or supply disruptions.
	Market Risk Minimization	Avoid overreliance on spot market for energy and capacity purchases and sales, which could introduce excess risk for customers.
Sustainability	Sustainability	Ability to produce energy in a way that proactively reduces pollution and impact on surrounding neighborhoods and ecosystem. Provide environmentally responsible power, leading to a low carbon future.
Reliability and Resource Diversification	Reliability	Ability to effectively produce and deliver the energy required by customers with minimal interruptions and consistent quality while maintaining compliance with PJM capacity obligations.
	Resource Diversity	Mitigate the risk of overreliance on one type of resource. Operational flexibility to back up the resource for resource types that could become operationally or economically eclipsed.

The IRP process complies with regulations and reliability requirements, while also quantifying risks introduced by the market and regulatory environments, the risk of over-reliance

on imports and/or exports, and the risk of supply disruptions. The process considered numerous new resource options across multiple portfolios and evaluated these portfolios across a wide range of metrics.

The electric utility industry is changing rapidly and is subject to a significant number of external factors that are largely outside its control. Examples include increased costs in business operations as well as the uncertainty in the timing and impacts that growth in renewable resources, customer-owned generation, and electrification of vehicles and the greater economy will have on load and resource requirements. Also, the focus of resource planning is shifting from the historical vertical approach to an integrated process that better coordinates and aligns the planning of generation, transmission, and distribution. As future IRPs are conducted, the Company expects continuous improvement in incorporating these dynamic and uncertain factors into the IRP process.

Summary of I&M's Resource Plan

I&M has prepared the Preferred Portfolio with a near-term plan, 2022 - 2028 and a long-term-indicative plan, 2029 – 2041. The near-term plan includes the resource additions that will be necessary for the Company to make from 2022 through 2028 and is inclusive of the Company's Short-Term Action Plan. The long-term-indicative plan includes the resource decisions that the Company will need to make from 2029 through the end of the planning period in 2041. The Company now has clarity regarding the Rockport Unit 1 retirement and the treatment of Rockport Unit 2 and the need for replacement capacity prior to 2028. Resource decisions beyond 2028 will ultimately be determined based on future decisions regarding the potential license extensions of the Cook Nuclear Plant, as well as other factors that will change over this time period. Because decisions have not been made regarding the license extensions and cost estimates have not been completed regarding the cost to extend the license, the Preferred Portfolio assumes Cook Unit 1 and 2 operations continue through 2034 and 2037, respectively.

With this significant decision regarding the potential license extensions at the Cook plant still uncertain, the Company was very intentional and thoughtful to structure the near-term plans in a manner that maintains optionality regarding the future decisions at the Cook Nuclear Plant. A significant consideration that the Company evaluated in the development of the Preferred Portfolio was the amount of energy being exported and potential future market risks. To maintain optionality regarding the future operations of the Cook Nuclear Plant, which is a significant emission-free energy producer, it was important for the Company to balance the need for near-term renewables and gas capacity additions with the energy position of the Company, while ensuring reliability. The resource additions included in the Company's Preferred Portfolio allow the Company to effectively begin its generation transition plan, replace the Rockport capacity, and maintain the option to extend the Cook Nuclear Plant Operating License. The Company's Preferred Portfolio achieves these three goals and performs well in the Balanced Scorecard against other Candidate Portfolios.

In addition to the existing resources, nameplate capacities of new supply-side resources in the Preferred Portfolio are shown in Figure 3 and include 1,600 MW of wind resources selected through 2038, 1,900 MW of stand-alone solar resources selected through 2041, the selection of hybrid paired solar + storage resources in 2027 of 60 MW storage / 300 MW Solar in 2027, 1,070 MW of Gas CC selected in 2037, and 1,750 MW of Gas CT resources through 2040.

