

STATE OF INDIANA
INDIANA UTILITY REGULATORY COMMISSION

INDIANA MICHIGAN POWER COMPANY
REPLY COMMENTS
ON
INTEGRATED RESOURCE PLANNING

Submitted to:

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June 20, 2016

Indiana Michigan Power's Reply to the IURC and Stakeholder Comments on the 2015 Integrated Resource Plan

Introduction

Indiana Michigan Power (I&M) submitted its 2015 Integrated Resource Plan (IRP) on November 2, 2015. I&M followed the proposed rule 170 IAC 4-7 Guidelines for Electric Utility Integrated Resource Plans (Draft Proposed Rule) development and submission process under review by the Indiana Utility Regulatory Commission (IURC). In January and February 2016 various individual and business stakeholders submitted comments in response to I&M's IRP filing. Thereafter, on February 12, 2016 the Citizens Action Coalition of Indiana, Inc., Earthjustice, Indiana Distributed Energy Alliance, Michael A. Mullet, Sierra Club and Valley Watch (Joint Commenters) collectively provided comments on the 2015 IRP. In addition, on May 20, 2016, the IURC Electricity Division Director submitted a draft report (Director's Report) regarding IRPs filed in 2015 by utilities. Please accept these comments in reply as I&M's response to the draft Director's Report and comments provided by the Joint Commenters.

I&M Integrated Resource Plan Stakeholder Process

This is the second I&M IRP to be developed under the Draft Proposed Rule and is the result of analyses performed by I&M that includes consideration of stakeholder input. I&M initiated a stakeholder public advisory process in February 2015 in order to provide an opportunity for public participation in I&M's IRP development process. I&M provided electronic notice and invitations to participate in the stakeholder process to IURC Staff, the Office of Utility Consumer Counselor, interveners in I&M's most recent general rate case in Indiana and stakeholders that participated in I&M's 2013 IRP public advisory process. I&M also provided invitations to participate to its thirty largest commercial and industrial customers. I&M further established an IRP webpage on its website to allow customers, stakeholders and interested persons to either participate or stay informed of the IRP public advisory process as it progressed. The IRP webpage provided stakeholders with the 2013 IRP, 2015 registration information, meeting documents and agendas.

Stakeholders were presented information at Stakeholder meetings in March, June and September of 2015 and, based on those sessions, provided useful feedback which has been considered and incorporated in the analysis, where warranted. The feedback included suggestions such as modeling of the following: additional Combined Heat and

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Power (CHP) resources as requested by the City of Fort Wayne, removing constraints on solar and wind additions, lowering solar cost options by extending the Investment Tax Credit (ITC), adding a carbon free portfolio model run, modeling extreme weather events, and evaluating the closing of existing fossil-fuel resources earlier than their estimated useful life. This feedback was used by I&M to modify the suite of scenarios that were analyzed. I&M addressed additional stakeholder comments pertaining to energy efficiency (EE), CO₂ cost estimates, load assumptions, Distributed Generation (DG) assumptions and provided transparency into assumptions and how EE measure bundles were modeled on the same basis as supply resources. I&M further engaged stakeholders by collecting input throughout the modeling process and provided responses back to stakeholders via the stakeholder meetings and by posting on the I&M IRP webpage.

I. DIRECTOR’S DRAFT IRP COMMENTS

The IRP is a planning document that represents I&M’s view of the resource planning landscape at a point in time. Because changes that may impact this Plan can, and do, occur without notice, this Plan is not a commitment to a specific course of action. The implementation action items as described in the Plan are subject to change as new information becomes available or as circumstances warrant. The Director’s Report indicated that:

“Indiana Michigan’s (I&M’s) IRP and IRP process has, in the opinion of the director, made significant improvements. I&M appropriately used this IRP to examine the potential scenarios for the future of its Rockport generating units and the uncertainties due to the potential ramifications of more stringent environmental regulations. Additionally, in this IRP, I&M gave more attention to risk analysis. The risk concepts it considered are exemplary. The improved narratives to describe the scenarios are also commendable as is the increased effort to treat new DSM on as comparable a basis as possible as other resources. I&M also gave increased consideration of RTO planning and innovation in the stakeholder process that included a concerted effort to include new types of customers. It is noteworthy that Dr. Paul Chodak, Chief Operating Officer, and other top officials participated in the stakeholder process, demonstrating a corporate commitment to the IRP process. Notwithstanding some important enhancements,

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there are some questions and concerns the director would like I&M to address.

I&M appreciates the Director’s compliments and comments regarding I&M’s IRP and stakeholder process. The following sections provide I&M’s responses to each of the questions identified in the Director’s draft report.

**A. Questions Regarding I&M’s Load Forecast
(Director’s Draft Report pp. 21-23)**

1. I&M’s long-term load forecast models account for trends in EE (EE) both in the historical data as well as the forecasted trends in appliance saturations as the result of various legislated appliance efficiency standards modeled by EIA. The load forecast utilizes the most current Commission-approved filing at the time the load forecast is created to adjust the forecast for the impact of these programs.

Question: Would I&M please elaborate on how this adjustment was done?

Response: I&M uses Itron’s Statistically Adjusted End-Use (SAE) models to develop its long-term residential and commercial energy sales forecasts. Trends in appliance/equipment saturations and efficiencies are already incorporated within these models. To avoid double counting the projected energy savings in the forecast, the gross impact of the Commission approved DSM/EE programs are degraded to capture the impact that the DSM programs had in accelerating the adoption of energy efficient technologies above what was already accounted for in the SAE models.

2. On page 16, sec. 2.4.5.1 shows that forecast values for the energy forecast for 2015 and 2016 are taken from the short-term process, with 2017 blending short-term and long-term. Page 23, sec. 2.6.5, “Blended Forecast,” states, “In general, forecast values for the year 2016 were typically taken from the short-term process.” This section also refers to Exhibit A-13 as providing an indication of which retail load forecast models are used – blended or long-term. Exhibit A-13 clearly states only the long-term forecast was used for the residential, commercial, industrial, and other retail classes.

Question: The IRP seems to say blended forecast was used at least some of the time, but Exhibit A-13 says only the long-term forecast was used. Would I&M please clarify? If only the long-term forecast was used, why is there so much discussion of the blended forecast methodology?

Response: The blending process is an integral part of the forecast review process. Even though the long-term models were ultimately selected, the short-term forecasts still play a vital role in evaluating whether or not the final forecast is reasonable and makes sense, especially with regards to the monthly variations. By comparing the model results from the two independent forecast methodologies, we are leveraging the strengths of both models to provide a better understanding of the key drivers that are impacting the final forecast. This approach

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also gives us more confidence in the ultimate forecast results to the extent that we find similar results from the separate modeling techniques.

3. The impact of past and ongoing customer conservation and load management activities, including DSM programs, is embedded in the historical record of electricity use and, in that sense, is intrinsically reflected in the load forecast. The effects on energy sales and demand of approved DSM installations are analyzed separately and subtracted from the blended sales forecast. These will typically extend for a maximum of three years. For the longer-term DSM assumptions, the company models various DSM bundles using the PLEXOS model to identify the optimal DSM portfolio for each year into the future based on expected future market conditions. Exhibit A-12 is referred to as providing the DSM/EE impacts incorporated in I&M's load forecast.

Questions:

a. What does the information in Exhibit A-12 reflect? Does it reflect only the impact of historical and ongoing customer and load management activities, including historical DSM programs?

Response: Exhibit A-12 contains the amount of energy that was subtracted from the initial sales forecast to account for the impact of the DSM programs. This represents the degraded impact of current programs that have already been approved by the Commission in addition to the assumed impacts of future DSM programs that have yet to be developed. It is the amount over and above the base energy efficiency that is already included in the base SAE models forecast.

b. Does the reference to the load impacts of "approved DSM installations are analyzed separately and subtracted from the blended sales forecast" mean the impacts of DSM programs being currently marketed or already approved by the Commission that are to be implemented? Please clarify what is meant by the statement that the load impacts will typically extend for a maximum of three years. Does this mean the load impacts of EE measures installed in 2016 will be subtracted from the load forecast through 2019 and then stop? Why three years?

