

**STATE OF IOWA
DEPARTMENT OF COMMERCE
BEFORE THE IOWA UTILITIES BOARD**

IN RE:)	DOCKET NO. TF-2016-0290
)	
INTERSTATE POWER AND)	RESPONSE
LIGHT COMPANY)	
)	

The Environmental Law & Policy Center and the Iowa Environmental Council (Environmental Intervenors) provide the following response to recent filings by Interstate Power & Light Company (IPL) and the Office of Consumer Advocate (OCA):

I. Background

On June 30, 2016, IPL proposed tariff revisions to its standard avoided cost tariff rates for small qualifying facilities (QFs) pursuant to 199 Iowa Administrative Code § 15.5(3). The proposed tariff was filed concurrently with IPL's report on electric utility system cost data in Docket No. IAC-2016-1503 in accordance with 18 C.F.R. § 292.302 and the Public Utility Regulatory Policies Act of 1978 (PURPA). Simultaneous to the proposed tariff, IPL also proposed to withdraw its revised tariff filing in Docket No. TF-2014-0294, which was still pending and had never been approved by the Board.

On July 18, 2016, OCA filed a conditional objection to IPL's proposed tariff revision. On July 26, 2016, the Board docketed TF-2016-0290, ordered OCA to file a report by August 31, 2016, and granted IPL's request to withdraw tariff filing TF-2016-0290. On August 31, 2016, OCA filed a status report and objection to IPL's tariff. Also on August 31, the Environmental Intervenors filed a request to file comments by September 22, 2016. On September 6, 2016, IPL filed a motion requesting additional time to respond to OCA's objection. The Board granted the

request on September 12, 2016. IPL's response is due on October 6, 2016.

IPL's avoided cost tariff comes after an investigation of avoided cost issues took place in Docket No. INU-2014-0001. On August 2, 2016, the Board issued an order closing the docket and pushing action on avoided cost issues to the recent filing of the MidAmerican and IPL avoided cost tariffs, stating: "additional investigation into avoided cost calculations and evaluation of the issues identified in this inquiry would be more appropriately considered in the tariff dockets and through stakeholder comments in the upcoming rule review proceedings." This statement points to the importance of careful investigation and consideration of the rates filed by IPL in this docket.

As part of an ongoing Notice of Inquiry Docket (NOI-2014-0001), the Board has also been exploring a series of distributed generation issues that are related to avoided cost methodologies including net metering, the value of distributed generation, and interconnection standards. On July 19, 2016, the Board issued an order in NOI-2014-0001 directing the utilities to file temporary, pilot net-metering tariffs that implement specific changes designed to expand distributed generation and collect data to allow the Board to evaluate the impacts of the changes. Pursuant to the Board's order in NOI-2014-0001, IPL filed a revised net metering tariff on August 31, 2016 in Docket NOI-2014-0001 and TF-2016-0321. Initial comments on the pilot net-metering tariff were due on September 20, 2016.

ELPC and IEC recommend that the Board wait to review IPL's avoided cost tariff until after it has reviewed and approved IPL's pilot net metering tariff. In addition, we think that IPL's current approach to avoided costs still falls short on transparency and meeting the purpose of PURPA. We think that steps can be taken to further improve IPL's approach, including the use of an independent valuation study, and that the Board should look at alternative methodologies

for setting avoided cost rates, including exploration of the proxy unit approach. We request that the Board require that IPL file alternative methodologies for setting avoided cost rates, including the proxy unit approach to be evaluated as part of this docket.

II. IPL's Net Metering Tariff Should Be Reviewed Before its Avoided Cost Tariff.

The Board's July 19, 2016 order in NOI-2014-0001 provides for a specific, three-year test of a new net metering protocol that includes a cash-out of excess generation credits on an annual basis at the tariffed avoided cost rate. This creates a new relationship between avoided cost rates and net metering and potential new importance for the avoided cost rates. Given the new relationship between avoided costs and net metering, we encourage the Board to complete review of IPL's net metering tariff design before completing the consideration of avoided costs and approving tariffs in this docket.

Prior to the July 19, 2016 order in NOI-2014-0001, the tariffed avoided cost rate was not a relevant factor for the majority of small QFs under 500 kW, who took service under the net metering tariff with indefinite rollover of credits. The avoided cost rates are a key consideration for the larger QFs that would not net meter, and IPL's traditionally higher avoided cost rates help explain why IPL has significantly more QF capacity than MidAmerican. The Board's July 19 order and the proposed pilot net metering tariffs make avoided costs a potentially important consideration for smaller QFs that net meter. The design of the net metering tariffs to comply with the Board's July 19 order could impact the relative importance and effect of avoided costs. The cash-out at the avoided cost rate may not have a major impact on the economics of QFs because facility size under the net metering tariff should be matched to the annual energy needs of the facility. IPL's proposed use of an estimation of a customer's maximum annual kilowatt demand to limit the monthly number of kilowatt-hours eligible for net metering would change

this dynamic and lead to an increased importance of the avoided cost rates. In addition, the timing of the cash-out is an important factor in whether a customer can afford to size a facility to meet their full annual energy needs, particularly for solar customers that generate excess credits in the summer and could utilize them over the winter. If the cash-out occurs in January, then the importance of avoided cost rates in encouraging QF development under the pilot tariffs will increase. If the cash-out is designed to better match a customer's annual energy use by giving the customer the option of when the cash-out occurs or moving it to April or May, then the avoided cost rates will not be as significant. We are addressing these issues in more detail in response to IPL's net metering tariff in Dockets NOI-2014-0001 and TF-2016-0321, and we are hopeful that these issues will be resolved in that docket.

We believe that until the design of the utilities' net metering tariffs is finalized, it is difficult to determine whether the avoided cost is at an appropriate level to encourage development of QFs, as required by PURPA, and request that the net metering tariffs be considered first.

III. IPL's Avoided Cost Methodology Significantly Undervalues Avoided Costs.

Using an avoided cost methodology that sets an appropriate avoided cost rate is important. A rate that is too high can result in consumers paying more for the addition of QF capacity than for a utility's planned new generation. But a rate that is too low will not be sufficient to encourage the addition of QF capacity, even if the QF capacity costs less (in total or to ratepayers) than the utility's planned new generation. As a result, a rate that is too low can also result in ratepayers paying too much. It is important that IPL's methodology lead to an avoided cost rate that is sufficient to achieve the PURPA policy goal of encouraging the development of cogeneration and small power production. *See* 18 CFR 292.304. IPL's current Board-approved,

tariffed avoided cost rates likely meets these goals for most QFs, but the proposed avoided cost rates are a significant reduction from the previously approved rates and likely do not.

IPL utilized EGEAS to model its avoided energy cost. EGEAS dispatches IPL's current generation mix against its load to determine its energy cost. It can also be used to forecast the energy cost of adding different levels and types of generation. EGEAS modeling reflects only the variable costs that impact dispatch and does not account for the capital costs of deploying new generation, environmental compliance costs, and distribution and transmission costs. To set the capacity portion of avoided cost, IPL has utilized the results of the MISO capacity auction for 2016-2017. Neither the energy nor capacity portions of IPL's methodology is designed with the PURPA goals or IPL's own demonstrated valuation of renewable generation in mind and so does not adequately account for the benefits consumers derive from QFs.

IPL's avoided cost methodology undervalues QF avoided costs in multiple ways. It focuses on short-term avoided energy costs and does not adequately account for the capital costs that are now and will be paid in the future by customers. The avoided cost methodology does not directly factor in benefits related to reducing transmission constraints and line losses, improving hedging and fuel diversity, providing quantifiable environmental benefits and other PURPA requirements, including those found in 18 C.F.R. § 292.304(e). One reference point that increases our concern about whether IPL's avoided cost is adequate is the power production expense listed in its 2015 Annual Report to the IUB.¹ IPL lists its power production expense (O&M only) as 3.10 cents/kWh. If transmission and distribution expenses are included in this cost, it increases to 5.29 cents/kWh. IPL's total operations and maintenance expenses were 6.31 cents/kWh in 2015. This is much closer to IPL's current CSPP tariffed rate than its proposed

¹ Iowa Utilities Board, *Utility Annual Report Information: Electric 2015* at <https://iub.iowa.gov/utility-annual-report-info>.

rate. We describe below several issues with how IPL undervalues the benefits of QFs in calculating its avoided cost. The issues we raise are not exhaustive.

A. Avoided Costs Should Account for the Capital Costs of Generation, IPL's Planned Capacity Additions, and Energy Market Purchases.

FERC regulations implementing PURPA require utilities to account for a range of factors in determining the avoided cost rates, including “deferral of capacity additions” as well as “estimated capacity costs at completion of the planned capacity additions and planned capacity firm purchases, on the basis of dollars per kilowatt, and the associated energy costs of each unit, expressed in cents per kilowatt hour.” 18 C.F.R. § 292.304(e), 18 C.F.R. § 292.302(b). IPL's proposed avoided costs do not adequately value QF generation or treat QF generation equally compared to IPL's planned or proposed resource additions. We have identified several specific concerns related to QF valuation and equal treatment with IPL's proposed use of MISO market prices for avoided capacity costs, IPL's projected need for market energy, IPL's planned wind projects (both with PPAs and IPL ownership), and IPL's planned solar installations. IPL appears to be willing to pay more for its own generation and capacity additions and for non-QF generation than it is for QF generation, despite the additional benefits that more QF generation and capacity offer for IPL and its customers.

IPL's utilization of the MISO capacity market price for the current year does not account for the avoided capital cost of adding resources. This undervalues the benefits of QFs, especially at a time when IPL is requesting approval from the IUB to add 500 MW of wind capacity and is in the process of [REDACTED]. IPL response to Environmental Interventions Data Request 7 attached as Exhibit EI-1 (Confidential). IPL's methodology does not place the capacity benefits of QFs on an even playing field with constructing IPL's own capacity or purchasing it from sources other than QFs.

IPL does not include a forecast of capacity costs beyond the current year, stating that it does not project any capacity purchases in 2018 through 2027 assuming the New Wind Project is completed. However, IPL notes “the New Wind Project will help reduce IPL’s projected long-term capacity deficit.” RPU-2016-0005, Direct Testimony of Brent R. Kitchen, at 8 (July 27, 2016). Even though there is not a short term capacity need, IPL acknowledges the long term capacity benefit to building its own wind. Even with the New Wind Project, IPL is projected to have a long term capacity need and QFs will provide a long-term capacity benefit to IPL that should be reflected in avoided cost rates.

IPL also states that it expects to purchase between 5% and 9% of its energy from the MISO market between 2018 and 2027. IPL Response to Environmental Intervenor Data Request 12 attached as Exhibit EI-2 (Confidential). This indicates that although IPL may have capacity sufficient to meet the requirements of MISO market participation, its capacity will not be sufficient to meet its Iowa load. There is a benefit to contracting for this energy on a longer-term basis with a QF rather than relying on the MISO market to serve load. In fact, IPL made this very point in RPU-2016-0005 when Witness Kitchen noted “IPL needs new resources that can cost-effectively meet its customers’ energy requirements, without exposure to price fluctuations in the wholesale market.” Kitchen Testimony at 7.

IPL’s latest investments in wind reflect the value it sees in renewable generation. Doug Kopp makes the case for increased renewable generation in RPU-2016-0005:

While IPL is proud of the progress it has made in delivering the benefits of cost-effective, cleaner power to its customers, the Company knows these steps, on their own, will not be enough to meet the future energy demands of IPL’s customers over the long term. Nor will these steps be enough to competitively secure IPL’s place in what will likely be a lower carbon future, whether those lower carbon levels are set by the Paris Climate Accord, the carbon regulations that may be driven by the currently stayed U.S. Environmental Protection Agency (EPA) Clean Power Plan, or some other carbon restrictions. **In short, IPL must**

continue to do more.

RPU-2016-0005, Direct Testimony of Douglas R. Kopp, at 9 (July 27, 2016) (emphasis added). The costs IPL is willing to pay to build these resources itself or procure them from a non-QF source indicate their avoided cost rate undervalues the benefits of renewables generally. IPL states that its all-in cost for New Wind is [REDACTED] while the highest rate in their CSPP tariff (for non-firm, summer peak with time-of-use metering) is 3.26 cents/kWh. IPL Response to Environmental Intervenors Data Request 6 attached as Exhibit EI-3 (Confidential).

IPL has also been willing to pay a significant premium for on-peak generation in a recent PPA, but this value has not been reflected in its avoided costs. Under IPL's [REDACTED]
[REDACTED]
[REDACTED] for peak generation versus off-peak generation ([REDACTED]
[REDACTED]). Exhibit EI-1. This premium is only 0.39 cents/kWh in the summer and 0.04 cents/kWh in the winter in IPL's time-differentiated avoided cost rates for as-available firm power and energy. Additionally, IPL [REDACTED]
[REDACTED] than its proposed avoided cost rate during winter peak. Exhibit EI-1. This demonstrates that IPL values peak generation more than is reflected in its avoided cost filing.

This undervaluation of avoided cost is further demonstrated by IPL's recently announced intention to own and operate a 105 kW solar facility at Indian Creek Nature Center and a 4 MW facility in Dubuque. Although IPL has not provided a levelized cost of generation from these facilities, we anticipate that they exceed the company's proposed avoided cost rates. IPL is making its own case for investments in renewable generation, and the benefits of small QFs deserve to be on equal footing with IPL's own investments.

B. Modeling of Transmission Constraints and Line Losses Does Not Reflect IPL's High Transmission Costs.

IPL's avoided cost methodology using EGEAS does not directly model or account for avoided transmission, distribution or congestion costs, but uses the cost of increasing generation to make up for line losses as a proxy for these costs.

The load forecast that IPL uses in its EGEAS avoided energy cost calculations (and IRP) includes 2.78% transmission line losses and 3.47% distribution line losses. By including these energy losses in the forecast, the generation portfolio must dispatch to slightly higher levels. Due to unique siting situations of individual QFs, IPL does not attempt to assign a specific line loss adjustment. Instead, the system average line losses are generically included in the avoided cost calculations through the forecast.

INU-2014-0001, IPL Responses to Questions Raised During Technical Workshop, Attachment B at p.3 (July 11, 2014). Accounting for reduced line losses by ramping up generation undervalues this benefit for IPL in particular, because IPL has little or no control over the cost of its transmission system, which ITC Midwest owns and operates. In IPL's 2015 Annual Report filed with the IUB, it reported transmission costs of 1.98 cents/kWh, a significant cost especially when compared to MidAmerican's transmission cost of 0.18 cents/kWh.² IPL does not specifically model avoided costs related to transmission, distribution, and congestion in its methodology, and therefore, there is not a specific dollar value assigned to transmission to reflect IPL's significant transmission costs. While we are skeptical that IPL's cost methodology appropriately reflects its high transmission costs, IPL's opaque methodology, makes it impossible to determine whether the forecast adjustment for transmission is accurate or appropriate, whether it reflects the costs and savings from reduced line losses as required in 18 C.F.R. 292.304(e)(4), and how it directly affects the avoided cost rates.

² Iowa Utilities Board, *Utility Annual Report Information: Electric 2015* at <https://iub.iowa.gov/utility-annual-report-info>.

C. IPL Touts Hedging and Fuel Diversity Benefits to Build Additional Wind But Does Not Account for Those Benefits in its Avoided Cost Tariff.

IPL pointed specifically to the hedging and fuel diversity benefits of wind energy in support of the New Wind Project. IPL Witness Kopp explained that “as a renewable resource, wind power has no fuel costs. Reducing IPL’s fuel costs will in turn reduce costs for customers and provide a hedge against the fuel price volatility that affects the delivered cost of energy from other generating sources” Kopp Testimony at 9. However, IPL has not included any value for fuel diversity or hedging in the development of avoided cost rates. As IPL explained:

The Integrated Resource Plan tests sensitivities of higher and lower fuel prices, but fuel price volatility is not monetized in the Avoided Cost filing. Please note that fuel price volatility runs the risk of increasing or decreasing fuel costs. IPL does not assign a hedging benefit because fuel prices are already shown to increase with time, and it is uncertain whether actual year-to-year prices will be higher or lower than projections.