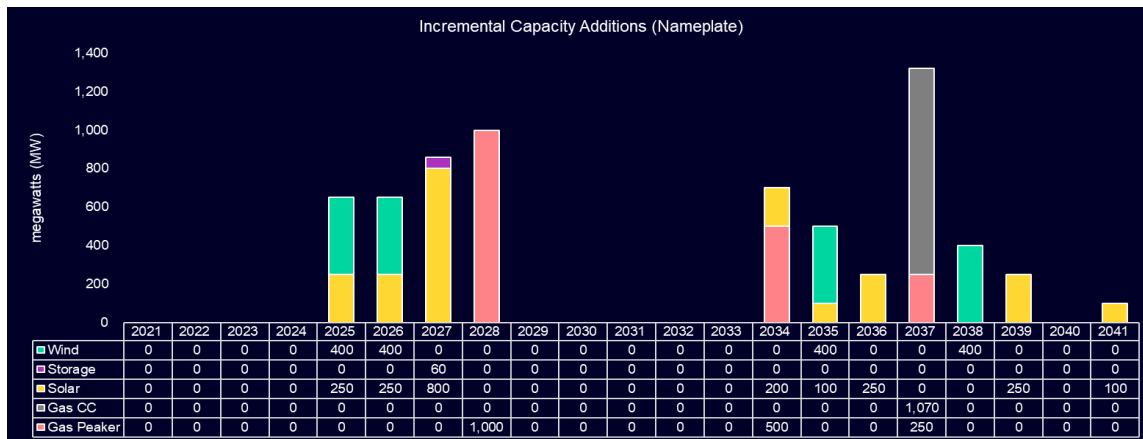


Figure 4. Incremental Capacity Additions (UCAP)

Figure 5 illustrates I&M's UCAP capacity position for the Preferred Portfolio and the PJM capacity obligation including existing resources for the periods when their capacity is available. The near-term plan includes both supply-side and demand-side resource additions in the Preferred Portfolio to meet the Company's near-term capacity needs. Resource additions through 2028 are sufficient from a capacity and energy needs perspective, with the exception of a short-term capacity deficit relative to the PJM minimum reserve requirement in PJM Planning Year 2024/2025. This deficit is currently expected to be approximately 314 MW, and will be filled with short-term PJM capacity purchases, as Rockport Unit 2 is transitioned out of the Company's regulated fleet and the Company transitions to a portfolio with more renewable resources. Short-term capacity needs are subject to further adjustments prior to the PJM Delivery Year based on evolving load forecasts and unit performance.

In the long-term plan between 2029 and 2041, utilizing an assumption for IRP modeling purposes that Cook Unit 1 and 2 will only operate until the end of the current license periods, the Preferred Portfolio includes an additional 800 MW of wind resources, 900 MW of solar, 1,070 MW of gas combined cycle, and 750 MW of gas peaking capacity. These resource additions will be modeled in future IRPs and updated as decisions are made regarding the Cook license extensions. The entire capacity plan is shown below:

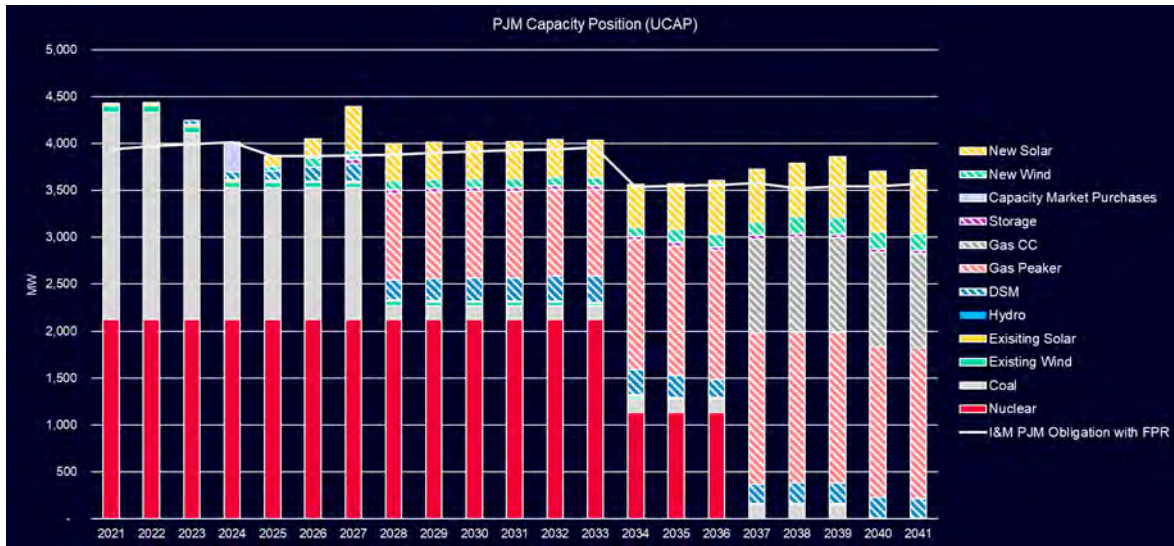


Figure 5. I&M’s Preferred Portfolio - PJM Capacity Position (UCAP)

