

IPL 2017 IRP Non-Technical Summary

This Non-Technical Summary provides a high-level description of Interstate Power and Light Company's ("IPL") 2017 Electric Integrated Resource Plan ("IRP" or "Resource Plan") and factors affecting the 2017 IRP. In doing so, this Non-Technical Summary describes IPL's resource needs, the resource plan IPL has created to meet those needs, the process and analytical techniques used to create the plan, and activities required over the next five years to implement the plan.

Background

Minnesota Asset Sale

On July 31, 2015, IPL closed on the sale transaction of its Minnesota electric distribution assets to the twelve member cooperatives of Southern Minnesota Energy Cooperative (SMEC). Accordingly, IPL no longer provides retail electric service to any Minnesota customers. However, as part of the transaction, SMEC and IPL entered into an agreement under which IPL sells the electric power to SMEC that is needed to serve the customers in the area in Minnesota transferred from IPL to SMEC.¹

New Generation

IPL has and continues to bring new resources into its generation fleet to benefit its customers. Of particular note, IPL placed into service on April 1, 2017, the nominal 630 MW Marshalltown Generating Station, a highly-efficient, natural-gas combined cycle generating station located in Marshalltown, Iowa. IPL also acquired the Franklin County Wind Farm, a 99 MW wind farm located in Franklin County, on April 1, 2017.

IPL is also expanding its renewable portfolio with owned and contract wind generation additions. In 2016, IPL applied to the Iowa Utilities Board ("IUB" or "Board") for and received advanced ratemaking principles to construct up to 500 MW of wind in Iowa ("New Wind I").² IPL also applied to the Board for advanced ratemaking principles in 2017 to construct up to an additional 500 MW of wind in Iowa ("New Wind II").³ IPL is awaiting the Board's decision regarding its proposed New Wind II project. The construction for these two projects will be done in phases, with in-service dates expected by the end of 2020.

Furthermore, IPL entered into a power purchase agreement (PPA) in 2016 for the 200 MW Turtle Creek Wind Farm, located in Mitchell County. The Turtle Creek Wind Farm has an expected 2018 in-service date.

¹ SMEC represents approximately 5-6% of IPL's load.

² IUB Docket No. RPU-2016-0005.

³ IUB Docket No. RPU-2017-0002.

Existing Portfolio

IPL's generating fleet continues to evolve to incorporate additional renewable generation, strengthen its market competitiveness, increase reliability, and ensure compliance with state and federal requirements. IPL is well-positioned to provide reliable and cost-effective service into the future through existing and expected investments in its owned and acquired generation fleet, which includes expanding renewable energy and energy efficiency opportunities. IPL's existing generation portfolio includes approximately:

- 550 megawatts (MW) of existing wind power;
 - 99 MW Franklin County Wind Farm, purchased in 2017
 - 200 MW Whispering Willow-East Wind Farm
 - 250 MW of wind PPAs
- 400 MW nuclear PPA;
- Nominal 630 MW Marshalltown Generating Station addition in 2017; and
- 2,400 MWs of other existing fossil fuel (coal and natural gas) power.

Requirement for IRP Filing

IPL's 2017 IRP is being filed pursuant to Chapter 7843 of the Minnesota Public Utilities Commission ("Commission" or "MPUC") rules.⁴

As noted above, IPL sold its electric retail service territory to SMEC on July 31, 2015, and no longer provides retail electric service to any Minnesota customers. Consequently, IPL is no longer a "public utility" in Minnesota,⁵ but remains a "utility."⁶ IPL is required to file an IRP as a utility; however, the Commission's order on the IRP is advisory in nature. The Commission is also required to consider the filing requirements and decisions in comparable proceedings in other jurisdictions, such as Iowa.

IRP Summary

This 2017 IRP is a written report of the EGEAS modeling and analysis IPL submitted to the Board in support of requested ratemaking principles for IPL's 500 MW New Wind II project.⁷ The resource planning analysis for New Wind II is similar to an analysis IPL submitted to the Board in 2016 to support of ratemaking principles for IPL's 500 MW New Wind I, which the Board approved on October 25, 2016.⁸

IPL recognizes that, due to the dynamic nature of the economy and the utility industry, IPL's portfolio must remain flexible. Accordingly, IPL's 2017 IRP considers a wide variety of analytical, market and policy issues and presents a

⁴ The Minnesota Public Utilities Commission's July 7, 2017 Order in E001/RP-17-374 approved IPL's extension request and set a due date of February 1, 2018 for its next Integrated Resource Plan.