Response: Yes, the load forecast was adjusted to account for the impact of DSM programs that had been approved by the Commission through 2015 plus levels of DSM/EE consistent with what I&M's 2016 plan at the time the load forecast was developed. The initial load forecast assumed that the 2016 level savings would be replicated in 2017 even though I&M had not yet received Commission approval to implement programs for those years. For 2018 and beyond, the Plexos model was allowed to select the optimal level of EE bundles based on its modeling of market conditions, achievable potential, etc.

While 2016 and 2017 DSM/EE levels in the IRP were intended to proxy amounts subtracted from the load forecast for those years, it was discovered after the fact that 2017 levels were omitted. The omission of these levels of DSM means that the load forecast was higher in 2017, since DSM represents a reduction in load. However this omission does not materially change the mix of resources selected in 2017 and beyond.

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The statement regarding a maximum of three years is consistent with the statutory requirement that a utility petition the Commission for approval of an EE plan not less than one time every three years. Ind. Code § 8-1-8.5-10 (Section 10). Because Section 10 has a 2017 compliance deadline, the three year reference is not applicable in this IRP. The discussion should not be construed to mean that EE stops after 2019. This reflects the potential timing of Section 10 EE plans and recognizes that while the initial petition must be filed no later than 2017, additional EE plans will be filed subsequently.

4. I&M notes there were a number of changes to the load forecasting methodology, and there is a suggestion of future enhancements. The following questions are merely intended to clarify and are not intended to be regarded as being critical.

Questions:

a. Would I&M please describe the changes and the rationale for those changes in the load forecasting methodology?

Response: The basic forecast methodology was unchanged, i.e. ARIMA models are used for the short-term forecast, SAE models are used for long-term residential and commercial forecasts and econometric models are used for other long-term forecasts. The only change was in the long-term DSM assumptions. Historically, I&M assumed that similar forecast levels of energy savings approved by the Commission would be replicated in future years.

b. As a clarification, on page 14, with regard to the cooling use in the residential load forecast, should the reference to "heating degree days" be "cooling degree days", or is this a change to the forecasting methodology?

Response: There are no changes to the load forecast methodology with respect to use of degree-days in the model analysis. Heating and cooling degree days are inputs to the SAE models. The heating degree-days are captured in the XHeat variable and the cooling degree-days are reflected in the XCool variable. The reference to heating degree-days in discussion of the XCool variable should be cooling degree-days.

c. On page 16, in previous forecasts, was street lighting included in the commercial forecast? If so, what was the rationale for the change?

Response: Street lighting has always been included in the other retail class in both the actuals as well as prior forecasts. It is not included in the commercial sales forecast.

d. If there was a change in the street lighting forecast methodology, for future IRPs, does I&M anticipate giving greater consideration to including increasingly efficient street and highway lighting?

Response: There was no change to the street lighting forecast methodology. If future Commission approved DSM/EE plans have a greater emphasis on street and highway lighting efficiency, then an adjustment could be made to account for the acceleration of efficient lighting technology adoption in the "other retail" class.

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e. If one of the changes in the forecast methodology refers, at least in part, to the residential customer survey on page 25, please describe how the “residential customer survey...in which data on end-use appliance penetration and end-use saturation rates were obtained” was integrated into the load forecast.

Response: The residential appliance saturation rates are used as a direct input into the residential SAE models.

f. With reference to page 25, what is I&M's rationale for not conducting industrial and/or commercial customer surveys to obtain end-use information?

Response: Commercial and industrial class customers are less homogeneous than the residential sector. As a result, the costs and difficulty associated with conducting such surveys are typically greater than the benefit a utility would receive from conducting its own survey. In lieu of its own survey of the I&M service territory, the Commercial SAE model relied upon the Energy Information Administration (EIA) Commercial survey where results are published by census region. This allows I&M to cost effectively incorporate reasonably representative end-use saturation information into the commercial SAE model.

g. It is commendable that I&M seems to have a good load research program (page 25), but how does I&M integrate “consumptions patterns through its load research program” into its load forecast? Does I&M plan an expansion of AMI to increase the amount of sub-hourly load data to provide a datum for customers that have not yet participated in demand response programs and to be able to compare those with customers that are participating in demand response programs?

Response: I&M relies upon load research information to derive the hourly end-use load shapes by customer class used in peak load modeling.

While an expansion of AMI was not considered within the context of this IRP, I&M recognizes that sub-hourly data may help inform the load forecasting process relied upon in IRP modeling, especially in DR applications. That said, I&M's DR customer load consists mainly of C&I tariff-based offerings that require customers to provide adequate metering of their respective load registered for DR purposes and to test and demonstrate the amount of load committed as DR. Since this load is known and quantifiable, I&M's existing tariff based DR can be assumed to impact both I&M's and PJM's peak loading periods. I&M regularly interacts with C&I DR aggregators to better understand the potential for additional C&I customer participation in DR activities and programs.

As accounted for in the IRP, I&M operates a residential air conditioner cycling program during the summer months of each year. This program currently relies upon one-way communicating switches that collect and store sub-hourly air conditioner load data during the summer months, but this data must be manually and physically downloaded by visiting a representative sample of switches. While I&M has collected and analyzed data from this program, the current amount of load that can be shed through this program for Demand Response (DR) purposes is limited and not materially significant enough to impact I&M's current overall

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supply side position. However, I&M is reviewing alternative programs that can yield sub-hourly data in a cost effective manner from a larger customer (participant) base where the impacts from these programs can be modeled within a future IRP.

h. The IRP states on page 27 that the “final residential, commercial, and industrial class hourly load estimates are provided to the forecasting organization for use in the long- term forecasting and planning process.” Would I&M please explain how the load shape information is used in the long-term forecasting and planning process?

Response: The hourly load shapes are used to convert monthly energy sales forecasts to hourly load forecast by sector. The aggregation of the sectors reflects the Company’s hourly load forecast from which is derived the monthly peak demand forecasts for the Company. Both the hourly and monthly demand forecasts are reflected in the load-forecast and used for planning purposes.

5. With regard to the load forecast for Industrial Customers, I&M said, “The Company’s customer service engineers are in continual contact with the Company’s large commercial and industrial customers about their needs for electric service. These customers will relay information about load additions and reductions. This information will be compared with the load forecast to determine if the industrial or commercial models are adequately reflecting these changes. If the changes are different from the model results, then add factors may be used to reflect those large changes that are different from those from the forecast models’ output.” (page 24)

Questions:

a. How, if at all, has the industrial forecast changed? On page 12, the industrial models are comprised of 20 large industrial models and models for the remainder of the industrial sector. The 2013 IRP used the 10 large industrial customer models. Although going from 10 to 20 sounds reasonable, what was the rationale for the change?

Response: The industrial forecasts are developed in the same manner as prior IRPs. I&M typically models 10 of the larger industrial customers for each jurisdiction. The 10 large industrial customer models referenced in the 2013 IRP was for Indiana alone and 20 large industrial customer models referenced in the 2015 IRP is for Indiana and Michigan combined.

b. Would I&M provide examples of how the load forecast was modified to reflect input from customer service personnel?

Response: The I&M Michigan industrial forecast was adjusted to reflect an anticipated load addition based on information from customer service personnel that was not already included in the economic forecast.

c. Does I&M conduct a retrospective analysis to determine the reasonableness of the input from customer service personnel, especially in the longer term?

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Response: When analyzing potential load additions provided by customer service personnel, I&M evaluates whether this load is already addressed by normal load growth that is already included in the long-term economic forecast model. An adjustment is made only if it is apparent that the base long-term load forecast model does not already include the impact of the load addition/closure that was provided by the customer service engineer.

d. Would I&M agree that professional judgment might be more appropriate for short-term forecasts than for long-term forecasts?

Response: No. Professional judgement is appropriate in all facets of preparing the load forecast. For example, an economic variable that worked in a previous forecast vintage may no longer work in a current forecast (based on statistical criteria) if the revisions to the historical data series from the government reporting agency are large enough to change the estimated relationship between the dependent and independent data series. In this instance, professional judgement is necessary to identify alternative variables that can capture the same intended measure, even though the primary data source is not usable. Accordingly, professional judgement is useful in many aspects of producing the Company’s long-term load forecast.

e. Given the importance of these customers, has I&M considered that too much weight might be accorded to comments from the customer service engineers? For example, because I&M didn’t include any industrial EE, does this mean that the customer service engineers are not aware of any efforts by their industries to make EE improvements?

