Indianapolis Power & Light Company
Public Advisory Meeting #3
October 10, 2014

Summary

Welcome
Kelly Huntington, President of Indianapolis Power & Light Company (IPL)

Dr. Marty Rozelle gave a safety briefing, noting the logistics of the meeting room, exits, and facilities.

Kelly Huntington thanked everyone for coming today, and said that this process has been very helpful to Indianapolis Power & Light (IPL). At the first meeting, IPL shared the Integrated Resource Plan (IRP) process and modeling descriptions. At the second meeting they heard input from stakeholders and shared preliminary modeling results. More than 140 comments were received and addressed.

Since the last meeting IPL announced its plan to convert the Harding Street Unit 7 plant from coal to natural gas. Involved in this decision was an analysis of environmental permitting issues. Today, IPL will share results of modeling for 8 scenarios created for the IRP. Ms. Huntington thanked stakeholders for helping to shape these scenarios. She advised participants to remember that results are based on what we know today, with assumptions about future risk. The new Eagle Valley CCGT unit plus coal to natural gas conversions of Harding Street units 5, 6, and 7 are expected to meet IPL's future predicted loads. These will be described in detail in this meeting.

Ms. Huntington reiterated that the stakeholders have helped to shape this process. She pledged that IPL will continue to balance environmental responsibility, reliability, and cost. As examples, she reported that IPL has received an IEEE benchmark for reliability, ranked 8th nationally. In a KB Parrish study looking at residential rates, IPL retained the lowest rate of the top 20 largest cities. In a recent JD Power residential customer satisfaction survey, IPL is in the top of the second quartile. Indianapolis also ranks 5th in the U.S. in solar capacity, which is unusual for a Midwestern city.

She then introduced Joan Soller, the new Director of Resource Planning, replacing Herman Schkabla, thanking her and her team for the work they've done.

Meeting Agenda & Guidelines
Dr. Marty Rozelle, The Rozelle Group Ltd.
(slides 3-7)

Dr. Marty Rozelle asked participants to introduce themselves, both those in the room and those on the phone. In the introductions, Indiana Office of Utility Consumer Counselor (OUCC) and Indiana Utility Regulatory Commission (IURC) representatives said that they were happy to see some industry representatives at this meeting. Dr. Rozelle noted that the phone line is muted

during presentations and callers can 'unmute' themselves to speak. She outlined some meeting guidelines, noting that there will be time for questions after each presentation. Anyone wanting information on confidential data should contact Teresa Nyhart of Barnes & Thornburg.

Summary of IRP Public Advisory Meeting #1 & 2
Joan Soller, Director of Resource Planning
(slides 8-23)

Joan Soller thanked everyone for coming, and said she will outline a brief summary of the first two stakeholder meetings. This included a profile of the company and its generating facilities, including wind resources in Indiana and Minnesota. She described the IRP process, noting that the IRP is a guideline for future actions and cases submitted to the IURC. Environmental regulations continue to be a major factor in planning, and will be discussed further today. She noted that while solar is an important and growing resource, distributed energy is challenging to implement. She said that IPL continues to monitor trends in distributed generation.

IPL's demand-side management (DSM) plan was filed with the IURC in May and is awaiting approval. The U.S. Environmental Protection Agency's (EPA) proposed Clean Power Plan was discussed at the last workshop, and IPL is assessing how to consider the possible requirements. Ms. Soller said that IPL has tried to address some of the main stakeholder comments, including assumptions for wind turbines and greenhouse gas emissions, DSM and energy efficiency (EE), and distributed generation.

IPL's initial modeling evaluated 4 scenarios. Conclusions from initial modeling include:

- IPL does not have a need for new capacity until 2030
- Combined cycle gas turbine is a preferred capacity resource.
- Wind generation is included in some scenarios.

Ms. Soller noted that more than 112 comments were received after meeting one and 29 comments post meeting two. All comments and questions have been addressed either through written responses on the IPL IRP webpage or included in the planning process. Main topics of stakeholder concern post meeting two included:

- DSM 2018-34 forecast
- Future environmental cost estimates
- Clean Power Plan evaluation
- NPDES analysis (National Pollutant Discharge Elimination System permit under the Clean Water Act)
- Wind congestion assumptions
- Flexible retirement dates within the planning model

All of these will be addressed in more detail today.

