

Indianapolis Power and Light Company -- Feedback Response Table

Energy and Demand Forecast		
Stakeholder Question or Comment		IPL's Response
1	At what level of granularity does IPL forecast its demand and energy requirements (e.g., by rate classification or sector)?	IPL forecasts its energy requirements by rate-class and peak demands by system.
2	Regarding page 4 of "IPL Public Advisory Meeting Summary, May 16, 2014" (IPL Meeting Summary), please explain the basis of IPL's response to the question, "What assumptions did you make about electric vehicle stations?"	Our estimate of electric vehicles is modeled based on adoption rates and average energy consumption of hybrid vehicles published in a 2007 EPRI report ('Environmental Assessment of Plug-In Hybrid Electric Vehicles'). We will refine our assumptions as and when more concrete information becomes available.
3	Please supply the detail behind the graphs on pages 31 and 33 of the Meeting Slide Deck.	Because the source data on Slide 31 is from Moody's Analytics, IPL cannot supply the proprietary data. Please see Appendix Slide 6 for detail behind the graph on Slide 33.
4	On slide 33 of the Meeting Slide Deck, why doesn't the forecast reflect company-sponsored DSM savings? Is this true for both past measures as well as new and future DSM savings?	The (base) forecast displayed on slide 33 is the modeling result incorporating economic and efficiency trends. This forecast does reflect past DSM measures as actual energy-consumption data was used to develop it. Company sponsored DSM savings are developed independently of the forecast modeling and netted against this forecast.
5	On page 3 of the IRP Public Advisory Meeting Summary (May 16, 2014), Swetha Sundar answers regarding the ten-year forecast for the twenty-year plan: "We believe that this gives us comparable results to running the forecast models for the additional years." This assumption is only correct if the modeling assumptions are identical for each year after the tenth year. For example, if prices are increasing steadily after the tenth year, the extrapolation of the tenth year forecast for the following decade may not be appropriate. Please clearly describe the assumptions used for this extrapolation. If prices and other factors are changing between years 10 and 20, wouldn't it be more accurate to run the model for twenty years, instead of assuming the twentieth year will be the same as the tenth year?	While we agree that the extrapolation for year 11-20 lacks the rigor reflected in the first ten years, we are limited in our ability to use the model for detailed year by year projections for this period since the macroeconomic information we receive from Moody's Analytics that provide the key drivers of the forecast are only available through 2025. The uncertainty with respect to the trajectory of load and energy forecast during this time period frame is probably best addressed in the IRP by incorporating load forecast sensitivities.
6	Pg 13 of presentation: What assumptions were used with regard to demand-side management or federal energy efficiency standards in developing future projections?	This slide shows the base forecast, without the effect of IPL sponsored DSM. Federal energy standards as accounted for in the efficiency trends published in the EIA's Annual Energy Outlook (2012) have been reflected in this forecast.
7	Pg 13 of presentation: What assumptions with regard to future climate change projections were factored into forecast demand?	The most recent 15-year average of peak-producing weather conditions was used as the basis for this forecast. This would reflect the most recent weather trends.
8	Pg 13 of presentation: Why do forecasts stop at 2023? Please provide the annual peak load and energy requirements for all years modeled (with and without DSM).	The forecasts stop at 2023 as they are primarily developed for a 10-year period for internal financial budget projections. Please see the response in Energy and Demand Forecasts number 5 for additional detail. We will provide the annual peak load and energy requirements for all years modeled (with and without DSM) when available.
9	Pg 16 of presentation: Please provide the annual DSM assumptions incorporated into the load forecast for all years modeled.	The load forecast presented shows the base-forecast, without the effect of IPL sponsored DSM, and is the result of modeling using economic and end-use drivers. Once the new DSM forecast is completed, the updated projection that will be incorporated in the IRP will be provided.
10	Pg 16 of presentation: Please explain if IPL is planning on changing these assumptions given the nullification of the IURC Order on DSM savings.	While IPL is no longer bound by the Commission targets established in Cause No. 42693, IPL expects to continue to provide DSM programs to our customers - to the extent that cost effective DSM opportunities continue to be identified. In Cause No. 44497, currently pending before the commission, IPL has proposed to offer DSM programs in the scale and scope approximately equivalent to the 2014 DSM programs. Future proposed offerings will be dependent on continuing identification of cost effective programs.
11	Pg 35 of presentation: With what industry-wide expectations is the observed forecast trend consistent? Please provide a source.	The overall expectations for load-growth have lowered over the years; this is gathered from survey information (conducted by Itron Inc.), white papers and general interaction with other forecasters. The State Utility Forecasting Group at Purdue University has shown a downward shift in load growth in their latest forecast update (2013) compared to the prior update (2011). IPL has also lowered its forecast-growth rates in successive updates due to the effects of increasing energy-efficiency and sluggish economic recovery.
12	Pg 35 of presentation: How does the forecast take into account the risk of large commercial and industrial customers withdrawing from the grid or installing combined heat and power? At what point does IPL forecast the likelihood of significant self-generation by commercial and industrial customers?	IPL's does not project large commercial and industrial customers withdrawing from the grid or installing combined heat and power. As Mr. Haselden explained in his presentation, there have been ongoing discussions with the two steam producers in Indianapolis concerning relatively small scale CHP projects. The presence of the steam heat system is an attractive alternative to Indianapolis customers that need a thermal input into their processes as opposed to the investment and operation of CHP systems. Consequently, development of CHP resources is not an economic choice for these types of customers.

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Demand Side Management		
	Stakeholder Question or Comment	IPL's Response
1	What will you do to meet future DSM goals?	With the passage of Senate Enrolled Act 340 by the Indiana legislature in March 2014, the previous goals that were administratively established by the IURC are no longer in effect. Therefore IPL does not have any specific state energy efficiency goals or targets to meet. However, IPL has just filed for IURC approval of a DSM plan that would be in effect for the years 2015 and 2016. This DSM plan, if approved, will result in IPL still achieving a significant amount of cost effective DSM. The amount projected in 2015 would be comparable to our energy efficiency achievement in 2014.
2	Model dramatic demand-side management reductions. My church has reduced its use of electricity by over 40%. We are not suffering in any way as a result. Over 50% of our congregants use on average 30% less energy than their average Hoosier neighbors. They are not suffering in any way. If I am remembering correctly, IPL had a very modest goal of reducing energy use by 2% through Energizing Indiana, rebates and incentives from IPL. This seems so trivial. With little expense, it is easy to reduce electricity consumption by 10 times that much. Incidentally, I want to compliment IPL on the use of the envelop stuffer that shows individual residents how much energy they use in comparison to their neighbors. Almost every other week members of my church bring me a copy of their report showing how their usage is below their neighbors' usage. This is a powerful tool! Thank you.	Thank you for your comments and compliments to you and your fellow congregants for leading the way on energy efficiency. It should be noted that over the last 4 years, IPL has made large investments in DSM programs, and in partnership with our customers, have achieved a significant amount of energy savings. IPL will continue to offer additional DSM programs and pursue savings to the extent that additional cost effective opportunities are identified. Ultimately, the amount of additional energy efficiency that can be achieved is limited by the amount of interest our customers have in making investments and taking actions. The Peer Comparison report that you noted is one way IPL is attempting to educate our customers on the benefits of EE and to spur them to take action.
3	Is IPL proposing to include on-going energy savings from past DSM programs in its 2014 IRP model?	Energy savings from historical IPL energy efficiency efforts are included in IPL's load forecast as a reduction in load. In other words – a high efficiency LED bulb installed in a prior year which requires IPL to produce less electricity is implicitly built into the subsequent years forecast.
4	A recent report by the American Council for an Energy Efficient Economy shows Indiana could save 22% of electricity (relative to 2012 consumption) by utilizing an energy savings target, building codes, combined heat and power and equipment standards (http://www.aceee.org/research-report/e140). Which, if any, of these potential energy savings strategies did IPL use in its IRP cost model runs, and at what level(s)? If none were used, please explain why.	IPL's load forecast explicitly takes into account the impact of building codes and equipment standards on IPL's future energy and demand requirements. While IPL and the other Indiana utilities do not presently have a state energy savings target – IPL is committed to pursuing all cost effective DSM for our customers and that is reflected in our recent filing with the IURC for approval of programs to be delivered in 2015 and 2016. This proposed DSM plan is similar in scope and scale to the significant DSM program offerings in 2014. With regard to Combined Heat and Power, IPL is not aware of any customers that are particularly good candidates for this technology other than the two facilities mentioned in the presentation (Covanta and the Perry K steam plant), but we will continue to work with our large customers and if there is an opportunity or a need for CHP for these customers we would expect to be involved in any such project.
5	The sixth bullet point on page 5 of the IPL Meeting Summary states that IPL expects to have energy savings from DSM in 2019, and that it is currently working with EnerNOC to calculate projected energy savings for 2019. When will that projection be available for IRP stakeholder review? When will it be incorporated into IPL's IRP modeling? Please also provide workpapers or other detail explaining the assumptions and methodology EnerNOC used to estimate those future energy savings.	IPL is still working with EnerNOC to create the projection. IPL does not expect to have this completed by the July 18 Public Advisory Meeting, but we will provide an update at the July 18 Meeting.
6	Pg 38 of presentation: Demand-side management, or energy efficiency, has been proven to save \$2 or \$3 for every dollar spent in Indiana in the past two years. During the meeting, Mr. Allen promised that IPL would conduct a "meaningful amount" of demand side management "over the near-term horizon." Please define "meaningful amount" and "near-term horizon." How much and for how long?	While IPL is no longer bound by the Commission targets established in Cause No. 42693, IPL expects to continue to provide DSM programs to our customers - to the extent that cost effective DSM opportunities continue to be identified. In Cause No. 44497, currently pending before the commission, IPL has proposed to offer DSM programs in the scale and scope approximately equivalent to the 2014 DSM programs. Future proposed offerings will be dependent on continuing identification of cost effective programs.
7	Pg 38 of presentation: How will IPL determine which DSM programs it will offer? What criteria will you use?	Future offerings beyond 2017 are indeterminate at this time, but IPL will continue to offer programs that have demonstrated success and look to have continuing market potential. IPL also continually monitors programs that are being successfully offered by other utilities in Indiana and other states. Input from stakeholders on new offerings will also continue to be sought. The primary screening criteria will continue to be cost effectiveness.
8	Pg 44 of presentation: Please show IPL's DSM achievements from 1993-2009, that is prior to the 2009 IURC order requiring investor-owned utilities to meet annual savings goals.	This information is not readily available for the period in question. IPL did not generally have a tracking or reporting requirement for DSM programs that were offered prior to the IURC's Generic Order. While IPL filed annual reports with the Commission regarding DSM activities, these reports typically did not include energy efficiency achievement.