Response: Information from customer service engineers provides first-hand knowledge of customer activity. That information is used to inform the load forecast. Regarding industrial energy efficiency, since 2010 I&M has offered three specific programs for commercial and industrial customers. Further, I&M directly promotes its commercial and industrial energy efficiency programs to industrial customers and trade allies. Although industrial EE was not modeled specifically, the load forecast includes significant prior year industrial DSM/EE activity.

**B. Questions Regarding Load Forecasting and Resource Adequacy Issues
(Director’s Draft Report pp. 24-25)**

1. I&M states, “[F]orecast uncertainty is of primary interest at the system level, rather than the operating company level. Thus, regardless of how forecast uncertainty is characterized, the analysis begins with the AEP System East Zone load.” (page 28)

Questions:

a. What is the reason for this statement when each operating company is responsible for its own resource adequacy?

Response: Due to the similarities of companies in the AEP East zone, the companies’ high and low scenarios were assumed to be similar. In future IRPs, load forecasts are expected to include high and low scenarios developed independently for each operating company.

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b. The statement of the relationship of I&M as being an integral part of the AEP System East Load Zone seems to be contradicted by the statement on page 127 referring to I&M as a stand-alone entity in the PJM RTO. Is I&M a stand-alone system within AEP?

Response: Currently I&M participates as a Fixed Resource Requirement (FRR) entity in PJM with other affiliate AEP operating companies under a Power Coordination Agreement (PCA). Under the PCA, each company is responsible to have adequate capacity to fulfill its load obligation as if it were a stand-alone entity in PJM. The statement on p. 127 and the assumptions and modeling performed in this IRP reflect I&M’s obligation as an FRR entity in that it must be capable of meeting its load obligation without relying on other PCA members. This is a separate and distinct aspect of the IRP process from the approach used in the development of I&M’s load forecast.

c. If “Company” in Exhibit A-12 refers to AEP System East, does this muddy the waters because it refers to providing the DSM/EE impacts incorporated in I&M’s load forecast? That is, Exhibit A-12 “provides the DSM/EE impacts incorporated in I&M’s load forecast provided in this report. Annual energy and seasonal peak demand impacts are provided for the Company and its Indiana and Michigan jurisdictions.”

Response: The DSM/EE impacts provided on Exhibit A-12 are for I&M and its Indiana and Michigan jurisdictions.

d. What does the information in Exhibit A-12 reflect? Does it reflect only the impact of historical and ongoing customer and load management activities, including historical DSM programs?

Response: See responses to 3 a. and 3 b. in the load forecast section.

e. Does the reference to the load impacts of “approved DSM installations are analyzed separately and subtracted from the blended sales forecast” mean the impacts of DSM programs being currently marketed or already approved by the Commission to be implemented? What does it mean that the load impacts will typically extend for a maximum of three years? Does this mean the load impacts of energy-efficiency measures installed in 2016 will be subtracted from the load forecast through 2019 and then stop? Why three years?

Response: See responses to 3 a. and 3 b. in the load forecast section.

2. In I&M’s development of the load forecast scenarios, it notes the first step is to estimate an aggregated “mini-model” of the AEP System East Zone internal energy requirements. The mini-model is intended to represent the full forecasting structure employed by producing the base-case forecast for the AEP System East Zone and by association for the company. After a base-case energy forecast had been produced with the mini-model, low and high values of independent variables were determined. The values finally decided on reflected professional judgement. Then base, high, and low load forecasts are presented for I&M.

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Questions:

a. Would I&M provide more information on how it went from the mini-model for AEP East to developing base, high, and low load forecasts for I&M?

Response: The companies within the AEP East Zone have some similarities, for example, most have primary metals as a key industry and most have a flat residential customer base. Therefore, it was assumed that each AEP operating company within the AEP System East Zone would have similar high and low spreads around the base forecast.

b. Was the load forecast range used to develop I&M’s high and low load forecasts the same as what resulted from the mini-model applied to AEP System East Zone?

Response: Each AEP operating company within AEP System East Zone had the same high low spread around the forecast.

c. Again, why is there a focus on the load forecast uncertainty for AEP System East Zone when I&M must operate as a stand-alone entity in PJM and must meet its own capacity obligations?

Response: The AEP System East Zone companies have some similarities that were the basis for this assumption. In future IRPs, each AEP operating company in the AEP System East Zone will have separate high and low models that will independently analyze each operating company’s load obligation.

**C. Questions Regarding Energy Efficiency and the Load Forecast
(Director’s Draft Report pp. 25- 29)**

1. I&M has implemented EE programs for 2015 that provide demand savings of 15 megawatts (MW). An additional 12 MW is expected in 2016 and 10 MW in 2017. This IRP considers attainment of these levels and the subsequent continuation of the program at the same level and has embedded such levels of EE savings into I&M’s load forecast. (page 50)

Questions:

a. What does “embedded” mean here? Does it mean the 2015-2017 EE savings level was subtracted in the load forecast for years beyond 2017?

Response: The term “embedded” refers to the inclusion of existing and forecasted EE programs in the load forecast used for IRP modeling. As explained above, in order to avoid double-counting the benefits of energy efficiency programs, the IRP uses a modified version of the load forecast and reasonably accounts for all prior year and forecasted EE program impacts up to 2017.

b. Does this contradict the statement on page 22 that load impacts will be extended a maximum of three years? Overall, the treatment of historical EE and current programs being implemented today is somewhat confusing and could be clearer. For example, what assurances

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are there that there is no double-counting?

Response: Please refer to the response in item 1.a. above. The modified version of the load forecast used for the IRP modeling effort only considers the effects of EE programs implemented up to 2017. Whereas the original load forecast, discussed in Section 2.0 of the IRP report, includes a projection of future EE programs beyond 2017.

The treatment of EE is different between the two forecasts, but should not be viewed as a contradiction since the IRP process relies upon the forecast that accounts for the impacts of existing and approved DSM/EE programs. This method avoids any potential double-counting.

2. I&M discusses the difference in the amount of EE demand (MW) included in the load forecast and the amount included in the 2015 DSM Plan filed with the IURC.

Director's Note: This is very insightful and commendable for I&M to periodically reassess the methodology for estimating the demand reduction due to EE. Especially because the forecasts and recent history suggest that demand seems to be growing at a slightly higher rate than energy use, this continual evaluation is very appropriate.

3. No industrial DSM programs were developed for industrial programs based on the thought that they will, by and large, self-invest in EE measures based on unique economic merit irrespective of the existence of utility-sponsored programs. So, I&M developed EE bundles only for residential and commercial customers.

Questions:

a. Please provide the technical data or research-related literature to substantiate the position that large customers will self-invest in EE measures. Is this position contradicted by AEP's reliance on the EPRI Market Potential Study, which includes the industrial sector?

Response: The IRP reflects I&M's understanding that in most instances, industrial customers readily undertake projects aimed at improving the efficiency of their operations in order to proactively manage the cost of electricity. In the IRP, I&M did not rely on specific technical or research-related literature to substantiate this.

While the EPRI study did include Industrial potential, an internal decision was made to not model efficiency improvements in this sector incremental to existing and known impacts included in the load forecast in part based on the rationale provided above and because I&M's largest industrial customers have the legislated option to opt out of DSM/EE programming. I&M is required to account for the impact of opt out customer load in forecasts of DSM/EE savings potential.

b. Does this view apply to all industrial customers regardless of size or how significant electricity is as a cost of operation?

Response: Yes, but only for this IRP. In the spring of 2016, I&M completed a Market

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Potential Study (MPS) of both its Indiana and Michigan jurisdictions. This MPS will be used as a basis to update and align Indiana & Michigan energy efficiency data in future IRPs.

c. Did or do I&M customer service engineers discuss the value of development of an industrial sector DSM with their customers? If so, can I&M share that information publically or confidentially?