National Pollutant Discharge Elimination System (NPDES) Analysis Results
Tate Ayers, Director of Corporate Planning and Analysis
(slides 24-33)

Ken Flora of IPL introduced Tate Ayers, noting that IPL's analysis will be filed shortly with the IURC as Cause No. 44540. (Because the case has not yet been filed, IURC staff stepped out of the meeting room during this discussion out of an abundance of caution if there were any ex-parte concerns.)

As an introduction, Angelique Oliger reminded participants about NPDES permit requirements for technology-based and water quality-based effluent limitations as well as monitoring and reporting. She said that the Indiana Department of Environmental Management issued new NPDES permits to IPL on August 28, 2012 for the Petersburg and Harding Street plants that include new effluent limits, requiring IPL to adopt additional wastewater treatment technologies.

Tate Ayers reported that IPL looked at its five largest coal-fired units for the NPDES analysis, Harding Street 7 and Petersburg units 1 through 4. He explained that this was done as a unit-specific risk analysis that assessed the probability and cost of risks. A 'simple payback' assessment was also performed. Results were evaluated against alternative resource options.

The analyses for each unit considered several future risks including natural gas prices, carbon emission requirements, other environmental regulations, and reliability for Harding Street 7. He showed a 'decision tree' that illustrated options for ensuring that Harding Street 7 is in place in 2017; these include retrofitting and refueling. There was also a decision tree for looking at carbon dioxide (CO_2) and natural gas risk scenarios. The analysis concluded that converting Harding Street Unit 7 to natural gas is the reasonable least-cost plan. This conclusion was assumed in all IRP modeling scenarios.

Participants had the following questions and comments:

- Do these costs include coal ash cleanup?
    - Pond closure is not included because it is not relevant for a comparative analysis; these are costs for wastewater treatment technologies. Pond closure and coal pile closure are considered sunk costs, which is why they are not included in analyses. IPL does plan to close these facilities. Once they are no longer in use, they will be considered waste and will be remediated.
- What does the cost of waste treatment include?
    - They primary wastewater streams include treatment of fly ash wastewater, bottom ash wastewater, and scrubber wastewater. IPL Petersburg currently has dry fly ash handling with the ability to sluice fly ash wastewater to the ash pond. The option to sluice to the ash pond will be eliminated. Bottom ash will continue to be sent to ponds but with enhanced treatment. Scrubber (flue-gas desulfurization system/FGD) will have a zero liquid discharge treatment system.
- On Harding Street 7, was there not a wastewater system installed when the FGD was installed?
    - No, it is now mercury and selenium permit limits which would require additional treatment technology for the FGD wastewater.

- What's the cost of parasitic load on Harding Street and Petersburg?
    - Less than Mercury & Air Toxics Standards (MATS) compliance or scrubbers. This has been calculated at less than $1 per megawatt hour, after the heat rate was adjusted. These costs are relatively low.
- What are the dates on the gap year mentioned?
    - The MATS compliance date – when coal units not meeting compliance must retire- is April 2016, but the new 671 MW Eagle Valley CCGT unit will not be online until April 2017. IPL will be short capacity during that year.
- How were the ranges of future environmental compliance costs used in the NPDES analysis?
    - The analysis looked at unit-specific risks, e.g. for coal combustion residuals and hazardous waste, and ran high and low risks on each unit. For cooling water intakes (Clean Air Act Sec. 316b), IPL ran high/low cases for units 1 and 2, since there is a big difference for large cooling towers.
- Did you look at National Ambient Air Quality Standards (NAAQS)?
    - Yes, on Petersburg; IPL included SCR installation unit 4 in the analysis.

Updated Modeling Assumptions
Joan Soller & IPL Team Members and David Costenaro, AEG
(slides 34-56)

Joan Soller introduced the team that will talk during this session. She summarized the adjustments that were made to modeling based on stakeholder input. Mainly, these include:

- The DSM forecast was developed for the full 20-year planning period.
- Load sensitivities were included in the high, low, and base cases.
- IPL modeled sensitivity for wind generation.
- A range of possible environmental compliance costs were estimated.
- Possible environmental effects of the Clean Power Plan were included in most scenarios through proxy CO_2 costs.
- Economic generation retirements were modeled versus full planning life.