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9	Pg 44 of presentation: Please show DSM projections for the next 20 years when it is available from EnerNOC, including a description of likely program design.	Yes, IPL will share this information once available.	9
10	Pg 44 of presentation: Please define the universe of customers who were offered an opportunity to opt out of the DSM program.	The opt-out parameters were generally defined by the legislature in Senate Enrolled Act 340, that became law in March of 2014. Customers that have a load at a site that exceeds 1 MW of demand, may opt out of IPL's DSM offerings. IPL has approximately 200 customer services that meet this criteria, representing approximately 25% of IPL's retail sales.	10
11	Pg 44 of presentation: If all these customers were to opt out, please estimate the benefits these customers will receive that will be subsidized by other ratepayers.	The legislation indicates that customers who opt out will remain responsible for the costs that were accrued or incurred prior to their opting out. IPL will track and recover these costs only from the customers who have opted out through Standard Contract Rider No. 22.	11
12	Pg 61 of presentation: Please provide charts that incorporate energy efficiency as a resource in 2017 and 2007.	See Appendix Slide 9 for the energy pie chart with DSM. It should be noted that the percentages can vary significantly with changes in fuel costs and market prices.	12

Renewables/ Environmental		
	Stakeholder Question or Comment	IPL's Response
1	How is wind being considered in the assumptions (cost, capacity factors, etc.), and are there plans to consider wind imported from other regions with higher capacity factors than can be found in the Indianapolis area?	We plan on modeling wind using the resource assumptions provided by Ventyx as part of the Midwest Reference Case. Sensitivity cases can address lower costs associated with higher producing wind resources. While still early, initial indications are that state compliance with proposed CO2 requirements of the June 2nd EPA Clean Power Plan would favor in state wind resources over out of state resources.
2	What impact will Climate Change have on your weather model? How do Climate Change predictions get incorporated into your model?	We have switched from using weather normals published by NOAA, which get updated once in 10 years, to creating our own 30-year average normals which incorporate the most recent weather information. Using 30-year averages of weather data is the most widely used practice in the industry.
3	What will a carbon tax do to your projections?	A carbon tax would increase the cost of carbon emitting resources and at a high enough price it could certainly tip the scale in favor of non-carbon or low carbon emitting resources.
4	What will currently proposed EPA rules do to your projections?	IPL is currently evaluating the June 2nd proposed EPA rules and will be providing an update at the July 18th meeting.
5	How many hours have you bypassed scrubbers on Harding Street 7?	In 2013, which was a typical year for Harding Street Unit 7, the unit bypassed the scrubber approximately 326 hours, which was equivalent to about 4% of total operating hours.
6	How can you stay in compliance with SOx standards on Harding Street with the scrubber off? Are standards too low? When Harding Street units 5&6 are repowered, will standard for SOx emissions on Harding Street 7 be lowered?	HS Unit 7 must comply with an SO2 limit of 5.3 lb/MMBtu based on a 30-day rolling weighted average according to 326 IAC 6.5-6. IPL is not required to operate the Scrubber 100% of the time in order to meet this limit. IPL does not expect that the refueling of HS Units 5 and 6 will result in a reduced SO2 standard for Unit 7.
7	What does the "scrubber upgrade" consist of? What is the projection for scrubber time online after upgrade?	For HS Unit 7, the Scrubber Upgrades consist of modifications to prevent freezing of certain equipment during winter, which can otherwise result in scrubber downtime. The scrubber upgrades for the MATS Compliance project at HS7 are intended to improve the scrubber reliability and thus enhance the operation of the process. Upon completion of the MATS construction project, the scrubber will be in operation essentially 100% of the time the unit is burning coal. The exceptions are during the startup procedures at very low generation capacity and during testing periods for the By-pass Stack monitoring equipment. The acid gas regulations (HCl) are the governing factors since the scrubber is the primary process for capture of those emissions.
8	What are projected costs for upgrading Harding Street 7 controls vs. replacing its generation with another source?	Costs for MATS compliance for HS Unit 7 are approximately \$54 million. The costs of replacement generation will depend on the resource(s) that provide the lowest cost option for IPL customers. The capital cost associated with replacing HS Unit 7 with new CT or CCGT capacity would be in the range of \$300-\$500 million.
9	New EPA rule on scrubber effluent due 2014 which will restrict its uses. What will you do with it?	EPA is expected to issue the revised Effluent Limitations Guidelines (ELG) Regulations for Steam Electric Generating Stations in September 2015. IPL is currently evaluating wastewater treatment technologies needed by September 2017 to comply with new metal effluent limits included in NPDES permits for Harding Street and Petersburg. This includes wastewater treatment technologies for scrubber effluent which may also address future ELG Requirements. However, at this time the final outcome of IPL NPDES compliance strategy plan and the final ELG Rule remain unknown.