Response: I&M currently offers DSM/EE programs to industrial customers and interacts with industrial customers and their trade allies to promote those efficiency programs. Historically, several industrial customers have participated in I&M’s energy efficiency programs but some have opted out as well. For those who have not opted out, I&M is aware of current and future projects planned by industrial customers for participation in DSM/EE programs. I&M does not share customer specific confidential information but is willing to discuss with the Commission Staff and stakeholder’s I&M’s efforts to promote EE to C&I customers.

4. I&M states that the impacts of such existing I&M DSM programs are propagated throughout the long-term I&M load forecast. (page 89)

Questions:

a. What does “existing” mean in this context?

Response: Here “existing” refers to past program savings achievements and future known and approved programs. Refer to the response to item 1.a. in the Energy Efficiency in Load Forecast section above for more detail.

b. Does it include programs approved by the Commission even if the implementation year has yet to occur?

Response: Yes. As stated above, while the programs for years 2016 and 2017 were not approved by the Commission at the time the IRP was prepared, I&M approached these as transition years and reflected a level of energy savings consistent with the level previously approved by the Commission. Forecast DSM//EE impacts through the end of 2016 were included (2017 was inadvertently omitted).

c. What does “propagated throughout” mean, and how is it done in the modeling?

Response: “Propagated throughout” means that the impacts of planned EE programs have been included in the IRP Forecast in the year they are to be implemented, as well as any subsequent years in which the programs will result in energy and demand savings based on the aforementioned and described degradation process.

5. I&M states, “The question of how much effort and money is to be deployed towards removing or lowering the barriers is a decision made by state governing bodies (legislatures, regulators or both).” (page 90)

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Questions:

- a. What does this mean with respect to the IRP (and future IRPs)?
- b. Is it reflected in the modeling, and if so, how?
- c. Did this thought affect how EE programs were analyzed or modeled?
- d. How did it affect the EE programs I&M thought were appropriate to include in the bundles for further analysis?

Response a: In general the statement is meant to point out that if the assumption utilized to develop the EE bundles (e.g. incentive levels) are not supported by the regulatory bodies, then the expected EE savings would be different than the modeled results, which will impact other resources selected in the model.

Response b: The modeling reflects two tiers of EE bundles, High Achievable Potential bundles, which provided an incentive of 75% of incremental measure cost, and Achievable Potential bundles, which provided an incentive of 50% of incremental measure cost. The use of these incentive levels were based on previous levels of incentives that the Commission had approved.

Response c: Yes, as described in Response a & b.

Response d: As described in Response a & b, the Company considered two levels of each EE bundle in this IRP, High Achievable Potential (HAP), and Achievable Potential (AP). HAP bundles have higher amounts of savings than the AP bundles. While these HAP bundles have higher savings, they also have higher costs. The incremental measure cost of the measures included in the bundles is the same regardless of HAP and AP. The difference is the amount of incentive offered to the customer. Increasing the incentive is expected to influence more customers to undertake efficiency improvements which results in more potential savings.

The model typically only selects an HAP bundle as a resource if all of the bundle’s corresponding AP potential has been selected (because the AP bundle is less expensive). This modeling approach recognizes that once all of the customers willing to participate in an EE program are accounted for, as a practical matter, the only way to increase savings from the program is to offer higher customer incentives.

6. Toward the bottom of page 90, I&M states, “The AP [Achievable Potential] range is typically a fraction of the economic potential range. This achievable amount must further be split between what can or should be accomplished with utility-sponsored programs and what should fall under codes and standards. Both amounts are represented in this IRP as reductions to what would otherwise be the load forecast.”

Questions:

- a. How is this split done in this IRP?

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- b. What is the basis for the split?
- c. How is it decided which programs can or should be accomplished by the utility and which programs can't for whatever reason? After this split is made, how are these different types of reductions represented in the load forecast?

Response a - c: The starting point for determining potential savings for any EE measure considered in this IRP is a load forecast which includes the effects of current and future codes and standards changes. When utility sponsored EE programs are implemented customers are enticed to realize energy savings sooner rather than at some point in the future due to evolving codes and standards.

This IRP makes a point to identify what quantity of energy savings is due to Company-sponsored EE programs, and what quantity is due to evolving codes and standards (see Figure 26, where savings due to evolving codes and standards is referred to as Non-DSM Energy Efficiency). The split between the two is created when the model selects future EE resources. If I&M implemented no future EE programs, all future EE savings would be due to evolving codes and standards. When EE resources are selected by the model future energy efficiency savings are split, with some attributable to the new EE programs, and the remainder attributable to evolving codes and standards. The timing, energy and capacity savings of new EE programs for the Company to implement is guided by the IRP modeling effort.

7. A determination was made as to the potential level and cost of such incremental EE activity as well as the ability to expand current programs. It was assumed the incremental programs modeled would be effective in 2018. (page 91)

Question: Would I&M please provide a discussion of the basis on which these determinations were made?

Response: The decision to allow the model to select incremental EE programs beginning in 2018 recognizes that we could not know what the new modeling approach would produce until after the IRP was prepared. Because it would take time to plan, design, and gain approval of a DSM/EE plan based on the new modeling approach, for this IRP, 2016 and 2017 were treated as transition years.

8. I&M used EPRI data to develop bundles of future EE activity for demographics and weather-related impacts of its service territory. (page 92)

Question: Would I&M please provide more explanation as to how bundles were put together, even an example? Otherwise, it is impossible to judge the modeling of EE. Obviously, many assumptions were necessary to move from EPRI data to what was included in the IRP, but there is little discussion to clarify.

Response: Numerous EE measures were analyzed for each sector (69 residential measures, and 64 commercial measures). Measures were initially grouped with other similar measures. For example, any measures which would lead to a reduction in energy use associated

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with water heating were grouped together (e.g. improved water heaters, low flow showerheads, pipe insulation, etc.). The two tables below depict the residential water heating measures considered for I&M’s IRP. The first table shows details of each measure considered. In this table the term “Energy Use” is the annual energy used for residential water heating. “Program Costs” include incentive and administrative costs. To begin creating bundles the measures were initially screened with the overall goal of developing EE measure bundles that are economic for customers. Each measure within a group was initially screened based on cost, where measures with high costs were removed from consideration for inclusion in an ultimate bundle. For example, it can be seen in the first table that the Solar – Water Heating measure provides significant savings, however at nearly \$9/kWh it is not economical for customers. Measures were then reviewed with I&M’s DSM/EE program coordinators to eliminate any which were either impractical to implement, or previously had not been embraced by customers. The remaining measures were then included in the bundles presented in the IRP.

The bundles modeled in this IRP are meant to serve as a proxy for energy efficiency programs which fit I&M’s market and service territory. Specific EE programs implemented by I&M in the future and used to achieve the optimal level of EE identified in the model may differ from the bundle selected by the model.

Costs and energy savings values for the Residential Water Heating bundle are shown in the second table below.

Initial Set of Residential Water Heating Measures Analyzed

MEASURE	SAVINGS (UEC)	COSTS (2014)			CUSTOMERS	MEASURE COST \$	ENERGY USE 2018 (kWh)	ENERGY SAVINGS 2018 (kWh)	COST OF SAVINGS (\$/kWh)	PROGRAM COST	
	(%)	(\$/Unit)	Units	\$						HAP (\$/kWh)	AP (\$/kWh)
EF=2 - Water Heating	45%	1,203	1	1,203	512,872	616,985,277	404,063,025	181,828,361	3.39	3.05	2.04
Solar - Water Heating	62%	4,300	1	4,300	512,872	2,205,350,534	404,063,025	250,519,075	8.80	7.92	5.28
EF=3 - Water Heating	64%	2,500	1	2,500	512,872	1,282,180,543	404,063,025	258,600,336	4.96	4.46	2.97
GSHHP EF=4 - Water Heating	73%	4,500	1	4,500	512,872	2,307,924,978	404,063,025	294,966,008	7.82	7.04	4.69
Future Tech - Water Heating	80%	5,383	1	5,383	512,872	2,760,791,145	404,063,025	323,250,420	8.54	7.69	5.12
Efficient Dishwasher- Water Heating	3%	60	1	60	512,872	30,772,333	404,063,025	12,121,891	2.54	2.28	1.52
Energy Star Dishwasher - Water Heating	4%	89	1	89	512,872	45,645,627	404,063,025	16,162,521	2.82	2.54	1.69
Adv. Tech. Dishwasher - Water Heating	1%	334	1	334	512,872	171,299,321	404,063,025	4,040,630	42.39	38.15	25.44
Faucet Aerators - Water Heating	3%	1	5	5	512,872	463,124	404,063,025	2,189,213	0.21	0.19	0.13
Pipe Insulation - Water Heating	6%	15	1	15	512,872	1,470,148	404,063,025	4,632,987	0.32	0.29	0.19
Low Flow Showerheads - Water Heating	15%	3	2	6	512,872	529,900	404,063,025	10,436,948	0.05	0.05	0.03