I&M conducted an expanded MPS that evaluated for a 20-year time horizon (2023-2042) the energy efficiency, demand response, and distributed energy resources potential separately for I&M’s Indiana and Michigan jurisdictions. The MPS used the most granular load shape information available to improve the value realized from these measures. Energy Efficiency measure potential was developed using I&M’s hourly load shape forecast data through an apportioning process based on the evaluation of which measures best aligned to load shapes according to I&M’s customer segmentation and use profiles. This expanded approach in the MPS development stage helped improve energy efficiency measure attributes for the time-based value of these resources, thereby improving the level of energy efficiency benefits to be realized during the IRP modelling and optimization process.

Informed by the MPS, a diverse mix of energy efficiency bundles was selected across three vintages that peak at 247 MW in 2033. Furthermore, the Preferred Portfolio includes incremental resources of 121 MW of demand response, 71 MW of distributed energy resources and 116 MW of conservation voltage reduction, based on the Company’s MPS and internal analysis.

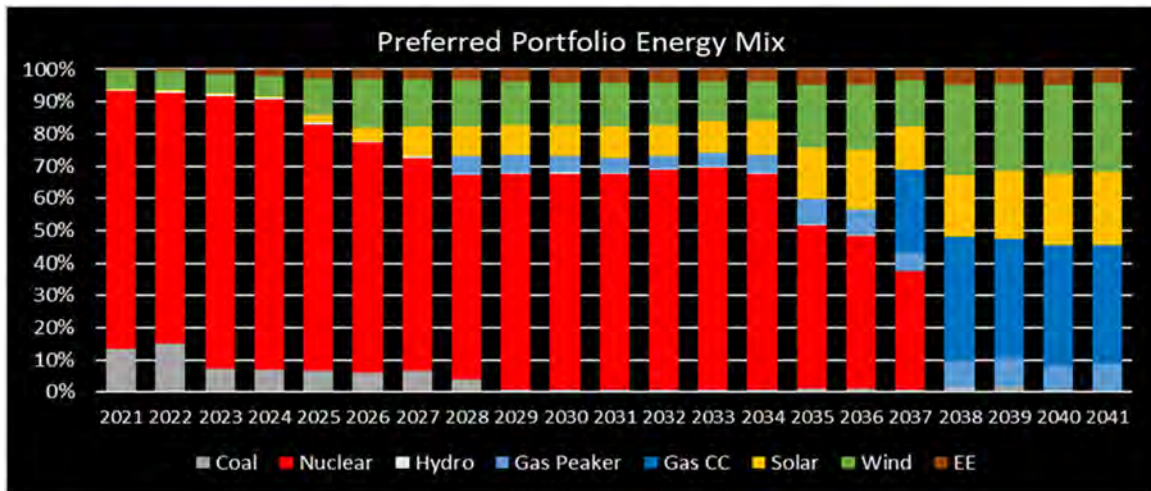


Figure 6: Preferred Portfolio Energy Mix

The forecasted energy mix by resource type contribution in the Preferred Portfolio over the planning period is illustrated in Figure 6. From an energy perspective, the Preferred Portfolio resources include the addition of energy rich renewable resources and DSM resources that serve to somewhat mitigate future risks related to fuel price uncertainty and potential carbon emission prices. Additionally, these resources include incremental dispatchable generating resources (CT) to support resource adequacy and reliability during the periods when renewable resources are not providing energy to meet the Company’s load obligation.

I&M’s Short Term Action Plan

The I&M IRP is regularly reviewed as new information becomes available. I&M intends to pursue the following activities for the IRP Short-Term Action Plan:

1. Continue the planning and regulatory actions necessary to implement additional cost-effective DSM programs in Indiana and Michigan consistent with this IRP that identified the potential for increased levels of cost-effective EE.
2. Obtain the capacity needed for the PJM Planning Year 2024/2025 deficit (currently estimated to be about 314 MW in this IRP).
3. Issue an All-Source RFP in the first quarter of 2022 to seek resources to satisfy the 2025 and 2026 needs (in-service by the end of 2024 and 2025), which the Preferred Portfolio identified as 800 MW of wind and 500 MW of solar.
4. Issue an All-Source RFP in 2023 or 2024 to satisfy identified needs, targeting 2027 and 2028 renewables, storage, and gas additions (in-service by the end of 2026 and 2027), totaling 800MW of solar, 60 MW of storage as a hybrid resource, and 1,000 MW of gas peaking.
5. Initiate efforts to evaluate Cook relicensing costs.
6. Adjust this action plan and future IRPs to reflect changing circumstances, as necessary.

