



Indianapolis Power & Light Company
2019 IRP Public Advisory Meeting #1
January 29, 2019

Meeting Summary

Welcome & Opening Remarks

Lisa Kreuger, President AES US SBU
(Slide 3)

Ms. Lisa Kreuger started off the meeting by introducing herself and officially beginning the IPL 2019 IRP process. She noted that IPL has an emphasis to continuously improve and to work with engaged stakeholders. She called on stakeholders to continue to ask questions; IPL wants your feedback. She noted her thanks in advance for the hard work from stakeholders today and in future meetings. She further emphasized how it is in all parties' interest to ensure that IPL has a plan to continue to provide reasonable, least cost service to our customers.

Meeting Objectives & Agenda

Stewart Ramsay, Facilitator, Vanry Associates
(Slides 4 - 5)

Mr. Stewart Ramsay introduced himself and his colleague Peter Claghorn. Mr. Ramsay shared that their job as facilitators is to keep the group on track during the meeting. Stewart shared that Lisa characterized it well, the intent of the IPL team is to get feedback from stakeholders. Stewart emphasized that the IPL IRP team is starting early and that what you are going to see today is just the start. These are the ingredients only to start; we haven't begun to bake the cake yet. Knowing this, there is time for stakeholders to provide comments to IPL.

2016 IRP Review

Patrick Maguire, Director of Resource Planning
(Slides 6 - 9)

Mr. Patrick Maguire thanked everyone for coming out to the meeting. He started off with a quick recap of previous IRP work by IPL to let everyone know where the IPL IRP team is coming from. The work with this group will identify some comments we received and how we are improving and moving forward. In 2016, IPL hosted four meetings and then one after IPL filed and posted the report. This documentation is available on the IPL IRP website. IPL is starting two months earlier than last time and will host an extra meeting for five (5) total meetings. If you are new to the IRP world, there was a Joint Utilities conference with materials for reference for terms. IPL reviewed the 2016 feedback and noted there are areas where we can do better. IPL has made improvements from past IRPs and the IPL team will continue to keep that momentum going.

There were four general categories of feedback we will discuss today. Patrick noted that these are not an exhaustive list. The first category of feedback was around the commodity forecast. In the 2016 feedback, it was noted that there was not enough narrative and description and that this data was not available. IPL will work hard to make sure stakeholders receive the necessary



data and access, when publicly available. Part of the nature of purchasing proprietary third-party forecasts is the requirement of having a signed Non-Disclosure Agreement (NDA).

The second category was around scenarios and portfolios. Patrick noted that this topic is different between each Indiana utility. IPL in 2016 conducted a scenario workshop for the drivers of risk and uncertainty. IPL also ran a stakeholder created scenario. IPL will continue to discuss scenarios, sensitivities, etc. The framework for scenario development will start at the March meeting. For example, IPL will pose and describe the questions that stakeholders may have confusion about: What is a Scenario versus a Portfolio? What is Stochastics versus Deterministic modeling? How does it all fit together? Which portfolios were optimized, and which were not? IPL will work throughout the 2019 IRP process to make it clear the differences in the terms and will work to ensure that all stakeholders have the same baseline of understanding.

The third category was around metrics. IPL improved the scorecard and metrics portion in the last IRP and will continue to improve this in the 2019 IRP. IPL will provide an exhaustive list of metrics and will provide opportunities for stakeholders to provide feedback on these metrics.

The last category was around Demand Side Management (DSM)/Energy Efficiency (EE) modeling. This modeling continues to evolve. As part of the IRP rule, the DSM modeling requirement is to model DSM the same as supply side resources. In 2016, IPL modeled the DSM selectable resources in two timeframes. The 2019 IRP team plans to work to break up these timeframes further. IPL is partnering with GDS Associates on this work. The Ascend Model will allow for flexibility in DSM modeling since IPL is running the model. It allows for more visibility into the process.

Introduction to the 2019 IRP: Timeline, Mission, Objectives

Patrick Maguire
(Slides 10 – 14)

As Ms. Kreuger said, IPL is working to find the least cost solution to serve our customers for the next 20 years. The stakeholder meetings will cover all the factors that encompass an IRP. After all the work of modeling, scenarios and portfolios, IPL is led to select a Preferred Resource Portfolio. The definition of the 'Preferred Resource Portfolio' from the IRP rule covers most of the considerations and factors needed and evaluated in an IRP.