IPL Response to Environmental Intervenors Data Request 28 attached as Exhibit EI-4. IPL points out that fuel price volatility is unpredictable but that, generally, prices will increase over time. IPL also points out that “the bulk of IPL’s avoided energy costs are contributable [sic] to natural gas combined cycle.” IPL Response to Environmental Intervenors Data Request 25 attached as Exhibit EI-5. Natural gas has historically had a particularly volatile price trajectory and IPL’s increased reliance on natural gas generation also increases the hedging and fuel diversity value of QF generation. IPL explicitly made these points in the New Wind Project filing when Witness Kitchen testified that:

The primary risk is long-term pricing. With natural gas and market prices as low as they are currently, the New Wind Project provides a hedge against rising natural gas and market prices in the future, while at the same time being competitive today. Furthermore, the New Wind Project provides long-term stable pricing through IPL’s ownership and operation, while market fuel and wind prices can be volatile. . . . The New Wind Project offers long-term certainty to insulate customers against the risk of rising fuel costs and market energy prices.

Kitchen Testimony at 23. When IPL develops renewable generation it acknowledges that there is significant benefit to hedging and fuel diversity. That benefit should be reflected in IPL's avoided cost calculation.

D. IPL Should Account for Environmental Attributes Including Future Compliance Benefits.

Environmental costs are one portion of the variable costs that impact generation dispatch results in EGEAS. IPL states that environmental costs could impact avoided costs through variable operations and maintenance (O&M) costs, changes to heat rate and capacity, and allowance costs. IPL Response to Environmental Intervenors Data Request 14 attached as Exhibit EI-6. In 2015, environmental costs made up between [REDACTED] of variable O&M costs at IPL's coal-fired units, ranging from [REDACTED]. For environmental O&M costs at Lansing Unit 4, [REDACTED], this amounts to [REDACTED] of IPL's proposed summer on-peak avoided cost rate under optional time-of-day rates and [REDACTED] of their winter off-peak avoided cost rate under optional time-of-day rates. This does not appear to include allowance costs, which totaled [REDACTED] IPL's coal-fired fleet in 2015. IPL Response to Environmental Intervenors Data Request 15 attached as Exhibit EI-7 (confidential). While natural gas generation can have lower environmental operations and maintenance costs, generating units still have to purchase allowances for compliance with some EPA regulations. Renewable QFs help IPL avoid operations and maintenance environmental costs, particularly at IPL's coal units, and offset the need to purchase allowances for compliance. These benefits should be fully reflected in IPL's avoided cost rates. It is currently not possible to tell whether IPL's methodology adequately reflects these environmental benefits.

There is also additional benefit to renewable generation with future compliance with carbon regulations. In testimony in the New Wind Project filing, IPL Witness Kopp stated: “The absence of carbon emissions positions IPL to better comply with potential future carbon restrictions or other carbon control programs that may be implemented by state or federal regulatory agencies.” Kopp Testimony at 9-10. IPL simulates its compliance obligation under 111(d) in EGEAS reducing carbon dioxide emissions by 34% from 2012 levels by 2030 for affected units under Section 111(d). IPL Response to Environmental Intervenors Data Request 15 attached as Exhibit EI-8. This is a reasonable proxy for modeling compliance with 111(d), and it is a useful addition to IPL’s model, but modeling compliance with carbon regulations in EGEAS does not in itself account for the compliance value low or no emission generation. The value of compliance with carbon regulations is another example of a benefit that IPL touts to support its development of its wind generation but does not account for in its avoided cost rates.

IV. IPL’s Rates Are Rising as it is Reducing its Avoided Cost Tariff.

To date, the INU and TF dockets have not provided a clear rationale for why IPL’s retail rates have increased significantly in recent years while IPL is proposing to reduce its avoided cost rates significantly. IPL’s proposed tariff in this docket reduces avoided cost rates that were instituted in 2008, while IPL received retail rate increases in 2010 and 2011 and will be filing a new rate case in the Spring of 2017. ELPC and IEC specifically asked “What costs does IPL incur that require an increase in retail rates that are not avoided by QFs or energy efficiency.” INU-2014-0001, IPL Responses to ELPC Workshop Follow Up Questions, Question 15. IPL responded that:

Rates increase for a wide variety of reasons, but few, if any, of the cost increases recently experienced are directly related to avoided costs. In fact, the vast majority of the recent rate activity is based on capital deployed to strengthen the system or improve IPL’s environmental footprint and are completely unrelated to

DG. Such capital investments (or fixed O&M for environmental controls) would require an increase in retail rates, but are not avoided by QFs or energy efficiency.

Many of rate increase drivers, therefore, are not directly related to avoided (energy) costs.

Further, as described previously, IPL's lower avoided costs are driven by the well-documented reduction in the cost of natural gas in recent years. These cost factors are unrelated to PL's [sic] recent rate case activity.

Id. We are not questioning the merits of the recent rate cases. However, we do question whether QFs are 'completely unrelated' to the drivers for the recent rate increases. Capital investment in wind generation and environmental controls were among the key drivers of these rate increases, both of which are costs that could be avoided by the addition of QF capacity. Based on IPL's responses and other information provided to date, it does not appear that these costs are reflected in the avoided cost methodology. This provides another example of the narrow set of costs that IPL is willing to recognize as avoided by QF energy and capacity. By focusing avoided costs on the short-term marginal cost of energy within its existing resource mix, IPL has refused to include the many other costs that QFs can avoid, and the methodology undervalues avoided costs.

V. IPL's Process for Setting the Avoided Cost Rate is Not Transparent.

The current process for developing avoided costs rates does not provide adequate transparency for interested third parties, including customers, to determine whether the rates are adequate, fair, and in compliance with PURPA. Even with the additional information about how utilities develop avoided cost rates that IPL provided in INU-2014-0001 and discovery in this docket, parties cannot fully understand how a specific tariff revision or avoided cost rate is determined by IPL. The only individuals who completely understand the way that IPL's avoided cost methodology works are the planners at IPL. The fact that the methodology is not transparent

is problematic in and of itself, but when coupled with some of the concerns noted above, the lack of transparency is more troubling. The lack of transparency makes it almost impossible to determine whether the rates are just and reasonable and in the public interest, nondiscriminatory, and accurately capture all of the costs avoided by utilities as required by PURPA.

VI. The Board Should Require IPL to File Alternative Approaches to Avoided Cost for Evaluation in this Docket.

During the Investigative Docket, ELPC and IEC recommended that avoided cost information and rates be filed using existing and alternate methodologies. We still believe this exploration should be done, and the Board should require IPL to file a comparison of its current methodology and other methodologies to be evaluated in this docket. This approach would be similar to the approach Michigan recently took in requiring utilities to file avoided costs using multiple methodologies after an investigation similar to Iowa's had concluded. *See Michigan Public Service Commission, Order (May 3, 2016) available at <http://efile.mpsc.state.mi.us/efile/docs/18089/0001.pdf>.*

One methodology that has the potential to address many of the concerns that we raise is a proxy unit approach that focuses the determination of avoided costs on the levelized cost of a utility's next planned generating asset or on a generic generating asset such as new wind. The proxy method would reflect a utility's full cost of deploying the next MWh of generation, including capital costs.³ When IPL made its own case for construction of the New Wind project and when it contracted with the Turtle Creek Wind Farm for generation, it bundled many of the benefits that PURPA requires into the overall project. The contract price of those projects would fairly and transparently address avoided costs without requiring a breakdown by each avoided

³ Carolyn Elefant, *Reviving PURPA's Purpose: The Limits of Existing State Avoided Cost Ratemaking Methodologies in Supporting Alternative Energy Development and a Proposed Path for Reform*, at 17 (2011). States using the proxy unit approach include Oregon, Idaho, Montana, and Utah.

cost component. If a utility chooses a proxy that is consistent with its generation goals and plans, then the rate would be cost-neutral for consumers and offer QFs an opportunity to sell their power to utilities at the going market rate, not a disadvantaged rate based on an opaque and highly theoretical modeling process.

The proxy unit approach would also simplify the development of resource-specific avoided costs, another concept worth exploring. A standard rate for wind would be different than a standard rate for solar and both would be different than a standard rate for energy storage or a methane digester. The different rates would reflect that each resource provides different benefits that are useful to the utility and customers. In fact, IPL has already performed some of this type of analysis using EGEAS. Without resource-specific standard rates, IPL's avoided cost rates do not reflect the same value IPL places on the various resources when it makes investments.

We agree with the Office of Consumer Advocate that the resource-specific rates should be set using the "levelized cost of procuring a similar resource by the utility." TF-2016-0290, Status Report and Objection to Tariff, at 7 (Aug. 31, 2016). Levelized cost information is available from Lazard on an annual basis, which could be used as a starting point for determining the appropriate levelized cost and associated resource-specific rates.⁴ The latest Lazard analysis provides a range of levelized costs by technology or resource and includes sensitivities based on the effect of federal tax incentives, fuel costs, and regional variations. Wind in the Midwest has a levelized cost of \$32/MWh to \$77/MWh without accounting for tax incentives, while solar has a levelized cost of \$74/MWh to \$215/MWh without accounting for tax incentives.⁵ Lazard provides sensitivities showing the impact of tax incentives or fuel price changes, but without

⁴ Lazard, *Levelized Cost of Energy Analysis 9.0* (2015) available at <https://www.lazard.com/perspective/levelized-cost-of-energy-analysis-90/>.

⁵ *Id.* at 9.

regional variations.⁶ While more analysis is needed, we believe the resource-specific levelized cost approach may not result in a significant change from the IPL proposal in the avoided cost rate offered for most or all wind QFs. However, the rate offered to most types of solar resources would need to change. Additional Iowa-specific levelized cost information from recently completed (or proposed) wind and solar projects would help inform the determination of an appropriate resource-specific rate.

Another methodology that the Board should explore for developing resource specific avoided cost rates is an independent valuation study for distributed resources. This study would provide significant data to help fill in gaps that currently exist in IPL's avoided cost methodology. A properly calculated avoided cost rate would need to account for the benefits to the electric utility system provided by QF generation, including but not limited to: reduction in utility energy and capacity generation requirements, particularly during peak periods; reduction in system losses; avoidance or deferral of distribution and transmission investments; localized grid support, including enhanced reliability benefits; fuel-price certainty; and reduction in air emissions and water use. As discussed above, IPL's avoided cost rates do not currently properly account for these benefits. While we continue to believe that the distributed generation market in Iowa is not sufficiently robust to make an independent valuation study appropriate at this time, the Board could set the framework for a future study and help prepare the utilities for a transition to this type of approach.

VII. Conclusion

It is important that IPL's methodology leads to an avoided cost rate that is accurate, transparent, fair, and sufficient to achieve the PURPA policy goal of encouraging the development of cogeneration and small power production. It is not clear that the avoided cost

rates filed by IPL in this docket fairly account for the full range of benefits required by PURPA and FERC's implementing regulations. The Environmental Intervenors propose that the Board require IPL to compare its current avoided cost rates to rates calculated using alternative approaches such as the proxy method to create resource-specific avoided cost rates and that such a comparison be filed in this docket for further evaluation. In addition to this comparison, the Board should help develop a framework for a future independent valuation study to account for the full range of benefits required by PURPA. These actions will help ensure that PURPA policy goals are met in a way that is fair to QFs and neutral for customers.

Additionally, we encourage to Board to delay a decision in this Docket until IPL's net metering tariff filed in NOI-2014-0001 and TF-2016-0321 has been approved due to the interrelated nature of the two dockets.

Respectfully submitted this 22nd day of September, 2016.

/s/ Joshua T. Mandelbaum

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ON BEHALF OF IEC

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 7

Docket Number: TF-2016-0290
Date of Request: August 4, 2016
Response Due: August 11, 2016
Information Requested By: Josh Mandelbaum
Date Responded: August 11, 2016
Author: Jamie Niccolls
Author's Title: Lead Resource Planning Consult
Author's Telephone No.: (319) 786-4882
Subject:
Reference:

Data Request No. 7

In April 2015, IPL issued an RFP for a power purchase agreement for up to 200 MW of wind generation.

- a. Please provide any bids received for that RFP and any PPA that IPL has entered.
- b. Please provide the contract terms for energy costs expressed in cents per kilowatt hour for the contract.
- c. Please explain how, if at all, this RFP impacts IPL's avoided cost rates.

Response:

- a. Please see Confidential Attachment A to this response for the PPA that IPL has entered into. Please see Confidential Attachment B through Confidential Attachment L for the original bids received.

[REDACTED]



- c. This RFP wind project was included in the EGEAS modeling so therefore affects the dispatch curve and the avoided energy cost calculations.

*Highlighted information is considered confidential

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 12

Docket Number: TF-2016-0290
Date of Request: August 4, 2016
Response Due: August 11, 2016
Information Requested By: Josh Mandelbaum
Date Responded: August 11, 2016
Author: Jamie Niccolls (opening and c)
Nichol Toomire (a and b)
Author's Title: Lead Resource Planning Consult
Dir. Energy Mkts & Fuel Supply
Author's Telephone No.: (319) 786-4882
(608) 458-3454
Subject:
Reference:

Data Request No. 12

How much energy and capacity did IPL purchase in the MISO market in 2015?

- a. Please provide a narrative discussion of market purchases.
- b. Please provide detailed information on those purchases, including energy and capacity purchase prices and times (e.g., hours ending or hours beginning for the year) for all purchases.
- c. What MISO purchases of energy or capacity does IPL project annually over the next 10 years?

Response:

MISO energy purchases:

IPL's 2015 MISO market energy reliance was 3,510,708 MWh and valued at \$53,940,230 per FERC Form 1, which comprised 21.8% of IPL's energy requirements. This is a net hourly market energy reliance further discussed in response to 12a below.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

Docket No. TF-2016-0290

Data Request No. 12

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MISO capacity purchases:

MISO Capacity Auction: For the 2015-2016 Planning Year (June 1, 2015-May 31, 2016) IPL had sufficient capacity and did not need to purchase Zonal Resource Credits through the MISO Planning Resource Auction clearing process, which occurred in the spring of 2015.

Bilateral Capacity Purchases: IPL purchased capacity through the bilateral capacity market in preparation for the MISO auction. IPL purchased [REDACTED] Zonal Resource Credits for [REDACTED]

ZRC Transfers: IPL received [REDACTED] Zonal Resource Credits transferred from NextEra for the Duane Arnold Energy Center.

PPAs: IPL received [REDACTED] Zonal Resource Credits of accredited capacity for several Power Purchase Agreements, mainly wind.

- a. Each hour, IPL sells all energy generated and purchases all energy needed to serve its customers from the MISO energy market. This includes several ancillary products to support system reliability and other charges needed to operate a stable market. In accordance with FERC docket RM04-12-001, IPL totals all purchases and sales for an hour to determine the net hourly position. The 3.5 million MWh in 2015 noted above represents the sum of all hours with a net purchase position for the year, with some standard adjustments for improved meter quality not available for several weeks following the financial month.

The value of energy is based on the actual price of energy purchased on behalf of IPL's customers, offset by the separate prices paid to each of IPL's online generators, as well as any adjustments for ancillary services, make-whole payments, fees and other charges needed to operate an efficient market. There are currently 56 separate charges calculated by MISO. Most of these separate charges calculated by MISO are hourly, a few are daily or monthly, and one charge is on an annual basis. Due to the price differential between the energy sold and purchased and all other activities included in determining the total market bill, there is no price to apply to the net hourly purchases.

- b. See attached for hourly energy volumes.
- c. 10 year MISO capacity and energy purchases:

Energy

The EGEAS case used for the avoided cost filing and IPL's New Wind Project projects the following for market purchases:

Docket No. TF-2016-0290

Data Request No. 12

Page 3 of 3

Year	Market Energy GWH	Market Energy as % Total Load
2016	3,731	22%
2017	3,176	19%
2018	1,555	9%
2019	1,142	7%
2020	820	5%
2021	906	5%
2022	1,159	7%
2023	1,259	7%
2024	1,298	7%
2025	1,370	8%
2026	1,417	8%
2027	1,535	9%

Capacity:

The EGEAS case used for both the biennial avoided cost filing and IPL's New Wind Project projects no capacity purchases (one-year peak power purchases) in the expansion plan through 2027.

