STATE OF INDIANA

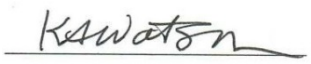
INDIANA UTILITY REGULATORY COMMISSION

VERIFIED PETITION OF NORTHERN INDIANA PUBLIC SERVICE COMPANY FOR (1) APPROVAL OF AND A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR A FEDERALLY MANDATED ENVIRONMENTAL COMPLIANCE PROJECT; (2) AUTHORITY TO RECOVER FEDERALLY MANDATED COSTS INCURRED IN CONNECTION WITH THE ENVIRONMENTAL COMPLIANCE PROJECT; (3) APPROVAL OF THE ESTIMATED FEDERALLY MANDATED COSTS ASSOCIATED WITH THE ENVIRONMENTAL COMPLIANCE PROJECT; (4) AUTHORITY FOR THE TIMELY RECOVERY OF 80% OF THE FEDERALLY MANDATED COSTS THROUGH RIDER 787 – ADJUSTMENT OF FEDERALLY MANDATED COSTS AND APPENDIX I – FEDERALLY MANDATED COST ADJUSTMENT FACTOR; (5) AUTHORITY TO DEFER 20% OF THE FEDERALLY MANDATED COSTS FOR RECOVERY IN NIPSCO'S NEXT GENERAL RATE CASE; (6) APPROVAL OF SPECIFIC RATEMAKING AND ACCOUNTING TREATMENT; (7) APPROVAL TO DEPRECIATE THE ENVIRONMENTAL COMPLIANCE PROJECT ACCORDING TO PREVIOUSLY APPROVED DEPRECIATION RATES; AND (8) APPROVAL OF ONGOING REVIEW OF THE ENVIRONMENTAL COMPLIANCE PROJECT; ALL PURSUANT TO IND. CODE § 8-1-8.4-1 ET SEQ., § 8-1- 2-19, § 8-1-2-23, AND § 8-1-2-42.	**) CAUSE NO. 44872**

SUBMISSION OF REDACTED DIRECT TESTIMONY & PUBLIC EXHIBITS

Sierra Club, by counsel, respectfully submits the following redacted prefiled testimony of Jeremy Fisher, PhD, and public exhibits in the above captioned Cause to the Indiana Utility Regulatory Commission ("Commission").

Respectfully submitted,



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CERTIFICATE OF SERVICE

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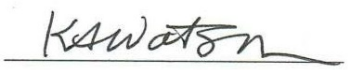

Kathryn A. Watson

BEFORE THE
Indiana Utility Regulatory Commission

VERIFIED PETITION OF NORTHERN INDIANA PUBLIC SERVICE COMPANY FOR (1) APPROVAL OF AND A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR A FEDERALLY MANDATED ENVIRONMENTAL COMPLIANCE PROJECT; (2) AUTHORITY TO RECOVER FEDERALLY MANDATED COSTS INCURRED IN CONNECTION WITH THE ENVIRONMENTAL COMPLIANCE PROJECT; (3) APPROVAL OF THE ESTIMATED FEDERALLY MANDATED COSTS ASSOCIATED WITH THE ENVIRONMENTAL COMPLIANCE PROJECT; (4) AUTHORITY FOR THE TIMELY RECOVERY OF 80% OF THE FEDERALLY MANDATED COSTS THROUGH RIDER 787 – ADJUSTMENT OF FEDERALLY MANDATED COSTS AND APPENDIX I – FEDERALLY MANDATED COST ADJUSTMENT FACTOR; (5) AUTHORITY TO DEFER 20% OF THE FEDERALLY MANDATED COSTS FOR RECOVERY IN NIPSCO'S NEXT GENERAL RATE CASE; (6) APPROVAL OF SPECIFIC RATEMAKING AND ACCOUNTING TREATMENT; (7) APPROVAL TO DEPRECIATE THE ENVIRONMENTAL COMPLIANCE PROJECT ACCORDING TO PREVIOUSLY APPROVED DEPRECIATION RATES; AND (8) APPROVAL OF ONGOING REVIEW OF THE ENVIRONMENTAL COMPLIANCE PROJECT; ALL PURSUANT TO IND. CODE § 8-1-8.4-1 ET SEQ., § 8-1- 2-19, § 8-1-2-23, AND § 8-1-2-42.	**CAUSE NO. 44872**

Direct Testimony of
Jeremy I. Fisher, PhD

On Behalf of Sierra Club

PUBLIC VERSION

April 3, 2017

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1. INTRODUCTION AND PURPOSE OF TESTIMONY

Q Please state your name, business address, position, and upon whose behalf you are testifying in this case.

A My name is Jeremy I. Fisher. I am a Principal Associate with Synapse Energy Economics, Inc. ("Synapse"), which is located at 485 Massachusetts Avenue, Suite 2, in Cambridge, Massachusetts. I am testifying on behalf of Sierra Club.

Q Have you testified before the Indiana Utility Regulatory Commission previously?

A Yes. I testified in various recent applications for Certificate of Public Convenience and Necessity ("CPCN") before this Commission, including Causes 44242, 44339, 44446, and most recently in Indiana Michigan Power Company's ("I&M") CPCN for the installation of environmental controls at Rockport 2, Cause 44871. In October 2013, I was invited to be a speaker at the Indiana Utility Regulatory Commission's ("IURC" or "Commission") Emerging Issues in Integrated Resource Planning ("IRP").

I describe my qualifications in attachment Exhibit JIF-01. My full curriculum vitae is attached as Exhibit JIF-02.

Q What is the purpose of your testimony?

A In this case, Northern Indiana Public Service Company ("NIPSCO" or "Company") seeks a CPCN to install various controls for compliance with U.S. EPA's Coal Combustion Residual ("CCR") rule and Effluent Limitation Guidelines ("ELG") at Schahfer units 14 & 15 near Wheatfield, Indiana, and Michigan City unit 12 in Michigan City, Indiana. My testimony assesses the economic analysis conducted by NIPSCO, and examines if the installation of controls at this time is in the interest of the utility's ratepayers. I also examine the Company's qualitative measures used to justify the Company's preferred portfolio outcome.

Q What are your findings with respect to the Company's decisions underlying this application?

A In general, the analysis conducted by NIPSCO and presented by NIPSCO witness Douglas does not support the Company's decision to retain Schahfer 14 & 15 and Michigan City, while retiring Bailly 7 & 8 and Schahfer 17 & 18. Instead, the Company's analysis, as presented, unequivocally finds that ratepayers are benefited through the retirement of both Bailly and Schahfer plants—including Schahfer 14 & 15. Even using the Company's projection for capacity prices—which, is I describe below, are flawed—indicates a substantial benefit for ratepayers from the retirement of Bailly, Schahfer, and Michigan City.

