
INTEGRATED RESOURCE PLANNING PUBLIC SUMMARY



An **AEP** Company

BOUNDLESS ENERGY™

I&M 2018-19 IRP Public Summary

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 (see Figure 1). Currently, I&M serves approximately 466,000 and 129,000 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 2018 and winter 2018/19) actual I&M summer and winter peak demands were 4,369MW and 3,770MW, occurring on June 18, 2018 and January 30, 2019, respectively.



Figure 1. I&M Service Territory

Over the next 20 year period (2019-2038) I&M's service territory is expected to see population and non-farm employment growth of 0.0% and 0.3% 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 0.1% per year with stronger growth expected from the industrial class (+0.4% per year) while the residential class remains relatively flat and the commercial class experiences a decline (-0.3% per year) over the forecast horizon. Finally, I&M's internal energy and peak demand are expected to decrease at an average rate of 0.2% and 0.2% per year, respectively, through 2038.

Indiana IRP Stakeholder Process

I&M implemented an enhanced stakeholder outreach/public advisory process to guide the development of its Integrated Resource Plan. I&M designed and implemented the IRP public advisory process in accordance with the requirements of Commission Rule 170 IAC 4-7-2.6. I&M's goal throughout the process was to improve its resource planning process by conducting a meaningful, transparent and comprehensive stakeholder outreach effort to explore a wide-range of assumptions and resource options as I&M anticipates substantial changes in its resource mix over the IRP planning period. The result of this process is a well-reasoned, vetted Preferred Plan, based on current assumptions, to help guide I&M's future resource decisions. Some key take-aways from the process are summarized below:

- Evaluating a “High Renewables” scenario;
- Evaluating Rockport scenarios with and without carbon futures;
- Evaluating an “EE Decrement” approach;
- Modifying EE potential to reflect the Market Potential Study;
- Evaluating unconstrained renewable build scenarios;
- Evaluating portfolios with Low Load with Low Band pricing and the High Load with High Band pricing;
- Providing access to the Company's modeling software and associated training; and
- Providing opportunities at all Stakeholder meetings for stakeholders to present and discuss key issues, including a presentation by students from Ball State University Immersive Learning Project.

Planning Process

The objective of a resource planning effort is to recommend a system resource plan that balances least-cost objectives with planning flexibility, asset mix considerations, adaptability to risk, conformance with applicable North American Electric Reliability Corporation (NERC) and RTO criteria. In addition, given the unique impact of fossil-fired generation on the environment, the planning effort must ultimately be in concert with anticipated long-term requirements as established by the EPA-driven environmental compliance planning process.

The information presented with the IRP includes descriptions of assumptions, study parameters, methodologies, and results, including the integration of traditional supply-side resources, renewable energy resources, distributed generation and DSM programs.

In general, assumptions and plans are reviewed and modified periodically when new information becomes available. On-going analysis is required by multiple disciplines across I&M and AEP to ensure that market structures and governances, technical parameters, regulatory constructs, capacity supply, energy adequacy and operational reliability, and environmental mandate requirements are current to ensure optimal capacity resource planning.

Further influencing this process are a growing number of federal and state initiatives that address many issues relating to industry restructuring, customer choice, and reliability planning. Currently, fulfilling a regulatory obligation to serve native load customers represents one of the cornerstones of the I&M IRP process. Therefore, as a result, the “objective function” of the modeling applications utilized in this process is the establishment of the least-cost plan, with *cost* being more accurately described as *revenue requirement* under a traditional ratemaking construct.

That does not mean, however, that the most appropriate plan is the one with the absolute least cost over the planning horizon evaluated. Other factors were considered in the determination of the Plan. To challenge the robustness of the IRP, sensitivity analyses were performed to address these factors.

In this IRP, the Company continues to model portfolios that not only add resources to meet its PJM capacity obligation, but also provide zero variable cost energy to enhance rate stability, reduce emissions and further diversify its generation portfolio.