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10	Where are your cost comparisons for installing new pollution controls vs. retiring coal units?	MATS costs were provided in the presentation on Slide 66 and future environmental potential costs on Slide 74. In the 2013 IURC MATS compliance filing IPL concluded that continued operation of the five remaining coal units was the preferred option vs. retirement. IPL continues to evaluate the continued operation of these coal units as new information becomes available.	10
11	You don't recommend wind or solar unless the Feds tell you to. What other driver might entice you?	IPL disagrees with the statement. IPL has voluntarily acquired the output from 2 wind farms totaling over 300 MW of nameplate capacity. IPL has also voluntarily acquired approximately 98 MW of solar PV power through Rate REP.	11
12	A long term plan for clean energy will be very helpful for Indiana in coming up with an implementation plan for the power plant standards that the EPA will be releasing in June as part of the President Climate Action Plan. It is critical to reduce the CO2 that is being emitted into our atmosphere if mankind is going to be able to survive on this planet. What are your plans for meeting the upcoming EPA requirements ?	On June 2, EPA released the proposed New Source Performance Standard for existing EGUs. IPL is fully committed to environmental compliance and will take necessary measures to ensure compliance with any final Green House Gas Regulation. IPL is currently in the process of evaluating this proposed Rule to determine potential impacts. This will be further evaluated upon issuance of a Final Rule and IDEM's development of a State Implementation Plan.	12
13	Model a scenario that increases the percentage of renewable energy generated. Over the next 10 years, the renewables should represent 30-40% of total generation. Indiana has wind energy available. We have solar available. Solar panels on individual residences and commercial and industrial buildings are a very viable option. The price is very competitive with other sources of electricity. Include in the model having IPL own or lease the panels to the users. It is a fact that solar is not available all the time. IPL's engineers are creative and clever and looking for the challenge to make this work. I want my local utility to be a leader that people from around the country come to learn how to do this.	Thank you for your comment and complimenting IPL's workforce. IPL is a supporter of renewable energy generation with 300 MW of wind and approximately 100 MW of solar under contract. As technology progresses and we learn the effects of such resources on the transmission and distribution system, IPL expects renewable generation to increase.	13
14	Page 8 of the meeting summary states regarding scrubber bypass Harding Street Unit 7, "Bypass time will be minimized when further upgrades are installed for MATS Compliance." a. Please list all "further upgrades" and whether these have or have not yet been approved by the IURC. b. Are all "further upgrades" listed on slide 67 of the "IRP Public Advisory Meeting #1 (Meeting Slide Deck)" c. Please show how all further upgrades will be included in IPL's modeling.	a. For HS Unit 7, the Scrubber Upgrades consist of modifications to prevent freezing of certain equipment during winter, which can otherwise result in scrubber downtime. The scrubber upgrades for the MATS Compliance project at HS7 are intended to improve the scrubber reliability and thus enhance the operation of the process. For Petersburg, the Scrubber Upgrades consist of redundant equipment and isolation valves to minimize bypass time during necessary repairs and maintenance activities. These upgrades were approved in Order 44242, MATS Compliance Project. b. Yes. c. IPL's modeling does not assume bypass of the scrubber.	14
15	Please clearly define the environmental costs that were used to evaluate future environmental regulations?	MATS costs were provided in the presentation on Slide 66 and future environmental potential costs on Slide 74.	15
16	Pg 20 of presentation: Please plan to provide information on each resource portfolio that compares annual environmental impacts on a utility-wide basis and by county (Marion, Morgan and Pike): annual CO2, SO2, NOx and particle emissions; toxic emissions to air, land and water; permitted water discharges to White River; annual water withdrawals from White River or groundwater; electricity demand/energy efficiency	The Ventyx Midas model calculates SO2, Knox and CO2 emissions for each resource portfolio on a system wide basis; these results will be provided when the initial modeling results are presented on July 18.	16
17	Pg 64 of presentation: Please explain the circumstances under which the Harding Street plant runs without scrubbers to control SO2.	Bypass of the scrubber can be caused by unit trips, shutdowns and start ups. Occasionally, bypass is also caused by fan issues that can misdirect flue gas. Less frequently, scrubber equipment issues require the FGD to be out of service. IPL is also required to conduct quality assurance/control work and testing of the bypass stack by EPA that requires bypass of the scrubber.	17
18	Pg 66 of presentation: Please explain how the Mercury and Air Toxics controls on air pollution will affect mercury and toxic releases to land and water.	Mercury is a trace metal and will be removed from the flue gas by electrostatic precipitators and baghouses. The materials collected by these control devices will be sent to mines or landfills for disposal.	18
19	Pg 66 of presentation: Will total toxic releases (air, land, water) from the Big Five coal-burning units be reduced, go up or stay about the same during the 20-year planning horizon?	Total toxic releases from the Big Five coal-burning units are expected to remain relatively constant over the 20-year planning horizon. Total Harding Street toxic releases are expected to decrease by about 70% in 2017 compared to 2013 levels.	19
20	Pg 66 of presentation: IPL has reported repeated smoke opacity exceedances for several years. Please explain the circumstances under which opacity is allowed to exceed permitted limits on the south side of Indianapolis.	As is the case with many industrial processes, IPL Harding Street, due to operational issues, occasionally experiences a nonconformance issue. These occurrences are infrequent and IPL quickly returns to compliance once an issue is detected. In 2013, which was a typical year, IPL was in compliance with opacity limits greater than 99.9% of total operating time.	20
21	Pg 69 of presentation: Please elaborate on the statement, "Currently a majority of fly-ash and scrubber product is beneficially used in encapsulated concrete and synthetic gypsum applications." How many tons of coal combustion residuals are generated each year? How is it reused or disposed, by final destination?	Approximate CCP/CCR generation is 1.2 M tons per year (from IPL's largest 5 coal units). Please note that the CCP/CCR generation varies dependent on numerous factors. IPL beneficially reuses approximately 800k tons of its coal combustion products in a wide variety of manners. Gypsum from our flue gas desulfurization process is used as an agricultural soil amendment, in wallboard, and in concrete and our fly ash is also reused in concrete.	21
22	Pg 69 of presentation: Why is coal ash mixed with water?	Ash is treated in on-site ponds to allow for settling to occur.	22

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23	Pg 69 of presentation: Are the on-site ponds at the three coal-fired power plants professionally engineered and lined with a synthetic material to protect groundwater?	The on-site ponds were professionally engineered, but are not lined. IPL has completed "as-built" designs, hydraulic and stability analysis and physical improvements, where needed, in addition to Operation and Maintenance, Instrumentation and Monitoring, and Emergency Action Plans in the past several years to ensure the safe operation of the ponds and to improve ability to respond in the unlikely event of a release.	23
24	Pg 69 of presentation: Will IPL commit to testing groundwater under the ash ponds and ensuring that contamination has not and will not migrate off IPL's property?	IPL is committed to complying with all environmental requirements and regulations. EPA is expected to issue the Coal Combustion Residuals Rule later this year which will likely require groundwater monitoring. IPL will comply with that regulation once final.	24
25	Pg 73 of presentation: The number of good air quality days in Marion County lags behind other comparable urban communities tracked by MCPHD-IUPUI. (See http://indyindicators.iupui.edu/) Will IPL commit to developing an energy plan that will increase the number of good air quality days so Indianapolis children can breathe clean air as often as children in Columbus, Cincinnati, Cleveland, Milwaukee, St. Louis, Kansas City, and Memphis?	Public policy, as determined by laws and regulations, determines the appropriate balance between health and the environment. IPL complies with those regulations developed through the public process and will comply with any regulations which may be developed and finalized to meet this initiative.	25
26	Pg 73 of presentation: Please provide cost estimates for the SCR at Petersburg unit 4.	Based on a recent estimate, the approximate cost of an SCR on Petersburg Unit 4 is \$146.5 million.	26
27	Pg 81 of presentation: This slide represents the only discussion of wind power in the entire presentation, and its emphasis on distributed generation is embarrassing. There is no discussion of utility-scale wind power and its price in comparison to coal and natural gas. IPL should present an analysis of purchasing wind power as a viable generation alternative within its IRP.	Slide 81 is within the Distributed Generation section of the presentation. Utility scale wind generation is included as a technology option in the modeling performed by Ventyx as shown on slide 96 (both the original and revised version of slide 96). IPL currently has Purchased Power Agreements for 300 MW of wind and supports wind as a future resource to further diversify the Company's portfolio.	27
28	Pg 82 of presentation: Has IPL had discussions with Citizens Energy Group about the feasibility of generating energy from the Belmont or Southport advanced wastewater treatment plants? If not, why not? If yes, what was discussed?	IPL has investigated the possibility of power generation by using the methane production from sewage treatment plants. The latest inquiries were conducted in relation to the Rate REP biomass rate. Candidate treatment plants were the Southport AWT, Town of Speedway and City of Carmel. The combined maximum potential was estimated at approximately 2.5 MW. The Belmont plant incinerates solid waste and was not considered to be a candidate. None of the host sites expressed an interest in pursuing a power production option due to economics and complications with use of the methane as a heat source for their operations.	28
29	Pg 84 of presentation: The graph on page 84 is misleading because the gray block showing "summer peak hours" does not show energy demand throughout that entire June day, nor does it show how the peak rises and falls during the 3 p.m. – 7 p.m. period. Please provide a new graph overlaying solar generation with average June day demand.	See Appendix Slide 10 for the new graph overlaying solar generation with average June day demand.	29
30	Pg 84 of presentation: Mr. Haselden indicated that solar renewable energy credits are sold separately, mostly to Ohio. If the renewable energy credits are sold so that someone else is claiming the energy as renewable, IPL should not attribute words like renewable, solar or wind to this energy, as required by law. We would like IPL to keep RECs in Indiana.	IPL is very careful to follow the Federal Trade Commission's Green Guides and frequently consults with the Center for Renewable Solutions when there is a question on this topic. At present there is no market for RECs in Indiana other than an occasional sale for green power programs. Absent a mandate, other stakeholders want the RECs sold since the Fuel Adjustment mechanism is credited with revenue from those sales. Sales to entities in other states is the only significant current market opportunity. http://www.ftc.gov/opa/2012/10/greenguides.shtm	30