The benefit accrued to the Company's ratepayers if all of Schahfer is retired is significant: according to the Company's own assessment, ratepayers will lose $326 million (2016$) by following the Company's preferred portfolio instead of the lower cost options. To further confirm this finding, I assess the Company's likely total net revenues at Schahfer plant in 2016, and estimate that the plant likely lost around [redacted] in 2016 alone. These findings are discussed in Section 2 of my testimony.

The Company's core modeling analysis, while conducted using a generally sound methodology, suffers from two substantial shortcomings that both indicate the costs likely to be incurred by ratepayers are much larger than $326 million if the entire Schahfer plant is not retired.

First, the Company's analysis fails to assess reasonable alternatives, thus overstating the benefit of the existing fleet. Second, the Company's analysis relies on arbitrary and non-plausible capacity prices, well above those claimed in its recent 2016 IRP. I will show that, for the purposes of this retirement analysis, the Company failed to present to the Commission the capacity market forecasts provided to it by PIRA Energy Group ("PIRA"), the entity that produced all of the other commodity price forecasts used by NIPSCO in this proceeding. The PIRA capacity price forecast is more consistent with reasonably expected market

conditions. Substituting the PIRA capacity price forecast, I conclude that NIPSCO's proposal would cost ratepayers $753 million more than an option that includes retiring Schahfer 14 & 15 and Michigan City. These findings are discussed in Sections 3 and 4 of my testimony.

The decision to retire these plants is not entirely driven by the environmental regulations facing Bailly, Schahfer, and Michigan City. A re-analysis indicates that ratepayers will see a $310 million benefit through the retirement of the full coal fleet even if no ELG or CCR capital investments are required at Schahfer and Michigan City. These plants are already today—absent any new capital investment requirement—generally higher cost than available alternatives and NIPSCO's own projections show that they are likely to remains so. These findings are discussed in Section 5 of my testimony.

The Company's decision to not retire its coal fleet is largely based on a poorly formulated and unsubstantial "qualitative" assessment, which is largely focused on preventing NIPSCO job losses and maintaining tax payments to local counties. The construction and presentation of the scorecard that NIPSCO used to rank portfolio options is misleading and incomplete. The deficiencies in the scorecard are discussed in Section 6 of my testimony.

The Company failed to quantify the implication of any of its scorecard's components, including its most prominent concern: the loss of NIPSCO jobs and reduced property tax payments. I find that the Company could actually continue to pay—in full—all local taxes and a full compensation package to its existing generation employees (including those no longer required after the retirements) and still produce substantial savings to ratepayers by retiring its entire coal fleet.

Table 1, below, shows the Company's Base Case assessment of the costs of each retirement Portfolio relative to Portfolio 4, the Company's preferred option and the basis of its application for the proposed CPCN.

Table 1. Net present value (NPV) of NIPSCO portfolios (Base Case) under incremental study scenarios (million 2016$). Cost/(savings) relative to Portfolio 4.

Portfolio	As Filed (2014$)	As Filed (2016$)	PIRA Capacity Prices (2016$)	PIRA Capacity Prices, No CCR/ELG (2016$)	PIRA Cap Prices, Pension + PILOT (2016$)
1: No Retirement	$233	$269	$591	Not available	$419
2: Retire Bailly (2023)	$188	$217	$497		$378
3: Retire Bailly (2018)	$31	$36	$295		$245
4: Retire Bailly (2018), Schahfer 17, 18 (2023)	$0	$0	$0	$0	$0
5: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023)	($282)	($326)	($621)	($269)	($362)
6: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023) MI City (2023)	($282)	($326)	($753)	($310)	($419)

Finally, I assess that the Company's preferred Portfolio 4 would result in residential bills approximately $37 higher per year (2016$)[1] than Portfolio 6 under the Company's assumptions and PIRA capacity price projections.

Q What are your recommendations to this Commission with respect to the application for CPCN?

A The Company's own analysis does not support the continued operation of any of its coal units after 2023. The change required in the generation portfolio of the Company is substantial, and should not be taken lightly. However, the costs expected to be incurred—not only to meet the ELG and CCR rules, but simply to keep the Company's coal fleet operational at its low current and projected capacity factors—are not justifiable at this time. Indeed, the Company should begin now to assess low-cost options for the procurement of energy and capacity, and begin building towards a sustainable long-term, low-cost future.

[1] Flat average 2018-2037.

I recommend that this Commission:

1. Affirm the decision of the Company to retire Bailly 7 & 8;
2. Affirm the decision of the Company to retire Schahfer 17 & 18;
3. Deny the application for CPCN to construct incremental CCR and ELG controls at Schahfer 14 & 15, but provide for the Company to comply with CCR and ELG requirements for long-term mitigation and monitoring, as required by law;
4. Deny the application for CPCN to construct incremental CCR and ELG controls at Michigan City 12, but provide for the Company to comply with CCR and ELG requirements for long-term mitigation and monitoring, as required by law;
5. Require that NIPSCO file an updated IRP or equivalent, seeking cost-effective and long-term sustainable generation and capacity replacements between now and 2023 in the absence of the Company's coal fleet.

2. COMPANY'S ANALYSIS SUPPORTS FULL RETIREMENT OF SCHAHFER POWER PLANT

Q What is the Company's proposal with respect to its coal-fired generating fleet?

A NIPSCO proposes to install ELG and CCR controls at Michigan City 12 and Schahfer 14 and 15, while closing Bailly 7 and 8, and Schahfer 17 and 18.

Q Is NIPSCO's proposal supported by an economic analysis?

A Yes, although the results of the economic analysis very clearly point to a different solution than selected by the Company. NIPSCO's analysis finds a substantial incremental benefit in retiring all four Schahfer units in each and every case reviewed by the Company.

Mr. Douglas testifies that he reviewed six different retirement portfolios across 15 different sensitivities. The six portfolios test different combinations of unit

retirements, starting with no retirements ("Portfolio 1"), and then incrementally adding Bailly (in "Portfolio 2" and "Portfolio 3"), Schahfer 17 & 18 ("Portfolio 4"), Schahfer 14 & 15 ("Portfolio 5"), and then Michigan City 12 (in "Portfolio 6"). The results of Mr. Douglas's analysis are shown in Attachment 5-A to his testimony.

In each and every sensitivity, Portfolio 5—in which all of Schahfer is retired—saves ratepayers from $178 to $421 million relative to the Company's preferred Portfolio 4, in which only half of Schahfer is retired. Mr. Douglas's Attachment 5-A, attached as Exhibit JIF-03, shows the differences between the cost of the Company's preferred Portfolio 4 against all other Portfolios.