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Residential Water Heating Measures Included in Bundle

WATER HEATING BUNDLE	
MEASURES	
EF=2 - Water Heating	
Efficient Dishwasher- Water Heating	
Faucet Aerators - Water Heating	
Pipe Insulation - Water Heating	
Low Flow Showerheads - Water Heating	
ACHIEVABLE POTENTIAL DETAILS	
Installed Cost (\$/kWh)	1.76
Potential Savings Per Year (MWh) 2018-2019	21,065
Potential Savings Per Year (MWh) 2020-2024	33,059
Potential Savings Per Year (MWh) 2025-2029	46,819
Potential Savings Per Year (MWh) 2030-2040	77,569
Measure Life	14
Levelized Cost (\$/MWh)	212.46
HIGH ACHIEVABLE POTENTIAL DETAILS	
Installed Cost (\$/kWh)	2.52
Potential Savings Per Year (MWh) 2018-2019	73,808
Potential Savings Per Year (MWh) 2020-2024	101,648
Potential Savings Per Year (MWh) 2025-2029	130,054
Potential Savings Per Year (MWh) 2030-2040	182,423
Measure Life	14
Levelized Cost (\$/MWh)	306.07

9. I&M discusses market acceptance ratios (MARs) and program implementation factors (PIFs). (page 94)

Questions:

- a. How are these terms defined?
- b. How are these adjustment factors used?
- c. Why are they used?
- d. How are they developed?

Response a - d: Consistent with the referenced EPRI study, the Market Acceptance Ratios (MARs) “reflect customers’ resistance to doing more than the absolute minimum required or a dislike of the technology option”. The MAR is used to convert, or reduce, the technical potential of a measure into the High Achievable Potential. The technical potential of a measure is multiplied by the MAR to arrive at the High Achievable Potential. The MAR is used to account for the fact that even though an energy efficiency measure makes economic sense, not all customers will adopt it.

The Program Implementation Factors (PIFs) reflect “existing market, financial, political, and regulatory barriers that are likely to limit the amount of savings achieved through EE

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programs. The PIF is used to convert, or reduce, the High Achievable Potential of a measure into the Achievable Potential. The High Achievable Potential of a measure is multiplied by the PIF to arrive at the Achievable Potential. The PIF is used to account for the fact that the Company will not be able to achieve the maximum EE savings available for a measure due to considerations such as budgeting, or implementation obstacles (e.g. logistic complexities, equipment availability, etc.)

The MARS and PIFs were initially developed by EPRI in 2009, and updated in 2013. MARS and PIFs were developed in EPRI workshops with industry experts.

10. I&M states the overall cost-effectiveness of the EE bundles offered in the model was approximated as part of the analysis. I&M references the California Standard Practice Manual as to methodology. (page 94)

Questions:

a. What data was used to approximate the cost-effectiveness?

Response: The following pieces of data were used in the cost-effectiveness calculations:

- PCT: annual energy savings, annual retail energy price, incentive cost, gross participant cost
- RIM: annual energy savings, annual retail energy price, annual capacity savings, annual capacity price, administrative cost, incentive cost.
- TRC: annual energy savings, annual retail energy price, annual capacity savings, annual capacity price, administrative cost, incentive cost, net participant cost
- UCT: annual energy savings, annual retail energy price, annual capacity savings, annual capacity price, administrative cost, incentive cost.

Annual energy and capacity savings for each bundle were determined by taking a weighted average of the annual energy and capacity savings for each measure, weighted by annual savings. Annual energy prices were provided by AEP’s Economic Forecasting department. Annual capacity prices were provided by AEP’s Fundamentals Forecasting department. Administrative costs were calculated as 20% of the incremental measure costs. Incentive costs were calculated as 50% and 75% of the incremental measure costs for AP and HAP measures, respectively.

b. How were the avoided costs calculated, and how were they used in the development of I&M’s IRP?

Response: In cost-effectiveness test calculations, avoided costs were calculated by taking the annual savings (energy or capacity) and multiplying by the forecasted market price (energy or capacity). See item 1 in the Avoided Costs section below for further details on the subject.

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c. How was bundle cost data created?

Response: Bundle costs were determined by taking the weighted average of the installation costs of each measure in a bundle, weighted by annual energy savings. Where
Installation Costs (\$/kWh) = [(Incremental Measure Cost (\$) / Expected Energy savings (kWh))
* Incentive (%) * (1 + Administrative Cost (%))]

**D. Questions Regarding Avoided Costs
(Director's Draft Report p. 29)**

1. I&M does not include avoided distribution or transmission capacity costs because these are ever changing, based on the location being considered. (page 99)

Questions:

a. While recognizing that considering avoided distribution and transmission (T&D) costs makes it difficult to calculate for the reasons cited by I&M, does I&M suggest that these costs are too difficult to calculate in all instances?

Response: I&M does not intend to suggest that the costs are too difficult to calculate in all instances. There are potential situations where T&D costs are avoided; however, within the IRP, the resource options considered and modeled are not geographically identified. Therefore, the ability to assign a T&D value to a generic resource addition is not appropriate at this phase of the planning process since it would be speculative in nature.

Given current transmission and distribution system conditions, the appropriate time to consider how resource additions impact future transmission and distribution system costs is during the implementation phase of the project. Once program or project specific details are known, with specific location on the grid, direct system impacts can then be determined. When the specific geographic location of the alternative resources are known then the associated grid impacts can be more specifically quantified and included as either a resource implementation cost or benefit.

b. Would I&M agree that there are circumstances where the avoided T&D costs may be significant?

Response: Yes, there may be situations where future DSM/EE impacts can be focused on a specific T&D area or location to defer future T&D upgrade projects. However, such DSM/EE program offerings need to be planned and coordinated in advance of the T&D upgrade project, where DSM/EE program definition and appropriate Commission authorization is critical. I&M's experience in attempting to offset required critical T&D system upgrades that are designed to improve system reliability and performance is that DSM/EE offerings need to be just as reliable and predictable as the alternative improvement in order to equally offset or improve upon the benefit offered by the alternative improvement.

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c. Did AEP perform any analysis to demonstrate the sensitivity (or lack thereof) of EE (and demand response and even customer-owned resources) to changes in avoided T&D costs?

Response: No. As described previously, the use of T&D avoided costs for DSM/EE programs is not appropriate at an IRP level of analysis.

2. On page 110, there is a reference to Table 4-3.

Question: Where is Table 4-3? Is it in the appendix?

Response: The reference to table 4-3 is incorrect on page 110 of the report. Please reference Tables 12 and 13 on pages 93 and 94, respectively, for the life of each EE bundle.

**E. Questions Regarding Risk Analysis
(Director's Draft Report pp. 29-31)**

1. Do we understand correctly that I&M never let the model optimize fully? The cases make sense given the importance of the Rockport decisions.

Question:

If our understanding is correct that the model was constrained in its optimization, would it have been better for I&M to allow the long-term planning model to fully optimize so as to provide a more objective result, or at least a different result that would provide I&M with additional insights? (page 114)

Response: The Plexos LTPlan model will select an optimum portfolio under a given set of conditions and input assumptions. There are reasonable conditions that experienced modelers will employ to minimize run-time or eliminate nonsensical results. For example, with Rockport Plant, I&M could have included a condition where the model determines, for each year, if a Rockport unit retires or continues to operate. However, the IRP team has found that there are certain triggering events that lead the model to select retirement over continued operation, such as the need to make a large capital investment (e.g. install a FGD) or where market conditions changed dramatically (e.g. addition of a CO₂ tax). Also, from a practical standpoint, the decision to retire a unit would require a triggering event for the Company to consider that option. Therefore, I&M created portfolios around those triggering events.