Generation	
Stakeholder Question or Comment	IPL's Response
1 Capacity prices have not been mentioned. I want to know how much excess capacity the Company is building and able to sell over the 20-year period.	Capacity in excess of minimum reserve margin requirements will be available upon completion of modeling runs. This information should be available at the July 18th meeting.
2 Off-system sales from excess generation available have also not been mentioned. Does the least cost plan assume that off-system sales revenues are passed on to ratepayers and does this comport with how they're currently handled.	The PVRR of the least cost plan is reduced by the amount of revenue, if any, associated with wholesale sales. This is consistent with the regulatory treatment IPL has received in its past rate cases.
3 Can you provide a pie chart showing actual generation versus projected (i.e. energy versus capacity)?	See Appendix Slide 3 for the energy pie chart. It should be noted that these percentages can vary significantly with changes in fuel costs and market prices. The capacity pie chart was provided as Slide 61 in the IRP Public Advisory Meeting #1 presentation.
4 When will you retire large coal units? What would motivate you to retire them sooner?	Normal retirement age for IPL large coal units is assumed to be around 60-65 years. For base modeling purposes we are assuming the following retirement dates for the remaining 5 coal units in our portfolio: Harding Street 7 - 2033, Pete 1 - 2032, Pete 2 - 2034, Pete 3 - 2042, Pete 4 - 2042. These units would be retired sooner if it becomes more economical to retire these units and add replacement resources.

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5	Stop burning coal at the Harding Street plant by 2020. This is a reasonable thing to model since it is the worst polluter in Marion County. It is causing negative health effects. We are already mandated to spend millions of dollars to remove mercury, and with the pending regulatory demands by EPA, the rate payers will have to pay millions more—for a plant that will eventually have to be closed. It is an old plant. We have the constant risk of the coal ash ponds sitting right there on White River. As a rate payer, I worry about this liability. There is growing sentiment in Indianapolis that the plant must be closed.	Thank you for your comment and sharing IPL's concern for the health of our community. Harding Street units 5 and 6 will be converted to run on natural gas by April 2016 and IPL continually evaluates the reliable, least cost, and environmentally responsible options for Harding Street unit 7. It should also be noted that the Harding Street plant also includes 3 newer gas-fired peaking units representing about 300 MW of capacity that is critical to reliably serving IPL customer load.	5
6	Please provide more details to the response on page 10 of the Meeting Summary regarding the conversion of a "mothballed" IPL unit to a synchronous condenser for voltage support.	The decision to convert a unit to a synchronous condenser involves various considerations such as system needs, age and condition, size and rating, and starting means. Please see Appendix Slide 4 and 5 for a detailed explanation.	6
7	Pg 16 of presentation: Please show the annual capacity reserve requirements and reserve margin for all years modeled.	The minimum reserve margin requirement used by IPL as a proxy for the MISO Resource Adequacy Requirements is 14%. The year by year reserve margins will be available when initial modeling results are presented on July 18.	7
8	Pg 16 of presentation: Please provide the annual excess capacity sales estimates, including MISO capacity price forecasts used by IPL.	The excess capacity sales projections will be available when initial modeling results are presented on July 18. The MISO Capacity Price forecast is part of the Ventyx Fall 2013 Midwest Reference Case assumptions and has been provided to those who have executed an NDA with IPL.	8
9	Pg 18 of presentation: Please provide retirement dates assumed for each of IPL's units.	The retirement dates assumed for IPL coal units are as follows: Eagle Valley 3-6 in April 2016, Harding Street 5-6 converted to gas by April 2016, then retired in Dec 2030, Harding Street 7 retired Dec 2033, Pete 1 retired Dec 2032, Pete 2 retired Dec 2034, Pete 3 retired Dec 2042, Pete 4 retired Dec 2042. The gas fired units are assumed operational throughout the 20 year IRP planning period.	9
10	Pg 18 of presentation: Please provide IPL's projected build-out for the 20-year period.	The 20 year IPL projected resource build out will be provided with the initial modeling results at the July 18 Public Advisory meeting.	10
11	Off-system energy and capacity sales revenues should be treated the way they are in IPL's current ratemaking. Otherwise, these revenues should not be included in the PVRR estimates.	The treatment of off-system energy and sales revenues as a credit to the PVRR costs is consistent with the regulatory treatment IPL has received in its past rate cases.	11

Modeling Assumptions/ Inputs	
Stakeholder Question or Comment	IPL's Response
1 Which numbers from the ranges of env. compliance costs on slide 74 will be incorporated into the modeling?	IPL intends to use the best information available at the time the modeling is performed. To the extent there is still a wide range of credible compliance costs estimates and costs are significant, sensitivity runs may be required.
2 Did the Company model any env. compliance costs for rules that were uncertain or assume these rules would cost nothing?	IPL will develop assumptions to address potential CO2 compliance costs including EPA's June 2nd Clean Power Plan proposal. The initial modeling results presented at the July 18th meeting will incorporate the CO2 costs reflected in the Ventyx Environmental Scenario.
3 Does the modeling assume that IPL doesn't exceed the 14% planning reserve margin in any given year? If not, what is the maximum annual reserve margin and is this excess assumed to be available to sell on the MISO capacity market?	No. The 14% is a minimum and the addition of blocks of new capacity will result in reserve margins in excess of 14%. Any capacity in excess of 14% minimum reserve margin requirement is available to sell in MISO capacity market.
4 I believe that reference case supply side technology options noted on slide 96 are flawed; there is no way these timeframes can be realistically met, particularly the nuclear line.	See Appendix Slide 2 for a revised chart for slide 96. Nuclear generation has been removed.
5 Also on this slide 96, where is the geothermal steam supposed to occur in the Midwest?	See Appendix Slide 2 for a revised chart for slide 96. Geothermal steam generation has been removed.
6 Include in the models, as best it can be done, the extraneous costs that are not now included in the cost of burning coal and gas, such as cost of health effects, the climate, effects of droughts, floods, and the rising level and acidification of the oceans.	Thank you for your comment. It is our view that a carbon price and/or CO2 emission limits serve as a proxy for the quantitative and qualitative impacts related to climate change. As an example, the EPA considered the projected negative impacts on the health and the environment of climate change in establishing the year 2030 30% CO2 emission reduction target.
7 If IPL has "hardwired" DSM into its IRP portfolio as a reduction to load, rather than as an energy resource option being evaluated under the IRP model, does IPL plan to re-run its IRP model treating DSM as a resource option?	IPL is working with Ventyx to see how we may be able to evaluate DSM as a resource in the IRP modeling. An update will be provided at the July 18 Public Advisory Meeting.
8 Please provide all cost estimates and assumptions used in IPL's base case IRP model run and in each of the other scenarios and sensitivities tested.	IPL has not completed the scenario runs for the IRP yet. The results will be presented at the July 18 Public Advisory Meeting. The data files that contain the proprietary modeling assumptions associated with the 2013 Fall Ventyx Reference Case have been provided to stakeholders that have executed a Confidentiality Agreement.
9 Please clearly identify and explain what is included in the base case/ reference case and in each of the scenarios and sensitivities (i.e. including all assumptions and costs).	The data files that contain the proprietary modeling assumptions associated with the 2013 Fall Ventyx Reference Case have been provided to stakeholders that have executed a Confidentiality Agreement.