In the Company's base case, Mr. Douglas's analysis shows a benefit of $282 million from retiring all Schahfer units, while in the case in which there is no cost to carbon dioxide (CO_2) emissions, Mr. Douglas's analysis shows a benefit of $380 million.[2]

Aware that NIPSCO is dramatically departing from traditional least-cost decision making, Mr. Douglas downplays these unequivocal results stating:

> In 13 out of 15 risk cases analyzed, NIPSCO's preferred portfolio, reflecting CCR and ELG compliance capital on Units 12, 14, and 15, is the third least expensive option of the generation portfolios analyzed and was the fourth lowest cost combination in the remaining two cases.[3]

Mr. Douglas's statement is misleading, at best. In <u>every</u> case, the least expensive portfolio involves the retirement of all four units of Schahfer. In fact, according to the Company's own analysis, its preferred portfolio only captures about half the expected ratepayer benefits of retiring all four Schahfer units. For example, in the

[2] This non-intuitive result is the outcome of the commodity price forecasts provided to NIPSCO by PIRA Energy Group. In the case without a carbon price, PIRA forecasts substantially lower gas and market prices, thus driving down the relative economics of NIPSCO's coal units.
[3] Direct Testimony of Mr. Daniel Douglas, page 15 at 6-10.

Company's base case, preferred Portfolio 4 saves ratepayers $233 million relative to the no-retirement portfolio 1; but ratepayers see a $514 million benefit if all of Schahfer is retired.

Q Does it make sense that Schahfer appears non-economic in the Company's analysis?

Yes. Schahfer's short-term market competitiveness has been declining substantially over the last half decade, as shown by the dropping capacity factors in Figure 1, below. Large steam-fired plants like Schahfer incur very large fixed costs to remain online, and thus are unable to recover their own costs as they become less competitive. As capacity factors drop, these plants reach a space in which ratepayers are paying more in fixed costs than the plant can reasonably recover in diminished energy revenues and capacity prices. At that point, an owner should take a hard look at whether it is worth keeping a plant around, irrespective of its large capital requirements.

Figure 1. Capacity factor for Schahfer Plant 1999-2016 (US EPA)[4] and 2015-2037 (NIPSCO Base Case, Portfolio 1)[5]

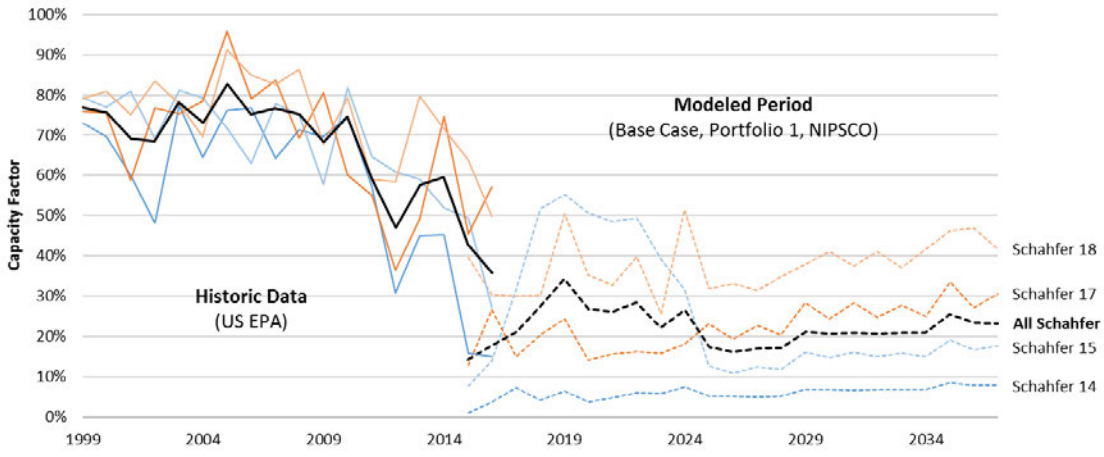


Figure 1 also shows that the Company projects that, under its current base case conditions, the capacity factor of Schahfer plant is not expected to recover in the

[4] Source: US EPA Clean Air Markets Division (CAMD) Air Markets Program Data (AMPD)
[5] Source: SC 1-008, tab "Generation."

foreseeable future. The modeled output of the plant remains extremely low through the analysis period (2015-2037). In fact, the expected output of Schahfer 14 (and 15 after 2025) is effectively that of a peaking power plant. The scale of the investment contemplated in this case is inappropriate to maintain a high fixed cost thermal boiler for the purposes of meeting long-term capacity requirements, and the Company's own analysis and modeled outcomes confirm this finding.

Q Why does the Company reject the lower cost portfolio where all of Schahfer is retired?

A Mr. Douglas shows a qualitative scorecard that seeks to account for "employee churn, reduced property taxes, and portfolio diversity" countervailing against ratepayer benefits. In NIPSCO's opinion, these factors overwhelm the $282 million ratepayer benefits of retiring all four coal units at Schahfer.

Q Do you agree that these three factors should overwhelm the ratepayer benefits of retiring all four Schahfer units?

A No. While I agree that employment and property taxes are important issues to NIPSCO as an employer and in particular to Jasper County, I think that the Company's assessment here is substantially misconstrued. Later in my testimony, I'll show that NIPSCO could—hypothetically—pay full salaries and benefits to all its staff at Schahfer and continue to pay full property taxes to Jasper County and yet still generate a substantial benefit to ratepayers by retiring all four Schahfer units in 2023. In addition, I'll show that the "portfolio diversity" measure is an artifact of NIPSCO's analysis method and not a reasonable consideration.

Q Is NIPSCO's economic analysis sound?

A In general, NIPSCO's fundamental analysis methodology was sound, although it suffers from several notable—but readily correctable—flaws that I will discuss later.

NIPSCO's analysis was conducted using Strategist, a dated but still widely used resource planning model. The Company properly constructed portfolios that tested incremental retirements, working down from the least economic plant (Bailly) to Michigan City, which requires the least capital to remain online. The Company's analysis sought to minimize the number of changing variables between the portfolios, resulting in a relatively clean analysis.

The Company assessed the forward-looking cost of each portfolio from 2015 to 2037, without end effects. I would not expect end effects to substantially change the outcome of NIPSCO's analysis.

Q What are some of your concerns with the economic analysis conducted by NIPSCO?

A I have three substantial concerns with NIPSCO's analysis, two of which are readily addressable.

1. NIPSCO's analysis failed to assess any alternatives to retiring coal units aside from market purchases, providing a distorted view of options available to the utility and potentially resulting in higher costs;
2. NIPSCO's analysis starts from 2015, inappropriately including two historic years, and discounts costs back to 2014, thereby making the retirements look less cost effective; and
3. NIPSCO assumed that it would have to purchase capacity from MISO's market at a price that is both unjustified and inconsistent with the Company's own recently filed 2016 IRP.

Without using the Company's model structure, or creating a parallel model, it is difficult to assess the exact composition of a reasonable alternative portfolio. Correcting the discounting assumption and making the Company's capacity price assumptions consistent with the IRP are readily achieved, as I have done.

