June 20, 2016

COMMENTS OF CITIZENS ACTION COALITION, EARTHJUSTICE, INDIANA DISTRIBUTED ENERGY ALLIANCE, MICHAEL A. MULLETT, SIERRA CLUB, AND VALLEY WATCH ON THE DRAFT REPORT OF THE IURC REGARDING 2015-2016 IRPs

INTRODUCTION

Pursuant to the Indiana Utility Regulatory Commission's ("IURC" or "Commission") Integrated Resource Planning Rule, 170 IAC 4-7[1] and P.L. 246-2015 (Senate Enrolled Act 412-2015), Citizens Action Coalition of Indiana, Earthjustice, Indiana Distributed Energy Alliance ("IndianaDG"), Michael A. Mullett, Sierra Club, and Valley Watch (collectively, "Joint Commenters") hereby submit the following comments in response to the Draft Report of the Commission's Electricity Division Director Regarding 2015 Integrated Resource Plans ("Draft Report"), which Dr. Borum issued on May 20, 2016. Joint Commenters submitted extensive comments on the 2015 IRPs of Duke Energy Indiana ("Duke") and Indiana Michigan Power Company ("I&M").

COMMENTS

I. DUKE ENERGY INDIANA'S 2015 IRP

Reducing the Potential of DSM

We agree with many of the comments and inquiries from the Draft Report concerning Duke's and I&M's treatment of demand side management resources in their 2015-2016 IRPs. As we explained in our comments on the IRPs, the utilities failed to consider demand-side resources on comparable a basis with supply-side resources.[2] Specifically, Duke and I&M constrained the amount of demand-side resources available to their planning models and, as a result, significantly underestimated the role that these resources should play in their preferred plans. The utilities should address these deficiencies going forward.

[1] All references to the Commission's IRP Rule, 170 IAC 4-7, refer to the revised draft of the Proposed IRP Rule, which the Commission circulated on October 4, 2012 in the IRP rulemaking, RM# 11-07. As explained in the Electricity Director's Final Report on the 2014-2015 Integrated Resource Plans ("2014 IRP Final Report"), p. 1 (June 10, 2015), available at http://www.in.gov/iurc/files/Director_2013_IRP_Report_-_Final_4-30-14.pdf, both Commission staff and utilities have decided to move forward with the IRP process set forth in the draft proposed rule as if the rule were in effect.

[2] *See* Draft Report at 4 (highlighting "[t]he treatment of energy efficiency (EE) on as comparable a basis as possible to other resources" as a significant concern and noting that Joint Commenters "raised important questions about the amount of EE that was considered and the need for transparency").

We agree with the Draft Report at 6 that "[i]t appears that Duke may have unduly constrained the amount of EE prior to being analyzed in the System Optimizer." This constraint hampers Duke's ability to deploy additional cost-effective demand-side resources to defer or eliminate the need for future supply-side resources. As the Draft Report explained, it appears that Duke "limited the amount of EE and demand response by assuming the composition and size of the future annual EE portfolio impacts were the same after 2018 (page 76-77 of the IRP)." Draft Report at 6-7. That is, Duke capped efficiency for years 2019 through 2039 at the level it proposed for 2018. This approach is seriously flawed as efficiency resources are not permitted to grow over the next two decades. As explained in our comments, this unreasonable constraint on efficiency completely ignores emerging and future technologies on the demand side and creates a self-fulfilling prophecy of viewing energy efficiency as a finite resource. 2015 IRP Comment Report at 3.

Moreover, Duke's approach is especially problematic in light of the fact that Duke's 2016-2018 EE goals proposed in Cause No. 43955 DSM-3 are lower than both Duke's Market Potential Study Action Plan and the former Energy Efficiency Resource Standard, as illustrated below:

Proposed Efficiency Goals in 43955 DSM 3 Compared to Action Plan and Former EERS

	2016		2017		2018	
Proposed Goal[3]	206	0.7%	208	0.7%	196	0.6%
Duke's Market Potential Study Action Plan[4]	436	1.5%	483	1.7%	534	1.9%
Former State Target[5]	410	1.5%	469	1.7%	527	1.9%

In Cause No. 43955 DSM 3, Duke stated that its proposed goals and plan were consistent with its 2013 IRP, but the Commission noted "the very large policy changes implemented as a result of SEA 340 and SEA 412 since the IRP was developed." IURC Cause No. 43955 DSM 3 Final Order at 45. The Commission ultimately found that Duke's 2016-2018 plan was not compliant with Ind. Code § 8-1-8.5-10(h) because it failed to provide energy efficiency goals consistent with Ind. Code § 8-1-8.5-10(c). The Commission stated:

> The law does not define what is meant by an optimal balance nor does the law specify things the Commission should consider when making a determination. However, it stands to reason that an optimal balance can only result from a well-developed and reasoned IRP that evaluates the appropriate balance of new supply-

[3] Cause No. 43955 DSM 3, Petitioner's Exhibit E (Goldenberg Supplemental), page 3. Savings as percent of 2014 total sales.

[4] Cause No. 43955 DSM 2, Petitioner's Exhibit A-2 (Duke Energy Indiana: Market Assessment and Action Plan for Electric DSM Programs), page 4, Table 3, GWh at the meter, available at: https://myweb.in.gov/IURC/eds/Modules/Ecms/Cases/Docketed_Cases/ViewDocument.aspx?DocID=0900b631801b6310.

[5] *Id*.

> side and demand-side resources taking account of risks and uncertainty. Petitioner's EE goals and plan are not based on an IRP as Petitioner acknowledges, instead the goals and EE plan were "informed" by the 2013 IRP. Petitioner's 2013 IRP developed three scenarios used to evaluate resource requirements and choices. However, in each scenario Petitioner assumed a given level of EE and then allowed the model to optimize the generation resource selection. In the 2013 IRP report Petitioner even explicitly refers to the "assumed" levels of EE. Thus the 2013 IRP cannot be said to have developed an optimal balance of energy resources.

IURC Cause No. 43955 DSM 3 Final Order at 45.

Unfortunately, Duke repeats its 2013 IRP mistakes in its 2015 IRP. By hardwiring unreasonably low amounts of energy efficiency into its model, Duke violated the IRP Rule that requires energy efficiency and other demand-side resources be treated on equal footing with supply-side resources, 170 IAC 4-7-8(b)(3), and failed to "develop[] an optimal balance of energy resources." IURC Cause No. 43955 DSM 3 Final Order at 45. The ultimate result of an IRP that does not fully and fairly consider the cheapest resource option, energy efficiency, is unjust and unreasonable rates for Duke's customers. Duke should be required to fix this major error. Specifically, Duke should redo its resource modeling such that the model can select energy efficiency whenever it is the optimal resource, rather than hard-wiring efficiency into the analysis and preventing competition with other resources.