Ms. Kreuger shared her thoughts on the word 'uncertainty', which is used in the IRP rule definition of a Preferred Resource Portfolio. She noted that uncertainty is a key word to note. A 20-year period is a long time, so we must think risk and uncertainty on how best to make that plan.

Participants had the following questions and comments, with answers provided after:

- On your definition of a Preferred Resource Portfolio, what is an example of a Demand Side resource? A demand side resource reduces energy demand rather than generating electricity.
 - Mr. Maguire shared that an example of a Demand Side resource would be a utility sponsored energy efficiency program.



- This stakeholder noted that the world has changed dramatically. The cost of renewable energy has changed since the last IRP process. He suggested that this approach should start with the end in mind. We are talking 20 years – in 20 years we should not be burning coal. – this changes the approach with the end – we don't have a choice – we have to make that happen – and with the folks in the room we can make that happen. He wanted to share this now rather than waiting to later in the meeting.
- A stakeholder shared that a letter was sent to IPL from the CAC requesting that an RFP be issued, like the process used by NIPSCO, to determine to current, market rate pricing for renewables compared to existing fossil fuel power plants. Is there a comprehensive response to that request?
 - Mr. Maguire responded that IPL applauds NIPSCO for their innovative approach. NIPSCO had a known capacity shortfall by a specific year and could solicit bids with that known. IPL is long capacity, and it is hard to issue an RFP in that situation. IPL will show assumptions at the March meeting and will request stakeholder feedback.
- The same stakeholder shared she may not be permitted to sign an NDA for this purpose based on this work. But perhaps I can revisit this, knowing that I would not be able to share with the solar developers that I work with.
 - IPL said ok. This discussion can be discussed further.

Slide 12 presents the IPL 2019 IRP timeline on what topics will be covered at which IRP Public Advisory meeting. (Note: IPL has rescheduled the March 13 meeting to March 26). IPL will provide opportunities for stakeholders to present in all future meetings, if stakeholders choose to do that. IPL has not selected dates for Meeting #3, #4 & #5. This gives time for IPL to get feedback before we hit go on the model after the March meeting and before the May meeting. In the August meeting, IPL will present preliminary results. In the October meeting, IPL will present the final resource plan.

Slide 13 is the high-level overview of the IRP process. All these pieces fit together in the Preferred Plan that will be filed. IPL has new models and processes in 2019. Ascend Analytics is new for the production cost model and capacity expansion model. Itron supports IPL on the Load Forecast and IPL has made improvements to our forecasting process. GDS Associates, Inc. is conducting the 2019 DSM Market Potential Study (MPS). The 2019 MPS includes an end use analysis which is new this year. Concentric Advisors will help build up the revenue requirements from the model. These partners will help drive visibility to stakeholders as IPL works to present results. Vanry, Stewart and Peter, are here to ensure a positive and successful meeting. This Resources list on Slide 14 is not exhaustive, but it shows how IPL has done lots of research to pull information that is robust for the IRP process.

Capacity Discussion: ICAP, UCAP, Capacity Factor, Economic Min/Max

Patrick Maguire
(Slides 16 - 26)

Mr. Patrick Maguire shared that often these terms can be confusing. The intention of section of the presentation is to present source material that can be printed and brought to future meetings. IPL's goal is to define these terms and then have clarity and consistency on all



presented materials. ICAP is a common term; it is the “Installed Capacity”. This is what you typically listed in a press release. The ICAP is the max output a generator can produce. To get firm capacity credit, in the Midwest Independent System Operation (MISO) market, MISO converts the ICAP to the UCAP. This is completed because of the requirements around grid reliability. The first piece of this conversation is for thermal units. The ICAP level is reduced by the forced outage level. Unplanned outages happen. Even though a gas turbine is dispatchable, it still has times when it is out. For existing units, historical operational data submissions are used for MISO to calculate the XEFORd. For generic new units, with less than 12 months of history, MISO publishes a pooled forced outage rates that is applied. IPL will use these values for new generic units in the model for the IRP. Slide 19 notes the references to all the materials presented.