Indianapolis Power and Light Company -- Feedback Response Table

10	On page 13 of his final report, Dr. Borum indicated that “[t]he development of well thought out scenarios with divergent views of the future can provide considerable insight into how resource decisions might evolve if circumstances change significantly over the forecast horizon.” Please explain how IPL’s IRP modeling satisfies that statement.	IPL’s IRP modeling will incorporate divergent views of the future through the four Ventyx scenarios including sensitivities along with possible additional scenarios and sensitivities reflecting stakeholder feedback.	10
11	Page 5 of the Meeting Summary states “DSM generally represents avoided capacity and energy costs, which he thinks provide comparability and consistency.” How does this calculation and the inputs differ from considering DSM a resource in the model?	To the extent that the avoided capacity and energy cost reflected in the DSM model is consistent with the avoided capacity and energy cost that would result from including the DSM as a resource in the Midas model, there would be no material difference.	11
12	Page 8 of the Meeting Summary states, “Compliance costs for 111D were not included in the base case...” Please explain: a. Why these compliance costs were not included in the base case. b. If the compliance costs will be included in the base case after the proposed rule is public on June 2, 2014.	a. At the time that the Fall 2013 Ventyx Reference Case was developed there was a high degree of uncertainty with respect to the nature of the EPA requirements associated with 111(d). CO2 costs were included as part of the Ventyx Environmental Scenario. b. IPL is currently evaluating the projected impacts of the proposed rule and will incorporate compliance costs in the base case as required. An update on how IPL will treat CO2 will be provided in the July 18 Public Advisory Meeting.	12
13	How is IPL considering energy storage in its IRP alternatives?	IPL intends to review the battery energy storage in collaboration with the AES Business Unit that develops battery energy storage projects around the world. IPL is currently in the early stages of evaluating the potential for a pilot project to assess the various ancillary service values that this technology may provide for IPL customers.	13
14	Part of the purpose of the IRP process is to evaluate possible future scenarios. Synapse 2013 Carbon Dioxide Price Forecast uses a Low case of \$10 per ton in 2020, increasing to \$40 per ton in 2040. The Mid case starts at \$15 per ton in 2020, increasing to \$60 per ton in 2040. The High case forecasts a carbon price of \$25 per ton in 2020, increasing to \$90 per ton in 2040. a. Please run a scenario with high carbon prices to show the potential risk on IPL’s generation strategy using the Synapse High case scenario described above. b. Please also provide a “break even” analysis. At what carbon price would IPL’s generation strategy significantly change?	Initial stakeholder feedback indicates that the modeling assumptions related to CO2 price and/or emission limits are considered a key driver in IRP modeling. At the July meeting IPL will provide an update on the June 2nd EPA Clean Power Plan proposed rule for CO2 emissions from existing resources. At that time IPL should also have initial results for the Ventyx Environmental Case, which reflects the Ventyx CO2 price forecast. While it is certainly possible to develop additional CO2 scenarios, this is not a trivial exercise in that it requires careful modeling to ensure that all relevant assumptions, particularly market prices, are properly aligned and correlated with the assumed CO2 emissions price.	14
15	What assumptions were used regarding distributed generation? For example, how much was assumed? Does the assumed amount increase over time? Please explain.	IPL has not completed the scenario runs for the IRP yet. The results will be presented at the July 18 Public Advisory Meeting. We expect to include the existing Rate REP solar projects in the modeling using typical solar profiles and a capacity credit of 30% of nameplate. We also intend to evaluate utility scale solar as a resource option in the optimization runs using the Ventyx Midwest Reference case modeling assumptions.	15
16	The model uses Carbon price as the primary (only) driver for re-powering considerations. What about climate change? How can you feed that into your risk analysis?	The carbon price and/or CO2 emission limits serve as a proxy for the quantitative and qualitative impacts related to climate change. As an example, the EPA considered the projected negative impacts on the health and the environment of climate change in establishing the year 2030 30% CO2 emission reduction target.	16
17	Include in the modeling the effects, as can best be determined, from the pending EPA regulations on existing coal fired power plants.	Thanks you for your comment. To the best of our ability we do intend to include in our modeling the effects of pending EPA regulations for coal fired power plants.	17
18	Since the EPA is expected to issue its proposed rule in early June, how does IPL plan to incorporate that development into its 2014 IRP model runs? If IPL does not expect to adjust its IRP assumptions to incorporate that new proposed EPA rule (once it is issued), please explain why.	IPL is currently evaluating the projected impacts of the proposed rule and will incorporate compliance costs in the base case as required. An update on how IPL will treat CO2 will be provided in the July 18 Public Advisory Meeting.	18
19	Pg 19 of presentation: How will these results be used to develop future scenarios?	At the July 18 Public Advisory Meeting we will present the compiled results of the stakeholder feedback and engage participants in the development of a scenario that reflects their view of the future.	19
20	Pg 60 of presentation: Please provide capital and O&M cost assumptions for wind and solar.	Data assumptions used for new wind and solar resources has been provided to those who have executed an Non-Disclosure Agreement with IPL.	20
21	Pg 60 of presentation: Are these costs fixed for all future years? If not, please describe how these costs are assumed to change in the future.	The costs are expressed in year 2013 dollars and are assumed to escalate at a general inflation rate to convert to nominal dollars for future years.	21
22	Pg 94 of presentation: What emissions does the model incorporate?	The Ventyx North American Reference Case model incorporates emissions for SO2, NOx and CO2.	22
23	Pg 96 of presentation: Why are wind turbines and photovoltaic systems confined to 10 MW?	They are not confined to 10 MWs, but rather 10 MWs is the minimum block size that wind and solar resources are added to the system. For example, if you wanted to add 30 MWs, that would be 3 blocks. Wind and Solar are added in varying increments depending on the amount needed to meet each state's RPS.	23

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24	Pg 99 of presentation: Please provide analyses supporting the use of relatively flat growth in coal prices for Illinois Basin.	<p>The primary driver for relatively flat pricing post-2020 is flat to declining demand for ILLB coal. Lower gas prices in the near-term drives coal demand down across the board, ILLB prices increase with increased demand in the 2017 to 2021 time period. After 2021, demand for ILLB coal begins to decline in earnest with retiring coal capacity, increasing renewable generation penetration, and increased reliance on gas, especially efficient CCs. Mining cost is also a major driver, Ventyx mine cost modeling incorporates the primary cost drivers for the U.S. coal industry, including:</p> <ul style="list-style-type: none"> • Cost-increasing regulatory pressure from new mining safety regulations (which has a high degree of uncertainty) and continuing legal and/or regulatory challenges to mountaintop mining in Appalachia; • Decreasing labor productivity and near flat capital productivity primarily as a result of deteriorating mining conditions in the form of thinner and deeper seams; • Limits on economies of scale. In particular, increases in economies of scale have plateaued at the large PRB surface mines; • Modestly increasing prices for fuel, equipment, tires, and explosives over the short- to medium- term; • A larger labor pool will likely decrease labor costs over the coming five years as the economic recovery in unemployment is likely to continue slowly; and • Much of the highly skilled segment of the mining workforce is nearing retirement in the East with associated legacy healthcare and pension costs. 	24
25	Pg 99 of presentation: Did IPL or Ventyx compare their coal price forecasts to any others (e.g. AEO 2014)?	Ventyx does not try to match the EIA forecast (or others) because its assumptions on coal-fired power plants, particularly around capacity additions and retirements are different from EIA's assumptions. IPL annually compares its coal price forecast to other market projections including IHS Insight (f/k/a CERA) and commodity broker prices. IPL believes its coal price forecast is generally consistent with other market views.	25
26	Pg 100 of presentation: The model should incorporate CO2 prices beginning no later than 2020 for all future scenarios and not rely on the Fall 2013 reference case for this information	IPL is evaluating the inclusion of CO2 policy and associated prices in the IRP scenarios.	26
27	Pg 108 of presentation: Does Ventyx assume a correlation between natural gas and CO2 prices? If so, please provide these correlations.	Yes. The integrated model is used to solve for the CO2 price which reflects the assumed CO2 emission cap in the environmental scenario. This CO2 price in turn increases the natural gas demand. The internal feedback loop drives the correlation with natural gas price.	27
28	Pg 109 of presentation: What does this statement mean, "IPL also evaluating other 3rd party CO2 policy scenarios"?	IPL has reviewed the publicly available CO2 modeling assumptions and price forecasts of the other Indiana utilities as well as the latest Synapse report. In addition, we are currently working with an outside consultant to better understand the potential implications of the June 2nd EPA proposed rule for existing resources.	28
29	Pg 111 of presentation: "Portfolio mandates" should be included but not simply as a minimum. DSM and renewables should be treated the same as other resources, not hard-wired into the model.	We do evaluate solar and wind generation the same as other resources in the modeling. For DSM please see the June 13 response under Modeling Assumptions/ Inputs number 7.	29
30	Capacity retirements and additions should be flexible in the model—not hard-wired.	Capacity additions are not "hard-wired" in the optimization analysis of the modeling. The optimization model is not suited to evaluate retirements as a choice. The portfolio simulation analysis is used to evaluate alternative resource portfolios in more detail and is also best suited for evaluating retirement decisions. In defining alternate resource portfolios and evaluating them in the context of different scenarios we are not hard-wiring resource decisions, rather we are running analyses that will help us in the selection of the resource plan that best meets the projected resource needs of our customers.	30