*Highlighted information is considered confidential

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 6

Docket Number: TF-2016-0290
Date of Request: August 4, 2016
Response Due: August 11, 2016
Information Requested By: Josh Mandelbaum
Date Responded: August 11, 2016
Author: Jamie Niccolls
Author's Title: Lead Resource Planning Consult
Author's Telephone No.: (319) 786-4882
Subject:
Reference:

Data Request No. 6

On July, 27, 2016, IPL filed for advanced ratemaking principles for an additional 500 MW of wind generation.

- a. Please explain how the 500 MW wind project is reflected in IPL's filing pursuant to 18 C.F.R. 292.302(b)(2).
- b. Please explain how the capital costs for this project are reflected in IPL's avoided cost.
- c. Please provide estimated capacity costs at completion of this project and planned capacity firm purchases, on the basis of dollars per kilowatt, and the associated energy costs, expressed in cents per kilowatt hour for the project.

Response:

- a. IPL's New Wind Project is included in the 600 MW of generic wind selected in the EGEAS expansion plan.
- b. The capital costs for IPL's New Wind Project are included in the total plan costs of the EGEAS modeling, however because these costs are fixed and not part of dispatch they do not directly affect the avoided energy cost calculations. The presence of IPL's New

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

Docket No. TF-2016-0290

Data Request No. 6

Page 2 of 2

Wind Project has an impact on the dispatch curve and therefore has an impact on the avoided energy cost calculations. Per the CSPP Tariff, IPL has proposed to compensate for actual accredited capacity that IPL receives from MISO for use in the Planning Resource Auction (PRA) on a year by year (or season by season) basis.

c.

Estimated capacity costs at the completion of the 500 MW wind project on the basis of dollars per kilowatt:

The requested cost cap for IPL's New Wind Project is \$1961/kW with AFUDC.

Planned capacity firm purchases, on the basis of dollars per kilowatt (at the completion of this project):

IPL's EGEAS modeling does not include capacity purchases (one year peak power purchases) in the expansion plan at the time of completion of IPL's New Wind Project.

The associated energy costs, expressed in cents per kilowatt hour for the 500 MW wind project:

IPL estimates IPL's New Wind Project to have a levelized all-in capacity and energy price of approximately [REDACTED] ¢/kWh for the 40-year life. Note that this all-in cost includes the capital costs identified above.

*Highlighted information is considered confidential.

☐ Confidential/Trade Secret

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 28

Docket Number: TF-2016-0290
Date of Request: August 31, 2016
Response Due: September 7, 2016
Information Requested By: Josh Mandelbaum
Date Responded: September 7, 2016
Author: Jamie Niccolls
Author's Title: Lead Resource Planning Consultant
Author's Telephone No.: 319-786-4882
Subject:
Reference:

Data Request No. 28

Is any benefit for hedging of fuel costs accounted for in QF avoided costs? If so, how? If not, why not?

Response:

No. IPL's modeling of fuel costs vary as noted in Docket No. RPU-2016-0005, Kitchen Direct Testimony, Confidential Schedule B (see Confidential Attachment A of Data Request 27 response). The Integrated Resource Plan tests sensitivities of higher and lower fuel prices, but fuel price volatility is not monetized in the Avoided Cost filing. Please note that fuel price volatility runs the risk of increasing or decreasing fuel costs. IPL does not assign a hedging benefit because fuel prices are already shown to increase with time, and it is uncertain whether actual year-to-year prices will be higher or lower than projections.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

☐ Confidential/Trade Secret

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 25

Docket Number: TF-2016-0290
Date of Request: August 31, 2016
Response Due: September 7, 2016
Information Requested By: Josh Mandelbaum
Date Responded: September 7, 2016
Author: Jamie Niccolls
Author's Title: Lead Resource Planning Consultant
Author's Telephone No.: 319-786-4882
Subject:
Reference:

Data Request No. 25

Please explain how IPL's avoided cost methodology accounts for the factors that PURPA requires a utility take into account to determine avoided costs as enumerated in 18 CFR § 292.304(e). For reference 18 CFR § 292.304(e) and 18 CFR § 292.302(b), (c), and (d) are included below. Please quantify how each factor affects the rates for purchase to the extent possible.

Response:

18 CFR § 292.304(e)

Factors affecting rates for purchases. In determining avoided costs, the following factors shall, to the extent practicable, be taken into account:

(1) The data provided pursuant to § 292.302(b), (c), or (d), including State review of any such data;

Response:

Please see IPL's more detailed response regarding 18 CFR 292.302 below.

(2) The availability of capacity or energy from a qualifying facility during the system daily and seasonal peak periods, including:

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

Response:

Please refer to the information IPL presented at the June 5, 2014 Avoided Cost Workshop (June 5, 2014 Workshop, see Attachment A). IPL's Electric Generation Expansion Analysis System (EGEAS) analysis captures avoided energy costs for the particular technology type considering IPL's projected loads and generation portfolio. The EGEAS modeling includes a projection of annual peak and energy information (load forecast), as well as an annual load shape to address "system daily and seasonal peak periods." Avoided Costs are calculated for Qualified Facilities (QFs) based on technology type and the particular annual energy profile of that technology (high capacity factor "block" resource, wind, solar) to address "availability of capacity or energy from a qualifying resource." IPL also negotiates capacity costs for PURPA facilities based on whether IPL is able to obtain Zonal Resource Credits (ZRCs) from the Midcontinent Independent System Operator, Inc. (MISO).

- (i) The ability of the utility to dispatch the qualifying facility;

Response:

IPL's EGEAS analysis captures avoided energy costs for the particular technology type. Avoided Costs are calculated for individual QFs based on technology type and the particular annual energy profile of that technology (high capacity factor "block" resource, wind, solar). Although weather-dependent QFs, such as wind, are not dispatched in a manner similar to gas combined cycle (for example), IPL recognizes typical annual performance profiles.

- (ii) The expected or demonstrated reliability of the qualifying facility;

Response:

IPL's EGEAS analysis captures avoided energy costs for the particular technology type. Avoided Costs are calculated for individual QFs based on technology type and the particular annual energy profile of that technology (high capacity factor "block" resource, wind, solar). These annual energy profiles recognize expected or demonstrated reliability/availability impacts.

- (iii) The terms of any contract or other legally enforceable obligation, including the duration of the obligation, termination notice requirement and sanctions for non-compliance;

Response:

Contract terms (durations) have an impact on the levelized power purchase agreement (PPA) prices IPL negotiates. Annual avoided energy cost values are shown in the instant filing. Termination notice requirements and sanctions for non-compliance are identified in PPAs signed by the company and the developer.

- (iv) The extent to which scheduled outages of the qualifying facility can be usefully coordinated with scheduled outages of the utility's facilities;

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Data Request No. 25

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Response:

As the typical QF is comprised of only one to a few wind turbines, this particular issue is not a significant quantifiable driver in IPL's PPA negotiations.

(v) The usefulness of energy and capacity supplied from a qualifying facility during system emergencies, including its ability to separate its load from its generation;

Response:

As the typical QF is comprised of only one to a few wind turbines this particular issue is not a significant quantifiable driver in IPL's PPA negotiations.

(vi) The individual and aggregate value of energy and capacity from qualifying facilities on the electric utility's system; and

Response:

IPL recognizes individual facilities sizes in its filings. For example, avoided energy costs for wind is calculated at 1 MW, 10 MW, and 20 MW. As IPL's EGEAS modeling includes previous QFs, the rolling aggregate QF participation is accounted for.

(vii) The smaller capacity increments and the shorter lead times available with additions of capacity from qualifying facilities; and

Response:

In cases where IPL can obtain MISO ZRCs for capacity, IPL negotiates capacity prices based on the actual cleared value of ZRCs in the MISO capacity auction. Such an approach recognizes small capacity and short lead times by paying for ZRCs created, not just capacity only in cases when the QF impacts IPL's expansion plan.

(3) The relationship of the availability of energy or capacity from the qualifying facility as derived in paragraph (e)(2) of this section, to the ability of the electric utility to avoid costs, including the deferral of capacity additions and the reduction of fossil fuel use; and

Response:

Please refer to the information IPL presented at the June 5, 2014 Workshop. IPL's EGEAS analysis captures avoided energy costs for the particular technology type. The EGEAS modeling includes a projection of annual peak and energy information (load forecast) as well as an annual load shape. Avoided Costs are calculated for individual QFs based on technology type and the particular annual energy profile of that technology (high capacity factor "block" resource, wind, solar). IPL also negotiates capacity costs for PURPA facilities based on whether IPL is able to obtain MISO ZRCs.

In cases where IPL can obtain MISO ZRCs for capacity, IPL negotiates capacity prices based on the actual cleared value of ZRCs in the MISO capacity auction. Such an approach recognizes capacity even if the QF is not large enough to impact IPL's expansion plan.

Reduction of fossil fuel use is recognized in the EGEAS economic dispatch modeling. As IPL explained at the June 5, 2014 Workshop, the bulk of IPL's avoided energy costs are contributable to natural gas combined cycle.

(4) The costs or savings resulting from variations in line losses from those that would have existed in the absence of purchases from a qualifying facility, if the purchasing electric utility generated an equivalent amount of energy itself or purchased an equivalent amount of electric energy or capacity.

Response:

The load forecast that IPL uses in its EGEAS avoided energy cost calculations (and Integrated Resource Plan (IRP)) includes transmission line losses and distribution line losses. By including these energy losses in the forecast, the generation portfolio must dispatch to slightly higher levels. Due to unique siting situations of individual QFs, IPL does not attempt to assign a specific line loss adjustment. Instead, the system average line losses are generically included in the avoided cost calculations through the forecast.

18 CFR § 292.302(b), (c), and (d)

(b) **General rule.** To make available data from which avoided costs may be derived, not later than November 1, 1980, June 30, 1982, and not less often than every two years thereafter, each regulated electric utility described in paragraph (a) of this section shall provide to its State regulatory authority, and shall maintain for public inspection, and each nonregulated electric utility described in paragraph (a) of this section shall maintain for public inspection, the following data:

Response:

IPL has been submitting this information to the Board on a biennial basis pursuant to 18 CFR 292.302, as adopted by the Board in 199 Iowa Administrative Code (IAC) 15.3.

(1) The estimated avoided cost on the electric utility's system, solely with respect to the energy component, for various levels of purchases from qualifying facilities. Such levels of purchases shall be stated in blocks of not more than 100 megawatts for systems with peak demand of 1000 megawatts or more, and in blocks equivalent to not more than 10 percent of the system peak demand for systems of less than 1000 megawatts. The avoided costs shall be stated on a cents per kilowatt-hour basis, during daily and seasonal peak and off-peak periods, by year, for the current calendar year and each of the next 5 years;

Response:

This information is filed as Table 1 in IPL's avoided cost filing.

(2) The electric utility's plan for the addition of capacity by amount and type, for purchases of firm energy and capacity, and for capacity retirements for each year during the succeeding 10 years; and

Response:

IPL submits this information as part of its filing.

(3) The estimated capacity costs at completion of the planned capacity additions and planned capacity firm purchases, on the basis of dollars per kilowatt, and the associated energy costs of each unit, expressed in cents per kilowatt hour. These

costs shall be expressed in terms of individual generating units and of individual planned firm purchases.

Response:

IPL files this information as part of its filing.

(c) Special rule for small electric utilities.

(1) Each electric utility (other than any electric utility to which paragraph (b) of this section applies) shall, upon request:

(i) Provide comparable data to that required under paragraph (b) of this section to enable qualifying facilities to estimate the electric utility's avoided costs for periods described in paragraph (b) of this section; or

(ii) With regard to an electric utility which is legally obligated to obtain all its requirements for electric energy and capacity from another electric utility, provide the data of its supplying utility and the rates at which it currently purchases such energy and capacity.

(2) If any such electric utility fails to provide such information on request, the qualifying facility may apply to the State regulatory authority (which has ratemaking authority over the electric utility) or the Commission for an order requiring that the information be provided.

Response:

Section (c) is not applicable to IPL.

(d) Substitution of alternative method.

(1) After public notice in the area served by the electric utility, and after opportunity for public comment, any State regulatory authority may require (with respect to any electric utility over which it has ratemaking authority), or any non-regulated electric utility may provide, data different than those which are otherwise required by this section if it determines that avoided costs can be derived from such data.

(2) Any State regulatory authority (with respect to any electric utility over which it has ratemaking authority) or nonregulated utility which requires such different data shall notify the Commission within 30 days of making such determination.

Response:

While more of a clarification than a substitution, IPL's avoided cost filings have been informed by the Board through a complaint proceeding. Specifically, please see the following two Board orders in Docket No. 199 IAC 15.3 (PURPA Section 210): 1) Order Requiring Amendments to PURPA Report and Tariffs issued December 21, 2007; and 2) Order Addressing Request for Clarification issued April 10, 2008.



IPL's 2014 Avoided Cost Filing

*IUB Presentation
June 5-6, 2014*

Objective and Overview

■ Objective

- To understand IPL's process of determining Avoided Cost of Energy

■ Overview

- Overview and Background
- EGEAS, IRP Assumptions
- Avoided Cost of Energy Filing, Table 1 (Incremental Costs)
- Avoided Cost of Energy Filing, Filing Tables 2 through 6 (Technology Types)
- Comparison of Avoided Costs for Technology Types
- Drivers of Avoided Cost of Energy
- Avoided Capacity Payments
- Applications of the Avoided Costs


Executive Summary

- IPL's EGEAS modeling shows a reduction in levelized 15 year Avoided Energy \$/MWH costs:

- This lower avoided cost of energy impacts these various Company initiatives:

- Qualifying Facilities (QF)
- Five Year Energy Efficiency Plans
- Co-gen and small power production tariff rates

- IPL maintains consistent modeling between the initiatives above and Integrated Resource Plans which support new generation additions. IPL uses the Electric Generation Expansion Analysis System (EGEAS) software for Resource Planning.



Year	10 MW Wind	10 MW Block	1 MW Solar
2012	\$48.13	\$53.23	n/a
2014	\$44.07	\$46.88	\$50.56

Avoided Cost of Energy Definition

- Definition per Iowa Administrative Code (199 IAC 15.1):
 - ...the incremental costs to an electric utility of electric energy or capacity or both which, but for the purchase from the qualifying facility or qualifying facilities, such utility would generate itself or purchase from another source
- Marginal Operating Costs, fuel and variable O&M, of energy (kWh) displaced by the Qualifying Facility (QF) that otherwise would have been produced or purchased

What Is the New Avoided Cost of Energy?

■ 15 year levelized \$/MWH Avoided Energy Costs:

Year	Wind	Block	Solar
2012	\$48.13	\$53.23	n/a
2014	\$44.07	\$46.88	\$50.56

■ Why are 2014 costs lower than 2012?

- Lower natural gas costs
- Lower market (MISO) energy costs

EGEAS Assumptions

- Significant Modeling assumptions include:
 - Fuel prices such as gas, coal prices and market economy energy costs (Wood Mackenzie)
 - Load Forecast (internally developed)
 - Existing generation portfolio, retirements (GENCO)
 - Emissions costs (Wood Mackenzie)
- Same assumptions as IPL's 2014 Integrated Resource Plan (IRP). The IRP may be used for future filings associated with SPU dockets, rate making principles and new generation filings.
 - Section 6.3 of IPL's 2014 IRP highlights EGEAS inputs.
- IPL's use of EGEAS modeling for determining the avoided cost of energy was accepted and subsequently refined by the Board in Docket No. AEP-05-1.
 - Same methodology since at least 2005 in Iowa Dockets AEP-05-01 through -04
- IPL's EGEAS modeling is set such that IPL's acquired resources (PPA & owned) serve its own load.
 - Limited market energy is available to the model (15% of portfolio 2014-2016, then only 5% for 2017-2029).
 - This ensures limited market reliance and insulates from potential market swings.