ELCC is “Effective Load Carrying Capability”. When the IPL IRP team discusses intermittent resources (like wind and solar) ELCC is equivalent to the term capacity credit. The ELCC is looking at historical or forecasted operations to note how much the unit is producing while the peak is occurring. The link to the MISO ELCC report is on Slide 20 for more detail.

UCAP is “Unforced Capacity”. How the UCAP is calculated differs if you are a thermal resource or an intermittent resource (wind and solar). For a thermal resource, if it has a 10% outage rate, it is 1- 0.1 to get the UCAP MWs. When the model is modeling our resources to get to our capacity requirement, it will use the UCAP number. For wind, a load carrying capability is published by MISO for the capacity credit. For solar, there is not enough solar on MISO’s system (also stated in the report) so there is not enough data to conduct the load carrying capability test and study. Therefore, generic new solar units, will get 50% capacity credit. Once that solar facility has production data, then the unit will get a capacity credit based on its performance.

Participants had the following questions and comments, with answers provided after:

- I understand there is not data on Solar Capacity, but IPL has 96MW of solar on the IPL system, so you don’t need to go to MISO to get real data, since you already know how solar is performing in your service territory. Why not use that?
 - Mr. Patrick Maguire noted that we are using that data. IPL affectively does an IPL specific load carrying test for our solar. One other note, IPL Solar Rate REP PPAs are fixed tilt solar assets. If assets have tracking, then their capacity credit would be better.

Slide 22 shows examples how the calculation applies to the different technologies. Each technology is noted as 100MW. For storage resources, you need both the MW and the MWh. For example, the 4-hour storage resource at 100 MW can discharge the full 100 MW for 4 hours for 400 MWh. Furthermore, the 1-hour storage resources at 100 MW can discharge 25 MW for 4 hours for a total of 100 MWh.

Participants had the following questions and comments, with answers provided after:

- Again, IPL/AES has a 20MW battery at Harding Street. Why not use that data?
 - The IPL battery is not registered as a capacity resource. If IPL did go through the MISO process, it would like a 1-hour battery. It is a 20 MW, 20 MWh and could discharge 5 MW for 4 hours. MISO is working on capacity accreditation process



right now. MISO is looking at applying a 5% XEFORd rate until you have operational data. If IPL registers as a capacity resource, that is how the capacity would be calculated.

- Why have you not registered in MISO?
 - The IPL battery is not being used for capacity, it is being used for primary frequency response.
 - Mr. Ramsay, the IRP Meeting Facilitator, further noted that the current operational function of the IPL battery is to provide small amounts of discharge to manage frequency rather than charge fully and then discharge completely that full amount.

Slide 23 provides an example on how you would cover a 1,000 MW shortfall. If you were to cover that shortfall with all thermal resources, you would need to build over 1,000MW of installed capacity to meet that UCAP shortfall. The applied capacity credit for wind and solar is not necessarily a disadvantage for those resources, there are other factors that are considered. These considerations are discussed on Slide 24. In the model, the constraint to meet the reserve margin requirement, IPL must have firm capacity. This is the method used to calculate that firm capacity.

Related to the example shown on Slide 23, the capacity value of a resource is only one piece of the puzzle. The IRP is not meeting just the need for the capacity, that would not be the full picture. The full modeling includes energy benefits, capital costs, variable costs, fuel costs, etc. Patrick wanted to focus on the capacity discussion, but it's not the primary driver of value. IPL will include the other listed drivers as well in the analysis.

Economic Minimum and Economic Maximum may or not be the ICAP value. It typically is closest to the ICAP value, but when you are modeling different capacity values of one resource the values change. The assumptions will be labelled for the assumptions for those who want to see. These inputs will go into the production cost model to determine the dispatch of the units.

