



2019 Integrated Resource Plan (IRP) Non Technical Summary

BACKGROUND

Indianapolis Power & Light Company (“IPL”) is engaged primarily in generating, transmitting, distributing and selling electric energy to more than 500,000 retail customers in Indianapolis and neighboring areas; the most distant point being about 40 miles from Indianapolis. IPL’s service area covers about 528 square miles. IPL is subject to the regulatory authority of the Indiana Utility Regulatory Commission (“IURC”) and the Federal Energy Regulatory Commission (“FERC”). IPL fully participates in the electricity markets managed by the Midcontinent Independent System Operator (“MISO”). IPL is a transmission company member of Reliability First (“RF”). RF is one of eight Regional Reliability Councils under the North American Electric Reliability Corporation (“NERC”), which has been designated as the Electric Reliability Organization under the Energy Policy Act (“EPAAct”). IPL is part of the AES Corporation, a Fortune 500 global power company, with a mission to improve lives by accelerating a safer and greener energy future.

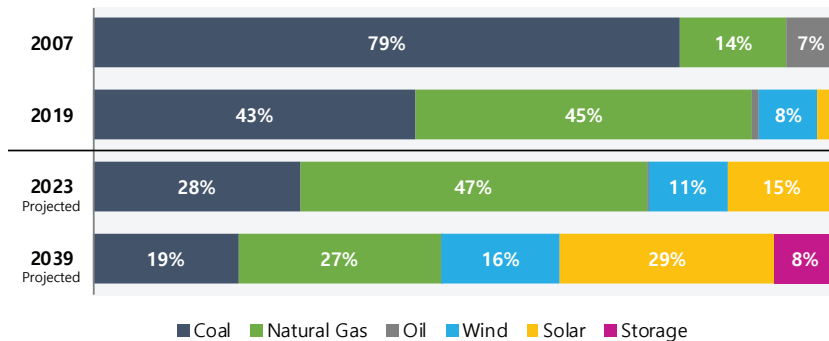
The Integrated Resource Plan (“IRP”) is viewed as a guide for future resource decisions made at a snapshot in time. Resource decisions, particularly those beyond the five-year horizon, are subject to change based on future analyses and regulatory filings. Any new resource additions, including supply-side and demand-side resources, will require regulatory approval.

IPL’s 2019 IRP continues to move the Company towards cleaner energy resources. Figure 1 shows how IPL’s resource mix has changed over time. For a map of IPLs’ service territory and location of current resources, see Figure 2.



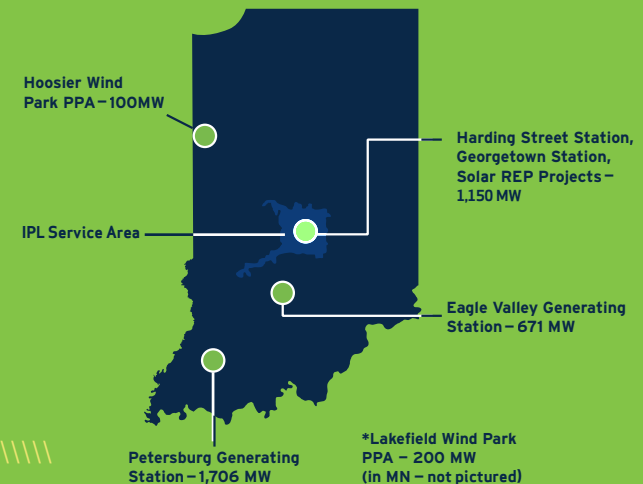
Figure 1 - **IPL RESOURCE MIX**

IPL has been a leader in moving toward cleaner energy resources.



Resources based on maximum summer rated capacity for thermal units and nameplate capacity for wind and solar. Includes both owned assets and those under long-term power purchase agreements. The 2039 projections are based on IPL’s most recent Integrated Resource Plan and are subject to change.

Figure 2 - **IPL SERVICE TERRITORY AND EXISTING RESOURCES**



IRP OBJECTIVE

The objective of IPL's Integrated Resource Plan ("IRP") is to identify a portfolio to provide safe, reliable, sustainable, reasonable, least-cost energy service to IPL customers throughout the study period giving due consideration to potential risks and stakeholder input.