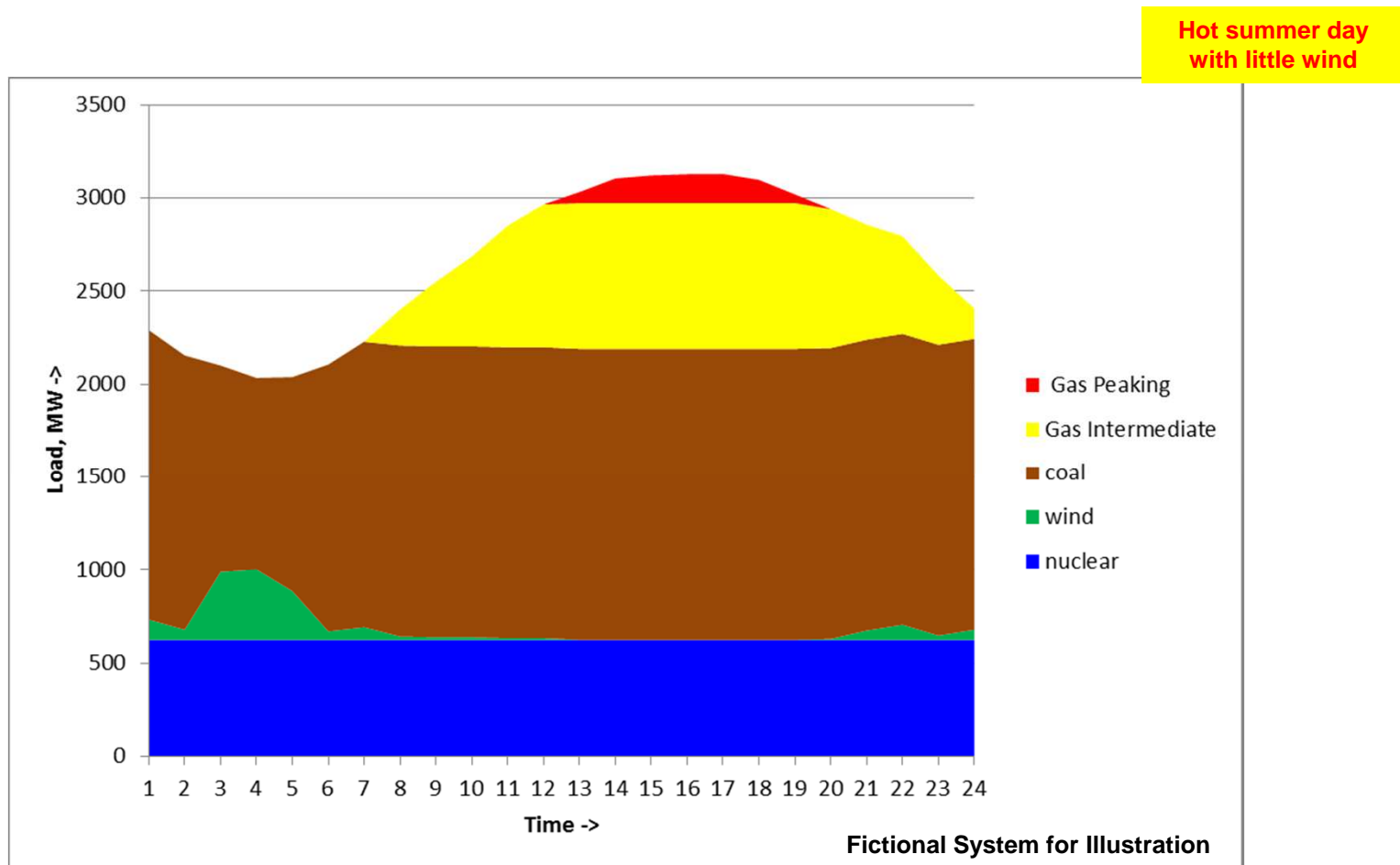
EGEAS Economic Dispatch

- EGEAS dispatches resources to meet IPL's load projections on an economic basis.
- Lower marginal operating cost resources (wind, nuclear) are dispatched before higher marginal operating cost resources (oil).
- The particular marginal operating resource may vary depending on the load level. For example, potentially coal units at light loads, or gas and oil peaking units during summer peak.

How Is Table 1 of the Avoided Cost Filing Calculated?

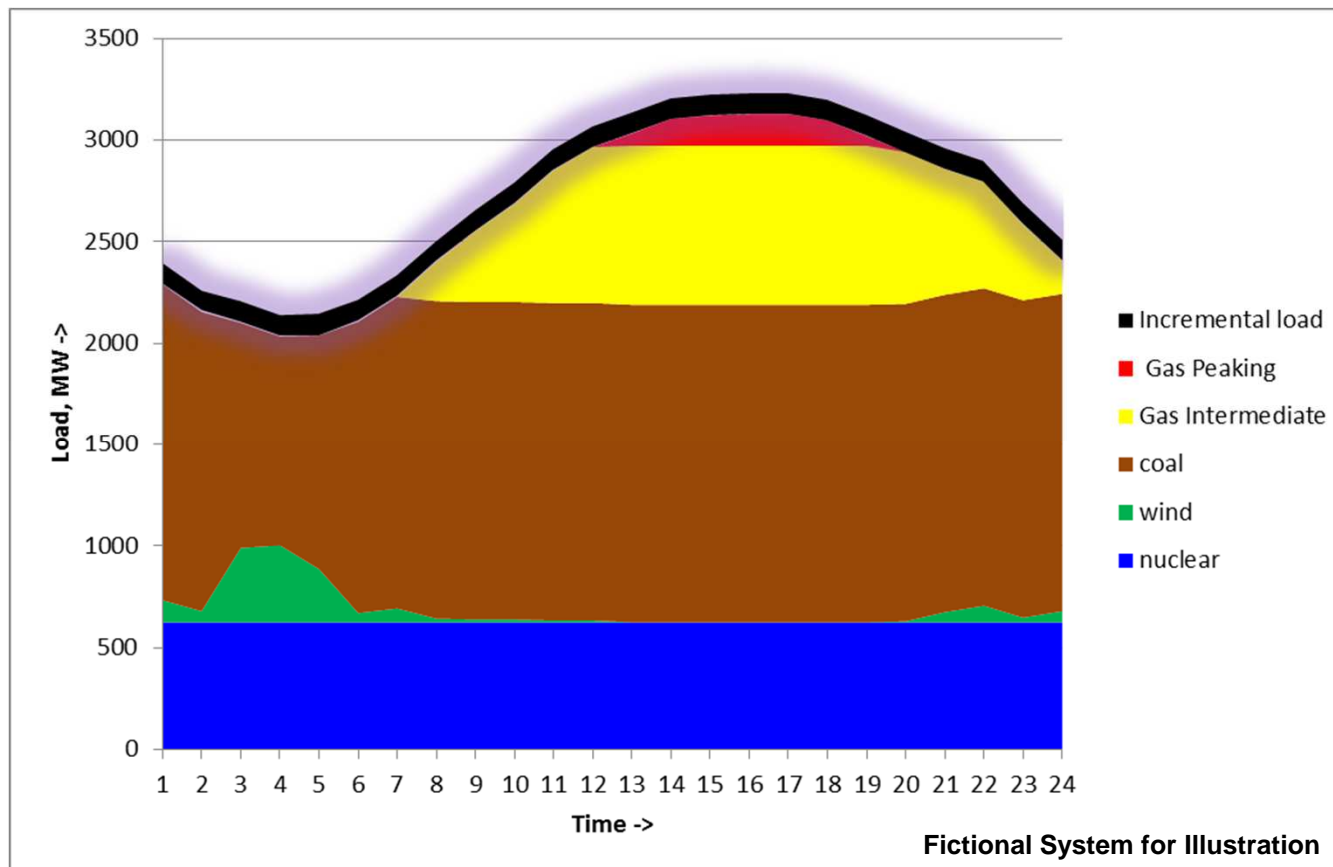
- Table 1 provides seasonal on and off peak incremental costs for the current year and subsequent five years.
- These values are derived by an incremental cost analysis from the Electric Generation Expansion Analysis System (EGEAS).
 - In EGEAS, Incremental Cost (or marginal cost) is defined as the cost of generating an additional unit of energy at a specified load level.
- EGEAS outputs hourly incremental costs into an hourly incremental cost file (*.hic).
- IPL copies the data from this hourly incremental cost file into Microsoft Excel, and creates a PivotTable to average the incremental costs over the yearly seasonal on and off peak periods.

Incremental Cost Graph



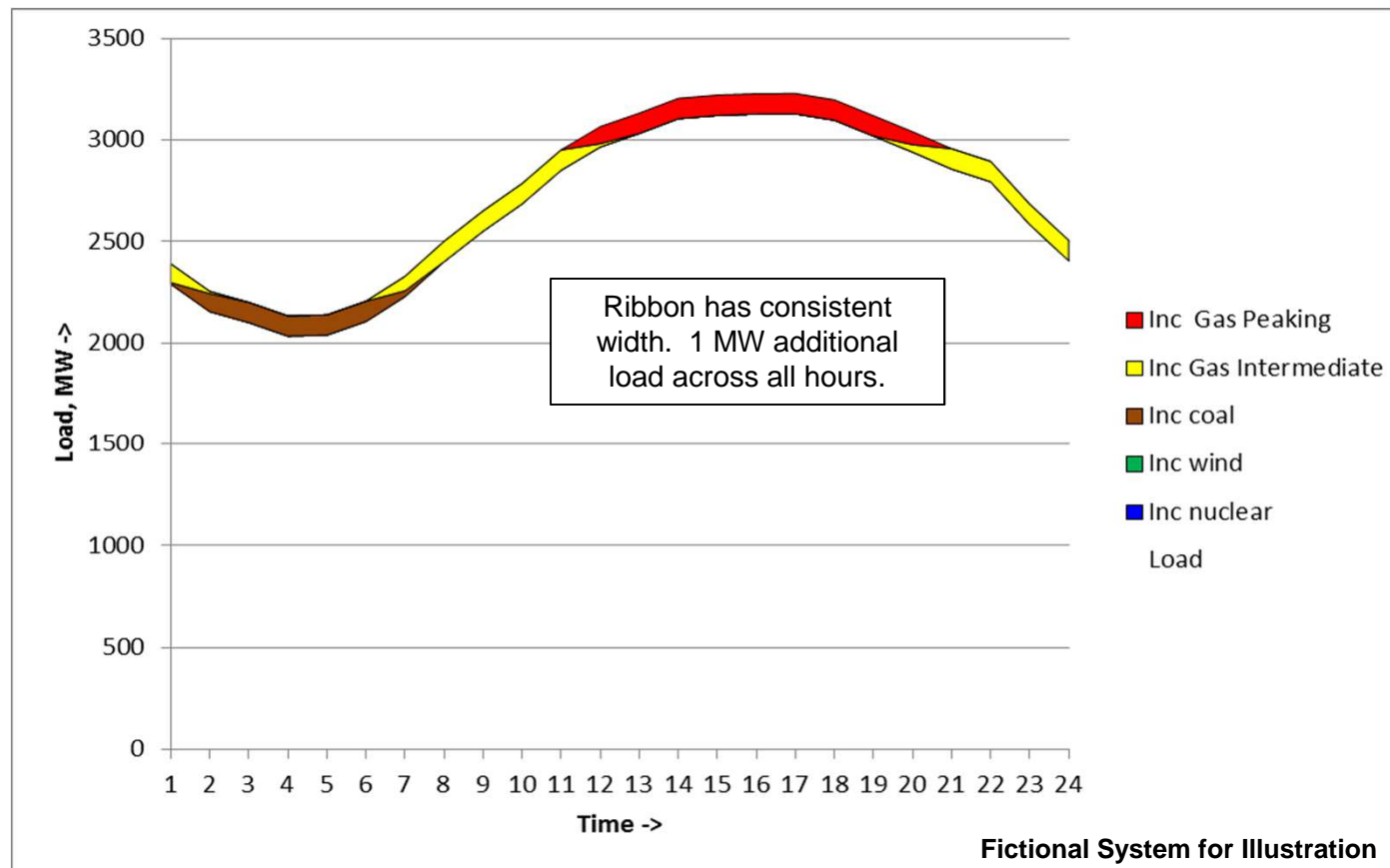
Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Incremental Cost Graph (cont.)



Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Incremental Cost Graph (cont.)

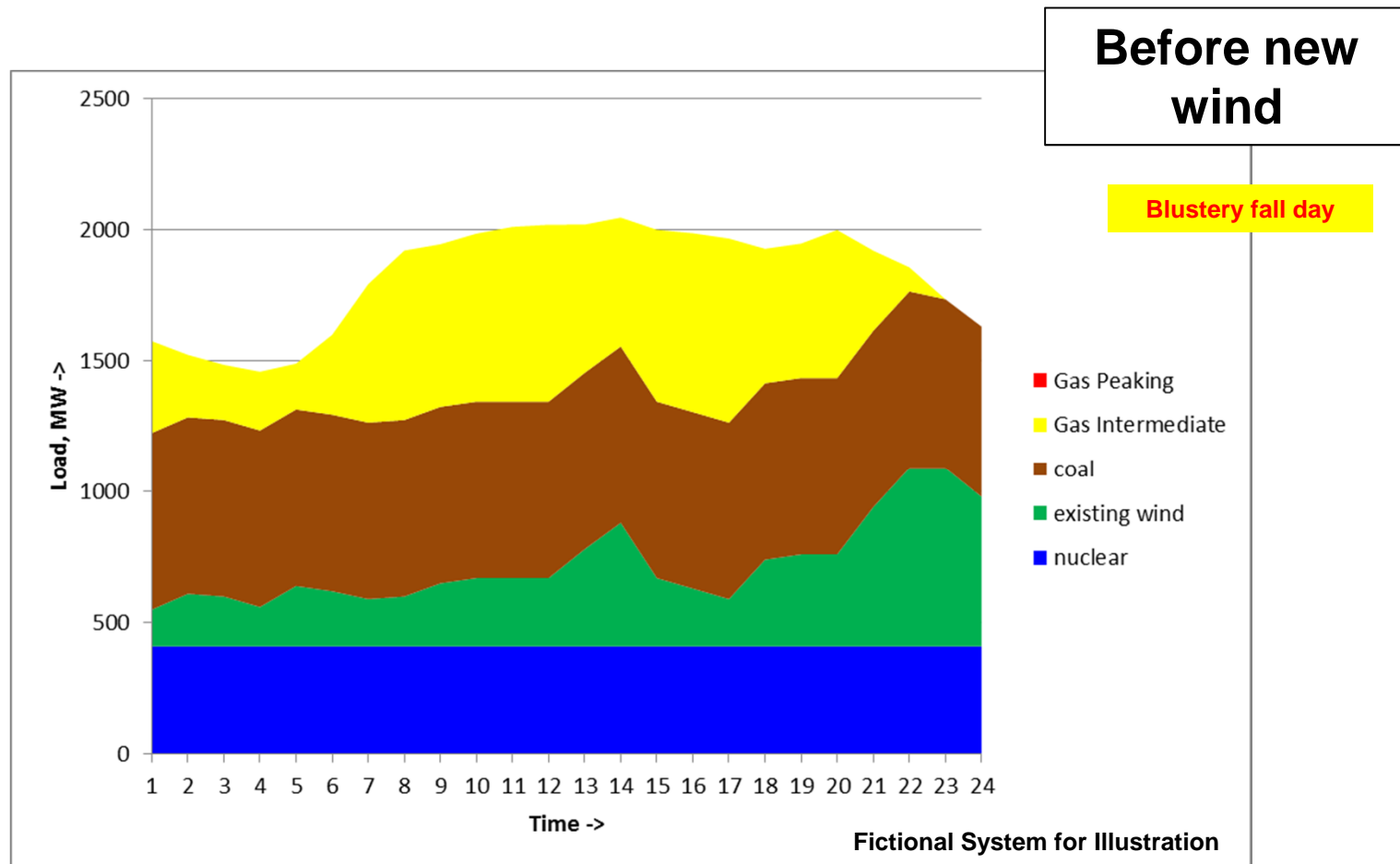


How are Tables 2 through 6 of the Avoided Cost Filing Calculated?