Duke's demand-side analysis is flawed in another significant way—Duke unfairly subjects efficiency to an additional cost-effectiveness screen that it does not apply to other resources. While the Draft Report did not squarely address this deficiency, we respectfully request inclusion of this issue in the Director's Final Report.

Like I&M, Duke subjects energy efficiency resources to cost-effectiveness testing prior to making these resources available to the IRP model, which then optimizes all resources based on the lowest PVRR (or highest revenue, in the case of I&M). That is, Duke (and I&M) prescreened demand side resources for cost-effectiveness *before* making them an available resource for modeling, which includes economic screening. This demand-side "double-screen" imposes an additional screen on demand-side resources that is not imposed on supply-side resources, unfairly stacking the deck against efficiency. 2015 IRP Comment Report at 19-24.

Moreover, this additional screen is inaccurate. DSM cost-benefit tests are intended to evaluate DSM at the stage of program design, not at the resource planning stage. Thus, detailed and accurate estimates of program costs are typically not available until substantial resources have been devoted to the design of program offerings. As such, the results of the cost-benefit tests in Duke's IRP will likely be inconsistent with the results of the same tests once Duke presents its DSM plan. Moreover, if these tests are intended to screen out non-cost-effective measures prior to their inclusion in the IRP model, Duke would have to use an avoided cost trajectory that may be entirely inconsistent with the avoided costs it develops through IRP modeling. *Id*. For this reason too, Duke should apply DSM cost-effectiveness tests only in the DSM planning process—not in its IRP.

Duke's unreasonable practice of double-screening demand-side resources exacerbates the unequal playing field between demand- and supply-side resources. The end result of Duke's current demand-side approach is a preferred portfolio that misses opportunities to pursue the least-cost resource, efficiency. Duke should be directed to rerun its model without this benefit-cost prescreen so that energy efficiency can be fully incorporated in IRP modeling and screened for economics in the IRP only, consistent with the treatment of supply-side resources.

DSM Bundles

We agree with the Draft Report at 7 that:

> [I]t was not clear how Duke constructed the bundles of EE and demand response resources. Moreover, because many of the resource portfolios were predetermined, meaning they were not the result of optimization, it is not clear how the EE and demand response bundles would have been optimized to treat EE and demand response as resources on as comparable a basis as possible to any other resource. Ideally, EE and demand response should be simultaneously optimized with the other resource alternatives, but it is not clear that occurred.

We also emphasize our 2015 IRP Comments at 19-20, including the following:

> DEI provided extremely limited efficiency bundle cost information, all of which was marked confidential. According to the IRP, DEI selected the Optimized CO_2 + CC portfolio as its preferred plan. The Company indicated that the preferred plan selected all of the base efficiency portfolios, and three of the five incremental portfolios. DEI provided us with two spreadsheets with efficiency impact data. Due to data inconsistencies, which were explained too late to be properly addressed in these comments, we were unable to thoroughly analyze and review DEI's cost assumptions.

The Draft Report also notes at 4-5 that:

> Technological improvements (note the precipitous drop in prices in lighting technology), combined with probable increases in the cost of providing electricity, seem likely to increase the cost-effectiveness of EE and demand response…As with EE and demand response, it seems likely that there will be some declining cost and increasing cost-effectiveness that may have been too modestly reflected in the IRP.

We agree and request that the Final Report specifically reflect upon Duke's stated rationale for the treatment of its program costs in its IRP modeling, which is highly unconvincing and without support. On this point, we emphasize the following from our 2015 IRP Comment Report at 8:

> [B]ased on the language in DEI's IRP,[6] it appears DEI did not create a placeholder for efficiency to grow over time due to emerging technologies or reductions in cost of existing technologies. This assumption is contrary to national experience, which is that "low-hanging" fruit grows back – meaning that incremental savings will continue to increase over time. For example, many utilities have retrofitted commercial customers' fluorescent lighting with high performance T8s, and it is [ ] often assumed that there are not future commercial lighting gains. However, this assumption ignores advances in LED technology, specifically LED troffers that can save 2-4 times more energy than high performance T8s.[7] This type of technology was not included in DEI's potential study, so is not part of DEI's IRP EE modeling. This is just one example of a DEI conservative assumption in its potential study that trickled down to the IRP planning.[8]

The persistence of cost-effective energy savings opportunities is a critical, important point, especially considering the fact that Duke (1) did *not* include LEDs in its latest Market Potential Study, and (2) modeled a very limited amount of technical potential from its Market Potential Study.

As an illustration of how quickly the price is dropping for energy efficiency measures, consider the 2015 update to the Indiana-specific, ratepayer-funded Technical Resource Manual (also known as the Technical Reference Manual version 2.2).[9] This update includes an incremental measure cost for residential LED lamps of around $30/bulb. Yet, we are now seeing the cost of LEDs at a price much lower than that, at times, well under $10/bulb.[10] Existing technology constantly improves and new technologies emerge, but Duke's IRP reflects neither. Duke's Market Potential Study is already very conservative, accounting for only a fraction of its technical potential. 2015 IRP Comment Report at 7. The fact that Duke does not have a placeholder to account for these emerging technologies or reductions in costs for current technologies puts energy efficiency at a distinct and significant disadvantage. In order for Duke to properly model DSM, Duke must rectify these deficiencies.

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[6] DEI 2015 IRP, pages 76-77.

[7] RAP, 30 Percent Electric Savings in 10 Years, Appendix E.

[8] An additional example can be found in the Pacific Northwest, where the Northwest Power and Conservation Council has found increasing amounts of energy efficiency in each Power Plan conducted since the 1980s. In the Sixth Power Plan, the NWPCC found that "the achievable technical potential of efficiency improvements increased from the Fifth Power Plan levels due to advancing technology, reduced cost, and estimates in new areas."

[9] IURC Cause No. 43955 DSM 3, CAC Exhibit 1, Attachment NM-15, available at page 265: https://myweb.in.gov/IURC/eds/Modules/Ecms/Cases/Docketed_Cases/ViewDocument.aspx?DocID=0900b631801cba66.