Summary of I&M's Resource Plan

I&M has analyzed various scenarios that would provide adequate supply and demand resources to meet its projected peak load obligations, and reduce or minimize costs to its customers, including energy costs, for the next twenty years. Following are the key components and inputs of I&M's Preferred Plan:

- Continue operation of the Cook units through the remainder of their current license periods;
- The Rockport Unit 2 lease expires at the end of 2022 and retire Rockport Unit 1 at the end of 2028;
- Continue deployment of supply-side renewable resource including the addition of over 3600 MW of wind and large scale solar by 2038, beginning in 2022;
- Incorporate 50MW of Batteries and 54MW of Micro/Mini-Grid resources by 2028;
- Add 2,700MW of Natural Gas Combined Cycle (NGCC) generation including 770 MW in 2028 to replace Rockport capacity, 770MW in 2034 to replace Cook Unit 1 and 1,155MW in 2037 to replace Cook Unit 2 at the end of their current license periods;
- Incorporates demand-side resources including 180MW of Energy Efficiency (EE) and Demand Response (DR) and
- Recognizes that residential and commercial customers will add distributed resources, primarily in the form of residential and commercial rooftop solar (i.e. Distributed Generation [DG]).

Figure 2 below shows I&M's "going-in" capacity position (i.e. before resource additions) over the planning period, which uses the PJM summer peak to determine resource requirements. Through 2022, I&M's existing capacity resources meet its forecasted internal demand. In 2023,

I&M anticipates experiencing a capacity shortfall, 484MW, based upon its assumption of not renewing its lease of Rockport Unit 2. This capacity shortfall is anticipated to increase to 1,762MW in 2028 upon the retirement of Rockport Unit 1. The retirement of Cook Unit 1 in 2034 and Cook Unit 2 in 2038 further exposes I&M’s capacity shortfall to 4,060MW.

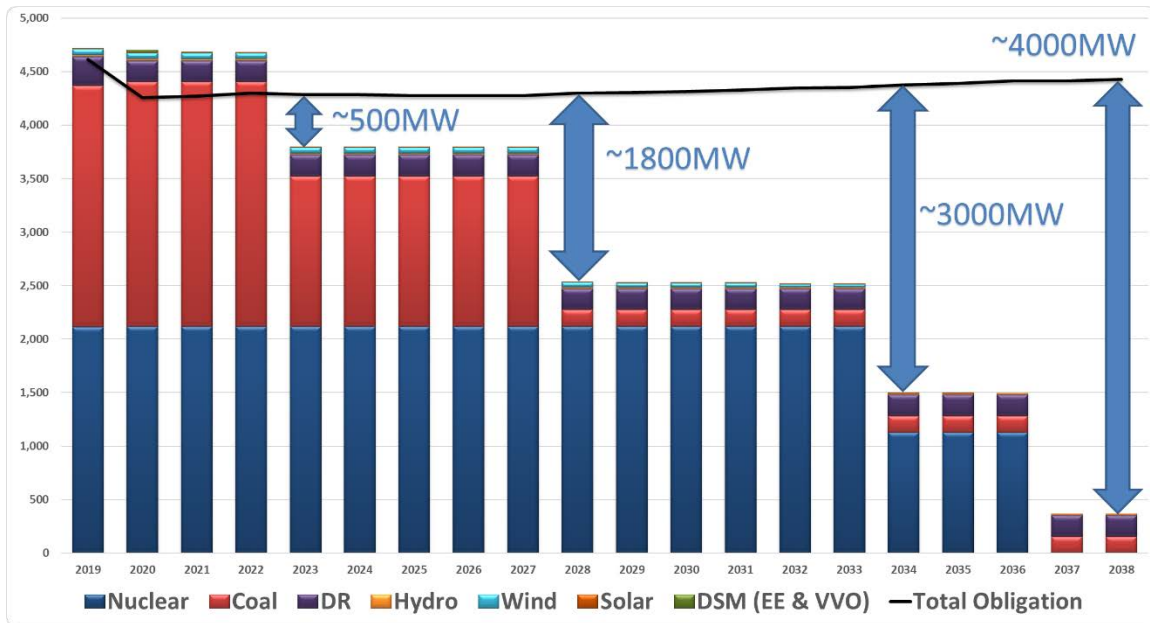


Figure 2. I&M “Going-In” Position

I&M has identified a diverse set of resources to address the capacity deficit position over the planning period. (Figure 3) These additions, which include solar, wind, natural gas, energy storage and energy efficiency resources along with short-term market purchases (STMP), are expected to eliminate the capacity deficit through the planning period. The solar resources are assumed to provide PJM capacity equal to 51.1% of their nameplate rating (or 102MW for 200MW of nameplate solar) and wind resources are assumed to provide PJM capacity equal to 12.3% of their nameplate rating (or 37MW for 300 MW of nameplate wind).