The last capacity term is "Capacity Factor". Capacity factor is how much energy it produced compared to its maximum capacity of energy. It is calculated over a time horizon, usually over a month or a year. Is the Capacity Factor an input or an output? For wind and solar, it is an input. There is an example on Slide 26. IPL would include 23,500 MWh as the target for November of 2020. This is scaled to the size of the unit and then it is seasonally and shaped hourly in Ascend. Where are we sourcing these forecasted energy and production profiles? This simulated data is catching to monthly targets in the model. For thermal units, it is an output from the model. IPL inputs the operating characteristics and the costs for that unit that affect the dispatch, like heat rate, start-up cost and emissions cost. The model will then dispatch the unit to whatever forward prices are in the model. The model will commit the optimal dispatch and level based on those prices.

BREAK

2019 IRP Starting Point: IPL Load and Resources

Patrick Maguire

(Slides 27 - 33)



Mr. Patrick Maguire shared that another piece of the IPL IRP 2016 feedback was that it was difficult to understand some of the basic IPL information and starting point for the IRP. On Slide 27, Mr. Maguire notes that IPL resource mix has gone through significant change in the last 10 years. Here are some highlights: IPL signed two Wind PPAs and 96 MW of Solar PPAs through Rate REP, which have been successful. For Solar, Indianapolis is now in the Top Ten on a per capita basis in the United States. IPL retired legacy coal unit and then converted three of the Harding Street steam units from burning coal to natural gas. In 2018, IPL went commercial with the 671 MW Eagle Valley Combined Cycle Gas Turbine (CCGT). In a ten (10) year period, IPL went from 80% capacity of coal to now less than 50%. Also, not on the slide, IPL also has the 20MW Harding Street Battery. This highlights how IPL is embracing new technology and is on the forefront of new technology trends.

Participants had the following questions and comments, with answers provided after:

- After the modeling is done and based on what you know now, how many years or decades with IPL rely on coal and natural gas related power?
 - Mr. Maguire reiterated that the ingredients are still being put together for the analysis. The analysis has not yet been run for the coal question. IPL is working now in the process to lay this out. IPL does have age-based retirement units for the coal units in the 2040s.

IPL is net long capacity coming into the 2019 IRP. IPL is long capacity through about 2032. This is shown on Slide 29 noting and including age-based retirement schedule. This breakdown is shown in the resource mix. The age-based retirements are driving the shortfalls in the mid-2030s.

Participants had the following questions and comments, with answers provided after:

- What is IPL's reserve margin? Is it driven by MISO?
 - Yes, it is driven by MISO. The reserve margin on a UCAP is about 8%.
- Does the reserve margin change in the model?
 - It will stay the same in the model throughout the whole timeframe. This number does change year over year through the MISO Loss of Load Expectation (LOLE) study. Since it is hard to know what that number would be in the future, it will stay the same in the 2019 IRP, but in future IRPs it will get updated.

Slide 30 shows the capacity for today in 2019. 1,700 MW of Coal, 1,700 MW of Gas, 47 MW of Oil for Black Start or Start Up for the Petersburg units, 450 MW of Wind & Solar (ICAP value). The previous slide shows 54 MW of Air Conditioning Load Management (ACLM) and Conservation Voltage Reduction (CVR) (17MW) and IPL also has a Load Curtailment Agreement with one customer that provides 1 MW.

Within Natural Gas capacity, there are a couple of operational types and ages. Looking at the bottom left on Slide 31, UCAP MW, Eagle Valley has the lowest heat rate of any unit we have and was in service in 2018. Harding Street has six (6) units and HSS Unit 4, 5 & 6 are combustion turbines. The steam units have different configurations of operations.

Slide 32 notes renewable generation for IPL. IPL has wind and solar PPAs. For purposes of the IRP, IPL will simulate the one production profile in the aggregate for existing PPAs. The Wind



PPA expirations are 2029 and 2032, respectively. These 20-year PPAs are in within the IRP timeline. For modeling purposes, IPL is assuming that these PPAs will continue in all future IRP portfolios. IPL does get capacity from the Hoosier wind park. Lakefield does not have firm transmission and therefore no capacity credit from Lakefield in Zone 3. For Rate REP solar, that solar receives the solar capacity credit as well as the additional

Slide 33 notes IPL's Coal Plant, Petersburg. The Petersburg unites are listed from smallest to largest and by age. Mr. Maguire knows that stakeholders are eager to know how IPL will model these units. IPL will share in the March meeting the framework for scenarios and how that impacts coal resources. Pete 1 and Pete 2 retirements are within the IRP period and this is the same as the 2016 IRP.