First, I will discuss the discounting error in the Company's analysis. Section 3 discusses the implications of not assessing reasonable alternatives to the retirements, and Section 4 discusses the capacity price inconsistencies.

Q What is your correction for the Company's discounting assumption?

A Mr. Douglas's analysis presents results in 2014 dollars, and his stream of discounted costs includes both 2015 and 2016—years which should not be assessed in a forward-looking analysis. By discounting back to 2014, Mr. Douglas significantly reduces and misstates the magnitude of ratepayer savings achieved by retiring the existing coal fleet. For all subsequent sections, I will show results in the correct 2016 dollar year (excluding 2015 and 2016 analysis years), except where otherwise noted. Table 2, below, shows the Base Case values for each portfolio examined by the Company in 2014$ (as used by the Company) and 2016$.[6]

Table 2. Net present value (NPV) of NIPSCO portfolios (Base Case) with 2014 and 2016 discounting (in million $). Cost/(savings) relative to Portfolio 4.

Portfolio	M 2014$ Total NPV (as filed)	*Relative to Portfolio 4*	M 2016$ Total NPV (as filed)	*Relative to Portfolio 4*
1: No Retirement	$12,288	*$233*	$12,743	*$269*
2: Retire Bailly (2023)	$12,244	*$188*	$12,692	*$217*
3: Retire Bailly (2018)	$12,087	*$31*	$12,510	*$36*
4: Retire Bailly (2018), Schahfer 17, 18 (2023)	$12,056	*$0*	$12,474	*$0*
5: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023)	$11,774	*($282)*	$12,148	*($326)*
6: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023) MI City (2023)	$11,774	*($282)*	$12,148	*($326)*

[6] Values in 2014$ are identical to those shown in NIPSCO Attachment 5-A. Please note that NIPSCO Attachment 5-A is in thousands of dollars.

Appropriately discounting the Company's own analysis to 2016$, and making no other changes or corrections, Mr. Douglas's analysis indicates that ratepayers would be expected to save around $326 million by retiring all four units of Schafer (NPV 2017-2037). The Company's base case, unadjusted, does not show an incremental benefit of retiring Michigan City 12.

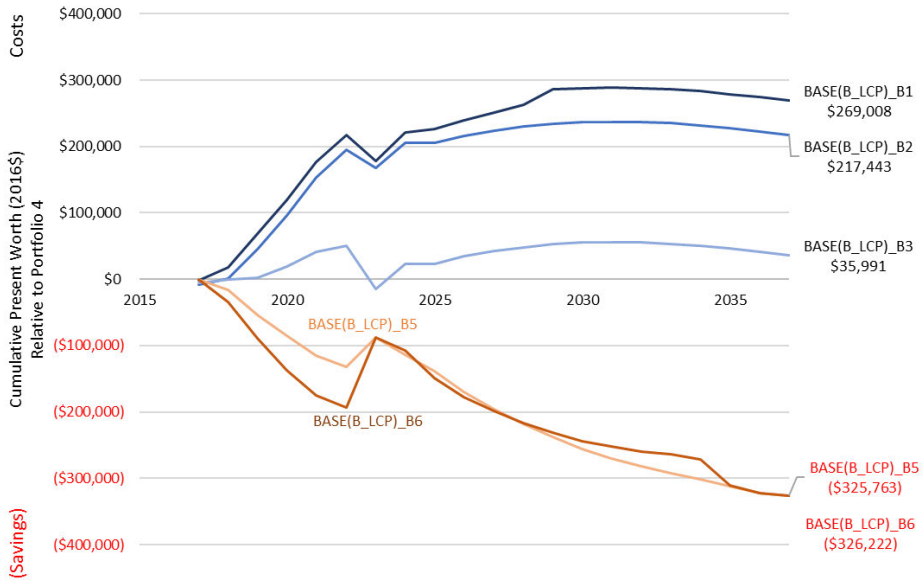
Q Is the ratepayer benefit of retiring Schahfer only realized in the long run in the Company's analysis?

A No. According to the Company's analysis, NIPSCO ratepayers see an immediate benefit with the choice to retire Schahfer in 2023. In the near term, ratepayers avoid three hundred million dollars in environmental capital costs,[7] while over the long run ratepayers avoid the fixed costs of maintaining a coal plant that NIPSCO does not expect to dispatch (see Figure 1 above).

Figure 2, below, shows the cumulative present worth ("CPW") of each of the environmental compliance portfolios modeled by NIPSCO relative to the Company's preferred Portfolio 4. Positive values indicate a net cost relative to Portfolio 4, while negative values indicate net savings relative to Portfolio 4. Both Portfolios 5 & 6 show substantial savings through each and every analysis year relative to Portfolio 4.[8]

[7] NIPSCO Attachment 4-A. Sum of Schahfer Remote Ash Conveying (U14 & U15), Material Management Area, Process and Storm Water Pond, Piping Bottom Ash to FGD, and Zero Liquid Discharge ("ZLD").
[8] The brief uptick in 2023 occurs as NIPSCO incurs a cost to decommission both Schahfer units.

Figure 2. Cumulative present worth (CPW) of NIPSCO environmental compliance scenarios (M 2016$)[9]



The savings associated with the retirement of all of Schahfer in Portfolios 5 & 6 are likely underestimated in NIPSCO's analysis due to the nature of the Company's replacement analysis and the Company's overstated capacity price assumption. I'll discuss each of these in turn, below.

Q Do you have other evidence that Schahfer is a ratepayer liability today?

A Yes. I ran an assessment of the net revenues to Schahfer in 2016, and found that the plant likely lost around [redacted] in 2016 relative to the market. This is not particularly surprising given Schahfer's dismal 2016 plant-wide 36% capacity factor. A plant with large fixed costs such as Schahfer cannot be expected to generate positive cash flow when dispatching at such low levels.

I pulled MISO real-time market prices at the Schahfer hub, as well as hourly gross generation at each Schahfer unit from the U.S. EPA's Air Markets Program Dataset ("AMPD") to estimate total gross energy revenues. I pulled MISO Zone 6 market capacity prices for 2015/2016 and 2016/2017 to estimate capacity

[9] Data as per Sierra Club Request 1-008 Attachment A, tab "PRV RR" *[sic]*.

revenues. For costs, I used the Company's model results to estimate fuel, variable O&M, and fixed O&M costs. [redacted] below, shows the estimated revenues and costs, as well as specific sources. While this estimate is by no means perfect, it is a reasonable representation of the revenue stream that would have been available had Schahfer been a merchant plant attempting to compete in the market. The plant's performance in 2016 is not substantially different than its expected and modeled performance in the Company's forward-looking model.