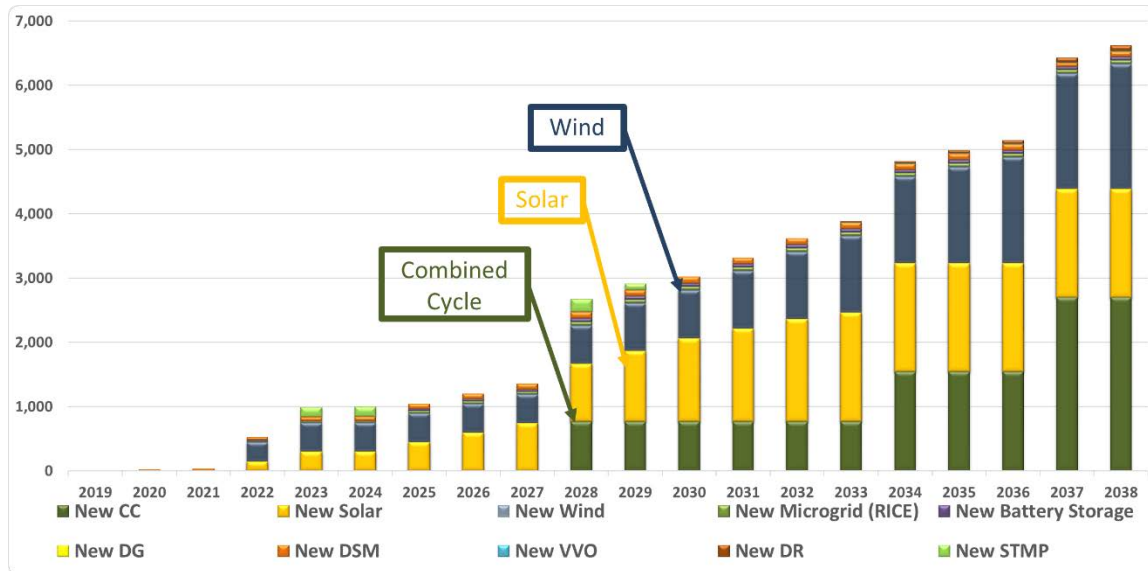


Figure 3. I&M New Capacity Additions – Nameplate (MW)

The resource additions allow I&M to satisfy its PJM load obligations over the planning period. Additionally, EECO and customer owned generation such as rooftop solar will also improve I&M’s capacity position.

Figure 4 illustrates I&M’s commitment to renewables and DSM over the planning period. The first nine years of the plan focuses on adding smaller, geographically diverse resources consisting of solar, wind, DSM, energy storage, microgrids and short-term market purchases. The quantity of these potential resource additions depends on the specific resources available (and their cost) during a “resources acquisition” process, providing the Company flexibility to acquire more or less of these planned resources at those times. This flexibility included in the Preferred Plan may ultimately lead to a delay or the elimination of one or more of the combined cycle resources added over the planning period.