[10] *See, e.g.*, http://www.consumerreports.org/cro/news/2015/02/as-led-prices-drop-it-s-time-to-make-the-switch/index.htm.

Exclusion of Industrial Efficiency

As we noted in our 2015 IRP Comment Report, both Duke and I&M excluded industrial energy efficiency thereby constraining the amount of long term energy efficiency potential. This is a significant shortcoming considering that Indiana's industrial sector consumed more energy in 2012 than the residential and commercial sectors combined and accounted for 45.7% of overall consumption in 2013. 2015 IRP Comment Report at 18; *see also* U.S. Energy Information Administration.[11] Industrial energy efficiency is often the least expensive of all energy efficiency measures. While there is currently policy in Indiana that allows large customers to opt-out of utility energy efficiency programs, the law also contemplates that these very same large customers could opt back into the programs. Ind. Code §§ 8-1-8.5-9(g) provides that "[a]n industrial customer that opts out of participating in an energy efficiency program may subsequently opt to participate in the same or a different energy efficiency program," and Ind. Code § 8-1-8.5-10(p) notes that "[a]n industrial customer may follow the procedure set forth in section 9(g) of this chapter to opt back in." Although approved efficiency must exclude all load from industrial opts outs, Ind. Code § 8-1-8.5-9(h), IRP resource planning is not the same as energy efficiency goal setting, which is defined instead in Ind. Code § 8-1-8.5-10(c) ("'energy efficiency goals' means all energy efficiency produced by cost effective plans that are: (1) reasonably achievable; (2) consistent with an electricity supplier's integrated resource plan; and (3) designed to achieve an optimal balance of energy resources in an electricity supplier's service territory."). An IRP analysis should include all industrial potential, even if the customer has opted out.

In addition, Duke's (and I&M's) IRP assumes that at least some of those customers might not opt back in efficiency programs. There is no information available on how the IRP energy efficiency bundles for the utilities would have changed in make-up and cost if industrial efficiency had been included, nor is there information on the impact if the model had had those bundles available to select during the optimization process.

Risk Assessment

The Draft Report notes that Duke's objective was to minimize revenue requirements while assessing the different risks confronting Duke. Draft Report at 5. We urge the Final Report to address aspects of Duke's IRP that fall short of properly analyzing revenue requirements for the preferred and alternative portfolios and the risks facing Duke's fleet. *See* 170 IAC 4-7-8(b)(7) (requiring a utility to assess the "balance of costs and risks" facing a utility's preferred portfolio); *see also* 170 IAC 4-7-6(b)-(c) (requiring a utility to consider a range of demand- and supply-side resources as alternatives for meeting future electricity needs).

Specifically, our prior comments identified multiple ways in which Duke failed to reasonably analyze wind and solar resources. Duke's assumption that solar prices will remain unchanged for the next 20 years is contrary to both historical price trends in the last decade[12] and

[11] http://www.eia.gov/state/?sid=IN

[12] *See* Mark Bollinger and Joachim Seel, Lawrence Berkeley National Laboratory, Utility-Scale Solar 2014, at p. i (Sept. 2015), *available at* https://emp.lbl.gov/sites/all/files/lbnl-1000917.pdf

other price forecasts for the next decade, including I&M's forecast;[13] Duke used a low capacity factor for wind resources that appears to be based on data from only a single wind project; and Duke assumed that the production tax credit for wind and solar projects ends in 2016, but Congress in fact extended the tax credits. *See* 2015 IRP Comment Letter at 7-10.

Duke cannot fulfill its goal of minimizing revenue requirements when its analysis artificially inflates the cost of renewable resources. Moreover, Duke's failure to analyze renewable resources using reasonable assumptions violates the requirement, 170 IAC 4-7-8(b)(3), to evaluate all supply- and demand-side resources on a consistent and comparable basis. In addition, Duke's flawed analysis of renewable resources falls short of satisfying 170 IAC 4-7-6(c), since the requirement to consider a range of supply-side resources as alternatives must be interpreted to mean that utilities must consider alternatives in a reasonable manner, using reasonable inputs.

In addition, as we explained previously, it is unclear whether Duke considered the possibility of carbon regulation in the manner in which it professed to analyze carbon pricing. While Duke claims to have used a carbon cap in certain modeling runs, carbon emissions exceed the "cap" in most of those runs. *See id.* at 10; *see also* 2015 IRP Comment Report at 63-65. Separately, Duke used lower heat rates for Gallagher[14] and Edwardsport than those plants actually achieved in 2014. *See* 2015 IRP Comment Letter at 10; *see also* 2015 IRP Comment Report at 66-67. Using an unreasonably low heat rate makes the units appear more efficient and improves the units' economics in the analysis. We recommend that the Final Report point out these errors regarding treatment of carbon emissions and heat rates, and note that the errors biased the analysis in favor of Duke's existing coal units. In addition, using inputs that are more favorable to coal resources than to other resources violates the requirement in 170 IAC 4-7-8(b)(3) to evaluate all supply- and demand-side resources on a consistent and comparable basis.

Finally, the Draft Report at 17 notes that "the 2015 IRP analysis was largely completed before the United States Environmental Protection Agency (EPA) issued its Clean Power Plan (CPP) final proposed rules in August 2015, this was an ideal time to experiment with this novel approach because of the uncertainties…the work done modeling environmental regulations—and lessons learned—will be useful in future complex analysis." We would respectfully request that the Final Report find that Duke's IRP is not compliant with the Clean Power Plan.

Stakeholder Process

The Draft Report mentions the stakeholder process, but does not discuss problems the Joint Commenters encountered during the development of Duke's IRP. As mentioned in our prior comments, Duke treated most of our questions over email as informal discovery requests,

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(noting that the installed cost of utility-scale solar project declined by more than 50% between 2007 and 2014).

[13] I&M forecasts solar prices to decline by more than 40% during the analysis period. *See* I&M IRP at 106.

[14] We recognize that Duke announced earlier this year that the remaining two units at Gallagher will be retiring.

even when such requests were for simple clarifications of what Duke had done or where to locate certain information. Doing so delayed our obtaining necessary information, thereby reducing the amount of time we had to analyze Duke's data and prepare comments. *See* 2015 IRP Comment Letter at 19. The Commission has "stress[ed] the importance of stakeholder input" in the IRP process and noted that "[i]t is the intent of the proposed IRP Rule to ensure meaningful participation by stakeholders." Final 2014 Director's Report at 3, 4. Stakeholders cannot provide timely and meaningful input if utilities delay providing information to stakeholders by treating virtually all questions, no matter how minor, as informal discovery requests.