In summary, any modeling profile must use reasonable business judgement to define the parameters by which the modeling software would be expected to operate within. Without such parameters, the modeling could be subjected to conditions whereby an impractical set of resource solutions could be created. For example, unless a (maximum) resource/reserve margin constraint were introduced, the model could potentially add an unlimited amount of "economic" resources; at levels far above what would be required to meet the capacity and energy needs of I&M's customers. Further, the 'triggering events' described above around the significant disposition decisions surrounding the Rockport units served as that practical framework from which the unique optimized portfolios were then modeled.

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2. I&M presents a table showing the cases and scenarios that were optimized. This information shows the Rockport Unit 2 Early Retirement being analyzed using only one scenario. (page 115)

Questions:

a. Why is only one scenario used to evaluate the Rockport Unit 2 Early Retirement case?

Response: To be clear, and as detailed in Table 17 on page 114, and also on page 120 in Table 22, there are four portfolios that include the “early” retirement of Rockport 2—meaning prior to the unit’s anticipated economic life- and one portfolio that includes the early retirement of both Rockport Units. Rather, the “Rockport Unit 2 Early Retirement” view identified in Table 18 on page 115-as described in the preceding text—represents a ‘sensitivity’ evaluation associated with foregoing the SCR investment and retiring the unit (i.e., returning Unit 2 to the Lessor under the terms of the Rockport Lease) prior to the unit’s anticipated economic life and prior to the potential 2022 lease termination date.

Also, keep in mind that the portfolios that were evaluated were discussed with, and adjusted, based on extensive stakeholder input.

b. Why is the “Steady State” case the only case evaluated using the high load and low load sensitivities?

Response: The sensitivities around load are used to determine which resources are on the margin, that is, which resources would be the first to be added if load increases, or the first to be eliminated if load decreases. Given that the “Steady State” case represented the optimal plan, it then represented the best candidate profile to use as the basis for determining the impact of changes to load.

Note also that the Company did consider the high load sensitivity in its decision to advance solar resources.

3. I&M presents the preferred portfolio, which differs from all the portfolio cases evaluated using the five basic scenarios. (page 118)

Questions:

a. What is the basis for the Preferred Plan?

Response: The modeled Steady State case is the basis for the Preferred Plan, taking into account stakeholder comments and insights from other portfolios. For example, certain stakeholders have been working with I&M to determine the feasibility of a combined heat & power (CHP) facility. The Preferred Plan assumes that an adequate host site and project would be developed by 2020, with another project by 2026. Both I&M and certain stakeholders were also concerned about the potential impacts of the EPA’s Clean Power Plan (CPP), therefore I&M

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advanced the installation of wind resources as another carbon free resource that could offer some CPP implementation optionality going-forward.

b. How was the “Preferred Plan” derived from the previous optimization results for the four cases and five pricing scenarios?

Response: The Preferred Plan was built off the optimized Steady State case results, which was the lowest priced profile under four of the five pricing scenarios. In addition to input from stakeholders, the Preferred Plan also considered results under other portfolios. For example, the High Load sensitivity indicated that large scale solar could be advanced to meet incremental capacity requirements. The addition of large scale solar then allowed for the deferral of the Natural Gas Combined Cycle plant from 2030 to 2035.

4. Figure 26 on page 121.

Questions:

a. How is non-DSM EE calculated?

Response: DSM programs, in their most basic sense, are a subset of the overall impact of energy efficiency where the distinction is that the Company has enticed (or accelerated) a behavioral or technology change that would have eventually happened in the market. To compute the overall Energy Efficiency impact, we use the SAE models to assume a fixed saturation and efficiencies for a specific point in time (i.e. based on 2015 saturations and efficiencies) and compare that to our base forecast. The delta would include the total impact of energy efficiency. The non-DSM EE would simply be the difference between the total energy efficiency impact computed above and the estimated impact of the modeled DSM programs that were selected in the Preferred Portfolio.

b. Was the calculation made after the fact?

Response: The calculation is done after the load forecast is complete but before IRP modeling begins. Please see response to Question 4a above

5. With regard to risk analysis on page 124.

Question:

Why was the steady state case not included in the risk analysis? It had the lowest cost in Table 22 on page 120. It’s not to say that this was improper, but additional clarification would be helpful.

Response: The IRP team has found that in order to get meaningful results from the stochastic modeling analysis, portfolios must be significantly different. Because the Preferred Portfolio was built off of, and significantly emulated, the Steady State portfolio, including the Steady State case results in the risk evaluation would only provide marginal information.

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6. The risk metric selected by I&M is called the Revenue Requirement at Risk (RRaR). The RRaR is based on the differential between the median and 95th percentile result from the multiple runs. Figure 33 on page 126 illustrates the RRaR (expressed in terms of a levelized monthly bill impact) and the expected value. (page 125)

Questions:

a. Why was this RRaR risk metric selected?

Response: RRaR is a relatively straightforward way to compare the potential cost variability of a suite of portfolios in a consistent manner. I&M has used this approach in previous IRPs in Indiana as well as other jurisdictions and it has generally been well regarded.

b. What other risk metrics are available in the PLEXOS modeling analysis? Please describe and define the other risk metrics available but not used.

Response: Plexos does not specifically produce the RRaR as a result of a risk analysis run. Instead Plexos has the capability to produce almost any unit of measure that can be used outside of the model to create different risk metrics. In other jurisdictions the Risk/Benefit Ratio metric was used based the risk values produced from the model. I&M would be open to discussions with Staff/stakeholders regarding other risk metrics for future IRP filings.

7. See Figure 33 on page 126. The preferred portfolio has the highest or second highest sensitivity based on RRaR.

Questions:

a. Did I&M consider evaluating the portfolios with other risk metrics? Please explain. Why did I&M not use or include the steady state portfolio if for no other reason than as a comparison?

Response: I&M did not consider other risk metrics. As stated earlier, I&M has been using RRaR for a number of years and in multiple jurisdictions with positive feedback. As also indicated, the Steady State and Preferred Plan portfolios were very similar so including the Steady State would have provided limited value.

b. Does the lack of a steady state portfolio make it more difficult to understand the preference for the preferred portfolio?

Response: No. Insight into the difference in the risk profile between the Steady State portfolio and the Preferred Plan portfolio may be derived by looking at the differences between the Fleet Modification (FM) case and Fleet Modification Prime (FM Prime) case risk results in Figure 33 on page 126. Recognizing that while the Fleet Modification Prime adds more solar and less NGCC resources compared to the Fleet Modification, the risk profiles of the two plans are almost identical. Similarly, given that the Preferred Plan adds more solar and less NGCC (through 2034) than the Steady State portfolio, such comparable risk evaluation results would also be likely.

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**F. Questions Regarding Load Forecasting Methodology
(Director's Draft Report pp. 35-36)**

Questions:

1. For future forecasts should I&M give some effect to industrial DSM?

Response: To the extent such programs are included in the Commission approved DSM portfolio or are selected by Plexos in the long-term DSM assumptions, they will be reflected in the load forecast.

2. Notwithstanding, I&M's legitimate rationale for Indiana law that permits industrial customers to opt out of utility-sponsored DSM initiatives, is it reasonable to assume industrial customers will capture all cost-effective "organic" DSM (DSM that would be undertaken without input or incentives from the utility)?

Response: Industrial customers will continue to pursue efforts to reduce energy costs. To the extent an industrial customer can justify the energy savings from deploying a more efficient technology or process, they will continue to do so which is consistent with the overall efficiency trends that have been seen in manufacturing over the past several decades. These trends are already reflected in the load forecast.

3. Do I&M's customer service engineers provide I&M with information of organic DSM (including demand response and customer-owned generation) that industrial customers are planning to implement?