Introduction to Ascend Analytics

Patrick Maguire
(Slide 34)

Mr. Patrick Maguire introduced Dave Millar from Ascend Analytics. Dave will talk about. In 2017, several AES entities are using Ascend for several functions. IPL hopes to highlight the new model today, with the intention that at each meeting, more and more will be explained and unveiled in future meetings in 2019 about the complex model. For the 2019 IRP, the model is being run in house by IPL staff, with the help of Ascend.

Ascend Analytics PowerSimm Model

David Millar, Ascend Analytics
(Slides 35 – 54)

Mr. David Millar noted his excitement to be here and introduced himself as the Director of Resource Planning at Ascend Analytics. This presentation is meant to high level to explain the concepts of the model. The agenda for this section of the presentation is to introduce the PowerSimm model, what makes it different, what is the difference between deterministic and stochastics, etc. Ascend Analytics is a Boulder, CO based analytics company with approximately fifty (50) staff members. The company focuses on the utility and electricity space. Ascend works across the country and internationally. The Ascend Product PowerSimm Planner is the long-term resource planning product – from today to thirty (30) years into the future. There is a lot of uncertainty in that time frame and the model works to understand that uncertainty and then provide insights into what to do about it. Slide 39 notes the products. The long-term planning is for a 30-year time horizon to use modeling and analytics to find the optimal timing for adding new resources, retiring existing resources to meet objectives. Like the objective of minimizing costs to customers or other objectives we want to put in the model and optimize form.

Reliability analysis is impacted by renewables, as they are intermittent. How do we integrate these resources in the model? When the wind blows or the sun shines, we must back off the dispatchable resources to balance. Furthermore, one tool in the toolkit of renewables integration is energy storage resources. Energy storage is still very new to the world of electricity on how it can play a role. What is the role of Energy Storage? What is the cost trade off? Ascend looks at Battery Storage specifically for timing and price reductions in the future.



On Slide 40, it describes the basic concept for PowerSimm. This is the key difference between PowerSimm and other models. The fundamental driver in PowerSimm is weather. Weather means primarily temperature. Temperature is the main driver for load. Temperature is a driver of the output of renewables. This is the market context from MISO to drive prices of electricity and natural gas. PowerSimm works to capture all these dynamics in one construct. Weather in the area for IPL Load and the model is figuring out how these two are related from the past historical data, to train the model to then forecast into the future. The model then includes the relationships between renewable output, the load and how those affect energy prices.

Slide 42 is the schematic of how the Ascend Model works. The spot prices listed are the hourly prices seen in the market. For example, MISO's website will say that at 12pm today the price for energy is \$50. It is higher today because it is cold due to supply and demand. Ascend is creating a simulation of spot prices via Monte Carlo simulations. IPL and Ascend can vary the inputs by using the simulations. This creates a series of spot prices. These spot prices will be calibrated to be equivalent to the forward price curves. The forward price curves include power, gas, coal, oil, emissions and all the commodities that drive spot prices. For the first five (5) years, this is driven by actual market transactions. After five (5) years there is not more data, then the forecast with fundamentals.

Participants had the following questions and comments, with answers provided after:

- Will this model consider global warming and the changes of weather?
 - The model works that the temperature is based on 30 years historical weather data. To capture this, there would have to be a change to how the weather is forecasted used in the model.
- Will IPL make a change to model that weather change?
 - IPL will review, and the group can discuss options for this.
- To clarify, are you saying the same relationship power, coal and gas forward?
 - No, the long-term forwards are driven by market fundamentals. For example, if there are more renewables on the system, this will drive down energy prices, but increase price volatility, and then you would see a change in the shape, like the duck curve. This drives the declining power prices in the middle of the day. After the solar comes offline, then the prices come back up to bring online the flexible dispatchable resources.
- Are you relying on outside vendors to characterize how those prices change after the five (5) year period?
 - Yes, the IPL team will identify this provider.
- How do you treat scenarios and sensitivities?
 - Ascend provides a large range in the stochastics modeling, so less sensitivities are needed since it is not inherently a deterministic model.
- Are you only doing stochastics and not doing scenario analysis?
 - IPL will be doing both. IPL will also do the input assumptions for the scenario analysis as well.
- How will you develop these inputs?
 - This will be covered at the March meeting.
- Can you take expansion and dispatch work together? How does this relate to the revenue requirements analysis that Concentric is going to do?