David Costenaro introduced the demand side management forecasting that was performed. He said he was formerly with EnerNOC Consulting, which has now been acquired by Applied Energy Group (AEG). This is the same team that's been working on this topic throughout the planning period. He described the forecasting process, which involved updating the 2012 LoadMAP model for exact 2012 and 2013 loads. AEG refined base year energy use, calibrated kilowatt sales to intervening years, updated forecast variables like avoided cost, coordinated with the filed IPL 2015-17 DSM Action Plan that included additional DSM programs, updated assumptions for electronics (decreasing potential for energy savings due to more efficient baseline units) and LED lighting (increasing potential because of improved technologies and lower costs), and tuned market adoption rates. This analysis turned out to be a close match to the filed Action Plan for residential, commercial, and industrial uses.

The allocation of customer energy use within the model 'flipped' among the commercial (higher) and industrial (lower) sectors relative to the 2012 study due to a change in NAICS codes. With improved IPL customer data, AEG was able to better define the commercial and industrial

markets. The largest unified sectors of industrial users are chemicals and pharmaceutical, food products, and transportation.

Theoretical scenarios were developed to represent increased DSM futures, including 'technical potential', 'economic potential', and 'realistic achievable potential', all of which would hypothetically decrease energy and demand more than the IPL modeled baseline forecast.

Modeled from 2015 to 2034 the overall potential DSM energy savings for the Realistic Achievable scenario would be 10.4% of the baseline energy forecast in 2034, for a net savings of 1,665 gigawatt hours (GWh). With respect to system peak demand, these same customer programs and measures would provide net reductions of 396 MW, which represents 10.8% of the system peak demand in 2034.

The group's questions and comments included the following:

- Does this analysis assume 100% participation of customers using over 1 MW?
    - No, there is an opt-out available for these customers, so they have been removed based on current opt-out rates. This assumption is about 20%.
- Is that 20% of eligible load or of total commercial and industrial (C&I) load?
    - Eligible C&I load
- Is compliance with building codes assumed?
    - Yes, these are accounted for in the modeling
- Is the change between the dotted line and red line (on the slide 44 graphic) the residual savings?
    - The dotted line is an IPL internal load forecast, and the red line is AEG's baseline forecast. Both lines are created from fundamentally different analysis processes, so there is no expectation that they would match exactly. However, they are both quite similar and represent the same kind of load growth.
- On the residential market profile pie chart, does that represent all energy usage or only electricity usage?
    - Only electric
- What's the breakdown for electric, gas, oil use?
    - Mr. Costenaro didn't have that data with him, but said it is detailed in IPL's 2012 DSM Market Potential Study completed by EnerNOC.
- In the residential profile there are 415,000 households; how many commercial customers are there?
    - Without having that data available at the moment, we can assume that the difference between 470,000 total customers and 415,000 residential customers would be the C&I users.
- Did you look at the Clean Air Act Sec. 111d legislation (new source CO_2 performance standards) building block in determining savings?
    - We're still trying to understand the specifics of these requirements, in terms of timing, etc.

John Haselden provided IPL's view of these forecasts outlined by AEG. DSM is still quite unpredictable, so future filings will likely vary from the forecast due to changes in legislation and

public policy, customer behavior including large customer opt-outs, and IPL savings expectations.

Lake Hainz explained that IPL has created high, low, and base load forecasts that reflect a range in economic activity, changes in technology, consumer behavior, and energy policies. He showed slides illustrating these.

Wind sensitivities have also been modeled in response to stakeholder requests. An assumption is that new wind resources have a 35% capacity factor and a locational marginal price (LMP) equivalent to MISO Indiana market prices. Mainly because of transmission congestion, sensitivities were run that lowered the capacity factor to 25% and lowered the market price. Conversely, a case was run that looked at a wind Purchase Power Agreement (PPA) having a 50% capacity factor, reflecting congestion-relief, and another with the wind-resource paired with a battery to relieve congestion based on a specific project that a stakeholder at the previous workshop mentioned.