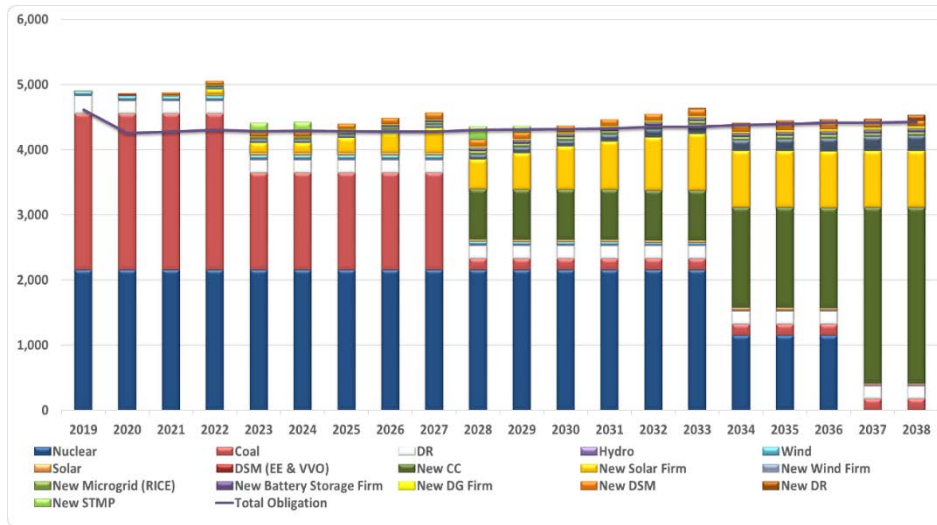


Figure 4. Existing and New Capacity Additions – FIRM (MW)

The capacity contribution from renewable resources is modest due to their intermittent characteristic; however, those resources (particularly wind) provide a significant volume of energy. Figure 5 and Figure 6 show annual changes in energy mix that result from the Preferred Plan over the planning period. I&M’s energy output shows a significant transformation away from coal and nuclear while the energy output attributable to renewable generation (wind and solar) grows.

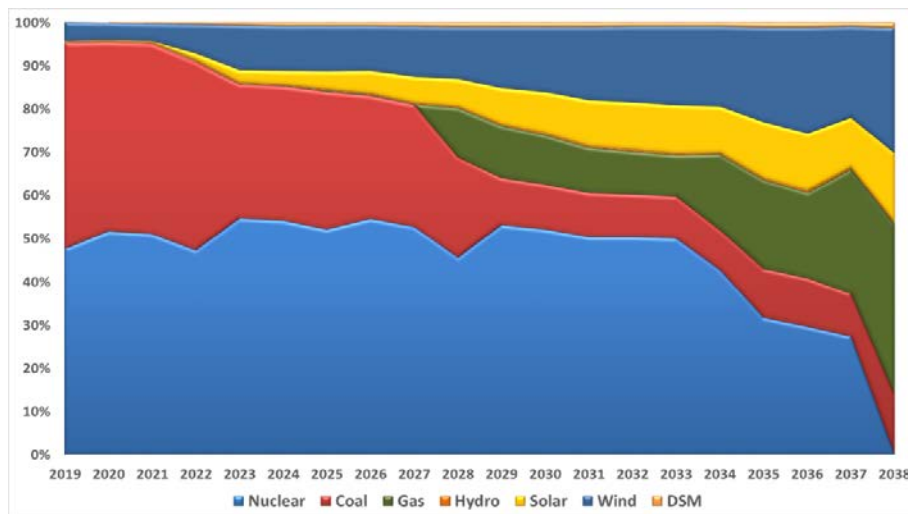


Figure 5. I&M’s Preferred Plan Percentage of Annual Energy by Supply Type (%)