- Ascend does a two-step process. First, the capacity expansion analysis. Once it is optimal, then we re-run dispatch.
 - It is an hourly chronological dispatch in the capacity expansion.
- Why would you then run optimal dispatch?
 - Re-running helps once you add new increments it can then be bundled together.
- Is there a run time issue?
 - Mr. David Millar notes that the Ascend Optimization Analyst can help answer some of this line of questioning.
- Is this a linear programming model or mixed integer?
 - It is Mixed.

LUNCH BREAK

Participants had the following questions and comments, with answers provided after:

- A lot of discussion in the presentation today about renewables has only been talking about capacity, but not about energy.
 - We discussed wind and solar energy profiles that will be modeled. The IRP modeling is a full view of energy and capacity value.
- Modeling electric vehicles in scenarios.
 - There is uncertainty around EV and the load impacts. Scenarios or sensitivities could be conducted.

Modeling Replacement Resources

Patrick Maguire
(Slides 55 – 62)

Mr. Maguire notes this section tees up the new generic resources that will be modeled in the IRP. Replacement resources on the supply side are natural gas resources – combined cycle, combustion turbine, and reciprocating engine. On the wind side, will be modeling Indiana Wind. Stakeholders will see how we source the profiles. Solar will be utility scale, or smaller as a selectable resource, or on the demand side. Storage modeling is complex and will continue to evolve with changes in technology and market rules.

Participants had the following questions and comments, with answers provided after:

- How will you be modeling Demand Response? In particular the Interruptible Tariffs, we would like to expand that going forward.
 - IPL is happy to discuss.
- In the last IPL IRP, wind was modeled with storage to meet FERC requirements. Will IPL be modeling it the same way this IRP?
 - No, IPL will not model it this way in 2019.

Patrick notes that the natural gas technology is mature and that there is less uncertainty around future costs and operating parameters. IPL will model several different natural gas technologies this IRP.

Patrick described how wind profiles will be sourced from NREL's Wind Toolkit. The NREL data set provides simulated wind profiles at various locations. The simulated data will be scaled to



the generic wind project size in PowerSimm, and the historical hourly data and forecasted monthly energy. Wind capacity credit will be based on the MISO Wind & Solar Capacity Credit report.

Participants had the following questions and comments, with answers provided after:

- What are the Local Balancing Authorities in Zone 6?
 - MISO Zone 6 consists of Big Rivers, Duke Indiana, Hoosier Energy, IPL, NIPSCO, and Vectren's areas.
- Zone 6, 7.8%. Why is it low compared to other Zones?
 - One reason could be the differences in wind production in the different areas. Minnesota & Iowa have the most wind. There is geographical and curtailment situations in the State of Indiana.
- Difference between Northern & Southern Indiana Wind?
 - There currently is not any wind in southern Indiana, so modeled wind will be in northern Indiana.

For solar, IPL will use existing solar production data to model Rate REP solar in aggregate. New generic solar profiles will be built using BNEF's Solar Capacity Factor Tool.

- Is a subscription required for the BNEF data?
 - Yes.
- NREL has a similar model for Solar. Did you consider that?
 - Yes. The BNEF tool provides the best data that aligns with how data needs to be entered into our model.

The capacity credit for solar will be based on the MISO Renewable Integration Impact Assessment (RIIA) study being conducted by MISO. IPL will align solar capacity additions from the fundamental forecast provider to calculate the

Participants had the following questions and comments, with answers provided after:

- Will you present the assumptions?
 - Yes. This info will need an NDA.
- As most of us are aware, NIPSCO is adding solar over the next several years. Is that factored into your calculation?
 - It depends on the year. Yes, IPL can calculate. This assumption will be embedded. It is typically in the 30 to 40 range depending on the level and timing.
 - At 10GW, MISO shows about a 30% capacity credit.
- If you look at Zone 1, are we thinking that Zone 1 is winter peaking and not summer peaking? Or not?
 - No, the ELCC report is looking at summer peak contribution.