Response: Yes. If a customer were to have behind the meter generation that would reduce energy purchases, that information is conveyed by the customer service engineers. However, I&M's customer service engineers may or may not be completely aware of all organic EE undertaken or planned by all of I&M's industrial customers.

4. Would it be reasonable to include various amounts of DSM as scenarios or sensitivities even if they were not attributable to a change in Indiana law or any specific impetus?

Response: In general, the current construct to include EE, or DSM resources, as resources with program specific cost and performance characteristics is the most reasonable way to consider DSM resources within the IRP process. This allows the model to select the most economical resources when needed on a cost and performance basis.

II. MISCELLANEOUS DIRECTOR COMMENTS

The Director's Draft Report contained various embedded comments and inquiries regarding I&M's IRP submission. I&M addresses these embedded comments as follows:

- Page 20. Additional information about how I&M (and other Indiana utilities) intend to enhance the IRP effort would be very much appreciated.

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- Page 31. However, I&M could have been more expansive in its assessment of other potential risks
- Page 33. I&M's assessment of future costs of renewable energy and EE seemed very conservative. Scenarios and sensitivities that have a broader bandwidth of costs and their associated probabilities might provide value to the credibility of future IRPs.
- Page 33. Greater attention to narratives also might reduce misunderstandings among the various stakeholders, which should benefit regulatory proceedings.
- Page 36. Stakeholder Process. While I&M held a stakeholder conference call in May and a second meeting in June to review stakeholder comments (e.g., load forecasting and evaluation of resource options, including DSM, treatment of risk analysis, and the implications for the IRP analysis), the director hopes that, given a three-year IRP cycle, I&M will consider greater involvement by stakeholders in the formulation of scenarios and assumptions.

Response: While I&M continually strives to improve the IRP process, in future IRP's an increased focus will be placed on some of the specific items highlighted in the Director's Draft report. These items include:

- Improved narratives on concepts and methodologies utilized in the IRP
- Further discussion of sensitivity and scenario development with stakeholders early in the IRP process
- Schedule IRP stakeholder meeting with focus on DSM/EE program development, including:
 - Tailoring the DSM analysis to I&M's service territory as practical
 - Review of Industrial DSM with I&M and what future potential exists
- Pages 33 & 34. DSM Bundlesthe director would like additional information on how I&M constructed the EE bundles and how they were evaluated before and within the IRP.

Response: See Item C (8) Energy Efficiency, Load Forecast section.

- Page 34. The director believes I&M made a credible effort to treat new EE comparably to other resources, but the director would like more detailed discussion and some examples.

Response: See Item C (5) in the Energy Efficiency, Load Forecast section.

- Page 38. The Commission has high regard for the Electric Power Research Institute and endorses selective use of borrowed information and collaborative projects with other utilities as a means of achieving cost- effectiveness and robustness. However, the director would appreciate I&M's thoughts on whether a more tailored approach to I&M's service territory would be more appropriate.

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Response: I&M intends to incorporate details tailored to I&M’s service territory into future EE (i.e. DSM) analyses. These details will primarily consist of cost and potential savings and will come from sources such as market potential studies or possibly a technical resource manual. The overall EPRI framework utilized by I&M is well suited to the IRP process in that it provides an unbiased view of potential EE savings. I&M will seek to use the most appropriate framework for evaluating future EE programs, and incorporate the most accurate information available.

- Page 39. Avoided Costs...it may be beneficial for I&M and its customers to have a plan to address the issue that would include a more comprehensive approach to avoided cost.

Response: I&M will continue to review and evaluate transmission and distribution avoided costs, and incorporate their effect into future IRP analyses when appropriate. As discussed earlier, the proxy resources modeled within the IRP are not locational specific; therefore, at this point in the resource planning process it is not appropriate to include either a grid benefit or cost to any resource modeled. Additionally, it is important to note that transmission and distribution costs associated with demand-side resources are not always “avoided”. Increasing levels of penetration of resources such as distributed generation could lead to increased expenses associated with the monitoring of voltage and power output from the resources providing power to the grid. Also, as the number of sources increases on the distribution network, so does the complexity associated with operating the network. Circuits may need to be reconfigured, and investments may need to be made to allow for the proper switching activities necessary to maintaining the reliability of the local network. While the common notion is that demand-side resources reduce the need for transmission and distribution investment, the opposite may prove to be true.

III. Supplemental Responses to Questions/Comments by “Joint Commenters”

The following supplemental information is provided in response to the Director’s request to provide written supplemental comments in response to the questions, comments, and concerns raised by the following organizations and individuals:

- Citizens Action Coalition;
- Earthjustice;
- Indiana DG;
- Mike Mullett;
- Sierra Club; and
- ValleyWatch.

Comment 1: I&M Failed to Evaluate Energy Efficiency and Demand Response in a Manner that is Consistent With and Comparable to Its Evaluation of Supply-Side Resources. (p. 2)

Response: This statement is not correct. I&M fully described in multiple stakeholder meetings and within the IRP report the treatment of all resource options, including EE and DR,

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and there are no intentional biases included in the resource options developed. The characteristics of the resource options considered are based on reasonable sources and reflect reasonableness in the approach I&M applied to its IRP.

The comment that I&M excluded certain energy efficiency measures, which limited energy efficiency potential, is misleading. I&M used a screening methodology that is reasonable, common and appropriate in modeling. Screening allows the modeler to optimize modeling resources to focus on modeling issues with the greatest probability of occurrence and the greatest probability of impact. For example: for energy efficiency, when considering measures that impacted the same customer end-use, I&M chose measures that had lower incremental cost rather than measures that had higher incremental cost. This allowed the model to select lowest cost options. If the modelers observed that all of this measure potential was being selected, the modeler has the ability to modify/adjust the energy efficiency measures considered. This phenomenon was not observed throughout the I&M analysis. Additionally, screening was applied to other resources, for example, I&M did not model large nuclear generation, large coal generation with or without carbon sequestration and many different configurations of a natural gas fired combined cycle. The IRP modeled resources are considered a proxy resource, the ultimate or final resource that is deployed may typically have common characteristics to the proxy resource, but will not be the same as the proxy resource. Specific to EE, this means that the programs ultimately selected to be implemented to achieve the level of EE savings identified in the model may differ from the bundle selected by the model. The amounts of energy efficiency selected and included in the preferred plan represents an economic level or least cost amount as compared to all resources over the planning period; it is not flawed.

Comment 2: I&M Failed to Treat Renewable Resources in a Manner Comparable to the Way It Treated Other Supply-Side Resources. (Page 4)

Response: Again this statement is not correct. The renewable resource characteristics and modeling assumptions are reasonable and are described in detail within the IRP document and were reviewed and discussed at each stakeholder meeting.

I&M in collaboration with stakeholders developed both the Fleet Modification Prime and the New Carbon Free cases. Both of these cases extended tax advantaged solar resource availability and as expected these cases result in additional solar resource being selected than the Steady State case; additionally, the Preferred Plan also includes additional wind and solar resources above that in the Steady State case. As stated throughout the IRP, one of I&M's goals is to add economical renewable resource to its portfolio. In keeping with this goal and as reflected in I&M's Preferred Plan, I&M added reasonable levels of renewable resources above the amounts economically selected in the Steady State case. There is a cost for this diversification since the renewable resources were not economically selected. Specifically, the difference in cost between the Preferred Plan and the Steady State case is essentially the cost of advancing the wind and solar resources. These analyses were all very well described in the stakeholder meetings and within the IRP document in Section 5.