⁵ See Minn. Stat. § 216B.02, Subd. 4.

⁶ See Minn. Stat. § 216B.2422 Subd. 1(b).

⁷ IUB Docket No. RPU-2017-0002.

⁸ IUB Docket No. RPU-2016-0005.

plan that continues to meet customer's needs in a cost-competitive, reliable, and environmentally-responsible manner. The following identifies some of the key components of IPL's 2017 IRP.

Demand and Energy Forecast

IPL recognizes that various factors, including economic and policy changes, can affect its load. Accordingly, IPL modeled a low and high load forecast in its analysis, in addition to its base load forecast. As in previous IRPs, IPL's load forecasts are based on statistical regression analysis, which predict electricity use based on historic trends, forecasts of economic activity, and forecasts of population growth.

The 2017 IRP reflects a lower demand and energy forecast compared to the 2014 IRP. This is largely due to a combination of lower than forecasted growth in the residential and industrial classes and the anticipated loss of a wholesale contract in 2018.

Fuel Price Forecasts

As in its previous IRP, IPL used fuel price projections provided by the Wood Mackenzie consulting service in the 2017 IRP. The base fuel price forecasts for Natural Gas, On Peak Market Energy, Off Peak Market Energy, and coal prices are markedly lower in the 2017 IRP than in the 2014 IRP. To understand the effects of changes in fuel prices, IPL performed analyses on a wide range of coal and natural gas prices, covering +/- 10, 20, and 30 percent.

Greenhouse Gas Regulation

In light of the continued uncertainty of long-term greenhouse gas regulation, IPL modeled sensitivity cases under three carbon dioxide (CO₂) scenarios, or futures:

- The "a" series future takes Wood Mackenzie's fuel and market energy price forecasts under a No Carbon long-term outlook and adjusts dispatch of existing units so that CO₂ emissions on these units ramp down 34% from 2012 levels by 2030. This future acts as a proxy for potential future federal implementation of a comprehensive policy to regulate carbon dioxide.
- The "b" series future is similar to the "a" series, but does not include the CO₂ ramp down on existing units.
- The "c" series future takes Wood Mackenzie's fuel and market energy price forecasts under a carbon monetization outlook. In this future, the CO₂ ramp down on the existing units is removed due to the carbon monetization.

Status of Coal-Fired Units

Previous resource plans discussed a tiered approach to IPL's coal-fired fleet, with significant emissions controls for newer, more-efficient units, and staged gas conversions and retirements of older, less-efficient units. For example, IPL is installing a selective catalytic reduction (SCR) control at the Ottumwa Generating Station, which will be in-service by 2019. In addition, IPL has converted Kapp Unit 2 and Prairie Creek Unit 4 from coal to natural gas, and Burlington Generating Station will convert to gas by the end of 2021. IPL has also retired certain other formerly coal-fired units, such as Dubuque units 3 and 4 and Sutherland units 1 and 3. Section 4 of the IRP discusses assumptions for further gas conversions and retirements.

Status of Existing Peaking and Intermediate Units

IPL continues the process of retiring several older, smaller and less-efficient intermediate and peaking units, such as Centerville Combustion Turbines ("CTs"), Burlington CTs, Grinnell CTs, Red Cedar CT, and Fox Lake Units 1 and 3; these planned retirements align with IPL constructing and bringing Marshalltown Generating Station into service. These retirements are contingent upon receiving MISO determination that the resources are not needed for system reliability.

Status of Power Purchase Agreements

For planning purposes, the 2017 IRP assumes that existing major PPAs expire at the end of their term.

Plan Development, Process and Analytical Techniques

IPL's 2017 IRP begins with a projection of customer demand and energy over the planning horizon. IPL calculates its energy forecast using regression modelling to separately forecast class-level customers and use per customer. The customer forecast and use per customer forecasts are multiplied and added to the forecasts of specific large customers. Forecasts are adjusted for factors that are not well represented historically, like customers with distributed generation.

To forecast demand, IPL reduces historical load data by the load of large customers, which are forecasted individually. The remaining customers are forecasted using a regression model. The individually-forecasted large customer demands are then added to the modeled results to arrive at the total IPL system demand forecast.