II. INDIANA MICHIGAN'S 2015 IRP

Reducing the Potential of DSM

> The Draft Report at 34 asks:
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> > [H]ow did I&M go from "achievable potential" (AP) based on the Report by the Electric Power Research Institute (EPRI) to the High Achievable Potential (HAP) and then to the EE that was actually used in formulating the EE bundles if the amounts of EE were different? That is, because HAP is more costly and would require a more aggressive implementation, it is not clear how HAP affected the construction of the EE bundles.

We would request that the Final Report emphasize the flaw in I&M's use of "achievable potential" in the IRP modeling process, rather than instead evaluating efficiency potential by bundling the measures from the "technical potential" analysis in order to satisfy the requirements of 170 IAC 4-7-8(b)(3). Instead of pre-screening measures to predetermine whether it was cost-effective, I&M should have allowed the optimization model to select from all measures identified in the analysis of technical potential. 2015 IRP Comment Letter at 2-3; 2015 IRP Comment Report at 2, 10-13.[15] We would respectfully request that the *Final Report* comment on I&M's failure to evaluate its efficiency potential by bundling the measures from the "technical potential" of the Market Potential Study, as opposed to any form of "achievable potential" (or "economic potential") and direct I&M to rerun its model to correct this error.

Like Duke and as discussed above, I&M erred in using cost-benefit tests to pre-screen DSM in its IRP. 2015 IRP Comment Report at 19-24. We respectfully request inclusion of this issue in the Director's Final Report. This demand-side "double-screen" unfairly stacks the deck against efficiency and should be eliminated. Specifically, I&M should be directed to rerun its model without this benefit-cost prescreen so that energy efficiency can be fully incorporated in IRP modeling and screened for economics in the IRP only, consistent with the treatment of supply-side resources. As noted with Duke, DSM cost-benefit tests are intended to evaluate DSM at the stage of program design, not at the resource planning stage, because that is when detailed and accurate estimates of program costs are typically available.

[15] *See also* Joint Commenters' Reply Comments for 170 IAC 4-7, 4-8 Rulemaking, http://www.in.gov/iurc/files/RM_15_06_Joint_Commenters_Reply_Comments.pdf.

Finally, we would offer our support for the *Draft Report's* notes and questions about I&M's use of the EPRI report at 28:

> I&M used EPRI data to develop bundles of future EE activity for demographics and weather-related impacts of its service territory. (page 92)…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…The EPRI Market Potential Study references another report for the development of [Market Acceptance Ratios and Program Implementation Factors], but it appears that this document is not publicly accessible. This puts a burden on I&M to explain more completely than is done in this IRP…

In addition, we would emphasize our criticisms of I&M's use of the EPRI study as noted in our 2015 IRP Comment Report at 10-13 and 20. As discussed in the 2015 IRP Comment Report, EPRI's analysis of demand side resource potential is generally known to be conservative, is national in scope, and is not representative of efficiency in Indiana. Therefore, I&M's reliance on high-level, national findings in the EPRI study to form the basis of modeling energy efficiency in its IRP raises serious concerns.

For example, consider incremental cost estimates. I&M based its incremental cost estimates on costs from the EPRI study, which are not specific to its service territory but are estimates derived from a proprietary database.[16] There is no publicly available information on the sources of incremental cost, nor is there any explanation of the measured included in the study.[17] Similarly, it is challenging to determine if the Air Conditioning Maintenance discussed in the EPRI Study is comparable to the Residential HVAC Maintenance/Tune Up measure in the Indiana Technical Resource Manual 2.2 ("Indiana TRM 2.2") when there is no qualitative explanation of the energy efficiency measure in the EPRI Study. This lack of information makes it difficult if not impossible for stakeholders to compare or assess the reasonableness of I&M's measure cost assumptions.

Despite this lack of transparency, it is clear that the EPRI incremental cost information does not align with the Indiana TRM 2.2 or the incremental costs found in the 2016 I&M DSM Plan filing, as the following table illustrates.

[16] EPRI. Palo Alto, CA: 2014. 1025477.
[17] *Id.* page 2-14.

Table 2.5 from the 2015 IRP Comment Report.
Comparison of Residential Energy Efficiency Measure Incremental Cost

Measure	Indiana TRM 2.2 Incremental Cost	DSM Plan Incremental Cost[18]	IRP Incremental Cost
Thermal Shell Measures			
Window[19]	$495[20]	N/A	$561[21]
Duct Sealing and Insulation/Duct Repair	$71.45	N/A	$239[22]
Water Heating Measures			
Energy Star HP Hot Water Heater	$700[23]	$1489	$1203[24]
Energy Star Dishwasher	$211[25]	N/A	$89[26]
Faucet Aerator	$2[27]	$1.28 - $2.78	$1[28]
Hot Water Pipe Insulation[29]	$27[30]	$8.35	$15[31]
Showerhead	$18.50[32]	$3.86	$3[33]

[18] IURC Cause No. 43827 DSM 5, I&M Workpaper "I&M DSM 5 2016 Plan Exhibits_9_10_15 Attach Final," Tab 2016 Res. Home Energy Products.
[19] Assume that one window is 15 SF and that an average house has 22 windows. http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/windows_doors/ESWDS-ReviewOfCost_EffectivenessAnalysis.pdf
[20] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, page 60. Energy Star Windows, $150/100 SF.
[21] EPRI Study, Table E-6, page E-13, Double Pane Window. Residential Central A/C Cooling End Use. $170 per unit, assuming that a unit is a 100 SF.
[22] EPRI Study, Table E-6, page E-13, Residential Central AC Space Cooling Measures.
[23] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, Indiana TRM 2.2, pp. 64-67. Heat Pump Water Heaters, Domestic Hot Water Measure category.
[24] EPRI Study, Table E-10, page E-18, Water Heater EF=2, Residential Water Heating Measures End Use. Energy Star Electric Hot Water Heaters energy factor requirements are currently greater than or equal to 2.0 for less than 55 gallons, and 2.2 for more than 55 gallons.
[25] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp.20-21. Energy Star Dishwasher Deemed Measure Cost.
[26] EPRI Study, Table E-10, page E-18, Residential Water Heating Measures.
[27] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 68-72. Low Flow Faucet Aerator, Domestic Hot Water Measure Category.
[28] EPRI Study, Table E-10, page E-18, Residential Water Heating Measures End Use.
[29] Assuming three feet of insulation.
[30] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 77-79. Domestic Hot Water Pipe Insulation (retrofit), Domestic Hot Water Measure Category.
[31] EPRI Study, Table E-10, page E-18, Pipe Insulation, Residential Water Heating Measures End Use.