[redacted]. Calculated net revenues for Schahfer plant in 2016 ('000 2016$)

	Unit 14	Unit 15	Unit 17	Unit 18
Capacity Factor (%)	15%	27%	57%	50%
Gross Energy Revenues[10]	[redacted]	[redacted]	[redacted]	[redacted]
Capacity Revenues[11]	[redacted]	[redacted]	[redacted]	[redacted]
Fixed Costs[12]	[redacted]	[redacted]	[redacted]	[redacted]
Variable O&M[13]	[redacted]	[redacted]	[redacted]	[redacted]
Fuel Cost[14]	[redacted]	[redacted]	[redacted]	[redacted]
Net Revenues	[redacted]	[redacted]	[redacted]	[redacted]
			Total	[redacted]

It is notable that in 2016, Schahfer 17 and 18—the units NIPSCO proposes to close—performed markedly better than Schahfer 14 and 15. Regardless, all four units at Schahfer lost substantial revenues in 2016.

[10] Source: Gross generation: EPA Air Markets Program Data (AMPD, hourly 2016). Real time energy price: MISO (hourly).
[11] Source: Capacity: SC 1-008 Attachment, Case 1. Capacity value: MISO auction results, zone 6. https://www.misoenergy.org/Library/Repository/Report/Resource%20Adequacy/AuctionResults/2016-2017%20PRA%20Summary.pdf and https://www.misoenergy.org/_layouts/MISO/ECM/Redirect.aspx?ID=198356
[12] Source: SC 1-008 Conf Attachment – Base Case, Retirement Portfolio 1. Fixed costs.
[13] Source: *Id.* VOM ($/MWh) * actual 2016 generation
[14] Source: *Id.* Modeled fuel cost / modeled generation * actual 2016 generation

3. NIPSCO ANALYSIS FAILS TO ASSESS REASONABLE ALTERNATIVES

Q What types of alternatives were the coal units assessed against in the Company's economic assessment?

A The coal units were compared to the purchase of market-based energy and a capacity price. In the 2016 IRP, NIPSCO explained that, in the environmental compliance assessment, the cost of the coal units were assessed against gas-fired combined cycle units:

> As part of the economic analyses, the incremental cost of an existing unit was compared to the expected cost of a generic, repeatable replacement combined cycle gas turbine (CCGT) sited in Indiana. A CCGT was selected as a proxy because of its favorable levelized cost of energy, reliability, dispatchability, and straightforwardness to plan, permit and build. The proxy CCGT was used for retirement analyses only.[15]

Mr. Douglas's initially filed direct testimony provided a virtually identical explanation, stating:

> In the CCR/ELG and retirement analysis, the total cost of complying, maintaining, and operating an existing unit was compared to the expected cost of retiring a unit and adding a new, generic, repeatable, replacement CCGT sited in Indiana. A CCGT was selected as a proxy because of its favorable levelized cost of energy, reliability, dispatchability, and straightforwardness to plan, permit, and build. The cost of replacing a unit with a CCGT included ongoing variable costs, ongoing fixed costs, and the cost of any future environmental controls for the replacement unit.[16]

[15] Exhibit JIF-04, NIPSCO 2016 IRP, Section 8.4.1.2.
[16] Initially filed (uncorrected) Direct Testimony of Mr. Daniel Douglas, page 13 at 13 to page 14 at 2.

Neither of these explanations is correct or accurate. The Company assessed the costs of the coal units against market energy purchases and capacity purchases, assumed to be priced at $282/MW[17] in 2016, 2017, and 2018, rising at three percent (3%) inflation thereafter. Mr. Douglas's revised testimony strikes mention of the CCGT alternative, instead simply stating that the market assumptions serve as a "proxy."[18]

Q What is wrong with the assumption that market energy and capacity can serve as proxy replacement resources?

The assumption that "the market" is a single ubiquitous resource rather than the representation of a diverse set of generators gives the false impression that the only alternative to a heavily coal-dependent utility is an equally unhedged reliance on a different single resource—in this case the market or an assumed gas-fired resource. In reality, as a proxy, the market assumption should have been compared against a portfolio of low cost resources.

Q Does the Company have the ability to review more optimal future resource portfolios?

A NIPSCO's resource planning model, Strategist, has the ability to assess optimal future resource portfolios, and NIPSCO actually used that ability in the 2016 IRP. In describing the modeling methodology of the IRP, the Company touts the optimization—or least-cost portfolio planning—capability of Strategist:

> NIPSCO used a capacity expansion model called ABB *Strategist*® as the optimization tool for performing the resource optimization. For each optimization run, the tool generates a number of resource portfolios as modeling results and ranks them from lowest to highest cost based on the objective function of NPVRR.[19]

[17] Revised testimony of Mr. Daniel Douglas, page 13 at 18.
[18] *Id*., page 13 at 13-15.
[19] Exhibit JIF-05, NIPSCO 2016 IRP, Section 8.3.2.

Going into further depth later, the Company describes the detail available to the model in selecting diverse, least-cost alternative plans in Strategist:

> The resource alternatives utilized in this IRP include 26 demand-side and about 20 supply-side options. To ensure that all resources are assessed on a comparable basis, the resources were optimized sequentially to allow all resources to be evaluated in each optimization run. Each resource option was individually and fully selectable during each optimization run.[20]

Yet in this CPCN proceeding, the Company made a distinct decision not to use that capability, thus overstating the cost of the coal unit replacements, and failing to seek a diverse and robust replacement portfolio.

Q What is your evidence that a non-market alternative resource portfolio would have been lower cost than the market assumption made by the Company?

A The Company's own modeling in the 2016 IRP demonstrates that non-market alternatives—at least as defined by NIPSCO—resulted in lower cost portfolios. In the IRP, NIPSCO created least-cost optimized portfolios using "traditional utility planning,"[21] and also conducted non-optimized modeling similar to that presented in the instant case. We can directly compare two portfolios created by the Company in the 2016 IRP with identical retirement schedules: the coal-retirement Portfolio 4 (i.e., the Company's preferred portfolio of the instant case) and the Company's least cost expansion plan from the IRP.

[20] Exhibit JIF-06, NIPSCO 2016 IRP, Section 8.5.1.
[21] Exhibit JIF-05, NIPSCO 2016 IRP, Table 8-2.

The Company's Strategist model outputs indicate that retirement Portfolio 4 has a net present value of [redacted] million,[22] [redacted] million more expensive than the optimized portfolio at [redacted] million.[23]

I draw two conclusions from this stark difference in the 2016 IRP.

1. NIPSCO's market "proxy" is significantly overpriced relative to the Company's own expectations about new generation resources; and thus
2. NIPSCO's failure to provide an optimized replacement portfolio in this CPCN proceeding likely resulted in a substantial understatement of the benefits of additional coal plant retirements.

Q Are there other reasons why a reasonable replacement portfolio would have impacted the Company's application substantially?