IPL used the Electric Generation Expansion Analysis System ("EGEAS") computer simulation model to explore how best to meet the generation demands identified in its forecast. The ultimate goal is to moderate cost, maintain reliability, and moderate risk. Given reasonable assumptions and after careful consideration of costs, reliability, and risks, a reference case is constructed. Using the identified reference case, IPL explores additional scenarios by

changing various input assumptions and resource selections. This modeling information provides a foundation to assess how different assumptions, scenarios, and sensitivities affect IPL’s resource needs.

Resource Needs

With the addition of the Marshalltown Generating Station in 2017 and IPL’s 500 MW New Wind I Project anticipated in 2020, IPL does not project a capacity deficit until 2026. IPL projects its capacity deficit to increase from approximately 300 Zonal Resource Credits (ZRCs) in 2026, to 560 ZRCs in 2034.⁹ After 2034, planning assumptions for additional large resource retirements drive the capacity deficit to approximately 1,250 ZRCs by the end of the study period in 2037. Figure 1 summarizes IPL’s load and capability before resource additions:

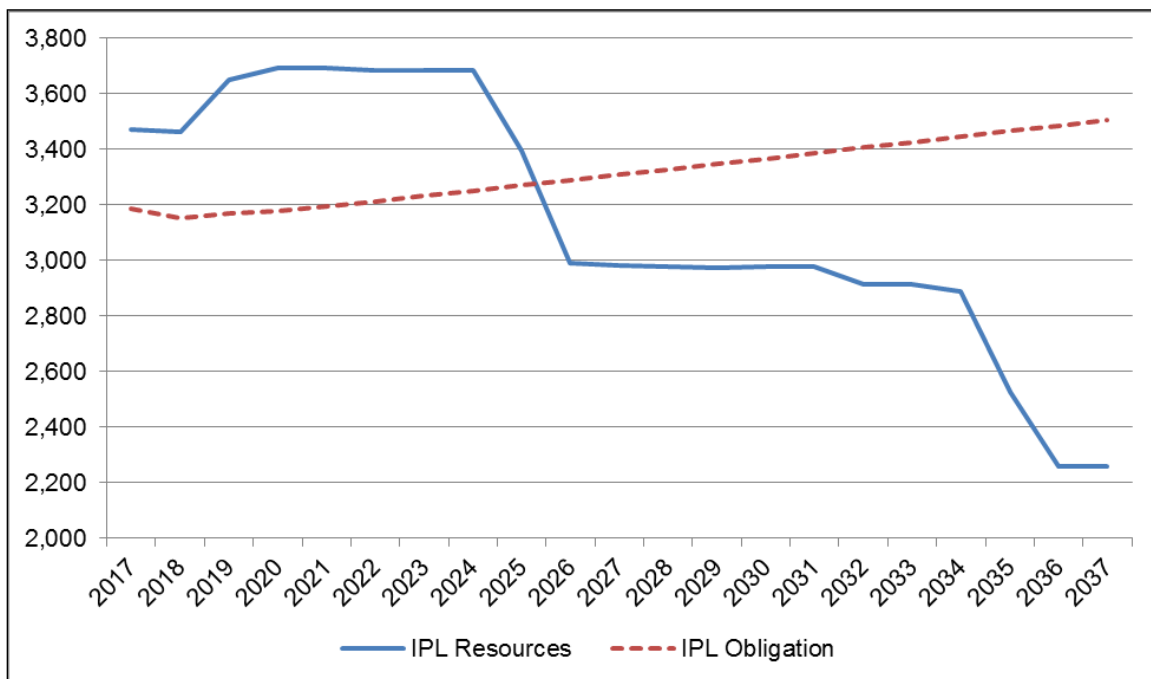


Figure 1: IPL’s 2017 IRP Load and Capability Projection – Before Generic Resource Additions and New Wind II

Five-Year Action Plan

The resources needed to meet IPL’s system capacity and energy requirements come primarily from two types of resources: demand-side and supply-side. During the forthcoming years, IPL will:

- Continue to pursue DSM activities in Iowa;
- Continue to develop PPA and owned wind portfolio:

⁹ ZRCs are accredited capacity units under the MISO’s capacity auction. A ZRC is equal to one MW of unforced capacity (UCAP) from a planning resource for a given zone during a specific planning year, as described in the requirements set forth in Module E of the MISO Tariff.

- Incorporating the 200 MW Turtle Creek PPA, which has an 2018 in-service date;
- Developing up to 500 MW of new wind as approved by the Board in Docket No. RPU-2016-0005 (“New Wind I”) by 2020; and
- Developing up to 500 MW of additional new wind (“New Wind II Project”) by 2020, as proposed by IPL in Docket No. RPU-2017-0002;
- Pursue reasonable emission controls and/or natural gas conversions on its remaining coal-fired units;
- Retire older peaking units;
- Retire older intermediate steam units; and
- Continue to investigate and pursue renewable energy.