Appliance Measures			
Energy Star Dishwasher	$211[34]	N/A	$8[35]
Residential ECM/Furnace Fan	$250[36]	$280	$101[37]
Energy Star Refrigerator	$30[38]	N/A	$212[39]
High Efficiency Refrigerator	$140 (CEE Tier 2)	N/A	$437
Energy Star Clothes Washer[40]	$210.12[41]	N/A	$650[42]
High Efficiency Clothes Washer	$215.90 (CEE Tier 2)	N/A	$700-800
Heating/Cooling[43]			
AC Maintenance	$64	N/A	$335[44]
SEER 15	$588	N/A	$800
SEER 16	$893	N/A	$1200
SEER 18	$1490	N/A	$2000
SEER 20	$2085	N/A	$2500
SEER 21	$2270	N/A	$3000
Lighting			
Screw in LEDs[45]	N/A	$7	$5

In sum, I&M's flawed demand-side approach results in a preferred portfolio that misses opportunities to pursue the least-cost resource, efficiency. Joint Comments respectfully request

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[32] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 73-76. Low-Flow Showerhead, Domestic Hot Water Measure Category.
[33] EPRI Study, Table E-10, page E-18, Low-Flow Showerheads, Residential Water Heating Measures End Use.
[34] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 20-21. Energy Star Dishwasher Deemed Measure Cost.
[35] EPRI Study, Table E-11, page E-20, Residential Appliance Measures.
[36] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 114-115. Residential Electronically Commutated Motors, HVAC Measure Category.
[37] EPRI Study, Table E-11, page E-20, Furnace Fans – ECM, residential appliances end use.
[38] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 9-12. Refrigerator Deemed Measure Cost for Energy Star Unit and CEE Tier 2 Unit.
[39] EPRI Study, table E-11, page E-19
[40] EPRI Study, Incentive level for a clothes washer with MEF 2.0. Current Energy Star requirements are 2.06 – 2.38.
[41] IURC Cause No. 44634, CAC Exhibit 1, Attachment NM-23, Indiana TRM 2.2, July 28, 2015, pp. 16-19; Clothes Washer Deemed Measure Cost for Energy Star Unit and CEE Tier 2 Unit.
[42] EPRI Study, Table E-11, page E-19, Residential Appliances Measures.
[43] All SEER calculations made assuming a 2.5 ton A/C unit.
[44] EPRI Study, Table E-6, page E-13, Residential Central AC Space Cooling Measures.
[45] Assuming a 9.5 A Lamp LED.

that I&M be required to rerun its model to correct its error in using a form of "achievable potential" rather evaluating its efficiency potential by bundling the measures from the "technical potential" of the Market Potential Study. I&M should also eliminate its unreasonable practice of double-screening demand-side resources, which exacerbates the unequal playing field between demand- and supply-side resources. Finally, I&M should be required to use an I&M specific market potential study that accurately and transparently explains any assumptions made and uses cost estimates specific to the region.

Technological Improvements

> We agree with the *Draft Report's* emphasis on concepts related to DSM at 19:
>
> Integration of new cost-effective energy efficiency (EE) and demand response on as comparable a basis as feasible with other resources. Technological improvements (note the precipitous drop in prices in lighting technology), combined with probable increases in the cost of providing electricity, seem likely to increase the cost-effectiveness of EE and demand response. . . . Load forecasting, including the appropriate treatment of existing EE and demand response.

As noted with Duke, the Indiana-specific, ratepayer-funded Technical Resource Manual (also known as the Technical Reference Manual version 2.2) provides an illustration of how quickly the price is dropping for energy efficiency measures. The Indiana TRM 2.2 was just updated during the summer of 2015[46] and reflects an incremental measure cost for residential LED lamps of around $30/bulb. Yet, we are seeing the cost of LEDs at a price much lower than that, at times, well under $10/bulb.[47] Technology will constantly be improving. The fact that I&M does not have a placeholder to account for these emerging technologies or reductions in costs for current technologies puts energy efficiency at a distinct and significant disadvantage. I&M should correct this deficiency.

Exclusion of Industrial and Commercial Efficiency

> The *Draft Report* notes at 26:
>
> 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. (pages 89-90)…Please provide the technical data or research-related literature to substantiate the position that large customers will self-invest in EE measures. Is

[46] IURC Cause No. 43955 DSM 3, CAC Exhibit 1, Attachment NM-15, available at page 265: https://myweb.in.gov/IURC/eds/Modules/Ecms/Cases/Docketed_Cases/ViewDocument.aspx?DocID=0900b631801cba66.

[47] http://www.consumerreports.org/cro/news/2015/02/as-led-prices-drop-it-s-time-to-make-the-switch/index.htm

this position contradicted by AEP's reliance on the EPRI Market Potential Study, which includes the industrial sector?

We agree that I&M's approach to industrial efficiency, namely to disregard it, raises serious concerns. As the Draft Report notes, there is a stark contradiction between the EPRI Market Potential Study and I&M's IRP with regards to the treatment of industrial efficiency. Furthermore, it is unclear how, if at all, I&M will account for industrial efficiency if it does not evaluate the efficiency potential of this energy-intensive customer sector. Will these customers just be deprived services and opportunities to participate in utility-sponsored DSM?

As noted with Duke, while there is currently policy in Indiana that allows large customers to opt-out of utility energy efficiency programs, the law also contemplates that these very same large customers could opt back into the programs. *See* Ind. Code §§ 8-1-8.5-9(g), and Ind. Code § 8-1-8.5-10(p). Despite the language in Ind. Code § 8-1-8.5-9(h) that "[e] nergy efficiency targets or goals that are approved or mandated by the commission in a DSM order must be calculated to exclude all load from an industrial customer that opts out under subsection (f)," IRP resource planning is not the same as an energy efficiency target or goal which is defined instead in Ind. Code § 8-1-8.5-10(c). Thus, the IRP analysis should include all industrial potential, even if the customer has opted out.

In addition, I&M's (and Duke's) IRP assumes that at least some of those customers might not opt back in and want to be served by the programs they are helping to fund. There is no information available on how the IRP energy efficiency bundles for the utilities would have changed in make-up and cost if industrial efficiency had been included, nor is there information on the impact if the model had had those bundles available to select during the optimization process. As in the case of the demand-side double-screen, no other resource is eliminated or extremely constrained due to existing policy.