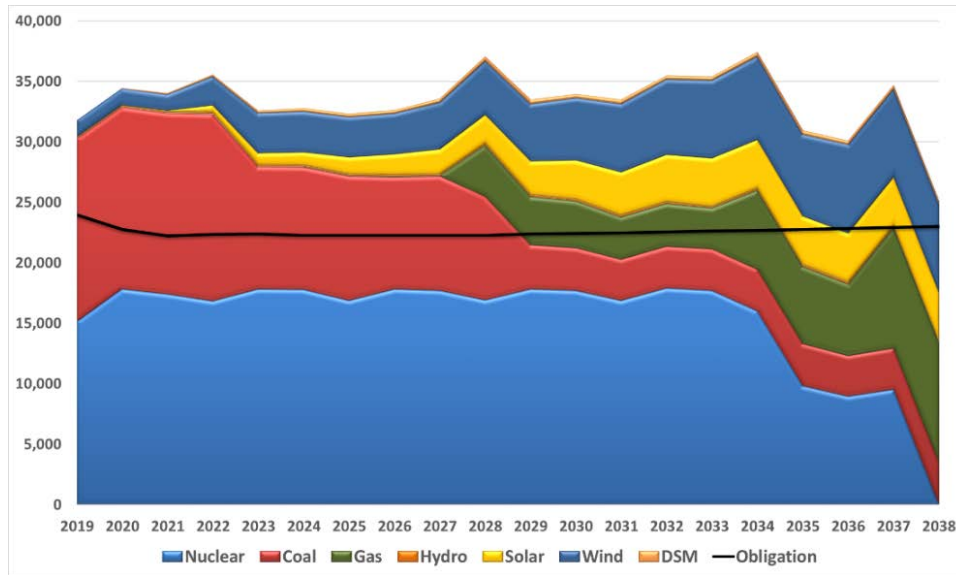


Figure 6. I&M's Preferred Plan Annual Energy Position (GWh)

Figure 7 provides insight to the emissions reductions over the planning period for the Preferred Plan. The Preferred Plan results in reductions from 2019 levels (baseline) of 65% for CO₂, and over 90% for NO_x and SO₂ emissions by 2038.

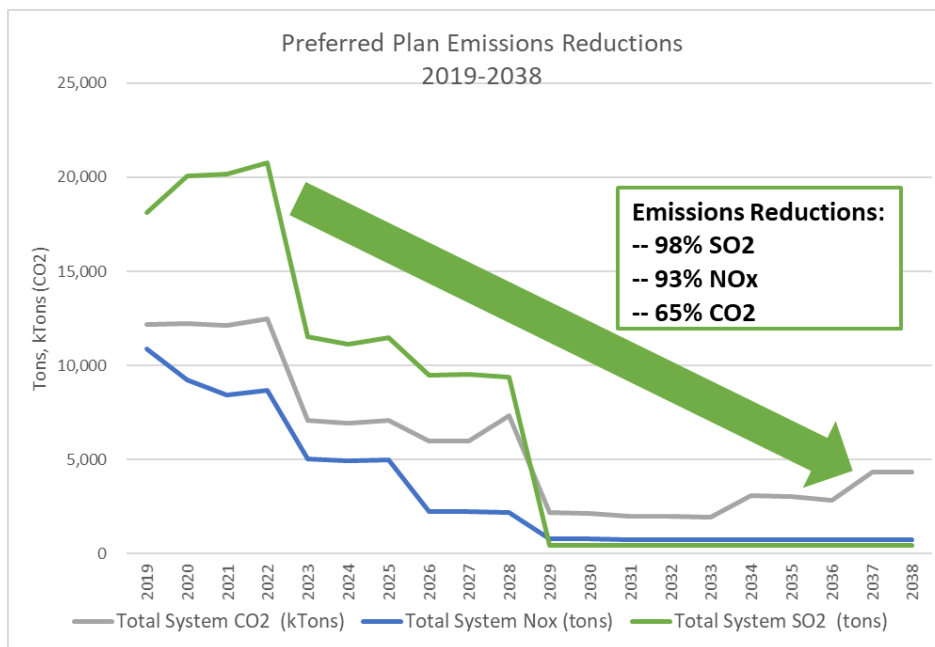


Figure 7. Preferred Plan Emissions Reductions

Conclusion

The resource portfolios developed for this IRP reflect, largely, assumptions that are subject to change; as an IRP is simply a snapshot of the future at a given time. As noted previously, this IRP is not a commitment to specific resource additions or other courses of action. The resource planning process continues to be complex, especially with regard to such things as technology advancement, changing energy supply pricing fundamentals, uncertainty of demand, and end-use efficiency improvements. These complexities exacerbate the need for flexibility and adaptability in any ongoing planning activity and resource planning process.

With this in mind, the Preferred Plan provides reliable utility service over the 20-year planning period at reasonable cost, through a combination of renewable supply-side resources and demand-side programs in the near term and renewable and gas-fired resources in the long-term. The plan provides a roadmap for I&M to serve its customers' peak load and energy requirements throughout the 20-year planning period. The Preferred Plan includes incremental resources that will provide—in addition to the needed capacity to achieve mandatory PJM peak demand requirements—additional carbon-free energy to reduce the long-term exposure of the Company's customers to PJM energy markets and potential carbon emission restrictions.