IRP Process

Every three years, IPL submits an IRP to the IURC in accordance with Indiana Administrative Code (IAC 170 4-7) to describe expected electrical load requirements, a discussion of potential risks, possible future scenarios and a preferred resource portfolio to meet those requirements over a forward-looking 20-year study period based upon analysis of all factors. This process includes input from stakeholders known as a "Public Advisory" process.

Public Advisory Process

IPL hosted five (5) public advisory meetings to discuss the IRP process with interested parties and solicit feedback from stakeholders. The meeting agendas from each meeting are highlighted here. For all meeting notes, presentations and other materials, see IPL's IRP webpage at IPLpower.com/irp.

IPL incorporated feedback from stakeholders to shape the scenarios, develop metrics, and clarify the data presented.



Public Advisory Meeting #1 January 29, 2019

Topics covered: 2016 IRP review, introduction to the 2019 IRP (timeline, mission, objectives), capacity discussion, 2019 IRP starting point, modeling replacement resources, DSM/EE modeling and load forecast update

Public Advisory Meeting #2 March 26, 2019

Topics covered: stakeholder presentations, detailed load forecast, IPL DSM market potential study and end use results, commodity prices and modeling, assumptions for replacement resources, scenario analysis framework and proposed scenarios

Public Advisory Meeting #3 May 14, 2019

Topics covered: electric vehicle and distributed solar forecast, stakeholder presentation, detailed load forecast, DSM bundles in IRP modeling, modeling and scenario recap

Public Advisory Meeting #4 September 30, 2019

Topics covered: modeling and scenario recap, preliminary model results, optimized portfolios, portfolio metrics

Public Advisory Meeting #5 December 9, 2019

Topics covered: summary of IPL 2019 short term action plan, 2019 IRP modeling insights, analysis of alternatives and preferred resource portfolio



Figure 3 - IRP SCENARIO DRIVERS

	Reference Case	Scenario A: Carbon Tax	Scenario B: Carbon Tax + High Gas	Scenario C: Carbon Tax + Low Gas	Scenario D: No Carbon Tax + High Gas
Natural Gas Prices	Base	Base	HIGH	LOW	HIGH
Carbon Tax	No Carbon Price	Carbon Tax (2028+)	Carbon Tax (2028+)	Carbon Tax (2028+)	No Carbon Price
Coal Prices	Base	Base	Base	Base	Base
IPL Load	Base	Base	Base	LOW	HIGH
Capital Costs for Wind, Solar, and Storage	Base	Base	Base	Base	Base

IRP MODELING

The electric utility continues to evolve through technology advancements, fluctuations in customer consumption, changes in state and federal energy policies, uncertainty of long-term fuel supply and prices, and a multitude of other factors. Since the impacts these factors will have on the future utility industry landscape remains largely uncertain, IPL models multiple possible scenarios to evaluate various futures.

The key drivers (Figure 3) that differ between each scenario are natural gas prices, carbon tax, coal prices, IPL load and the capital cost assumptions for wind, solar, and storage. In this IRP, IPL evaluated a set of fifteen (15) candidate resource portfolios (Figure 4) created from a modeling process that incorporated an evaluation of coal retirement dates, DSM targets and new resource economics in a probabilistic optimization framework. The candidate resource portfolios were stressed across a wide range of scenarios, which allowed IPL to identify the portfolio that mitigates risk and performs the best across multiple futures.

Figure 4 - IPL CANDIDATE RESOURCE PORTFOLIOS

Portfolio	Description	DSM Decrements 1-3	DSM Decrements 1-4	DSM Decrements 1-5
Portfolio 1	No Early Retirements	1a	1b	1c
Portfolio 2	Pete Unit 1 Retire 2021; Pete Units 2-4 Operational	2a	2b	2c
Portfolio 3	Pete Unit 1 Retire 2021; Pete 2 Retire 2023; Pete Units 3-4 Operational	3a	3b	3c
Portfolio 4	Pete Unit 1 Retire 2021; Pete 2 Retire 2023; Pete 3 Retire 2026; Pete Unit 4 Operational	4a	4b	4c
Portfolio 5	Pete Unit 1 Retire 2021; Pete 2 Retire 2023; Pete 3 Retire 2026; Pete 4 Retire 2030	5a	5b	5c

PREFERRED RESOURCE PORTFOLIO

The candidate resource portfolios produced by the capacity expansion model are summarized in Figure 5.