I&M's treatment of industrial efficiency is particularly alarming given that the utility has the lowest opt out as a percentage of eligible load as compared to NIPSCO, Duke, and Vectren, as illustrated below:

	Opt out
NIPSCO[48]	42%
DEI[49]	49%
Vectren[50]	75%
I&M[51]	10%

[48] Cause No. 44634, NIPSCO Discovery Request Response to CAC Set 2-006, Attachment A (CAC Exhibit 1, Attachment NM-8).
[49] Cause No. 43955 DSM 3, Duke Witness Douglas' Public Workpaper #2 (CAC Exhibit 1, Attachment NM-9).
[50] Cause No. 44645, Vectren Discovery Request Response to CAC 2-5 (CAC Exhibit 1, Attachment NM-10); *see also* Cause No. 44645, Petitioner's Exhibit No. 2 (Huber), p. 24, lines 13-14, which says approximately 76% of eligible load has opted-out.

I&M's efficiency analysis also raises concerns regarding commercial customers. I&M did not include any commercial efficiency in its preferred plan, and dozens of commercial measures were excluded from the analysis. *See* 2015 IRP Comment Report at 16, especially Table 2.9. We respectfully request that the Final Report specifically comment on this.

The Draft Report also notes:

> 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. (page 8)…Would I&M please elaborate on how this adjustment was done?

We wish to emphasize our 2015 IRP Comment Report at 21-22, especially Tables 2.12 and 2.13, and would encourage the Director and his Staff to carefully compare the various incremental cost assumptions in preparation of the Final Report, especially as it relates to appliances, which are much higher than I&M presented in its 2016 DSM plan.

Finally, we agree with the questions on page 35 concerning Organic Industrial DSM. We especially agree that "the lack of inclusion of organic EE would overstate the industrial load forecast. It may be the lack of demand response would also result in over forecasting."

<u>Rockport</u>

The Draft Report states that, "Given that I&M appropriately used this IRP largely to evaluate the conditions under which it made sense to retire one or more of the Rockport units and stakeholders seemed to be largely in agreement with this, I&M should take confidence that I&M's perspectives were not significantly different from those of stakeholders." Draft Report at 31. We agree that one of the most critical components of I&M's IRP is the evaluation of Rockport's future. However, as explained in our prior comment letter and technical report, there are fundamental shortcomings in I&M's evaluation of Rockport.

Our prior comments pointed out that I&M's off-system sales exceed the amount of Rockport Unit 2's generation, which means that Rockport Unit 2's output is not needed to serve customers' energy requirements. *See* 2015 IRP Comment Report at 47-51. The IRP lacks a discussion of risks to customers from I&M's gamble that it can make large amounts of off-system sales in the market.

Since Rockport Unit 2 is essentially being run as a merchant plant, I&M should have analyzed Rockport Unit 2 as such, by comparing the unit's expected revenues to its expected costs. We performed such an analysis using I&M's inputs, and the results indicate that Rockport Unit 2 will not be profitable during the period analyzed by the IRP, because the unit's revenues

[51] I&M Discovery Request Response to CAC Set 1-11, Attachment 1 (CAC Exhibit 1, Attachment NM-6).

do not cover its costs. *See id.* at 52-55. Moreover, this is true not just when averaged across the entire planning period; Rockport Unit 2 loses money every year of the planning period. *Id.* at 53. The economic outlook for Rockport Unit 1 is similar: its costs exceed its revenues in every year of the planning period. *Id.* at 52-55. Rockport Units 1 and 2 are uneconomic even before accounting for the capital costs of installing the SCR and FGD systems which are required by a consent decree. *Id.*

Furthermore, the economics of Rockport Units 1 and 2 are even worse, because the off-system sales and heat rate assumptions which I&M used likely overstate the revenues which would be credited to customers. Our prior comments noted that I&M's analysis did not account for the fact that when off-system sales exceed $37.5 million, customers are credited only half of the revenue, as shareholders receive the other half. *See* 2015 IRP Comment Letter at 5.

As explained in our prior technical report, I&M's analysis assumes that the heat rate for both Rockport Units 1 and 2 improves over time. 2015 IRP Comment Report at 56-57. However, a consent decree requires Rockport Units 1 and 2 to install and operate SCR and FGD systems in the next several years, and both systems need energy to operate. All other things being equal, the "parasitic load" consumed by the pollution controls decreases the amount of energy available to the grid, which decreases the heat rate. *Id.* at 56. We reiterate our request for I&M to explain how operation of new pollution controls is consistent with an ever-improving heat rate, and we likewise recommend that the Final Report address this issue and its impact on the economic analysis of Rockport Units 1 and 2.

Finally, Joint Commenters are concerned that continued investment in the Rockport and Clifty Creek plants poses severe risks to customers because the plants are already running at lower-than-usual capacity factors due to their apparent inability to compete in the PJM market. For example, as shown in the attached graph and table, Rockport's capacity factor fell below 50 percent in October 2015 and had not exceeded 50 percent as of March 2016, the most recent data available from SNL Financial. Moreover, future market prices do not look favorable to Rockport and Clifty Creek. We respectfully ask that Final Report address the risk of market volatility to I&M customers and the need for I&M to carefully consider large capital expenditures on uncompetitive power plants.

Risk Assessment

We urge the Commission to address in the Risk Assessment section the issues we raised in our prior comments concerning I&M's treatment of environmental and fuel price risks, as well as cost issues. First, the Draft Report states that "I&M's assessment of future costs of renewable energy and EE seemed very conservative." Draft Report at 33. While we do not know which aspects of I&M's assessment the Draft Report is referencing, we identified several ways in which I&M prevented the model from selecting amounts of renewable resources that would otherwise be available under more reasonable assumptions. I&M assumed that the production tax credit for wind projects ends in 2016, but the tax credit has in fact been extended by Congress. *See* 2015 IRP Comment Letter at 3-4. Compounding this error, I&M prohibited the model from selecting more than 50 MW of solar and 300 MW of wind in any given year, without a rational explanation of the basis for the limits. *See id.* at 4-5. Taken together, these decisions

artificially increased the price and decreased the amount of renewables that could be selected by the model. Moreover, I&M did not place comparable constraints on the amount of non-renewable resources that could be selected by the model, and I&M did not make equivalent adjustments to its pricing of non-renewable resources to account for failing to model the extension of the tax credit for wind.

