



Indianapolis Power & Light Company
2019 IRP Public Advisory Meeting #4
September 30, 2019

Meeting Summary

Welcome & Opening Remarks

Vince Parisi, IPL President and CEO
(Slide 3)

Mr. Vince Parisi introduced himself to the group and opened the meeting with a reminder to participants to seek out any IPL person with an IPL nametag should they have any questions about the 2019 IPL IRP and the IRP stakeholder process. He thanked the group for their time and contribution.

Meeting Objectives & Agenda

Stewart Ramsay, Meeting Facilitator
(Slide 4 – 5)

Mr. Stewart Ramsey noted the agenda topics planned for the meeting. He let everyone know his role of facilitating discussion and ensuring everyone gets their questions answered.

Modeling and Scenario Recap

Patrick Maguire, Director of Resource Planning
(Slide 6 – 10)

Mr. Patrick Maguire began the meeting with a recap of modeling assumptions. He also noted that updated files were provided to stakeholders with a Nondisclosure Agreement (NDA) prior to the meeting. Mr. Maguire noted that the IPL IRP team has been hard at work with the stochastic capacity expansion modeling since the last meeting in May. Specifically, some updates to assumptions have been made since May as well, noted on Slide 7. One update included a recalibration of the capacity credit for utility-scale, tracking solar. The starting point is different for the capacity credit assumption for solar. For the first year of the IRP, IPL initially used a solar effective load carrying capacity (ELCC) of 46%. The update specifically utilizes IPL's tracking data instead of a mixture of solar configurations (fixed tilt, rooftop, single axis tracking) and is now 63% in 2020. The ELCC decreases over time (regardless of solar technology type, tracking or non-tracking) and the end point of 23% in 2039 stays the same and has not changed in this update. Additionally, Mr. Maguire mentioned to the group that IPL hardcoded a Combined Cycle Gas Turbine (CCGT) in 2034 as a placeholder for firm, dispatchable capacity required on IPL's 138 kV system after the Harding Street Steam units retire in the early 2030s. This assumption does not impact short term resource selection, and the technology choice and size will likely change though time as IPL conducted detailed engineering studies. Furthermore, this addition is in every portfolio and scenario so that it does not influence differences between portfolios.

Slide 9 highlights the key findings from IPL's preliminary IRP modeling results. In all cases, renewables are being selected first with storage and gas then filling in remaining shortfalls in the



study period. There are only small variations in capacity expansion resource selections in the carbon case versus the reference (base) case. The model, in both cases, prefers renewables. The presentation highlighted the five (5) candidate resource portfolios that IPL will stress across a range of scenarios to inform IPL's assessment. Slide 10 summarizes what Unit Retirements were modeled by Portfolio.

Portfolio 1: No Accelerated Retirements. Petersburg Unit 1 (220 MW) retires in 2032.

Petersburg Unit 2 (410 MW) retires in 2034. Petersburg Unit 3 (520 MW) retires in 2042.

Petersburg Unit 4 (520 MW) retires in 2042.

Portfolio 2: Petersburg Unit 1 retires in 2021. Petersburg Units 2 – 4 remain operational.

Portfolio 3: Petersburg Unit 1 retires in 2021. Petersburg Unit 2 retires in 2023. Petersburg Units 3 & 4 remain operational.

Portfolio 4: Petersburg Unit 1 retires in 2021. Petersburg Unit 2 retires in 2023. Petersburg Unit 3 retires in 2026. Petersburg Unit 4 remains operational.

Portfolio 5: Petersburg Unit 1 retires in 2021. Petersburg Unit 2 retires in 2023. Petersburg Unit 3 retires in 2026. Petersburg Unit 4 retires in 2030.

Retirements that remain in all portfolios are Harding Street Oil 1-2 (37 MW) retire in 2024.

Harding Street Steam Turbines (ST) 5-6 (189 MW) retire in 2031. Harding Street ST 7 (394MW) retires in 2034.

Preliminary Model Results: Optimized Portfolios

Patrick Maguire, Director of Resource Planning

(Slide 11 – 38)

Mr. Maguire started off with the key takeaways from the preliminary modeling results. Each Portfolio is presented in Firm Unforced Capacity (UCAP), Installed Capacity (ICAP) MW Additions, Energy Mix (MWh), Energy Mix (% by Fuel Type) and a Portfolio Additions Recap.