The “Preferred Resource Portfolio” represents what IPL believes to be the most likely scenario based on factors known at the time of the IRP submission. Portfolio 3b, depicted in Figure 5, is the Preferred Resource Portfolio. Each candidate resource portfolio was run through stochastic production cost modeling runs for each scenario which provides insight into the risk, benefits and overall robustness of portfolios across time and a range of market conditions. IPL analyzed three primary categories of metrics: cost, risk and environmental, as shown in Figure 6. The results of these metrics show that the largest key driver of changes in the Present Value Revenue Requirement (“PVR”) of the candidate resource portfolios is carbon tax legislation. There is also strong benefit to having a diverse portfolio. The diverse Preferred Resource Portfolio is the lowest cost across a range of futures.

Figure 5 - CUMULATIVE INSTALLED CAPACITY CHANGES THROUGH 2039 (ICAP MW)

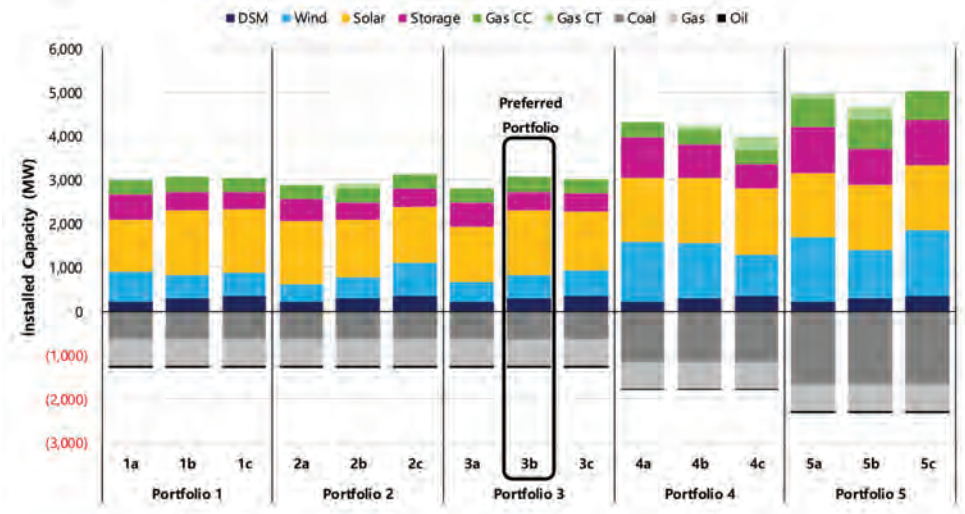
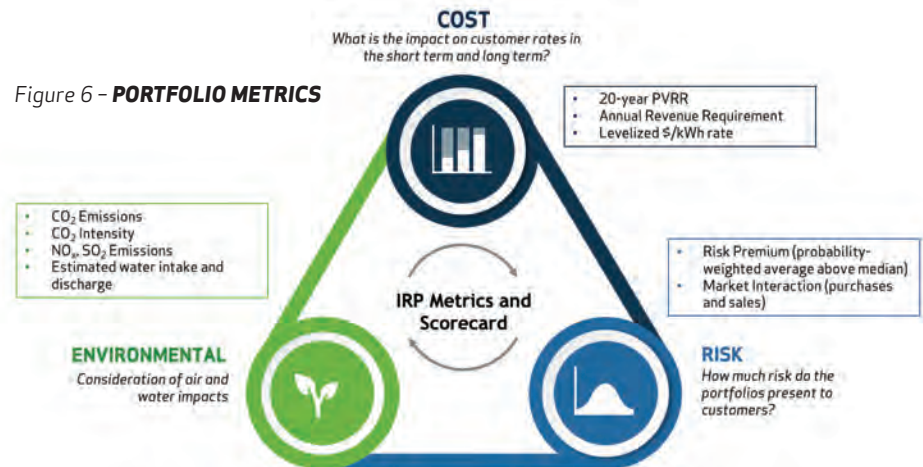
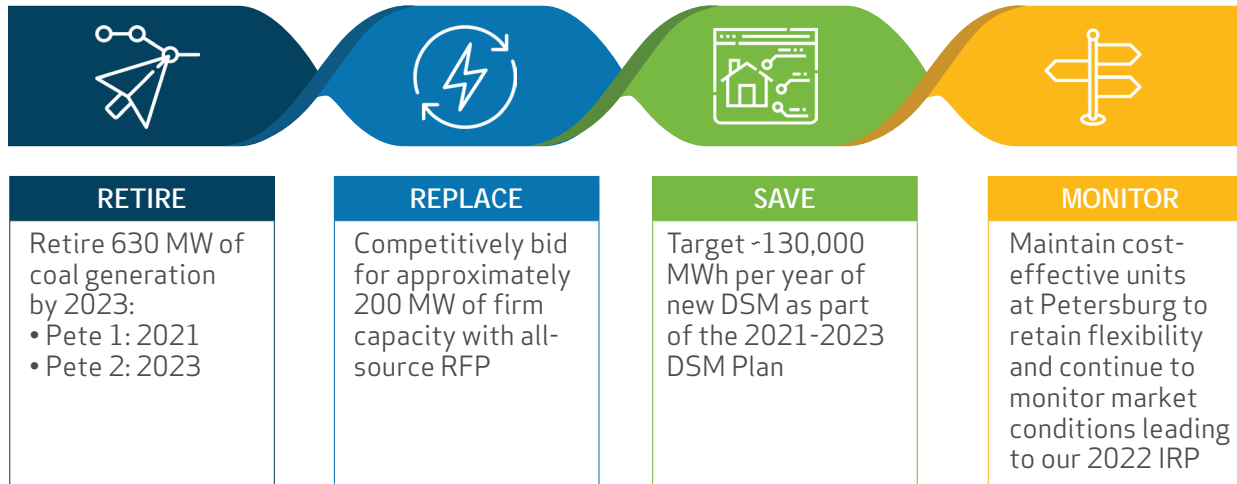