Angelique Oliger summarized IPL's estimates of future environmental compliance costs. IPL believes it will be able to comply with Cross State Air Pollution Rule requirements using its existing air quality controls. Coal combustion residuals (ash) disposal requirements will likely cause pond closures and disposal changes (onsite landfills v. continued beneficial use sales, for example). Wastewater treatment and handling changes have been estimated in response to effluent limitation guidelines. Greenhouse gas emissions are being dealt with as requirements evolve. Upgrades and new equipment have been assumed to Petersburg including a SCR to comply with potential changes in NAAQS for SO_2 and Ozone levels, although final limits are not known.

Joan Soller described briefly how greenhouse gas requirements were dealt with in developing alternative scenarios for the IRP. These will be addressed in more detail this afternoon.

Questions from participants were:

- Is the $27 million for upgrades to FGDs at Petersburg definite or estimated?
    - At this time, they are just based on plant operators' estimates using their knowledge, but specific engineering studies will be conducted when final emissions limits are defined to determine specific improvements.
- What probabilities did you assign to air quality compliance?
    - For Sec. 316b compliance, a 70% probability was assigned for not installing a closed-cycle cooling system. For NAAQS, no probabilities were assigned because a significant amount of uncertainty remains regarding the outcome of changes to the Ozone standard. Costs were assumed for the SO2 standard.
- For wind resources in MISO, what capacity credit can you expect?
    - MISO currently assumes 14%.

LUNCH BREAK

Presentation of Scenario Results
Joan Soller & Swetha Sundar

(slides 57-78)

Joan Soller explained that slide 58 shows representative costs as used in the modeling, since IPL's costs are confidential. Costs of resource technology options are shown along with the MW capacity and performance attributes of each. Ms. Soller noted that energy efficiency is not shown on the slides as a resource, since IPL considers this its first resource; however, demand response is shown as a dispatchable resource.

Swetha Sundar described Ventyx modeling results for the 8 scenarios, representing a wider range in CO_2 prices and gas prices. Scenarios 1-5 use the EPA shadow price for CO_2 starting in 2020; scenario 6 uses the Waxman-Markey proxy price starting in 2025, scenario 7 uses Mass Cap ICF prices beginning in 2020, and scenario 8 is the low environmental case with no CO_2 price assigned. She showed a graphic depiction of the assumed carbon prices for several scenarios. IPL feels that these CO2 prices represent the foreseeable range of CO_2 uncertainties.. Annual MISO-Indiana market price and Henry Hub annual gas prices forecasts were shown comparatively for various scenarios.
Capacity expansion plan results – the modeling outputs - were also provided on a separate large handout since the font is small. This handout depicts retirements and additions for each scenario over the planning period from 2015 to 2034. In years when capacity is needed, the model selects a combination of market purchases, combined cycle gas turbine (CCGT) build-outs, and some wind additions. IPL has concluded that its existing resource portfolio is sufficient to meet future needs, with only limited capacity additions.
Ms. Sundar then explained the 5 build-out plans that were developed based on the capacity expansion plan results. These were modeled in six out of the eight scenarios. The generation mix in 2025 associated with these 5 plans was presented, showing the distribution of coal, natural gas, oil, solar, and wind resources. She explained that all plans allow IPL to meet reserve margins of 14% without capacity purchases for all years after 2017. CO_2 emissions per plan were shown, with lower emissions correlating to plans with less coal generation.

The present value revenue requirements (PVRR), or cost, of each of the 5 build-out plans were presented. Plans 1 or 2 were shown to be the least-cost options in four out of the six scenarios analyzed. Plan 1 is IPL's current portfolio and Plan 2 is similar but adds 200 MW of wind generation in 2025.

Wind sensitivities performed on the Base Case Scenario were presented. An average wind generator is valued against the same market prices as all other units, and has a capacity factor of 35%. For this analysis, the four wind sensitivity-cases exploring alternative capacity factors, market prices and congestion conditions were applied to Plan 2, with the existing modeling of Plan 2 as the base. The results show that wind resources, when modeled with current market characteristics are less cost-effective than the base-case modeling.