A Yes. A large part of the Company's justification for rejecting the lower cost retirement scenarios was on the basis of the replacement portfolio's lack of diversity, and the likely job impacts of replacing the existing fleet. Both of these factors are heavily influenced by the potential replacement portfolio.

With respect to diversity, a replacement portfolio comprised of renewable energy options, efficiency, storage, thermal resources, and market purchases provides extraordinary diversity, insulation from market volatility, the ability to hedge fuel, and flexibility.

The Company's assessment of job impacts—which, as described below, is incomplete—would likely be quite different if informed by a reasonable replacement portfolio. Rather than simply assessing job losses, the Company could have determined what kinds of staff requirements it would have for the construction, operation, and maintenance of new utility resources and remediation

[22] Exhibit JIF-07, CAC Request 2-001 Confidential Attachment A. File "CONFIDENTIAL - Base Retirement Analysis Case 4 REP File.REP," line 26,135.
[23] Exhibit JIF-08, NIPSCO 2016 IRP, Table 8-4: Base Scenario Expansion Plan. See also Exhibit JIF-09,CAC Request 2-001 Confidential Attachment A. File "CONFIDENTIAL - Base Case Fossil Fuel Optimization REP File.rep" line 26,400.

and/or redevelopment of property at retiring coal—both at existing plant sites and elsewhere in northern Indiana.

4. CAPACITY PRICES ARE INCONSISTENT WITH THE IRP, INCORRECTLY CALCULATED, AND INFLATED

Q What is the source of NIPSCO's price for capacity as used in the economic analysis supporting this case?

A NIPSCO's record is very muddy on this point. In its initial application, NIPSCO's stated that its commodity prices, including capacity prices, were provided to the Company by PIRA Energy Group for the purposes of the IRP, and then used again in this CPCN's retirement analysis. In response to discovery questions from Sierra Club and the Industrial Group, the Company reversed course and noted that capacity price projections were actually separately developed by NIPSCO.

In the application, Mr. Douglas states that

> The analyses used commodities price assumptions as described in NIPSCO's 2016 IRP. These include coal prices for two types of coal, Powder River Basin and Illinois Basin, MISO Indiana capacity prices, and on peak and off-peak market energy prices.[24]

The Company submitted revised testimony on March 15, 2017, yet this statement was not revised. NIPSCO further affirmed this view in response to discovery, noting that "commodity assumptions used in the direct testimony of Mr. Douglas (Petitioner's Exhibit No. 5) are identical to those used in the 2016 IRP."[25]

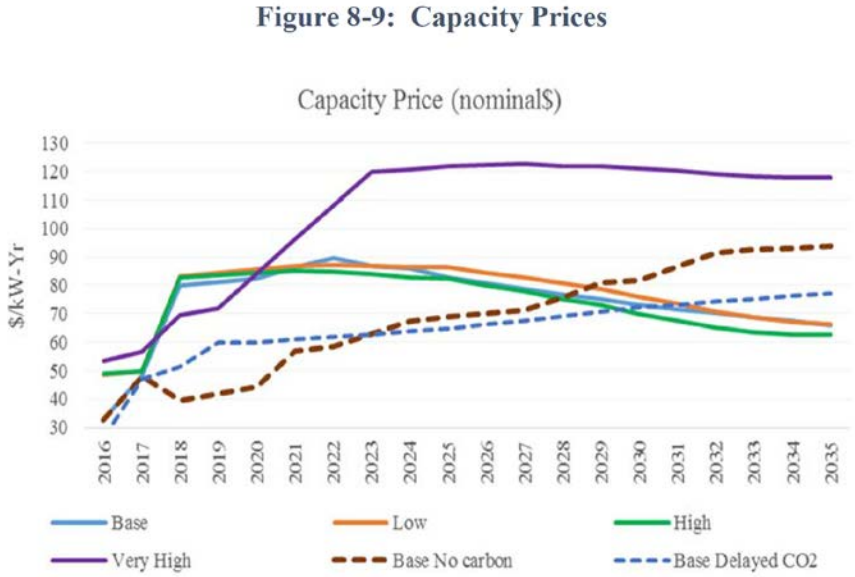
[24] Revised Direct Testimony of Mr. Daniel Douglas, page 13 at 1-4. Emphasis added.
[25] Exhibit JIF-10, Response to SC DR 2-003(a) ("Commodity assumptions used in the direct testimony of Mr. Douglas (Petitioner's Exhibit No. 5) are identical to those used in the 2016 IRP.")

The 2016 IRP is unequivocal that market capacity prices were provided by PIRA Energy Group,[26] and even provides an explanation to stakeholders with respect to the shape and structure of the PIRA capacity price forecast.[27] In this application, NIPSCO again affirms that the source of the commodity pricing was PIRA Energy Group.[28]

The capacity prices provided by PIRA and presented in the IRP are shown in Figure 3, below.[29] It is notable that these capacity prices vary by sensitivity and, aside from the "Very High" scenario, barely exceed $90/kW-yr in any scenario.

[26] Exhibit JIF-11, NIPSCO 2016 IRP. Page 16. "Market Capacity Price: NIPSCO used information as provided by PIRA Energy Group for long-term forecast of capacity prices at the Indiana Hub." See also, Exhibit JIF-12, IRP Appendix A, Exhibit 1, page 57. "Capacity Price Forecast (MISO IN)" "Source: PIRA Energy Group, NiSource Requested Scenarios 2016."
[27] Exhibit JIF-13, NIPSCO 2016 IRP. Appendix A, Exhibit 4, Meeting 3 Page 27. "[Question] The capacity price forecast chart appears to be counterintuitive. Can you explain? [Answer] In a high pricing environment (in the future), there is incentive for more capacity additions, which will consequently lead to the market being adequately supplied and hence cause capacity prices to plateau or even decline. Please note: these results are from proprietary models."
[28] Exhibit JIF-10, Response to SC DR 2-003(c) ("NIPSCO received commodity pricing from PIRA in Q1 2016.")
[29] Exhibit JIF-14, NIPSCO 2016 IRP. Figure 8-9. Page 121. Described as "long-term projections, *[sic]* of the major commodities on a nominal basis through year 2035 and used as modeling assumptions in the scenario and sensitivity analysis."

Figure 3. Capacity prices in the 2016 IRP as provided by PIRA Energy Group



In modeling the retirement portfolios, NIPSCO overrode PIRA's capacity price projects and instead set the prices at $282/MW-day (2016$), or $103/kW-yr with a 3% inflation rate. On March 6, 2017, NIPSCO affirmed this finding with a discovery response to Industrial Group, and then in Mr. Douglas's Revised Direct Testimony stating that "capacity prices were set at the CONE [Cost of New Entry] price of $282/MW-day with 3% inflation."[30]

Q What does NIPSCO claim this capacity price represents?