By treating renewable resources in a manner that is not consistent with and comparable to the treatment of other resources, I&M violated the requirement, 170 IAC 4-7-8(b)(3), to evaluate all supply- and demand-side resources on a consistent and comparable basis. I&M's flawed analysis of renewable resources also violates the requirement in 170 IAC 4-7-6(c) to consider a range of supply-side resources as alternatives, since, as mentioned previously, this requirement would be meaningless unless utilities must consider alternatives in a reasonable manner, using reasonable inputs.

Second, we noted that I&M continues to ignore the environmental risks facing the Clifty Creek and Kyger Creek plants of which it owns a part. *See id.* at 6-7. And we noted that the gas prices I&M used are well above actual prices today. *See id.* at 6. By ignoring environmental compliance costs at coal units, and using unreasonably high natural gas prices, I&M biased the analysis in favor of coal resources, which violated the requirement to evaluate all supply and demand resources on a consistent and comparable basis, 170 IAC 4-7-8(b)(3).

Third, 170 IAC 4-7-8(b)(7) requires each utility to "demonstrate how the preferred resource portfolio balances cost minimization with cost-effective risk and uncertainty reduction." A utility cannot demonstrate that it has balanced costs against risks without first disclosing and analyzing risk. Here, I&M did not disclose in the IRP text its reliance on off-system sales and the risks such a strategy poses to customers, which violates I&M's obligation to demonstrate that its preferred portfolio balances costs against risk. We urge the final report to note that I&M's IRP relies on continuing to make off-system sales that exceed the generation from Rockport Unit 2, and that the IRP does not fully disclose and does not properly analyze the risks to customers from this strategy.

Finally, the Draft Report at 37 notes "It is worth reiterating that this round of IRPs was against the backdrop of the uncertainties around the potential ramifications of the Clean Power Plan and state legislation, with the Final CPP Rule being adopted after I&M produced most of its analysis." We would respectfully request that the Final Report find that I&M's IRP is not compliant with the Clean Power Plan.

<u>Risk and Uncertainty Analysis</u>

The Draft Report correctly notes the importance of the "examination of Rockport's future" to the current, and future, IRPs. Draft Report at 33. In the coming years, I&M would have to spend large sums of money on capital upgrades to keep Rockport Units 1 and 2 running. *See* 2015 IRP Comment Letter at 14. To properly examine and plan for Rockport's future, I&M must consider the risks from using Rockport to make off-system sales, should analyze Rockport as a merchant plant, should account for the share of off-system sales credited to customers, and must reconcile the assumed heat rate with the installation of new pollution controls. I&M must

also fix the errors identified above in how it analyzes the renewable and energy efficiency resources that could replace Rockport. As explained above, these changes are necessary in order to satisfy the requirements to demonstrate that costs have balanced against risk, 170 IAC 4-7-8(b)(7), to consider demand- and supply-side alternatives, 170 IAC 4-7-6(b)-(c), and to consider all demand- and supply-side alternatives in a consistent and comparable manner, 170 IAC 4-7-8(b)(3).

I&M's Preferred Case

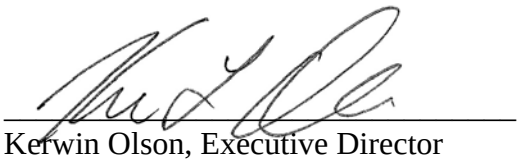
We urge the Commission to address the absence of text in I&M's IRP clearly stating that the preferred portfolio is not the least-cost option. *See* 2015 IRP Comment Letter at 11. While the IRP Rule does not prohibit a utility from selecting a preferred portfolio with a higher revenue requirement than alternatives, the goal of the IRP Rule is to promote transparency in utility decision-making. In particular, the IRP Rule requires presentation of the "results of testing and rank ordering the candidate resource portfolios by the present value of revenue requirement." 170 IAC 4-7-8(b)(7)(D). In a document as long and as dense as an IRP, compliance with this provision requires utilities to clearly state in the text which portfolio is least-cost, and to note if the preferred portfolio is not least-cost.

Moreover, as explained more fully in our prior comments, the IRP lacks a rational explanation for choosing a more expensive option as the preferred portfolio. *See id.* at 11-12. The Final Report should address both of these shortcomings in I&M's IRP.

Stakeholder Process

We recommend that the Draft Report's section on the stakeholder process address the difficulties stakeholders encountered in obtaining information regarding the modeling software I&M used, Plexos. We noted in our prior comments that the Plexos vendor, Energy Exemplar, refused to provide us with the manual for Plexos and refused to allow Plexos input files to become part of the IRP proceeding. *See* 2015 IRP Comment Letter at 17-18. Stakeholders cannot fully and meaningfully participate in the IRP process if they do not have access to the data that is input to the model and instructions on how the model operates. *Cf.* IURC, Electricity Director's Final Report, 2014-2015 IRPs (June 10, 2015) ("It is the intent of the proposed IRP Rule to ensure meaningful participation by stakeholders."). While these problems resulted from the third-party vendor of the modeling software, I&M ultimately needs to be responsible for ensuring transparency in its IRP process. We request that the Commission address this in the Final Report by urging I&M and all utilities to ensure that they timely provide all inputs and manuals to stakeholders in usable file formats.