Conclusion

This IRP incorporated an extensive and thorough process that engaged Stakeholders through five public Stakeholder meetings and tested several Scenarios and many different Portfolios to arrive at a Preferred Portfolio.

The Preferred Portfolio performs well across a range of metrics that were used in the Balanced Scorecard. The Preferred Portfolio is the best performing portfolio across multiple measures on the Balanced Scorecard and provides several additional benefits to I&M customers and Stakeholders, including the following:

Affordability and Rate Stability:

- The Preferred Portfolio is among the lowest reasonable cost portfolios measured on both a 20-year and 10-year cost to serve load metric. The only comparable portfolios are the Cook 2050+ life extensions portfolios, which do not include consideration of the capital investments required to extend the life of those facilities (will be evaluated further in future IRPs).
- The Preferred Portfolio has one of the lowest absolute values for the 95th percentile value of NPV cost to serve load. All portfolios share a similar upside risk. This translates into having one of the lowest risk of increases in cost across the portfolios.
- Resource type additions in the Preferred Portfolio are similar through 2028 to the portfolios that modeled Cook license extensions (Cook 2050+), resulting in a “no regrets” position for the next several years.
- The Preferred Portfolio includes dispatchable resources that can enhance opportunities for wholesale sales without overexposure to market risks.
- The Preferred Portfolio takes advantage of existing tax incentives for new wind, solar and hybrid solar resources.
- The Preferred Portfolio requires the lowest capital requirements during the near-term planning period, which also lowers the risk associated with the availability of acquiring the necessary resources.

Market Risk

- The Preferred Portfolio mitigates overreliance on market purchases and sales for capacity and energy throughout the forecast horizon.
- The Preferred Portfolio requires short-term PJM capacity purchases for capacity in 2024 to replace Rockport Unit 2 capacity.
- Market purchases and sales of energy are reasonable and there is less reliance on the spot energy market, with the Preferred Portfolio averaging 7.2% for purchases and 19.8% for sales over the forecast horizon.
- The Preferred Portfolio results in small amounts of surplus capacity over the forecast period

- The Preferred Portfolio avoids reliance on any single resource or fuel type, with potentially over 60 unique resources and eight unique fuel types.

Sustainability:

- The Preferred Portfolio leads to a lower carbon future, achieving 76% reduction by 2041, when including CO₂ emissions for short-term and spot market purchases, from 2005 levels that did not include CO₂ emissions assumptions from short-term and spot market purchases. Excluding short-term and spot market purchase emissions estimates, the Preferred Portfolio realizes CO₂ emissions reductions of 82% by 2041.
- The Preferred Portfolio includes a substantial amount of renewable resources as it continues to transform its fleet.
- The Preferred Portfolio maintains the optionality for the Cook License Extensions which maintains the opportunity to extend the operations of a significant emission-free resource.
- The Preferred Portfolio provides potential opportunities for natural gas conversion to hydrogen fuel later in the planning period.
- The Preferred Portfolio significantly reduces the reliance on coal fired generation by 2029.

Reliability and Resource Diversity:

- The Preferred Portfolio includes additions that when added to the Company's current resources, provides a more diversified portfolio of supply-side and demand-side resources that will allow the Company to optimize the use of each resource type to ensure the reliable supply of electricity while also maintaining PJM capacity requirements and supporting resource adequacy.
- The Combustion Turbine (CT) resources provide flexible, fast ramping capabilities and can help mitigate risks associated with intermittent renewable resource additions.
- The Preferred Portfolio manages the reliance on market purchases and sales for capacity and energy purposes. In addition, it avoids reliance on any single resource or fuel type, with potentially over 60 unique resources and eight unique fuel types.

The Preferred Portfolio manages the reliance on either market purchases or sales for capacity or energy purposes. In addition, it avoids reliance on any single resource or fuel type, with potentially over 60 unique resources and 8 unique fuel types and offers I&M significant flexibility should future conditions differ considerably from the assumptions underpinning the Preferred Portfolio.