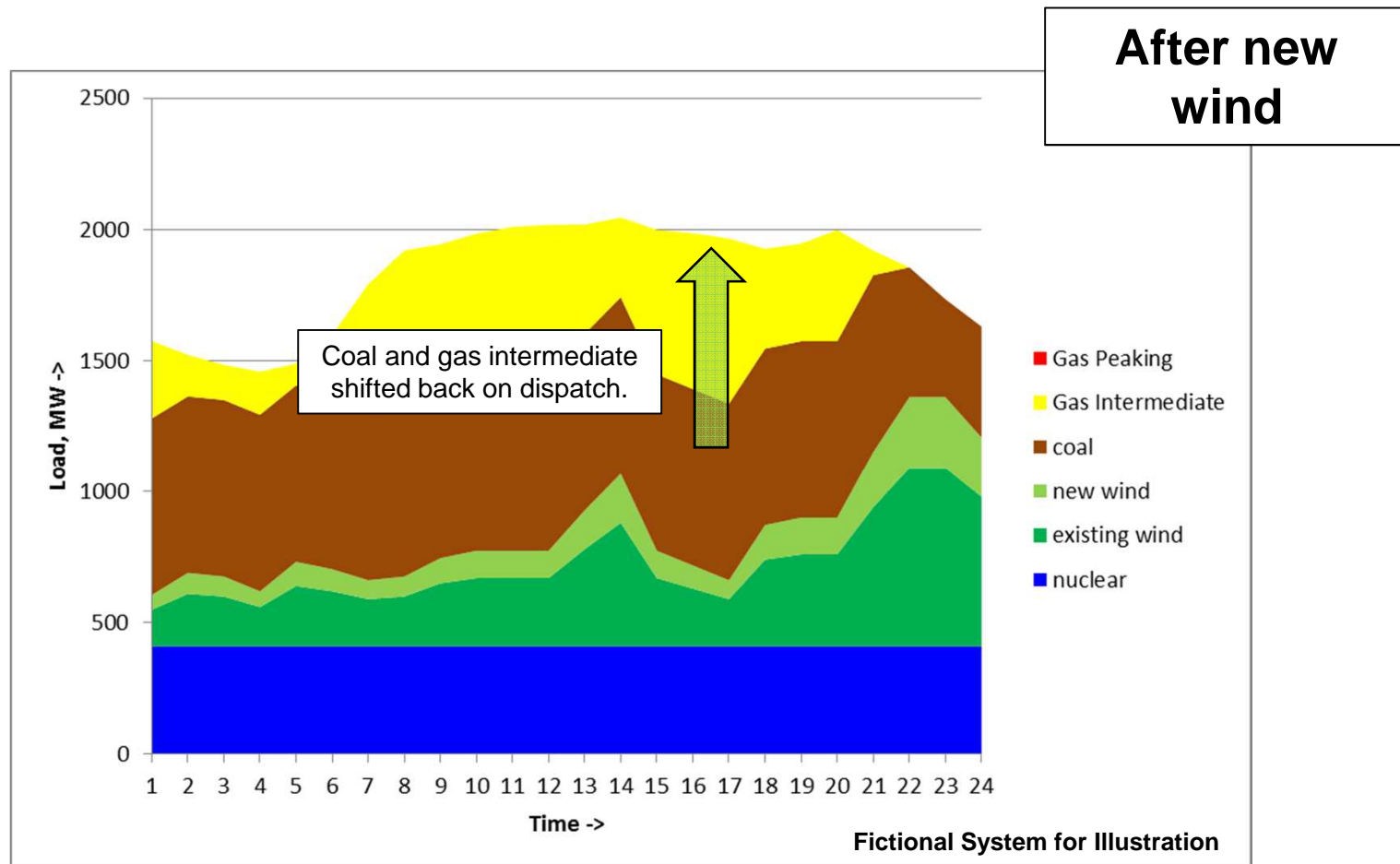
- Tables 2 through 6 provide Avoided Energy Costs for Wind and “Block” Energy of various MW sizes.
 - Block Energy meaning a 100% capacity factor unit which provides stable energy output over all hours of the year. (e.g., landfill gas, bio-digester)
- IPL uses EGEAS modeling to develop avoided costs that result in system costs that are neutral to customers.
- IPL performs and compares two EGEAS runs:
 - One run without the QF resource.
 - One run with the QF resource at zero cost.
 - The difference in these plans is the annual marginal operating costs that would be incurred if not for the energy from the QF.
 - In a spreadsheet, the Present Value of Revenue Requirements (PVRR) for the annual differences are calculated and levelized over a 15 year period arriving at a cost on a \$/MWH basis that is neutral for IPL’s customers.

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Wind Avoided Cost Graph

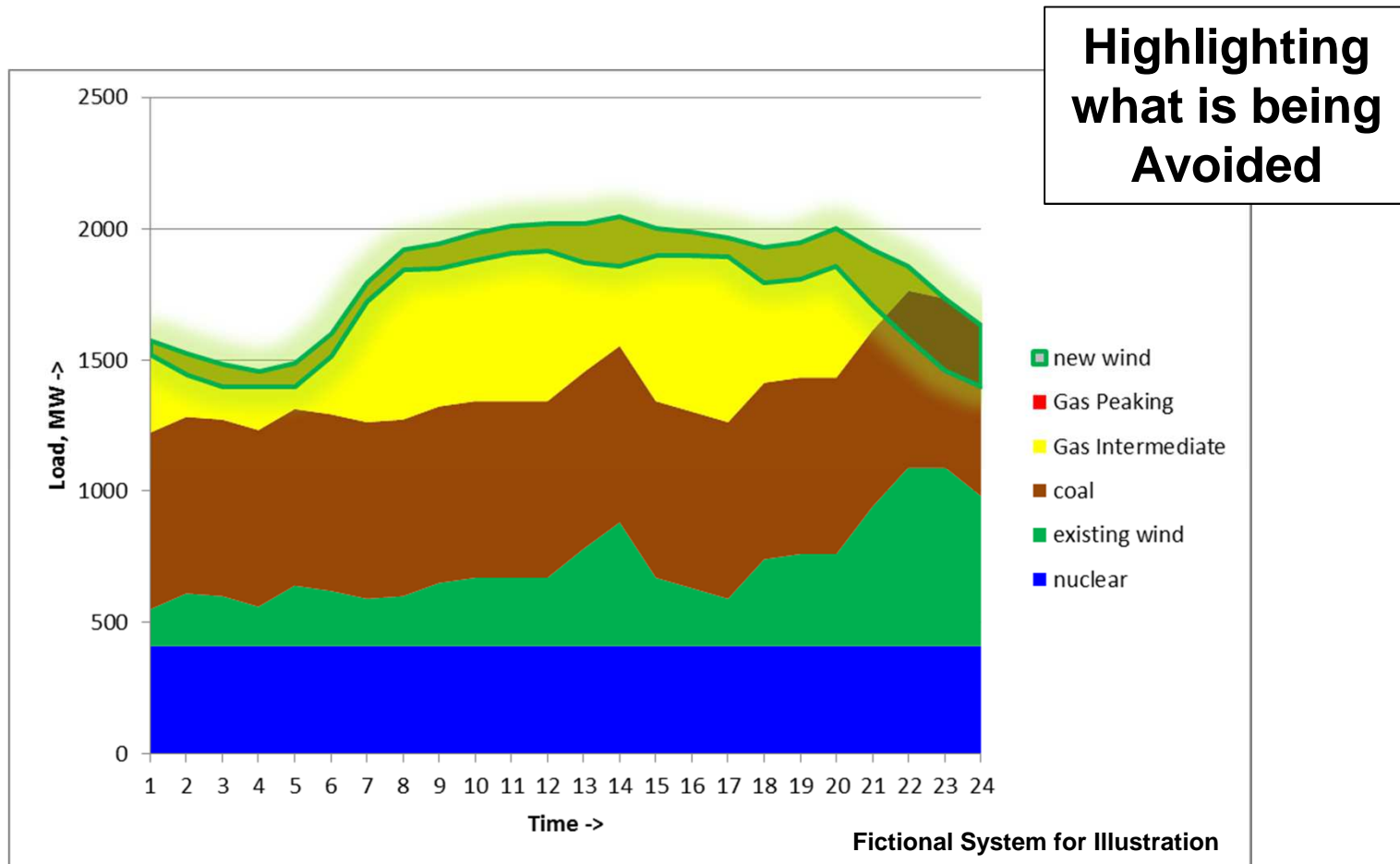


Wind Avoided Cost Graph (cont.)



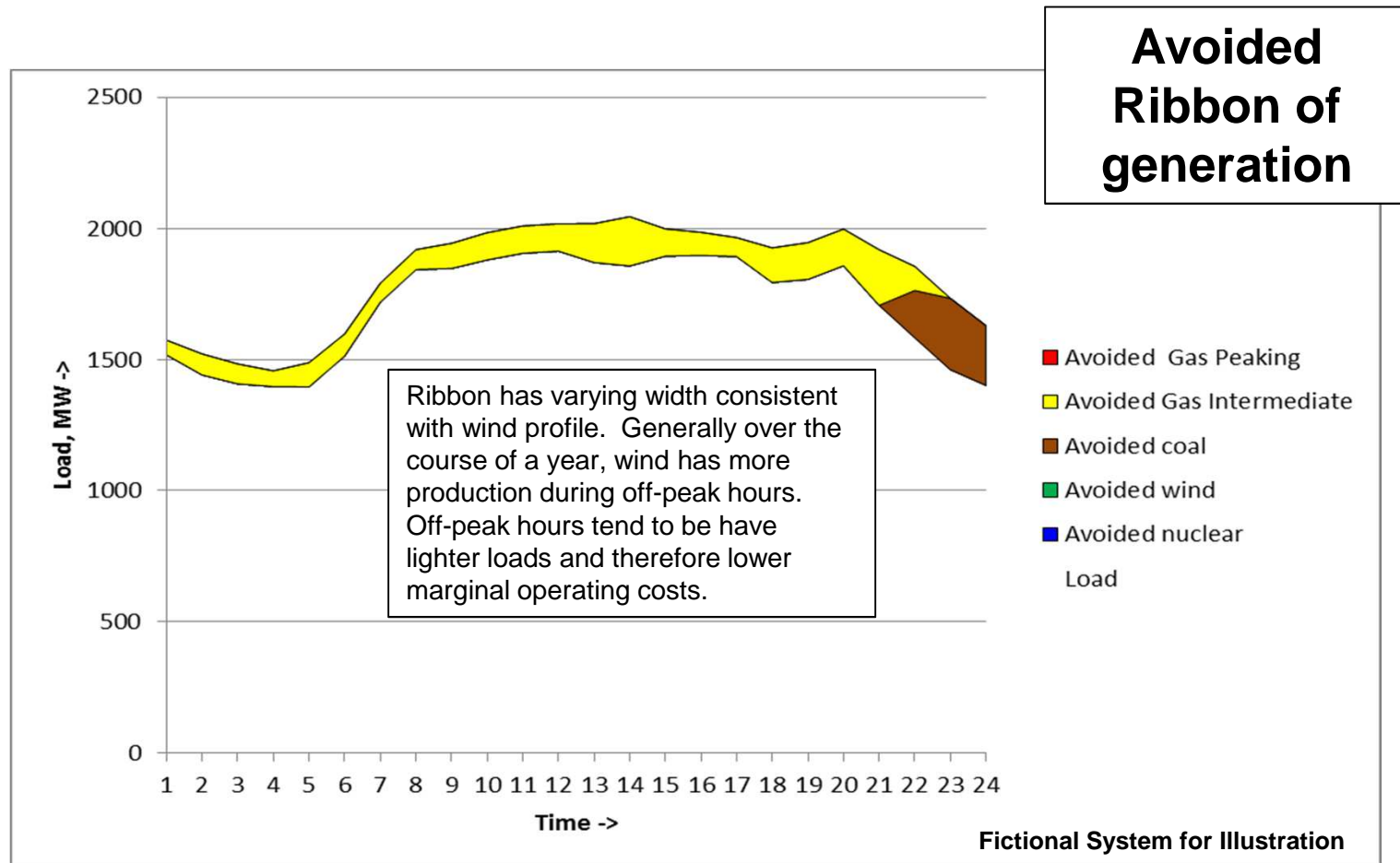
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Wind Avoided Cost Graph (cont.)