IPL concludes that the Base Case represents the most likely combination of inputs and risks. In four scenarios, the most cost-effective plans are Plans 1 and 2. Given the uncertainties of future regulations, Plan 1 is the preferred plan. Ms. Soller reminded the group that there are risks associated with resource planning that IPL manages at all times, including weather, loads, technology, fuel supply and cost, environmental regulations, MISO market changes, and others.

Questions and comments included the following:

- Why is there a capacity build-out when there is still excess of reserve margins in some plans?
    - This was done to explore the cost of adding renewable resources to the system, since this may be needed depending on the CO_2 regulations. It was noted that wind resources represent minimal capacity addition to the system.
- What's the point in doing capacity expansion plan if its results were not directly used?
    - Plan 1 is the base-case result of the capacity expansion plan. The other plans were developed based on the interpretation of the capacity expansion plan's results in terms of flexible retirement dates and the types of resource-additions.
- Please clarify that IPL has not applied the cost of adding a selective catalytic reduction (SCR) system at Petersburg 4 in its modeling
    - That's correct, because of the uncertainty associated with regulations.
- Why did you model for 50 years instead of 20 years, the planning horizon of the IRP?
    - The model analyzes the need for additional resources for 20 years, which is the IRP planning period. It then applies cash-flows for another 30 years to capture the full life cycle and economic value of all the resources.
- MISO analysis uses $38/ton for carbon price. Did you use that?
    - No, we used other proxy prices.

Short-Term Action Plan
Joan Soller
(slides 79-87)

Ms. Soller described how a short-term action plan will be addressed in the IRP. IPL will describe the changes since the last IRP and what actually transpired. She outlined the major elements of the 2104 short-term action plan, including the generation portfolio, DSM, capacity needs, transmission and distribution upgrades amounting to about $100 million, and exploration of research and technology options.

Meeting Recap and Next Steps
Marty Rozelle
(slide 89)

Marty Rozelle outlined the schedule of filings and milestones in the near future:

October 17, 2014	Public Advisory Meeting #3 Notes Posted to IPL Website
By November 1	IPL to Submit IRP to the IURC
90 days after filing (February 1, 2015)	Interested Party Deadline to Submit Comments to IURC. See 170 IAC 4-7-2 for details
120 days after filing (March 1, 2015)	IURC Director Draft Report Published

She asked for any additional questions or suggestions. The group offered the following:

- Can we count on IPL's continuing support for residential net metering for solar?
    - Yes, we will continue to support net metering as it is approved by the IURC.

- A participant wondered what motivated several commercial & industrial customers to come today?
    - One representative said they are concerned about effects of climate change, and know they must reduce carbon emissions.
    - Another said they wanted to increase their understanding of where the market and industry is headed.

Dr. Rozelle asked participants to think about one thing they liked about this process, and one thing they would change for the next time. Ideas included those below.

Liked	Change Next Time
Stakeholder input has been very helpful as a wider view of opinions.	General public would be better served if there was a public education session on a weekday evening, including both presentations about the process and sessions to gather public input. May get more diverse opinions. Also allow presentations by stakeholder groups, making it more interactive. Offered as 'food for thought'.
Written materials were done very well and presentations were clear – appreciates the effort.	This is a pretty passive format. In future, the initial meeting should include an exploration of what IPL is doing to stimulate Distributed Generation in its territory and in its planning.
Thanks to IPL for making important mid-term corrections.	Observation: OUCC has done a lot with its web page and ability to submit comments electronically. IPL should explore whether this would work well for these processes, to enhance more general public participation. Perhaps develop a video presentation available for people to look at on their own time.
Everybody did a good job.	Have quarterly stakeholder informational meetings, especially about environmental issues.

Conclusion

Kelly Huntington thanked participants for their time and comments today. She also thanked Barnes & Thornburg and Teresa Nyhart for hosting the meeting. She called people's attention, again, to the pie charts showing IPL's changing generation mix over the past 10 years that show a significant reduction in reliance on coal. Portfolio diversity is increasingly considered to be a beneficial approach. She feels that investments IPL is making today will position them well in

the future. For example, when Harding Street 7 is converted to natural gas it will still be retired in 2034, and at that time there may be a completely different mix or technology available.