IPL's Modeling		
	Stakeholder Question or Comment	IPL's Response
1	IPL's model does not appear to use company-specific or even Indiana-specific values or assumptions. What factors drove IPL's decision to use a regional model, rather than a company-specific model. If cost was a factor, state the approximate dollar amount IPL believes it will save by using a regional model to develop and present its 2014 IRP to the Commission. If that information is claimed to be proprietary and confidential, please also submit the underlying calculations supporting that estimate.	A regional model was used to develop the market prices for IPL's specific market area (MISO-Indiana). Once the price trajectories have been developed and the optimal resource plans are identified, the MIDAS Gold module is used to perform IPL's specific portfolio analysis.

Indianapolis Power and Light Company -- Feedback Response Table

2	Does IPL's model compare the cost of running generating units to the cost of purchasing or selling energy on the market? Please explain how that analysis is performed.	Yes. MIDAS allows for detailed operational characteristics of IPL's portfolio. The generation fleet, contracts and load are dispatched competitively against the market prices created for the MISO-Indiana Market Area.	2
3	When will IPL be prepared to show its analysis of how selected candidate resource portfolios performed across a wide range of potential futures? Please provide copies of each model run as soon as that information is available.	We plan to provide initial modeling results at the July 18 Public Advisory Meeting.	3
4	Throughout the Meeting Summary document are the terms "base case" and "Reference Case." Please explain the differences between these terms.	Ventyx produces a fundamental analysis of the North American electric market twice a year, developed using the PROMOD Electric Market Simulation tool, Velocity Suite data and Horizons Interactive, a market-based, fundamental model of North American power, gas, coal and environmental markets, which accounts for the interdependency of these markets and provides forecasts based on consistent economic assumptions. This analysis, called the North American Reference Case, considers current and projected new resources; transmission limits and losses; operations and seam issues in neighboring markets; and hourly loads. It includes a fundamental base forecast of Market Clearing Prices, which are comprised of hourly, monthly and annual prices for the 25 year study period. The base assumptions used in the reference case to create the base forecast is the "base case". The Reference Case also includes low gas, high gas, and environmental scenarios.	4
5	Pg 13 of presentation: Is IPL planning on conducting scenarios or sensitivities with different load trajectories?	Yes. IPL does plan to include load forecast sensitivity as part of the 2014 IRP analysis.	5
6	Pg 20 of presentation: Please define Present Value Revenue Requirement in terms that stakeholders can understand. Also, describe how off-system energy and capacity sales revenues are counted towards the PVRR requirements.	The annual revenue requirement reflects the total amount of money that must be collected each year from utility customers to compensate a utility for all expenditures in capital, goods and services required to meet the electricity needs of customers. These annual values are discounted to a fixed point in time and summed to establish the Present Value of Revenue Requirements (PVRR) for a given period. The off system energy and capacity sales revenue is reflected as a credit against the PVRR.	6
7	Pg 20 of presentation: Please describe how portfolios will be evaluated in terms of safety and reliability. What criteria will be used?	The resource plans will be required to meet all NERC reliability criteria and all applicable environmental rules and regulations.	7
8	Pg 20 of presentation: Please describe "other resource alternatives" not chosen by the Ventyx model that may be further evaluated.	This is meant to preserve the flexibility to further evaluate resource alternatives that may not be selected in the optimization analysis. They could include any of the resource candidates evaluated as well as non-conventional resource options such as distributed generation and storage technologies.	8
9	Pg 96 of presentation: Please explain again what this table describes with regard to the supply side technology options.	This table includes the options available for the regional market model to select from in response to forecast electric demand, given that the added capacity is economically viable, while maintaining reserve margins that are either in accordance with regional requirements or sufficient to ensure reliability.	9
10	Pg 96 of presentation: What is meant by "on-line year?"	This is the first year that the technology is available in the market. Essentially, 2014 identifies that the technology is currently available. The Combined Cycle H-Class for example will first be available as a resource addition in 2020.	10
11	Pg 104 of presentation: The "Environmental" case was described during the meeting as representing "a lot more wind." This chart does not represent a lot of wind in 2034, considering that Iowa and South Dakota already generate 25% of their electricity from wind.	The Environmental scenario has an increase of approximately 50% wind capacity over the base case. That was the basis for the "a lot more wind" statement.	11

Other		
	Stakeholder Question or Comment	IPL's Response
1	How is IPL and MISO addressing FERC order 755 regarding fast-response frequency regulation?	On October 20, 2011, the Commission issued Order No. 755, requiring regional transmission organizations (RTO) and independent system operators (ISO) to compensate frequency regulation resources based on the actual amount of frequency regulation service provided in responding to a transmission system operator's automatic generator control (AGC) signal for purposes of responding to actual or anticipated frequency deviations or interchange power imbalances. On September 20, 2012 FERC approved MISO's tariff modifications to address the FERC 755 requirements. As a member of MISO, IPL relies upon MISO to comply with the Order.
2	A model that looks at doing away with the rate structure that gives lower rates for higher use must be included. This rate structure sends the wrong signal. Rather we must reduce our consumption. This will have to be part of the long term plan.	Thank you for your comment. IPL is open to exploring other rate design structures, but this will be done within a rate proceeding. IRP filings typically do not address rate design.

Indianapolis Power and Light Company -- Feedback Response Table

3	Pg 19 of presentation: Please share the compiled results of the stakeholder worksheet on risk parameters	See Appendix Slides 7 and 8 for the compiled results of the stakeholder worksheet on risk parameters. These will also be discussed at the July 18 Public Advisory Meeting.	3
4	Pg 85 of presentation: This slide notes a 1.8% estimated rate increase as a result of the Rate REP. Is this a residential rate increase? What is the estimated rate increase for continued investment in the Big 5 coal-fired power plants and the Martinsville CCGT plant during that same time period?	Rate REP yields a 1.8% residential increase for approximately 100 MW of nameplate intermittent generation that is expected to produce approximately 153,000 MWH/year of energy (approximately 1% of IPL annual sales). The new federal air quality standards and the projects slated to create cleaner energy are projected to result in a 3.5% residential annual increase for the period 2014 – 2018 for retrofits to the remaining generating fleet and the new CCGT. Due to the significant differences in operating characteristics, capacity and MWHs of energy produced, it is inappropriate to compare the rate increases.	4
5	Pg 104 of presentation: In future meetings, please present a graph estimating how much electricity would be generated annually from each of these sources in 2034 – and not just their summer capacity.	Thank you for your suggestion. Presenting resource mix in terms of generation output as well as capacity would provide an additional perspective.	5
6	The scale on y-axis for all graphs should be provided.	Graphs that contain proprietary data will not contain axis scales. Please contact Terry Nyhart at Barnes & Thornburg for information about obtaining a Non-Disclosure Agreement. Teresa.nyhart@btlaw.com	6