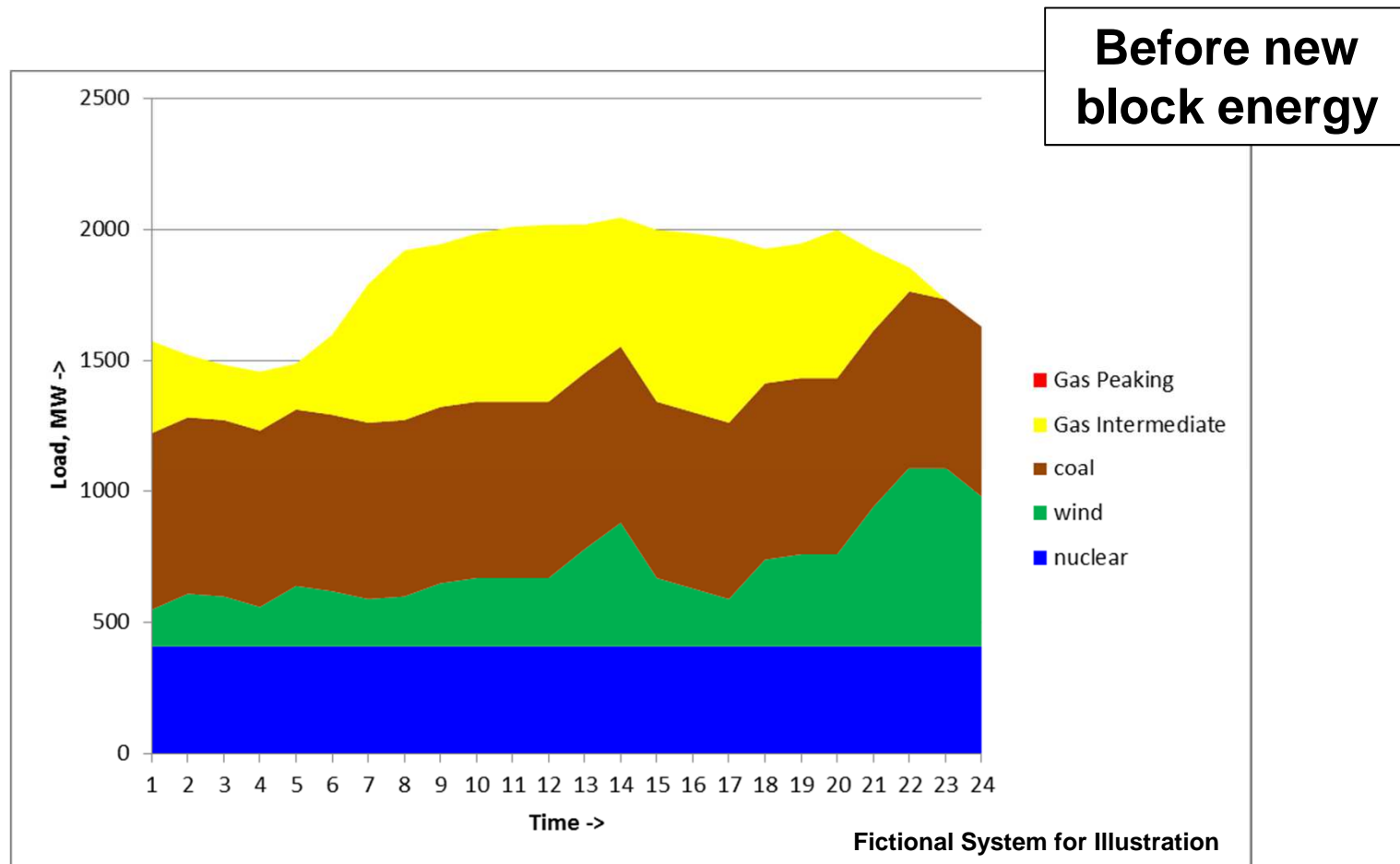


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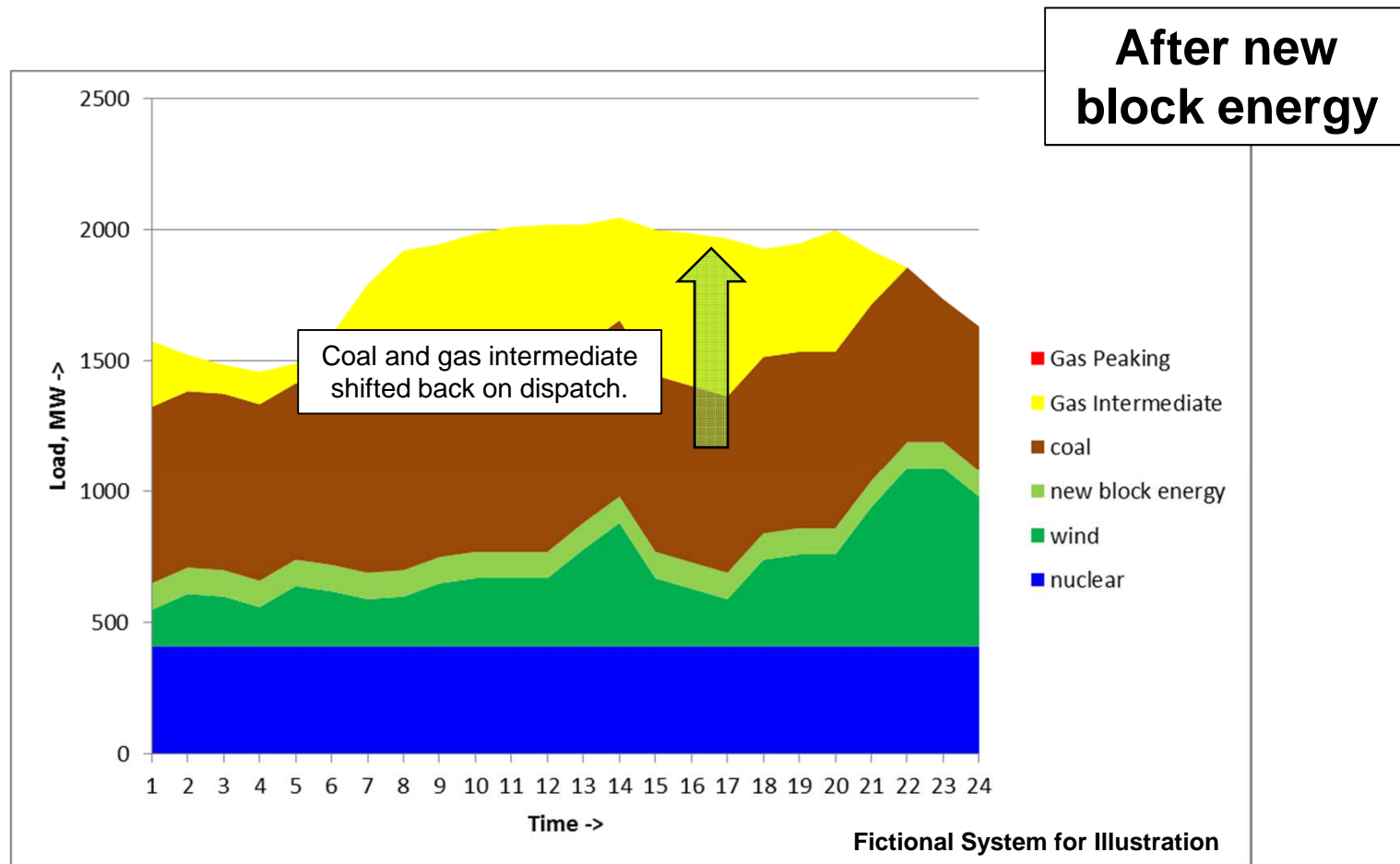
Wind Avoided Cost Graph (cont.)



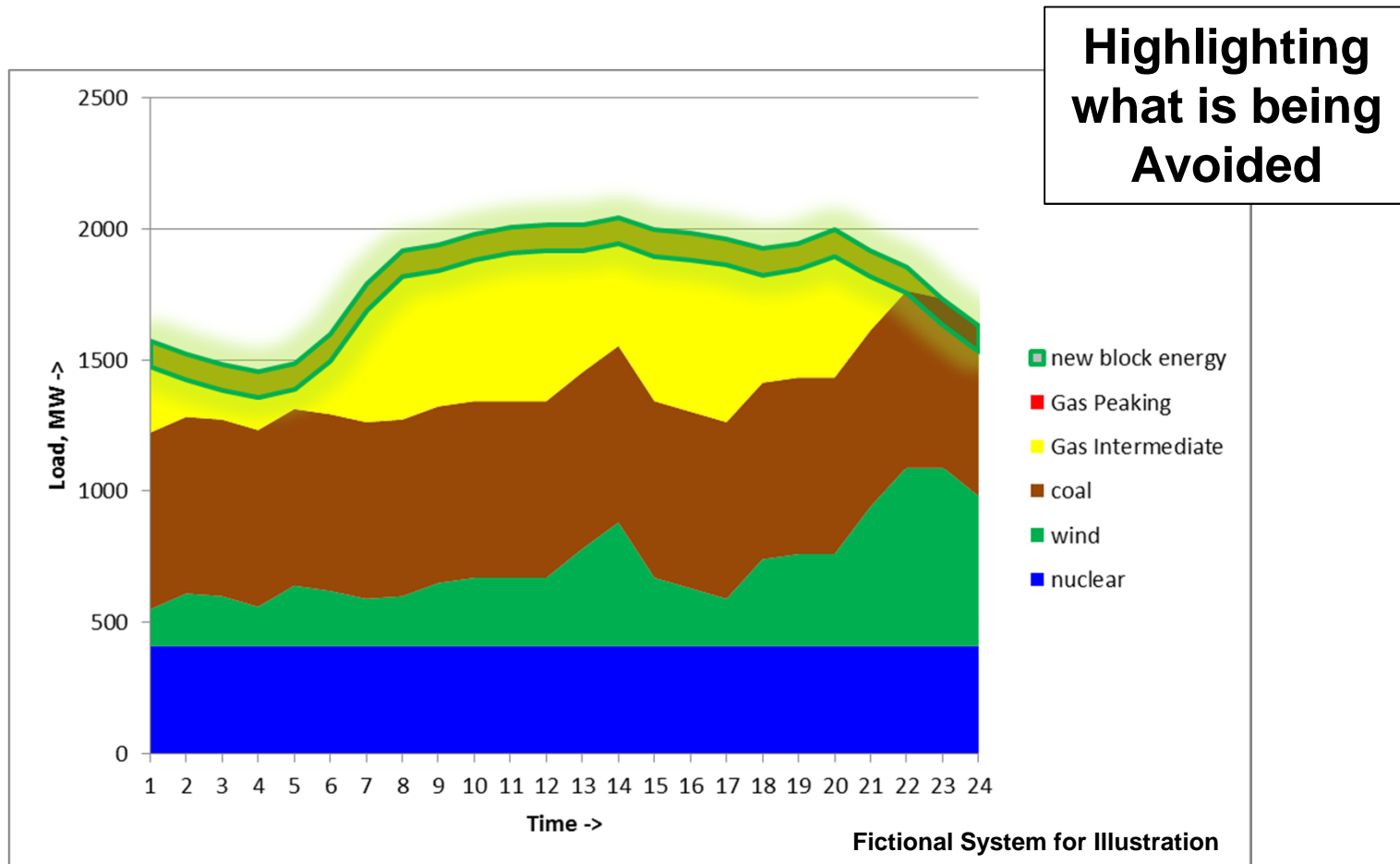
Block Avoided Cost Graph



Block Avoided Cost Graph (cont.)

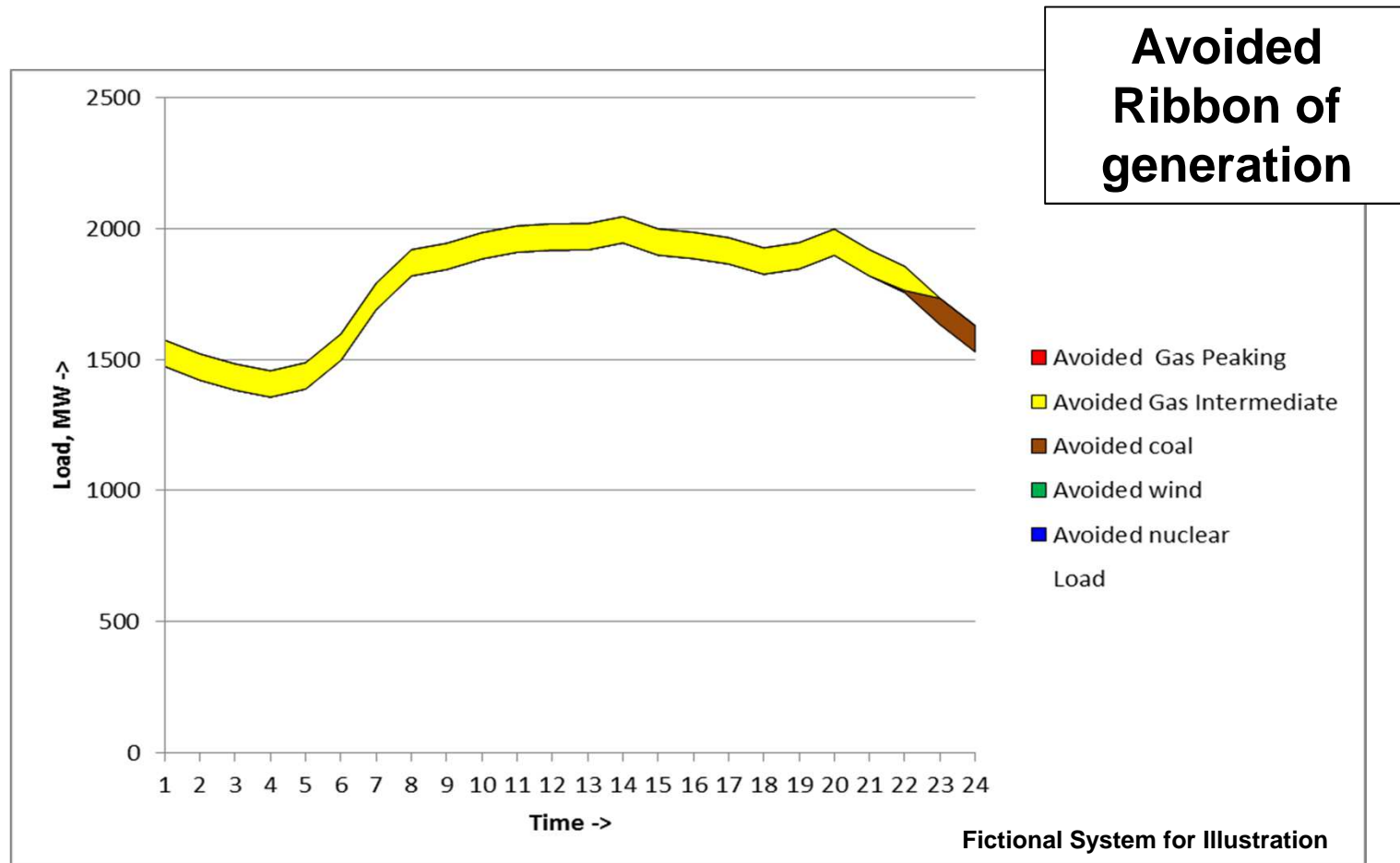


Block Avoided Cost Graph (cont.)



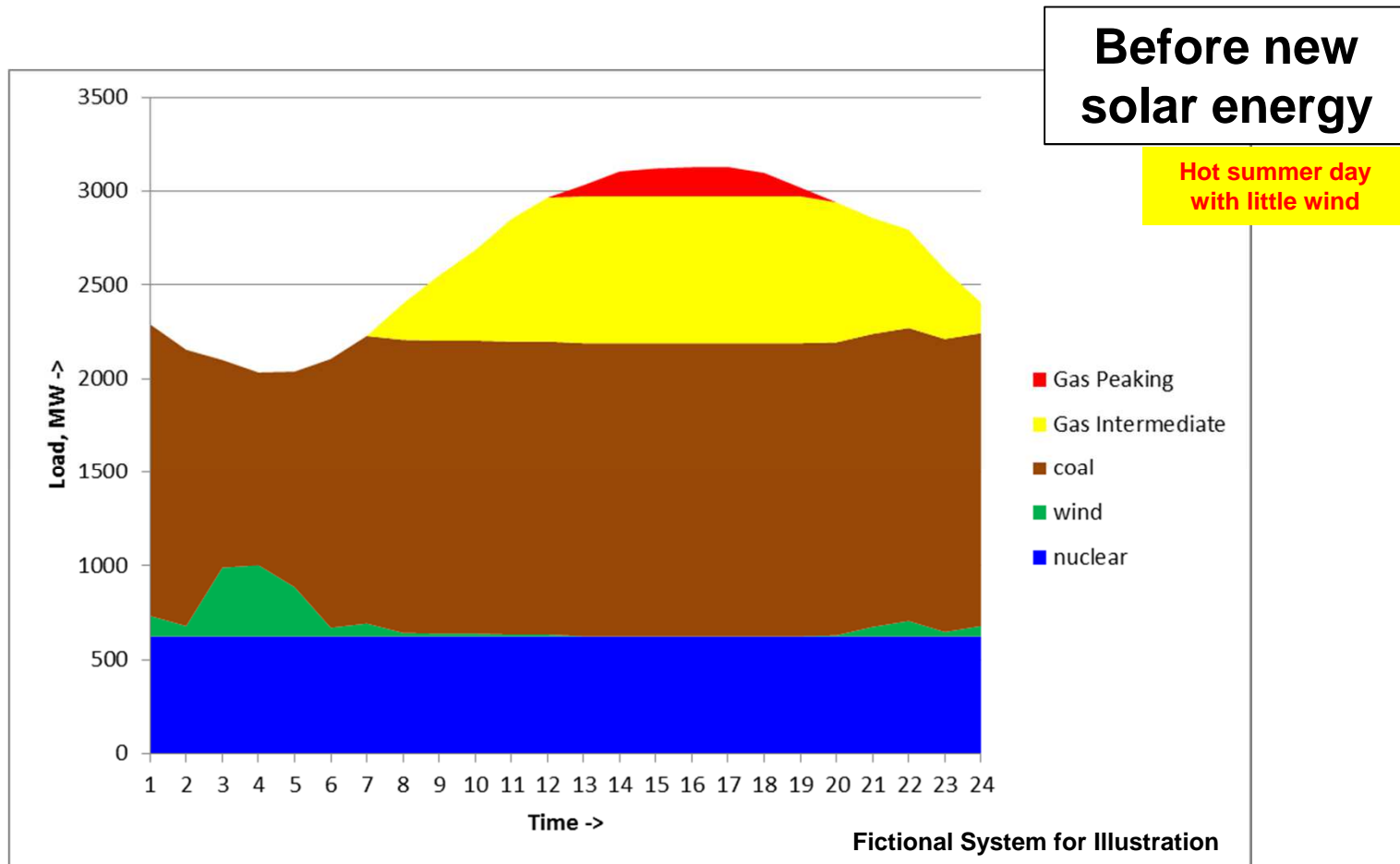
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Block Avoided Cost Graph (cont.)