A The Company claims that the analysis represents a case in which "the replacement capacity [is] assumed to be purchased in MISO's market and priced at MISO's cost of new entry ("CONE")."

Q Is NIPSCO's override of PIRA's capacity price forecast problematic?

A Yes, for several reasons.

[30] Exhibit JIF-15, Response to IG DR 2-011 and Revised Direct Testimony of Mr. Daniel Douglas, page 13 at 18 through 14 at 1.

1. The $282/MW-day capacity value used by NIPSCO is above the highest capacity market price currently allowed under MISO's rules, and well above current MISO market prices;
2. The use of this arbitrarily high capacity price is inconsistent with NIPSCO's own explanation about the importance of linking capacity prices with fundamental scenario assumptions;
3. The price appears to be erroneously derived and does not represent what NIPSCO claims it does;
4. The growth rate of the capacity value is far above NIPSCO's assumed inflation rate; and
5. Capacity prices could not be sustained at anywhere close to the high levels predicted by NIPSCO, as such high capacity prices would result in a substantial overbuild in the market and subsequently drive down the capacity price.

Overall, it would have been appropriate for NIPSCO to use the capacity market prices provided to it by PIRA and shown in the 2016 IRP, rather than making this substitution with a cost nearly 30% higher than recommended by PIRA in 2018.

Q What is the Cost of New Entry, or CONE?

A Brattle Group, which develops Cost of New Entry, or CONE, estimates for PJM Interconnection, provides a succinct definition:

> CONE represents the first-year total net revenue (net of variable operating costs) a new generation resource would need in order to recover its capital investment and fixed costs, given reasonable expectations about future cost recovery over its economic life.[31]

[31] Brattle Group. 2014. Cost of New Entry Estimates for Combustion Turbine and Combined Cycle Plants in PJM. Available online at: http://www.brattle.com/system/publications/pdfs/000/005/010/original/Cost_of_New_Entry_Estimates_for_Combustion_Turbine_and_Combined_Cycle_Plants_in_PJM.pdf?1400252453

This definition applies for a resource that does not recover any of its costs through other revenue streams, such as energy or ancillary service markets. The term "Gross CONE" is often used to refer to the above definition. The same Brattle Group report goes on to define Net CONE "as the operating margins that a new resource would need to earn in the capacity market, after netting margins earned in markets for energy and ancillary services (E&AS)." Note that a new resource receiving Gross CONE and market revenues for energy and ancillary services would be recovering far more than its costs.

Q Why is a $282/MW-day capacity price above the highest possible MISO market price?

A In MISO's current construct, Gross CONE sets the maximum offer and maximum clearing price in the Planning Resource Auctions ("PRA") in which residual capacity is traded.[32] This cap price represents the least cost effective resource possible—a capacity resource that exists to provide capacity only. NIPSCO acknowledges "this amount is the price cap for capacity in the MISO market and, therefore, the maximum price NIPSCO would be required to pay purchase capacity from the market."[33] In other words, NIPSCO's capacity price assumption, representing the cost of a replacement resource for the retiring coal units, is an extreme upper bound and not a forecast of NIPSCO's opportunity cost for capacity. In fact, NIPSCO's capacity price is well above even Gross CONE expectations. Capacity auctions through May 2017 have already occurred[34] and in MISO Zone 6, of which NIPSCO is a member, CONE was set at $252 and $258 for 2015/2016 and 2016/2017, respectively.[35] Therefore, NIPSCO's forecast of CONE is at least nine percent (9%) over the maximum possible clearing price.

[32] Exhibit JIF-16, MISO. October 2015. Cost of New Entry. PY 2016/17.
[33] Exhibit JIF-17, NIPSCO response to SC 3-002(c).
[34] The MISO planning year runs from June to May.
[35] Exhibit JIF-18, MISO. April 14, 2015. 2015/2016 Planning Resource Auction Results; Exhibit JIF-19, MISO. April 15, 2016. 2016/2017 Planning Resource Auction Results.

Q Have the MISO capacity markets cleared anywhere close to Gross CONE?

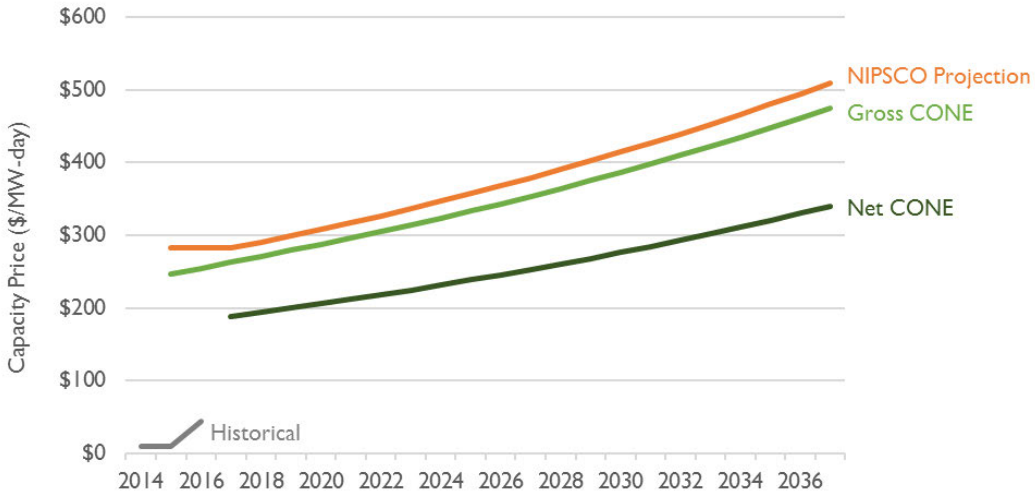
A No, and nor would we—or NIPSCO—expect them to. Gross CONE represents a pure capacity payment—i.e., payment for a resource that exists solely to provide capacity. Most resources provide both capacity and other services, and new generators are made whole at Net CONE prices—substantially below Gross CONE levels. Recognizing the disconnect between Gross CONE and Net CONE, MISO recently sought to change its capacity market construct, setting the auction cap as a multiple of Net CONE, rather than based on Gross CONE.

Recent history speaks for itself. MISO has remained flush on capacity, and in the most recently completed PRA, MISO Zone ("LRZ") 6 cleared at $72/MW-day, or less than 28 percent of Gross CONE (and 25% of NIPSCO's capacity price).[36] In the prior auction, Zone 6 cleared at $3.48/MW-day, or less than two percent (2%) of Gross CONE,[37] and well below Net CONE values.