Based on IPL’s recent and upcoming wind development projects, IPL plans to obtain a renewable energy portfolio of over 35 percent of energy in the next five years.

Environmental Considerations

As shown in the chart below, IPL’s projected annual CO₂ output (tons), in even its No Carbon Case (as a conservative look), notably declines over 15 years, despite IPL’s energy growth.

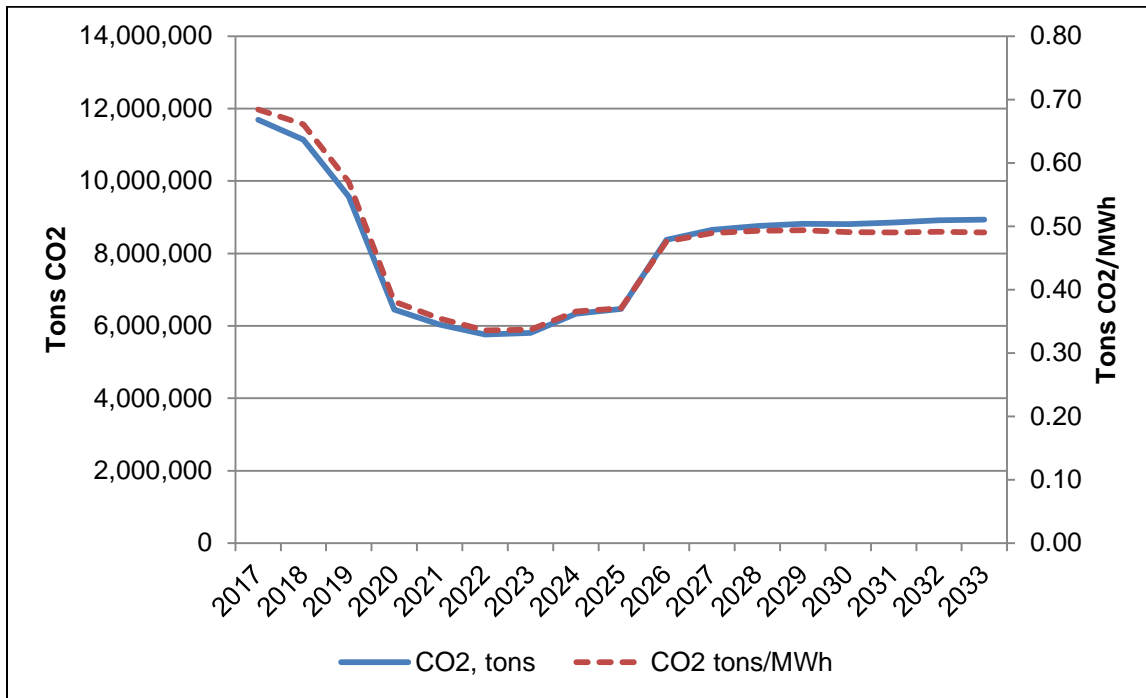


Figure 2: No Carbon Case, CO₂ Emissions and Rate

Cost Implications

IPL develops IRPs based on the lowest cumulative present worth of revenue requirements, given regulatory and other constraints. This ensures an

optimum plan and reasonable rates for customers. The EGEAS results indicate that IPL's modeled supply-related EGEAS costs (such as fuel, existing unit variable operations and maintenance, new capital fixed charges, new fixed and variable operations and maintenance, and new unit tax credit benefits) per kWh over the 2017-2033 period will increase nominally at an average rate of about:

- 2.5 percent per year for the No Carbon scenario; and
- 3.2 percent per year for the Wood Mackenzie 2027 Carbon scenario.

Assuming an inflation rate of approximately 2 percent per year over that same time period, the change in real terms is approximately:

- 0.5 percent per year for the No Carbon scenario; and
- 1.1 percent per year for the Wood Mackenzie 2027 Carbon scenario.

As a customer-focused electricity provider, IPL will continue to provide safe, efficient and cost-competitive electric service to its customers.

IPL continues to monitor the political and legislative climate to attempt to anticipate renewable and emissions regulatory standards that may be implemented.

Conclusion

This IRP provides a comprehensive generation expansion and resource plan that appropriately balances all considerations and best serves its customers.