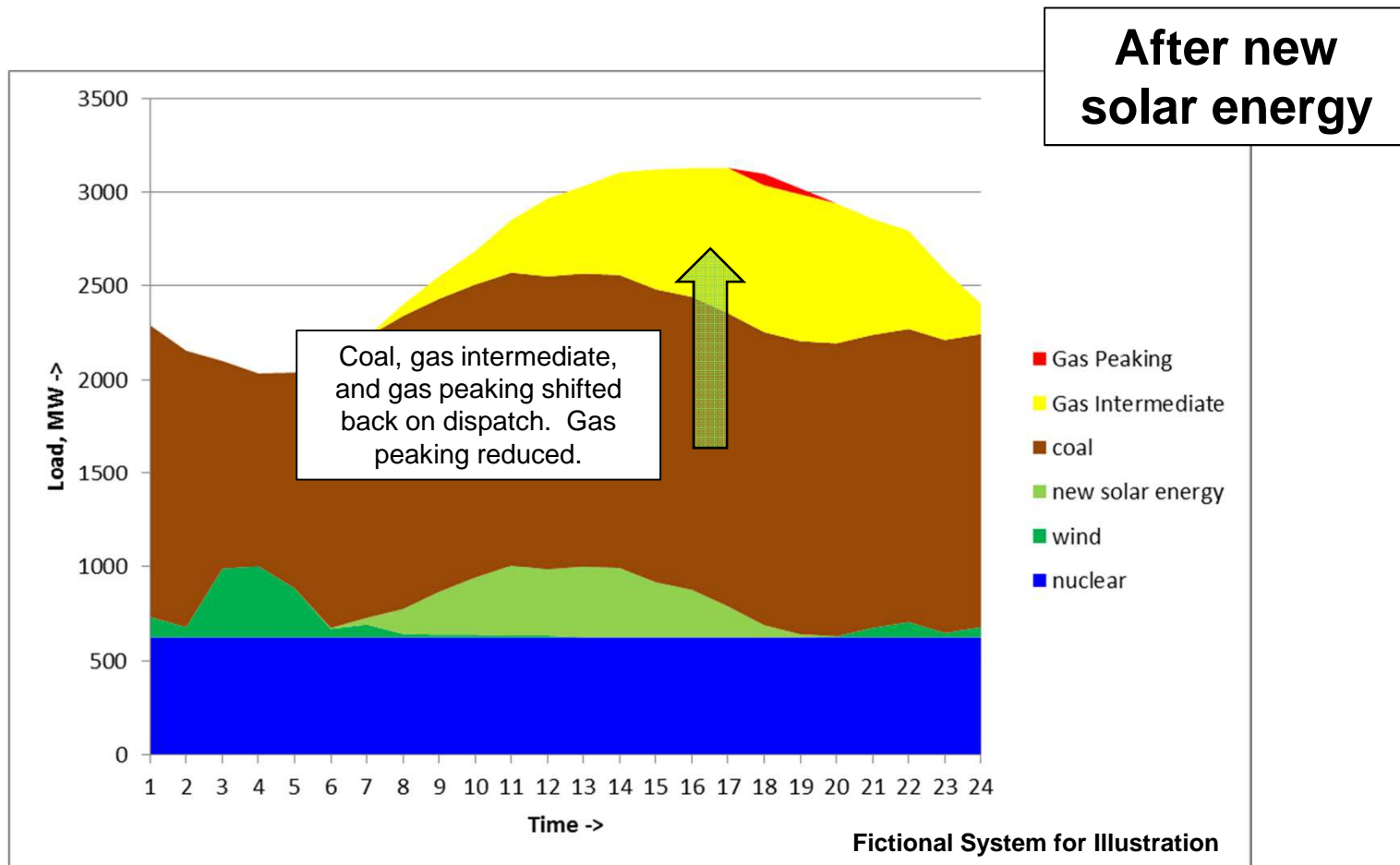


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Solar Avoided Cost Graph

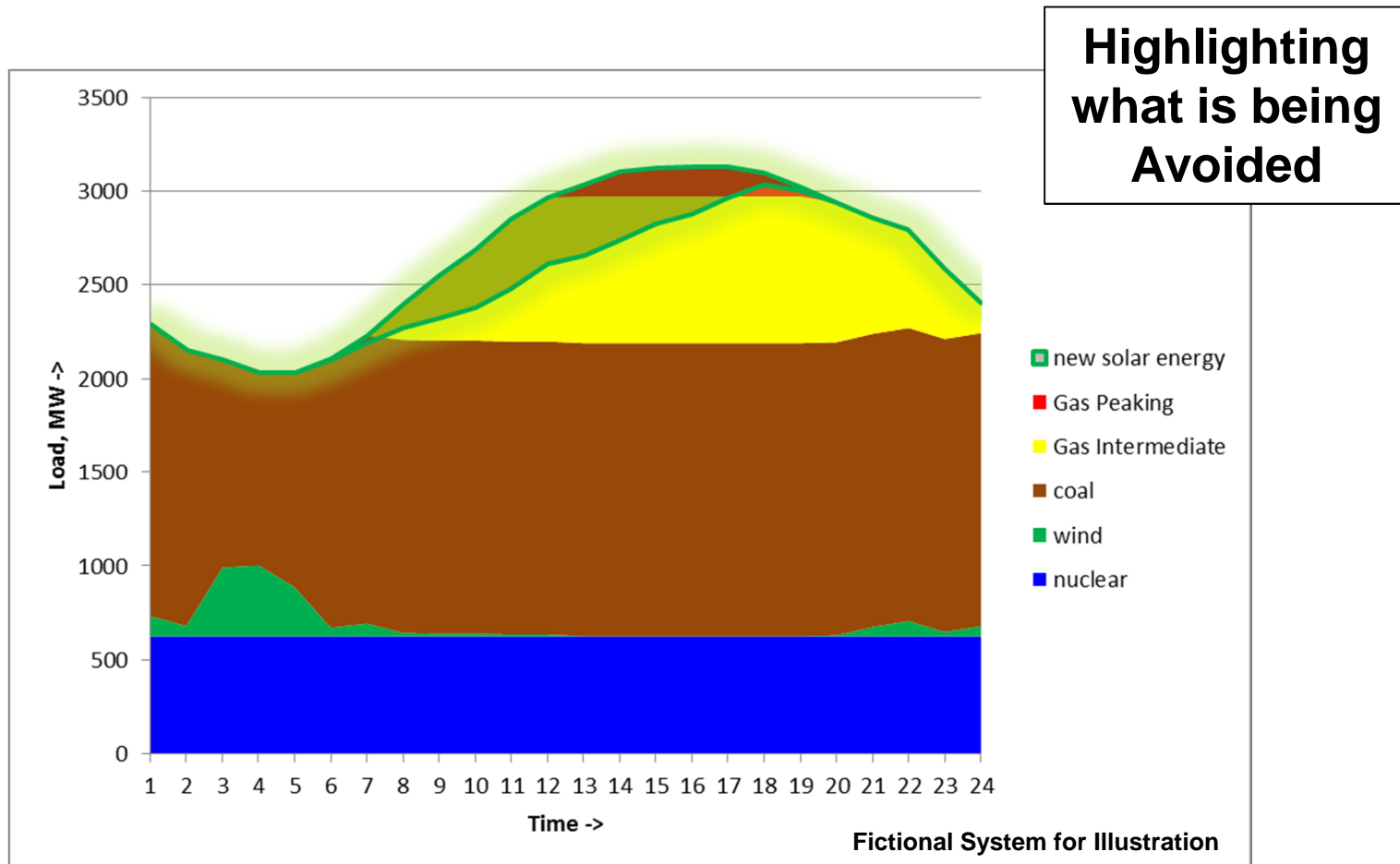


Solar Avoided Cost Graph (cont.)



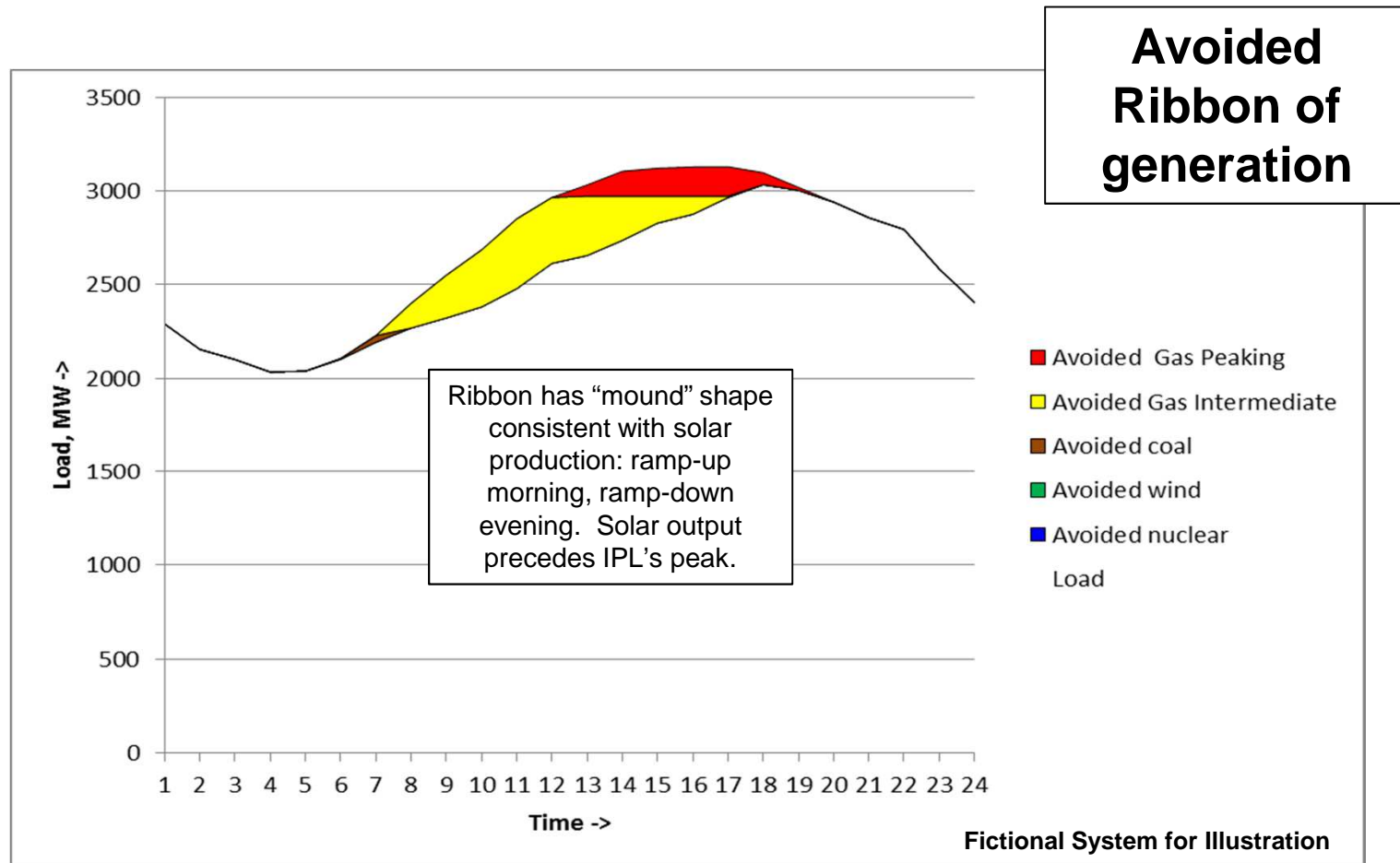
Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Solar Avoided Cost Graph (cont.)



Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Solar Avoided Cost Graph (cont.)



Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Why are Avoided Costs Different for Each Resource?

- Avoided resource energy profiles off-set different amounts of generation over the course of the 15 year EGEAS study period

IPL 2014 IRP, 2017 Avoided Energy Make-Up by Fuel Type and Avoided Resource Type						
	coal	Market (on-peak)	gas-intermediate	gas-peaking	oil	15 year avoided cost \$/MWH
10 MW Solar	5.0%	4.5%	86.3%	3.6%	0.5%	\$50.50
10 MW Block	7.6%	2.7%	87.3%	2.1%	0.3%	\$46.75
10 MW Wind	7.9%	2.3%	88.1%	1.5%	0.2%	\$44.00
Marginal \$/MWH *	\$37	\$45	\$38	\$86	\$284	

* Marginal \$/MWH costs and percentages are from 2017 as opposed to a 15 year levelized value.

Significance of Natural Gas Prices

- The Avoided Cost of Energy is highly dependent on the cost of gas-intermediate (Combined Cycle, CC) resources.
- CC resources have an approximate heat rate of 7,000 btu/kwh.
- The Marginal Operating Cost of a CC is calculated as approximately Heat Rate * Fuel + Variable O&M.
- Example:
 - 7,000 btu/kwh Heat Rate (= 7 MBTU/MWH)
 - \$5/MBTU natural gas fuel price
 - Variable O&M \$3/MWH
 - $7 * 5 + 3 = \text{\$38/MWH}$
- A \$1/MBTU reduction in natural gas fuel price equates to a \$7/MWH reduction in the marginal operating costs for a combined cycle facility.

What Decreases the Avoided Cost of Energy for IPL?

- Lower load forecast
- Lower natural gas fuel prices
- Lower economy energy prices, or availability
- The addition of lower marginal cost resources (wind)

What Increases Avoided Cost of Energy for IPL?

- Higher load forecast
- Higher natural gas fuel prices
- Higher economy energy prices, or availability

Avoided Capacity Payments

- Capacity payments are negotiated on a case-by-case basis provided IPL receives MISO Zonal Resource Credits (ZRCs).
- For most QFs:
 - Small size so no ZRCs, or no significant ZRCs.
 - No significant impact to expansion plan.
 - No guaranteed annual capacity amount.
- Capacity credit for wind can be roughly 14% of nameplate.
 - Although transmission constraints limit some large wind farms to Energy Resource with no capacity contribution (as opposed to Network Resource)
- Solar ? – MISO has not established guidelines yet.
- Applicable capacity payments determined by recent MISO capacity auction results and Wood Mackenzie MISO capacity market projections.

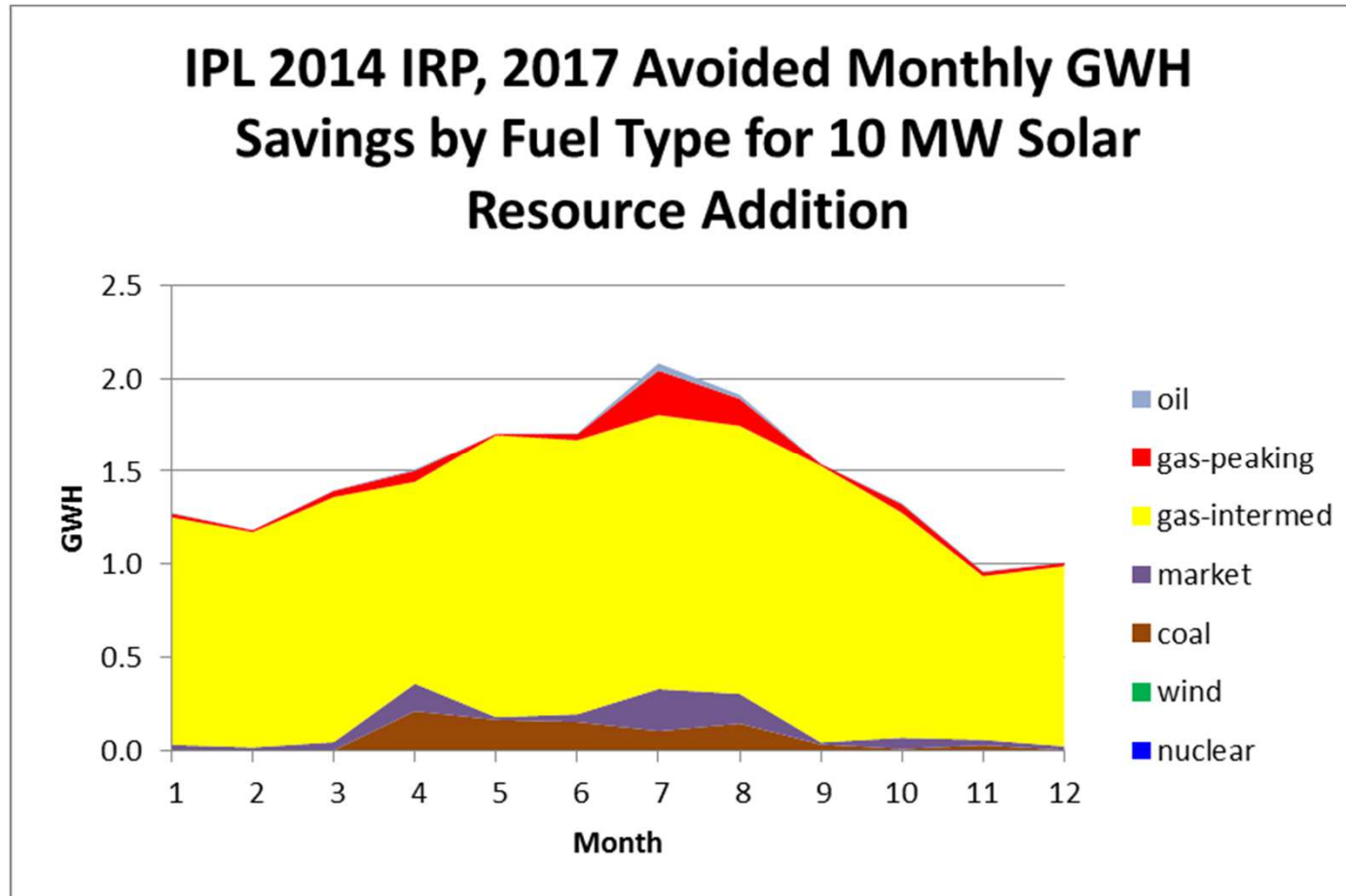
Applications of the Avoided Cost of Energy

- Avoided cost of energy sets the hurdle rate for Distributed Generation, Energy Efficiency, Resource Planning efforts, and QF's. Qualifying Facilities/Distributed Generation (< 20 MW).
 - IPL is required by PURPA to purchase from QFs up to 20 MW and up to an avoided cost rate.
 - Higher avoided costs encourage movement towards more customer- and developer-owned distributed generation.
- Energy efficiency planning
 - Incremental costs (as part of the avoided cost calculation) determine cost-effectiveness, thus benefits by technical measure.
 - Lower avoided costs means fewer measures will be cost effective.
- Resource planning
 - Modeling used to determine avoided costs is the same modeling which supports rate-making principles and new generation filings.