Battery energy storage will be based on today's rules for capacity accreditation. IPL will improve modeling as MISO rules evolve over time.

DSM/EE Modeling and Load Forecast Update

Erik Miller, Senior Research Analyst



(Slides 64 – 78)

Mr. Erik Miller introduced himself. The discussion today is an overview, since we do not yet have results. Erik started with the DSM Market Potential Study (MPS). Per the IURC rules, we model EE as a selectable resource. Erik noted touching on the bundling of the EE models.

Erik gave an overview of the Market Potential Study (MPS) process and how it is incorporated into the IRP.

Participants had the following questions and comments, with answers provided after:

- Would you give us an example of a bundle that went through the 2016 IRP?
 - An LED light bulb. LEDs are a popular measure. How much will our customers will adopt? Direct installs of these LEDs or rebated through purchases. The bundle shows the 8760 load shape for the period of the measure and include a cost for how much it would cost. Once selected, that amount of energy savings we need to achieve and then we pick the vendor is deliver the program.
- How close did the MPS come to what actually happened?
 - It came close.
- So it said you could get to 25% and you got to it?
 - We do have results from the 2019 MPS End Use Analysis

Erik continued to describe the bundling process and showed examples from the 2016 IRP. Erik described the partnership with GDS Associates and laid out the key steps to the MPS.

Participants had the following questions and comments, with answers provided after:

- I understand why the Indiana Utilities have this strategy for analyzing DSM in the future for planning. In the past, there was no economic planning. The issue with this approach that the MPS comes a self-fulfilling prophecy. Savings for seeking in the DSM programs. What gets lost, the cost of what you got this ends up being less. Avoiding this issue by noting the decrement approach and the other is thinking about doing availability and cost sensitivity for DSM. Has IPL thought about that?
 - IPL would like to discuss the decrement pricing approach in addition to this presented approach.
- In the same way you may conduct deterministic sensitivities, you could do the same thing for DSM, but at the same time also vary the level of savings available in the bundle.
 - IPL is open to talking about this also during the decrement pricing discussion.

End Use Analysis to establish as a baseline of our customers for the load forecast. For instance, IPL is setting up how a residential customer uses their home. IPL uses End Use Saturation data from the EIA considers codes and standards on what energy efficiency looks like in the future.

Participants had the following questions and comments, with answers provided after:

- Is IPL considering time of day cost into DSM planning?
 - IPL is open to looking at this.
- Charging more per kWh if you use more than less.



- That is more of rate design question, not DSM planning.

Erik moved on to the load forecast. He described the key components of the load forecast, including the modeling framework and the important inputs to the model. He explained the key differences between the residential, commercial, and industrial load forecast models.

Participants had the following questions and comments, with answers provided after:

- On Slide 71, on the pie chart, it notes No Central AC at 5%. Is this a reasonable assumption for IPL?
 - This is actual data. This is preliminary data from the end use surveys. More information to follow.
- This seems low. Seems it could be higher.
 - IPL will verify.
- How many industrial customers does IPL have?
 - IPL has approximately 80 very large customers, which is 40-45% of the IPL load.

IPL will present MPS results, the High, Low and Mid Load Forecast at the March meeting.

Participants had the following questions and comments, with answers provided after:

- What are you doing for an EV Forecast?
 - IPL is working with MCR to look at EV and DG adoption for the 20-year period.

Q&A, Concluding Remarks & Next Steps

Patrick Maguire & Stewart Ramsay
(Slides 79 & 80)

Mr. Maguire noted that we've covered a lot of ground today and we have more to cover over the next 8 to 9 months. The next meeting in March will be hosted at the Electric Building in Downtown Indianapolis. IPL will post meeting materials a week prior to the next meeting. Please email us at ipl.irp@aes.com with any additional comments or questions. Also, please fill out the Feedback Form and submit.

Mr. Ramsay concluded with the posed question to the group, was it a good use of your time? Did you get your immediate questions answered? I will take thumbs up. Continue to ask questions. Come prepared with questions. The more we turn this into a conversation, the better.

Thanks.

Meeting Concluded.