Appendix

**IPL's Response to Stakeholder Questions and
Comments - IRP Public Advisory Meeting #1**



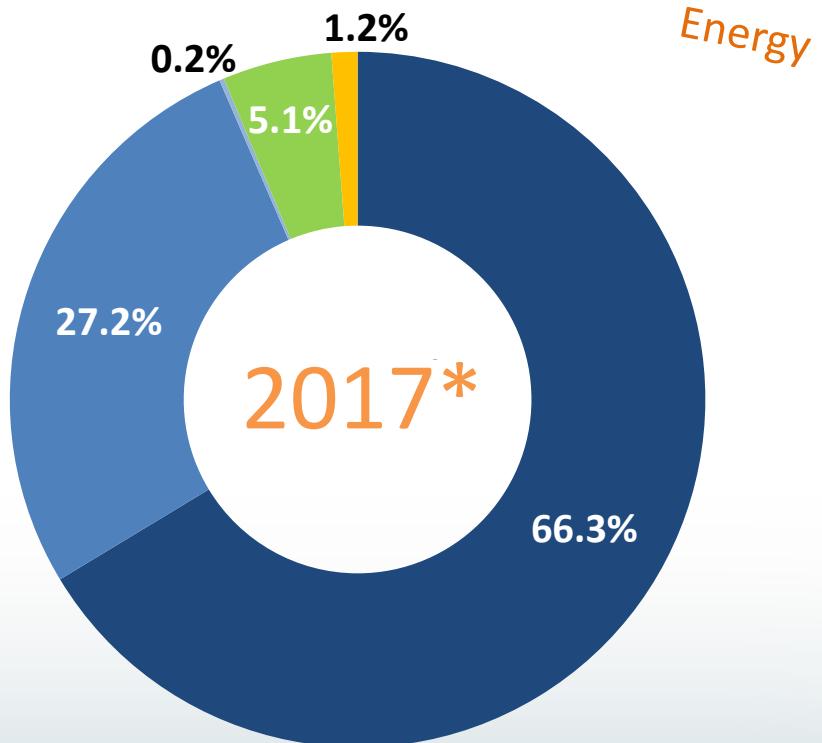
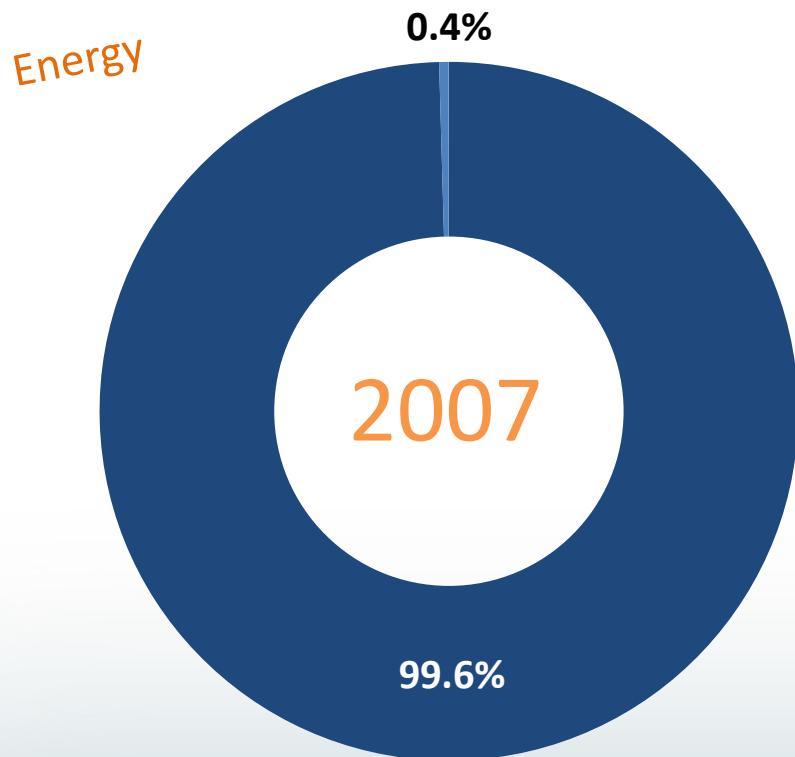
Updated Version of Slide 96 in the IRP Public Advisory Meeting #1 Presentation

	Summer Capacity (MW)	On-Line Year
Combined Cycle F-Class	450	2014
Combined Cycle G-Class	350	2014
Combined Cycle H-Class	400	2020
Combustion Turbine	160	2014
Landfill Gas	10	2014
Biomass	10	2014
Photovoltaic	10	2014
Wind Turbine	10	2014

Note: The On-Line Year is the year that the technology is available in the market.
Essentially, 2014 identifies that the technology is currently available.



Newly Created Energy Pie Charts



- Coal
- Natural Gas
- Oil
- Wind
- Solar

It should be noted that these percentages can vary significantly based on unpredictable fuel costs and market prices.

***Includes long-term PPAs & anticipated Rate REP contracts*



Detail regarding the conversion of a “mothballed” IPL unit to a synchronous condenser for voltage support

- IPL has performed a preliminary investigation regarding the conversion of a mothballed unit to a synchronous condenser including conversations with the USSBU Huntington beach plant that converted two 225 MW units to 145 MVAR synchronous condensers. The decision to convert a unit to a synchronous condenser involves various considerations such as the four items below.
 - System Needs – The voltage stability performance of the system is a main factor in determining the type of equipment needed to provide reactive support. Equipment such as mechanically switched capacitor (MSC) banks, synchronous condensers, static VAR compensators (SVC) and static compensators (STATCOM) are possible options depending on the needs of the system. Fast or slow speed of response of the equipment to mitigate dynamic voltage stability events can be a driving factor in selecting the best option. STATCOM and SVC technology provide the fastest response while MSC banks are slow and the response of synchronous condensers is in-between the two boundaries. IPL system needs are for reactive support equipment that has a faster response to meet dynamic performance requirements.
 - Age and Condition - The age and condition of the generator is an important consideration whether to convert a unit to a synchronous condenser. The units proposed for retirement are 1940-1950 vintage generators and considered at the end of their useful life.



Detail regarding the conversion of a “mothballed” IPL unit to a synchronous condenser for voltage support (cont.)

- Size and Rating - The size of the unit is another factor in the evaluation. About 200-300 MVAR of reactive support is needed to replace the units scheduled for retirement. Conversion of a unit with a size of about 500 MVA or larger would be more advantageous considering the cost of conversion to a synchronous condenser. The ratings of the units proposed for retirement is considered too small and costly for conversion.
- Starting Means – Typically, a steam generator provides steam to the turbine generator to start a generator. Since the turbine is disconnected from the generator for conversion to a synchronous condenser, another means to start the unit is required. Typical starting systems consist of either a pony motor connected to the generator shaft or an adjustable speed drive connected to the electrical output of the generator with additional breakers. Both systems require adequate space and modifications to the electrical connections in the plant which would be a tight fit at the units proposed for retirement.



Detail Behind Slide 33 Graph - Base energy forecast by sector (GWh)

Sector	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Residential	5,218	5,294	5,366	5,426	5,497	5,569	5,618	5,672	5,737	5,807
Small C&I	5,218	5,294	5,366	5,426	5,497	5,569	5,618	5,672	5,737	5,807
Large C&I + Public Lighting	7,026	7,124	7,222	7,266	7,292	7,311	7,337	7,350	7,369	7,390
Total	14,136	14,343	14,540	14,652	14,753	14,850	14,935	15,004	15,093	15,189



Compiled Results of Stakeholder Worksheet

These are some of the key risk factors that must be considered in developing a “prediction” of what the next 20 years will bring in the utility industry and IPL specifically. Pick up to 5 of these factors that are most important to you:

Key Risk Factor	Number of Responses
Amount and cost of energy generated by natural gas	4
Amount and cost of energy generated by coal	6
Amount and cost of energy generated by wind turbines	7
Amount and cost of energy generated by solar facilities	5
Amount and cost of energy generated by other renewable sources (biomass, landfill gas, geothermal, etc.)	7
Amount and cost of consumer-initiated energy generation (“rooftop solar” / net metering)	10
Level of federal “carbon tax” imposed on power plant emissions	11
Level of government environmental regulations for air and water quality	10
Level of consumer energy conservation through voluntary programs (energy efficiency, etc.)	8
Load forecast	2
Cost of electricity delivered to the consumer (\$ / megawatt hour)	5
Other - energy conservation through mandatory programs	1
Other - weather calamities	1
Other - climate change: reducing carbon footprint, mitigating effects, CO2 production = climate change, loss of productivity of corn & soybeans in Indiana from water (changes)	4
Other - water drought & scarcity	1
Other - effects of rate structure to encourage conservation	1
Other - health effects of burning coal	1
Other - environmental cost of carbon (emissions)	1
Other - risk of industrial customers dropping load through constructing own generation or co-generation	1



Compiled Results of Stakeholder Worksheet

These are the technologies that may be included in IPL's Resource Plan.