Respectfully submitted,



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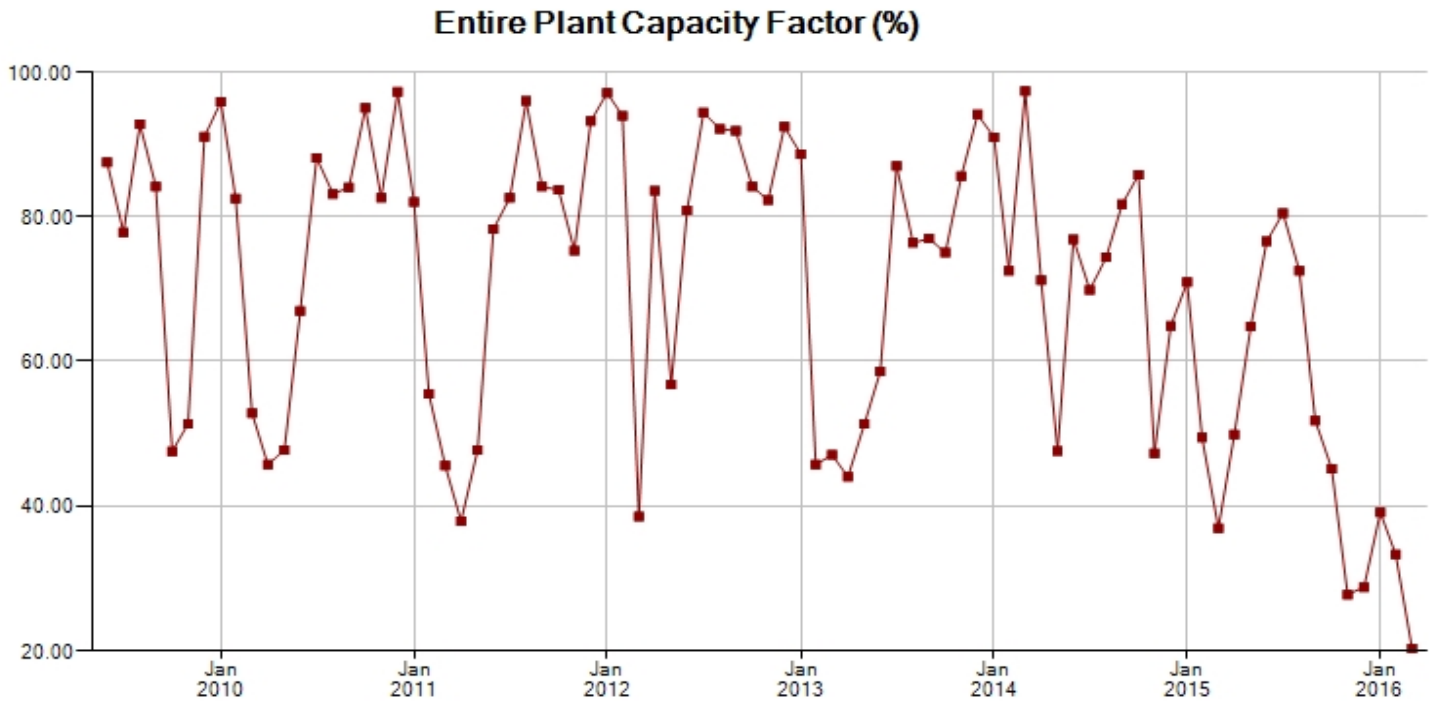
Rockport

Generation Chart

Source: SNL.com (subscription service)
Frequency: Monthly
Period: 7 Years



Rockport

Plant Capacity Factor (%) Values

Source: SNL.com (subscription service)

Frequency: Monthly

Period: 7 Years

Period As Of	Entire Plant	Unit 1	Unit 2
3/31/2016	20.23	24.00	16.46
2/29/2016	33.26	28.60	37.92
1/31/2016	39.10	42.33	35.87
12/31/2015	28.75	40.62	16.87
11/30/2015	27.72	55.44	0
10/31/2015	45.12	45.87	44.37
9/30/2015	51.80	44.62	58.98
8/31/2015	72.46	75.22	69.71
7/31/2015	80.45	81.63	79.28
6/30/2015	76.54	77.91	75.17
5/31/2015	64.76	76.94	52.57
4/30/2015	49.82	23.19	76.44
3/31/2015	36.89	0	73.79
2/28/2015	49.42	19.14	79.71
1/31/2015	70.91	69.10	72.72
12/31/2014	64.88	88.07	41.69
11/30/2014	47.24	94.33	0.16
10/31/2014	85.76	86.41	85.11
9/30/2014	81.67	81.58	81.76
8/31/2014	74.35	83.11	65.58
7/31/2014	69.85	59.35	80.35
6/30/2014	76.85	73.69	80.00
5/31/2014	47.56	0	95.12
4/30/2014	71.21	78.30	64.12
3/31/2014	97.34	99.12	95.55
2/28/2014	72.49	72.30	72.68
1/31/2014	90.95	93.22	88.69
12/31/2013	94.08	95.06	93.10
11/30/2013	85.56	81.09	90.03
10/31/2013	74.99	60.64	89.35
9/30/2013	76.94	85.54	68.35
8/31/2013	76.36	85.11	67.60
7/31/2013	87.01	90.07	83.94
6/30/2013	58.57	45.83	71.30
5/31/2013	51.32	78.67	23.97
4/30/2013	44.01	88.01	0
3/31/2013	47.04	94.08	0
2/28/2013	45.69	87.60	3.78
1/31/2013	88.60	95.01	82.20
12/31/2012	92.41	97.07	87.74
11/30/2012	82.24	70.45	94.03
10/31/2012	84.17	97.58	70.76
9/30/2012	91.83	93.70	89.97
8/31/2012	92.11	92.46	91.75
7/31/2012	94.34	96.37	92.31
6/30/2012	80.86	84.21	77.51
5/31/2012	56.74	90.08	23.40

4/30/2012	83.56	79.36	87.76
3/31/2012	38.52	13.79	63.25
2/29/2012	93.93	96.30	91.55
1/31/2012	97.10	98.70	95.50
12/31/2011	93.17	94.78	91.57
11/30/2011	75.28	80.45	70.11
10/31/2011	83.66	71.36	95.96
9/30/2011	84.14	73.83	94.45
8/31/2011	95.96	97.51	94.40
7/31/2011	82.57	88.04	77.10
6/30/2011	78.27	63.34	93.21
5/31/2011	47.69	0	95.38
4/30/2011	37.86	0	75.72
3/31/2011	45.54	0	91.08
2/28/2011	55.50	14.60	96.39
1/31/2011	81.98	82.78	81.18
12/31/2010	97.21	95.93	98.50
11/30/2010	82.60	98.19	66.76
10/31/2010	95.00	95.19	94.81
9/30/2010	83.99	78.31	89.77
8/31/2010	83.13	70.15	96.32
7/31/2010	88.12	96.30	79.82
6/30/2010	66.92	93.87	39.55
5/31/2010	47.73	94.74	0
4/30/2010	45.67	58.39	32.77
3/31/2010	52.81	14.83	91.37
2/28/2010	82.46	67.74	97.42
1/31/2010	95.87	96.63	95.09
12/31/2009	91.02	98.01	83.93
11/30/2009	51.31	96.27	5.66
10/31/2009	47.53	94.33	0
9/30/2009	84.16	91.12	77.09
8/31/2009	92.74	92.37	93.11
7/31/2009	77.79	64.38	91.40
6/30/2009	87.50	87.98	87.00