Participants had the following questions/comments, with an answer provided after:

- Meeting participant asked how does the energy versus capacity play out for the Harding Street Station? Since capacity factors are low for those units, would a combustion turbine (CT) be a better fit than a combined cycle (CC).
 - Mr. Maguire noted that while annual capacity factors are low for the Harding Street Steam units, the units are often called on for multi-day runs in the winter and summer. Harding Street 7, which has a dispatchable range from 100 MW at min to 420 MW at max, runs often for its location, flexibility, and size.
- What is the system specific constraints/characteristics that influence optimized results? What is the Present Value Revenue Requirement (PVR) impact from adding a combined cycle (CC) versus three (3) combustion turbines (CTs) 3 CTs?
 - Mr. Maguire shared the rationale for this placeholder. A CCGT is an industry standard for representing a need for firm capacity and reminded the group that the specific resource would be identified in the future. He noted that he would speak with the stakeholder after the meeting about this specific additional analysis.
- A participant stated his view that emissions should be cut in half by 2030. Furthermore, he asked why emissions aren't listed in the presentation.



- Mr. Maguire stated that the emissions for each portfolio is being compiled and is not available yet. He stated that at least one of the portfolios will likely show a 50% reduction in carbon emissions.

Mr. Maguire articulated that the modeling is selecting renewables first based on economics and is filling in incremental capacity additions with natural gas and storage. Storage is shown in the capacity charts but not the energy charts because storage is energy neutral, meaning that the charge and discharge energy is roughly the same on an annual basis.

Participants had the following questions/comments, with an answer provided after:

- Since we see a lot of renewable build out, what is the capital expenditure?
 - IPL is still working on PVRP per portfolio.
- Ok, what is the indicative cost per kW of installed capacity for renewables?
 - Mr. Maguire stated that \$1,000/kW was a fair estimate of that cost.
- A participant asked about the consistent selection of the amount of DSM in each optimized portfolio. Knowing this, what is the role of DSM?
 - Mr. Maguire explained that IPL is conducted additional DSM analysis to test the cost-effectiveness of incremental DSM decrements. He also noted that since renewables and storage are being selected first, any additional DSM would likely displace these resources.

Portfolio Metrics

Patrick Maguire, Director of Resource Planning
(Slide 39 – 43)

After a short break, Mr. Maguire described IPL's framework for metric analysis. The first category of metrics is Cost. Specifically, IPL will measure the 20-year PVRP, the annual revenue requirement per candidate resource portfolio, and the levelized \$/kWh rate. The levelized rate provides perspective for what each portfolio costs. The second category is Risk. For PVRP calculations, IPL is working with Concentric to complete this analysis, which is not yet final and available. In the IPL IRP modeling, each portfolio inherently accounts for some risk through the stochastic production cost modeling process and differing renewable production shapes and cost prices. One risk metric is "risk premium" and IPL is reviewing the probability weighted average above the median. This metric gives a sense of the impact of a tail event occurring. The 2019 "risk premium" metric replaces the risk cost trade off that was presented in the 2016 IPL IRP materials. Another risk metric is total amount of market interaction. All portfolios include market interaction to some degree. IPL buys and sells in the MISO market, which benefits IPL customers. Reliance on the market provides a general sense of how balanced the portfolio is over time.

Participants had the following questions/comments, with an answer provided after:

- One stakeholder posed a question around the levelized rate per kWh and suggested a potential revision to this. Her suggestion was that the nominal revenue requirement divided by sales is what matters from the rate impact. By getting rid of peaks and valleys that would show up in the annual revenue requirement it is more apparent.
 - IPL responded that they could calculate and show the annual \$/kWh along with the levelized rate.



- One participant asked IPL to retire the Petersburg plant by 2028. She further asked how hardcoding the additional CCGT impacts the next five years.
 - Mr. Maguire noted again that the 2034 CCGT addition does not impact short term decisions for this IRP.
- A participant asked about Demand Response (DR). Not specifically noted in the presentation.
 - Mr. Maguire shared that DR was included in the modeling.

The last metric category is Environmental. Environmental metric review is primarily air emissions metrics. New for 2019, IPL is working internally with our environmental team to estimate water impacts. This water metric is more difficult to present and calculate than air emissions, and therefore will be less precise.

Participants had the following questions/comments, with an answer provided after:

- One participant asked if there is a risk metric for stranded fossil fuel assets?
 - Mr. Maguire responded that stranded fossil fuel assets were not specifically identified as a separate risk metric.

Q&A, Concluding Remarks & Next Steps

Stewart Ramsay, Meeting Facilitator

Patrick Maguire, Director of Resource Planning

(Slide 44 – 46)

Mr. Maguire presented Slide 45 to the group and let the group know the next steps that the IPL IRP team will be conducting prior to the presentation of final results on December 9th. For example, one item IPL is working on is further analysis of adding more DSM decrements to the model results and what impact that has.

IPL will file the 2019 IRP on December 16, 2019. As always, stakeholders can send comments, questions and feedback via the IPL IRP inbox at ipl.irp@aes.com.

Mr. Ramsay requested any final questions or comments. Meeting attendees, in-person and remote, had no further questions.

Meeting adjourned.