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Comment 3: I&M Constrained the Model from Adding Reasonable Amounts of Wind and Solar. (page 4)

Response: The constraints or resource characteristics that I&M utilized are reasonable. These characteristics were reviewed at each stakeholder meeting and there was some understanding of their reasonableness by all stakeholders. Reasonable constraints are needed to run the IRP analyses with the understanding that the IRP is a planning document. As I&M moves forward with implementation further analysis and resource characteristics will be discovered and considered at that time. For example, if I&M issues a large-scale solar RFP and discovers that significant economies of scale can be achieved on solar resource greater than 10MW, this information will be reviewed and vetted with stakeholders to determine what level of incremental resources should be selected, as well as other factors impacting this decision. Even the Commenters’ reference 12 states that studies show only modest scale of economies for a 100 MW project compared to a 10 MW project. This suggest that I&M’s constraint for large solar is reasonable and additionally offers a solar resource which the model may select when minimal load growth is being observed. Referring back to Section 5 of the IRP, Table 19 clearly illustrates that the constraints for both solar and wind resources are not a concern over the next 10 years. And as stated throughout the IRP document, as I&M prepares to implement or begins development of the next IRP all modeling assumptions will be reviewed and modified as appropriate. Regarding the constraint for wind resources set at 1400MW over the entire planning period, again I&M believes this is reasonable. As any resource becomes lower cost than the market price, other parties besides I&M will pursue and develop this resource, thus it is reasonable to suggest that I&M will possibly implement their share of the resource within the market, which for this IRP I&M assumed to be 30%.

Comment 4: I&M’s Modeling Results Call into Question Whether Both Rockport Units Are Needed to Serve I&M’s Native Load Customers, and Whether the Rockport Units Generate Revenues Sufficient to Cover Their Costs. (page 5)

Response: The modeling in the IRP was intentionally designed to test numerous scenarios around the Rockport units, which is appropriate given the uncertainties facing I&M over the next several years in terms of market prices, carbon prices and unit availability. The results of the modeling show that the differences in cumulative present value of the revenue requirement are relatively close. In four out of the five scenarios, the model selects the Steady State approach, which would continue the operation of both units. Thus, the comment is not correct in that the results show that under the circumstances evaluated in the 2015 IRP, operating both units is an appropriate and economic choice to meet the needs of I&M’s customers.

I&M uses its IRP as a tool for making judgments on how to manage its business in the interest of customers. The uncertainty surrounding the factors affecting the Rockport Plant as a resource to meet the needs of I&M’s customers obviously makes long-term decisions about I&M’s generation portfolio more complex. I&M continues to explore all options as it determines the best way to serve customers and does not “put down its pencil” on resource planning after an IRP is submitted to the Commission. Further resource modeling, when circumstances become clearer, may reinforce the results in the 2015 IRP or may suggest a

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different course. For now, the results of the modeling support the decision that the continued efficient operation of the Rockport Plant is important to meeting the need of I&M’s customers for dependable and affordable electric service.

Comment 5: I&M’s IRP Uses Natural Gas Prices that Are Unreasonably High (page 6)

Response: I&M’s long-term natural gas price forecast provides a weather-normalized view that is not materially affected by weather volatility because it is modeled with an assumption of the demand associated with normal, 30-year average weather (aka “weather-normalized”). Through January of the winter of 2015-2016, Indiana was 19% warmer than normal and Michigan was 20% warmer than normal. It is also reasonable to expect that colder-than-normal periods will also occur.

I&M’s projection of future natural gas prices is not based upon extensions of nearby spot prices associated with abnormal weather. The development of the long-term natural gas price forecast begins with an analysis of the supply, demand and price relationship – which produces a price elasticity of supply over time. This elasticity, when applied to modeled natural gas consumption yields a corresponding change in natural gas prices. Consequently, each year’s natural gas price forecast is unique and exhibits a price response correlated to consumption occurrences including CO₂ regulation, LNG exports, natural gas use as a transportation fuel, and others.

Comment 6: I&M’s 2015 IRP Repeats Its Failure to Consider the Environmental Costs and Risks Facing the Clifty Creek and Kyger Creek Plants. (page 6)

Response: The OVEC units represent less than 4% of I&M’s owned capacity and less than 3% of its energy generation. The OVEC units provide value to I&M’s customers in that their variable cost of energy is less than the PJM market prices, so, like Rockport, they help maintain stable rates. There are no pending requirements at the OVEC units that would cause their costs to increase significantly and as such there is no near-term reason to consider removal of those units from I&M’s fleet. Due to their relatively minimal impact on I&M’s fleet, there was not a need to model portfolios that exclude these units.

Comment 7: I&M’s IRP Misrepresents the Modeling Results by Failing to Mention that Its Preferred Portfolio is not the Least-Cost Option. (page 11)

Response: This is a completely false and disingenuous representation of I&M’s IRP results. First, in the IRP text, the Executive Summary (page ES-6) states “While not representing a ‘least-cost’ solution, the Preferred Portfolio provides a resource plan with reasonable costs...” and in Section 5.0 Resource Portfolio Modeling, page 119 the report refers to the “incremental cost” of the Preferred Portfolio. Also, as pointed out in the comments, Table 22 clearly shows the cost of all portfolios. To imply that I&M was trying to hide the fact that the Preferred Portfolio was not the lowest cost portfolio is simply not true.

In addition, the report is clear that the Steady State portfolio, not the Fleet Modification portfolio, is clearly the least cost plan. What the Commenters fail to point out is that the reason the

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Preferred Portfolio is more expensive than either the Steady State or Fleet Modification plans is that I&M accelerated the adoption of renewable energy sources prior to them being economic in the PJM market. So contrary to the comments above that I&M was trying to limit renewable sources, the plan laid out by I&M actually adds more renewables than a purely “least-cost” solution would call for.

For additional information, also refer to I&M’s response to the director’s questions regarding the basis for the Preferred Plan, Section E(3)(a).

Comment 8: I&M Would Have to Spend More than ██████ to Operate the Rockport Plant in Compliance with Federal Environmental Standards. (page 14)

Response: The information provided to the Commenters clearly showed I&M’s variable cost, including emission costs and consumable costs, in addition to incremental capital cost required to continually operate the Rockport units. Clearly I&M will be required to show that incremental capital investment and incremental operating costs are in the best interest of its customers prior to proceeding with any significant environmental retrofit. The IRP is not the mechanism for authorizing such investments, but at this point in time provides reasonable assumptions as to the ongoing viability of the Rockport units.

Comment 9: I&M Stakeholder Process Prior to IRP Submission. (page 16)

Response: The meeting venues were discussed with the Stakeholders and were established to facilitate maximum stakeholder participation. I&M was more than willing to hold the meetings wherever the stakeholders wanted. With regard to an outside facilitator – while I&M is not opposed to consider an outside facilitator, they do add to the cost of the IRP process. Also, I&M did not receive any feedback during the process that stakeholders were being disadvantaged by the absence of an outside facilitator. I&M published stakeholder comments and also responses to those comments.

Comment 10: I&M Stakeholder Processes after the Submission of IRPs. (page 17)

Response: The Joint Commenters introduction noted that they were unable to obtain critical information from the company, Energy Exemplar, who owns Plexos, the modeling software which I&M used for its IRP. The proprietary Plexos software that I&M is utilizing is a proven best in class product that truly integrates company owned assets into a wholesale market structure, thus allowing the generating assets to operate and to be optimized across a much larger market, which ultimately lowers the cost of energy. The Joint Commenters requested that in the future I&M should provide or use another modeling platform. I&M provided all stakeholders ample opportunity to discuss and review all IRP related inputs, scenarios and outputs as well as any topic that a stakeholder group wanted to discuss. The premise that stakeholders must have access to the software I&M utilizes for the IRP modeling is not reasonable. Energy Exemplar indicated that they would be willing to explore reporting options to provide transparency to model inputs, however because this issue only came up after the IRP was submitted, not during the stakeholder process, there was not enough time to pursue this option.

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Conclusion

In conclusion, I&M's assumptions in developing its IRP, and its treatment of existing and proposed resources, are reasonable and appropriate. Prior to reaching its final conclusions, I&M met with interested stakeholders under the Commission's proposed process and initiated a dialogue on IRP topics. That process and nature of the dialogue exchanged for the issues raised appeared to address a number of the stakeholder's concerns. I&M reiterates its offer to meet with interested Staff of the Commission if such a meeting is determined to be beneficial to further discuss these matters. I&M appreciates the opportunity to participate in the comment process and trusts its comments will help alleviate any concerns with the IRP document produced by the Company.

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Certificate of Service

I&M certifies that on June 20, 2016, a copy of these Reply Comments were submitted electronically to the Director of the Electricity Division of the Commission and served via electronic mail on the Office of the Utility Consumer Counselor and by electronic mail or United States Mail, first class, postage prepaid the following interested parties that submitted written comments:

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