Appendix

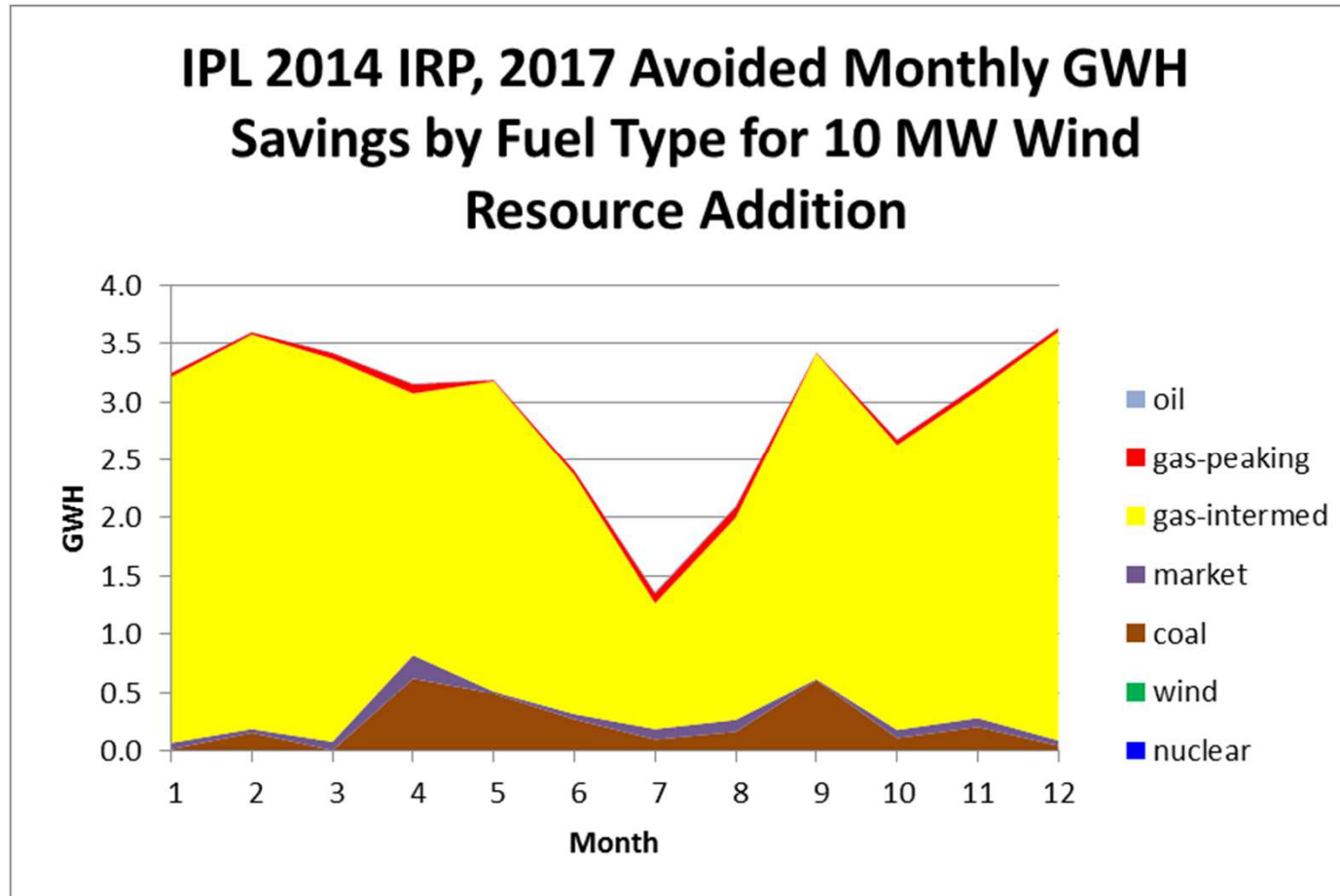
Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Why are Avoided Costs Different for Each Resource? (cont.)



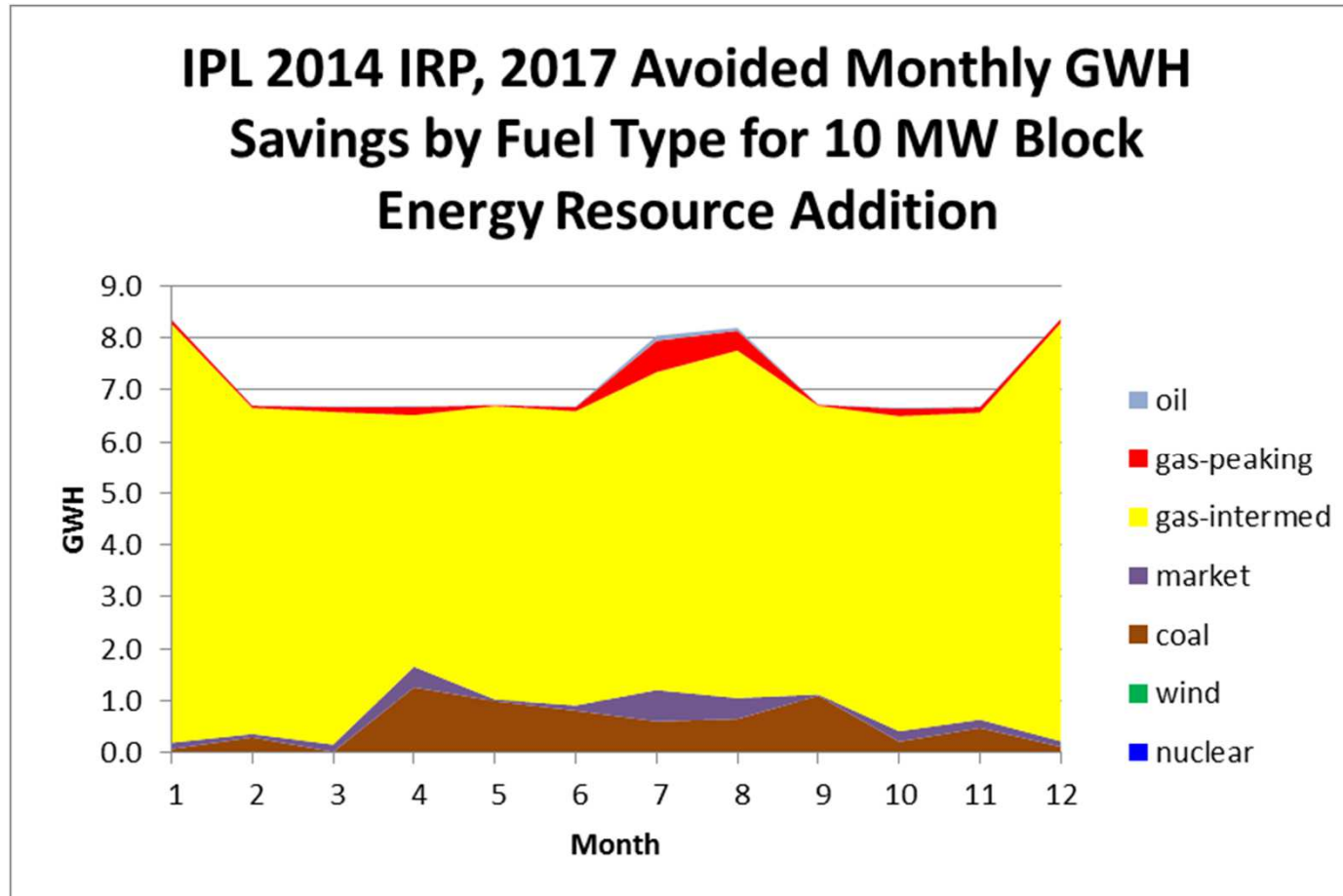
Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Why are Avoided Costs Different for Each Resource? (cont.)



Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

Why are Avoided Costs Different for Each Resource? (cont.)



Filed with the Iowa Utilities Board on September 22, 2016, TF-2016-0290

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 14

Docket Number: TF-2016-0290
Date of Request: August 4, 2016
Response Due: August 11, 2016
Information Requested By: Josh Mandelbaum
Date Responded: August 11, 2016
Author: Jamie Niccolls
Author's Title: Lead Resource Planning Consult
Author's Telephone No.: (319) 786-4882
Subject:
Reference:

Data Request No. 14

IPL has added various emissions controls and other upgrades or changes to comply with existing, new and forthcoming environmental regulations at coal units that it owns or co-owns in Iowa. Please describe how the cost of adding, operating and maintaining emissions controls and upgrades impacts IPL's avoided costs.

Response:

The following factors on emissions controls could have an impact on IPL's avoided energy costs:

- A variable operating and maintenance (O&M) cost component for the emissions controls on the controlled unit may affect the dispatch price and/or the dispatch curve.
- Capacity and heat rate impacts due to emissions controls may affect the dispatch price and/or the dispatch curve.
- Emission allowance costs (e.g. NO_x @ \$XX/ton) may affect dispatch pricing relative to an uncontrolled unit.

Fixed costs such as capital investment and Fixed O&M costs do not enter into dispatch and as a result do not affect the avoided energy costs.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 15

Docket Number: TF-2016-0290
Date of Request: August 4, 2016
Response Due: August 11, 2016
Information Requested By: Josh Mandelbaum
Date Responded: August 11, 2016
Author: Nichol Toomire
Author's Title: Dir. Energy Mkts & Fuel Supply
Author's Telephone No.: (608) 458-3454
Subject:
Reference:

Data Request No. 15

For each of IPL's existing generating unit (coal, gas, diesel, etc.) operating in Iowa:

- a. Please provide the fuel cost and variable O&M costs for 2015 (or the most recent year available) in a \$/MWh basis.
- b. Please indicate the fraction of the variable O&M costs that are environmental compliance costs.

Response:

- a. Please reference Table 1. Average Generation Costs for 2015. Fuel cost includes expenses for fuel consumed for the generation of electricity, the cost of fuel consumed during unit startup, and emission allowance expense. Dubuque, Red Cedar and Centerville did not have positive net generation during calendar year 2015. VOM has not been specifically analyzed for Sutherland 1, Red Cedar, Burlington CTs, Centerville CTs, Sutherland CTs, Grinnell CTs, and Dubuque Diesels.

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Docket No. TF-2016-0290

Data Request No. 15

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b. Please reference Appendix D worksheet from our 2016 EPB Update filed on April 1, 2016. This worksheet has environmental O&M 2015 Actuals for coal-fired units, and for some formally-coal-fired units that converted to gas. This may not represent all environmental O&M spend for each plant.

**Appendix D: IPL Emissions Plan and Budget Summary -
 Maintenance Capital and O&M**

as of December 31, 2015 (100% Project Costs, No AFUDC)

O&M	Burlington	Environmental Monitoring and Testing	185,301
		Environmental Maintenance	162,498
		Environmental Operations and Compliance	371,758
	Ottumwa	Environmental Monitoring and Testing	182,721
		Environmental Maintenance	1,871,665
		Environmental Operations and Compliance	1,557,630
	Lansing	Environmental Monitoring and Testing	111,522
		Environmental Maintenance	527,829
		Environmental Operations and Compliance	771,551

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Total	Prairie Creek	Environmental Monitoring and Testing	503,338
		Environmental Maintenance	200,048
		Environmental Operations and Compliance	276,173
	Sutherland	Environmental Monitoring and Testing	64,378
		Environmental Maintenance	15,295
		Environmental Operations and Compliance	83,472
	M.L. Kapp	Environmental Monitoring and Testing	119,284
		Environmental Maintenance	81,237
		Environmental Operations and Compliance	32,279
	Total		
Chemicals	Burlington	Hg Emission Control Chemicals	304,789
		Flue Gas Conditioning Chemicals	218,876
	Ottumwa	Hg Emission Control Chemicals	449,878
		Nox Emission Control Chemicals	
		SO2 Emission Controls Chemicals	1,268,506
	Lansing	Hg Emission Control Chemicals	160,562
		Nox Emission Control Chemicals	502,251
		SO2 Emission Controls Chemicals	172,720
	Prairie Creek	Hg Emission Control Chemicals	149,471
		Flue Gas Conditioning Chemicals	117,277
	M.L. Kapp	Flue Gas Conditioning Chemicals	4,312
	Total		
Total	IPL Total	SO2 Allowances IPL	13,572,500

*Highlighted information is considered confidential

☐ Confidential/Trade Secret

**Response of
Interstate Power and Light Company
to
Environmental Law & Policy Center
& Iowa Environmental Council**

Data Request No. 30

Docket Number: TF-2016-0290
Date of Request: August 31, 2016
Response Due: September 7, 2016
Information Requested By: Josh Mandelbaum
Date Responded: September 7, 2016
Author: Jamie Niccolls
Author's Title: Lead Resource Planning Consultant
Author's Telephone No.: 319-786-4882
Subject:
Reference:

Data Request No. 30

FERC allows environmental costs to be included in avoided costs as long as those cost are real costs that would be incurred by utilities. How do IPL's avoided cost models incorporate environmental costs into the methodology?

Response:

Allowances prices are included in dispatch prices, and, therefore, avoided energy costs. In other words, IPL's Electric Generation Expansion Analysis System (EGEAS) modeling monetizes the emissions costs with dispatch prices.

For the 2016 avoided cost analysis, the EGEAS modeling includes emissions allowances for NO_x-Ozone ("NO_xO"). The "NO_xO" emissions are only active May-September (EGEAS Segments 5-9), and have no emissions during the remaining months. "NO_xO" emissions have an allowance cost of \$1,300/ton per the Environmental Protection Agency's (EPA) November 2015 Regulatory Impact Analysis for the Proposed Cross-State Air Pollution Rule (CSAPR) Assessment (see Attachment A to this Data Request response).

Wood Mackenzie forecasts sulfur dioxide (SO₂) and nitrogen oxide (NO_x) emissions allowances at \$0 because emission rules, such as Mercury and Air Toxics Standards

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Data Request No. 30

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(MATS), force retrofits and retirements of units, which results in an oversupply of allowances.

Finally, in the 2016 avoided cost analysis, the EGEAS modeling adjusts dispatch of Clean Power Plan section 111(d) affected units so that carbon dioxide (CO₂) emissions on these units ramp down 34% from 2012 levels by 2030. (See Docket No. RPU-2016-0005, Kitchen Direct Testimony, Confidential Schedule B, Page 9, or Attachment B to this Data Request response.)