Figure 6 - PORTFOLIO METRICS



SHORT TERM ACTION PLAN



Retirement of 630 MW of coal by 2023

Based on extensive modeling, IPL has determined that the cost of operating Petersburg Units 1 and 2 exceeds the value customers receive compared to alternative resources. Retirement of these units allows the company to cost-effectively diversify the portfolio and transition to cleaner, more affordable resources while maintaining a reliable system.

Competitively bid for 200 MW of replacement capacity

IPL intends to issue an all-source Request for Proposal (“RFP”) to competitively procure replacement capacity by June 1, 2023, which is the first year IPL is expected to have a capacity shortfall. IRP modeling indicates that a combination of wind, solar and storage resources would be the lowest cost options for the replacement capacity, but IPL will assess the type, size and location of resources after bids are received.

Target -130,000 MWh per year of DSM and energy efficient programs

IPL plans to continue to be a state leader in Demand-Side Management (DSM) implementation and through an extensive valuation of DSM bundles, compared to supply-side alternatives, will target 130,000 MWh of DSM in the 2021-2023 plan.

Maintain safe, reliable, cost effective generation at Petersburg

IPL conducted a holistic evaluation of the economics of each coal unit in our fleet. While several systematic changes in wholesale power markets are impacting the viability of coal in MISO, Petersburg Units 3 and 4 provide firm, dispatchable capacity. Maintaining those units preserves optionality in the face of great uncertainty over the next five years. Examples of this uncertainty preceding the next IRP include a federal election, the Indiana 21st Century Energy Task Force publishing its recommendations to Indiana lawmakers, and IPL being on the path to execute plans for replacement capacity as part of the RFP process.



CONCLUSION

As part of the 2019 IRP, IPL is focused on

- Customer Centricity
- Least Cost
- Flexibility & Balance
- Greener Energy Future

As a result, IPL hired a 3rd party to manage an all-source RFP. For more information, visit IPLpower.com/RFP





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