Nuclear Natural gas combined cycle Natural gas combustion cycle	Geothermal steam Gas turbine Landfill gas	Biomass Utility Scale Solar Wind Turbine
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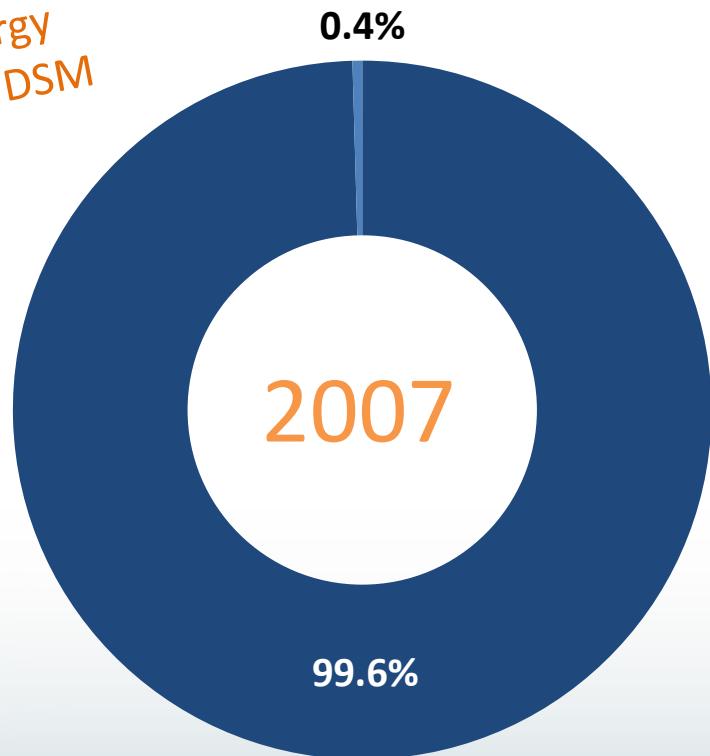
Are we missing anything?

(3) Storage / DG solar energy storage	Geothermal heat pumps
(5) Consumer/Home Scale Solar	Remove geothermal
Utility-provided distributed solar	CCS for new & existing coal generation
(5) Evaluate EE/DSM as a supply-side resource	Small wind turbines
(2) Emerging technologies: voltage control, smart meters, etc., flow battery technology, synchronous condensers (voltage regeneration)	Biomass from fast food deep fryers & other waste food
(2) Remove nuclear	Rate design
Industrial customer CHP = district heating	"Show us a plan with zero coal by 2020."

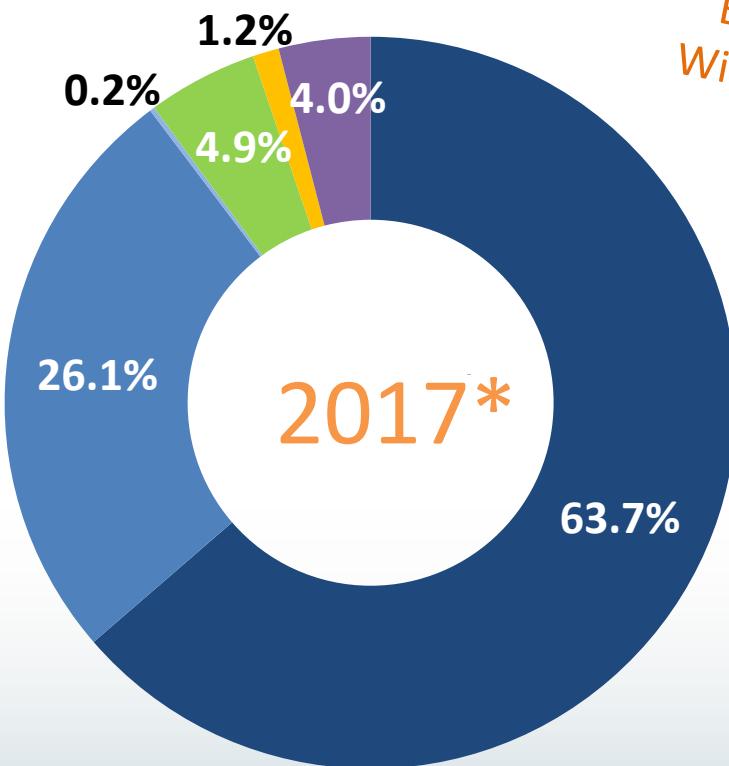


Newly Created Energy Pie Charts With DSM

Energy
With DSM



Energy
With DSM



It should be noted that these percentages can vary significantly based on unpredictable fuel costs and market prices.

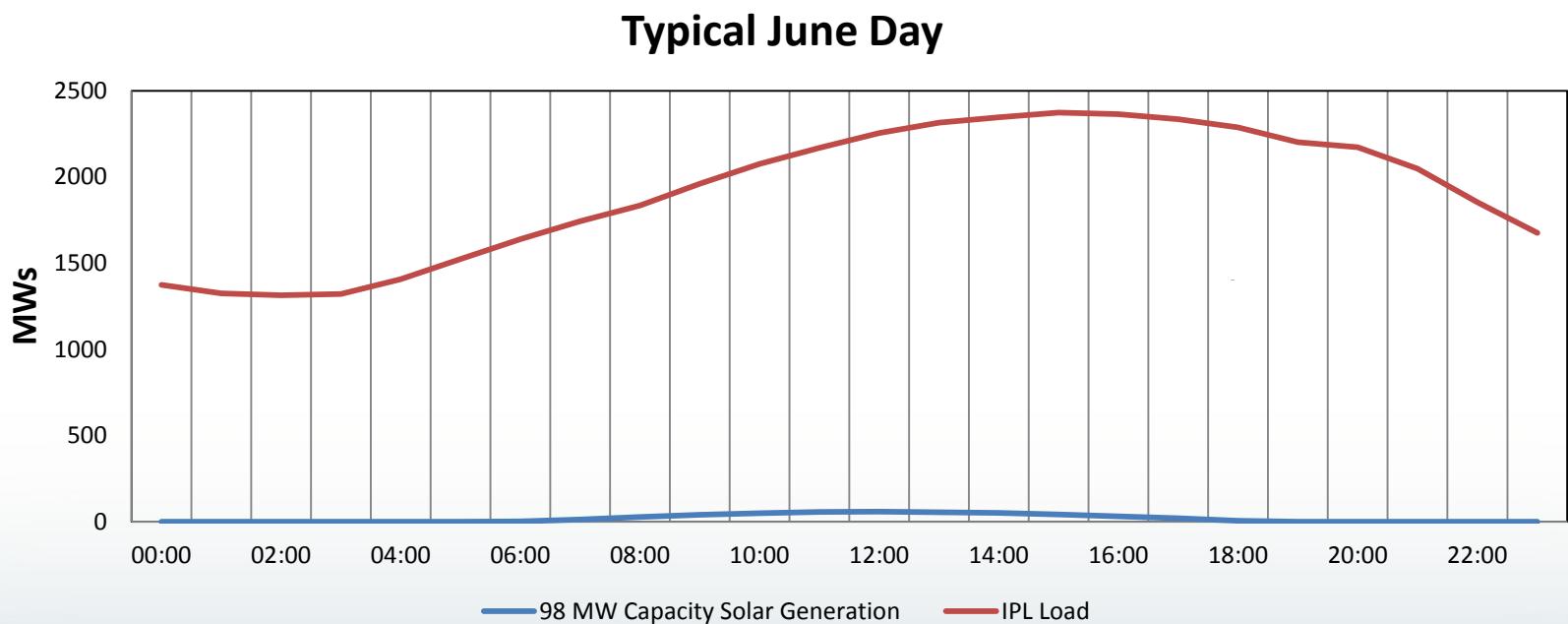
- Coal
- Natural Gas
- Oil

- Wind
- Solar
- DSM

***Includes long-term PPAs & anticipated Rate REP contracts*



Regarding Slide 84 in the IRP Public Advisory Meeting #1 Presentation



**New graph overlaying solar generation
with average June day demand.**