In a recent report for MISO, the Brattle Group estimated the current Net CONE value for NIPSCO's zone to be $185/MW-day, or about 28 percent below Gross CONE.[38] Figure 4 compares NIPSCO's capacity price assumptions to historical MISO Zone 6 values, and to current Gross CONE and Net CONE values inflated at the same 3% capacity price growth rate assumed by NIPSCO. NIPSCO's projection is four times higher than actual prices in 2016, and increase to $480/MW-day by 2035.[39]

[36] Exhibit JIF-19, MISO. April 15, 2016. 2016/2017 Planning Resource Auction Results.
[37] Exhibit JIF-18, MISO. April 14, 2015. 2015/2016 Planning Resource Auction Results.
[38] Exhibit JIF-20, Brattle Group. July 11, 2016. MISO Retail Choice Solutions: Comparison of Design Options. Page 10.
[39] Exhibit JIF-21, SC DR 3-002 Attachment A.

Figure 4. NIPSCO capacity price assumptions relative to historical values, Gross CONE, and Net CONE



Q How does NIPSCO's capacity price compare against PIRA's commodity prices as stated in the 2016 IRP?

A NIPSCO's capacity prices as used in this assessment are well above the PIRA commodity prices provided for the 2016 IRP, and thus inconsistent with PIRA's method of seeking to have fuel, electricity, and capacity prices that are internally consistent.

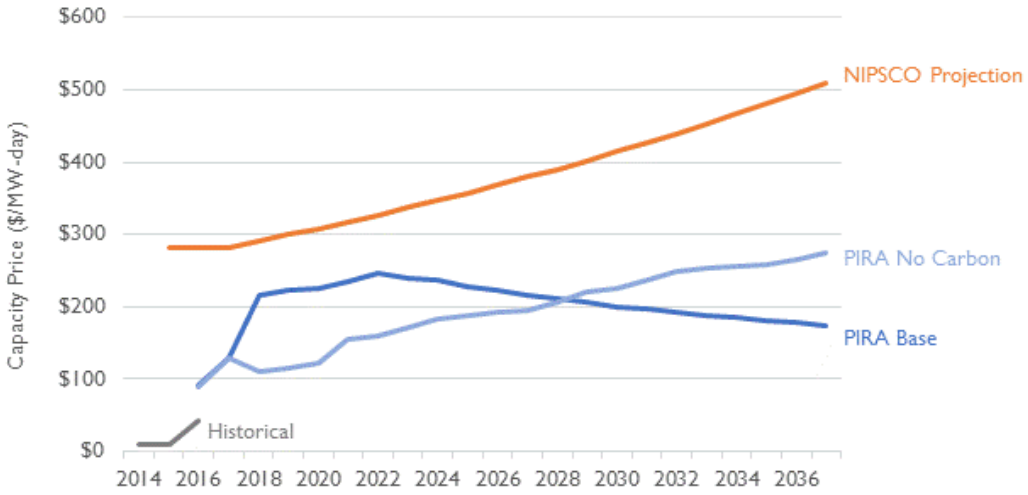
In the IRP, a stakeholder (Mittal) requested that NIPSCO explain the "counterintuitive" falling capacity prices projected by PIRA. NIPSCO responded that the capacity price assumption is necessarily linked to the forecast cost of energy and fuel, stating "in a high pricing environment (in the future), there is incentive for more capacity additions, which will consequently lead to the market being adequately supplied and hence cause capacity prices to plateau or even decline."[40]

NIPSCO's explanation in that instance is consistent with PIRA's capacity prices—and completely inconsistent with NIPSCO's arbitrarily increasing capacity price in this CPCN proceeding. Figure 5 (below) shows NIPSCO's

[40] Exhibit JIF-14, NIPSCO 2016 IRP, Appendix A, Exhibit 4, Meeting 3, page 27.

CPCN capacity price projection relative to the PIRA prices received by NIPSCO and cited in the 2016 IRP.

Figure 5. NIPSCO capacity price assumptions relative to PIRA Base and No Carbon scenarios.



PIRA's Base forecast shown in this chart indicates that capacity prices will increase only as high as approximately $250/MW-day, and will decline from there, dropping below $200/MW-day by 2035. Under PIRA's Base No Carbon scenario, in which there is no national carbon policy, capacity prices gradually increase over the study period, but still remain below $270/MW-day in 2035.[41]

Q How did NIPSCO settle on $282/MW-day as a capacity price?

A The capacity price forecast used in NIPSCO's analysis is based on NIPSCO's projection of the Gross CONE for gas-fired simple-cycle combustion turbines ("CTs") in the MISO region.

NIPSCO provided a workbook "supporting" the derivation of the $282/MW-day capacity price.[42] In that workbook, the $282 value is actually hard coded, and thus we must attempt to intuit the Company's logic. The Company seems to have

[41] Exhibit JIF-14, NIPSCO 2016 IRP at 121.
[42] Exhibit JIF-21, SC DR 3-002 Attachment A.

assessed MISO's preliminary 2015 Gross CONE estimates[43] (including Zone 6 prices at $94,340/MW-yr or $258/MW-day), but chose a higher value ($96,630/MW-yr or $265/MW-day).[44] Then, ignoring both values, NIPSCO appears to have settled on an "assumed starting capacity price" of $282/MW-day, or 9.3% above stated Gross CONE values, inflating at 3% per year. This is clearly an erroneous and arbitrary pricing.

Q What capacity prices should have been used in this analysis?

A I believe that PIRA's capacity prices, as provided to NIPSCO, were probably closer to an accurate forecast and would have been reasonable for these purposes. In this case, I focused my review on PIRA's Base and Base No Carbon projections. Both of these projections substantially over-state actual near-term capacity prices. They each assume 2016 capacity prices of approximately $90/MW-day, whereas actual 2016 MISO Zone 6 capacity prices averaged 43$/MW-day.[45] Likewise, the PIRA forecasts project 2017 capacity prices of approximately $130/MW-day, even though it is already known that the capacity price for the first half of 2017 is $72/MW-day.[46]

Nonetheless, I find that PIRA's Base and Base No Carbon capacity price forecasts generally fall within the range of reasonable future capacity prices. At a minimum, they offer much more defensible projections than those used in the retirement analysis presented by NIPSCO in this application. PIRA's capacity price forecasts also offer the advantage of being consistent with both NIPSCO's IRP assumptions and the other PIRA commodity price forecasts that underlie NIPSCO's retirement analysis.

[43] Exhibit JIF-16, MISO. October 2015. Cost of New Entry. PY 2016/17.
[44] This higher value ($96,630) may have been a typo, combining LRZ 4 ($94,630) and LRZ 5 ($96,430) prices. Irrespective of its derivation, it is 2.4% higher than LRZ 6 prices ($94,340).
[45] Exhibit JIF-14, NIPSCO 2016 IRP at 121; Exhibit JIF-18, MISO 2015/2016 Planning Resource Auction Results; Exhibit JIF-19, MISO 2016/2017 Planning Resource Auction Results.
[46] Exhibit JIF-14, NIPSCO 2016 Integrated Resource Plan at 121; Exhibit JIF-19, MISO 2016/2017 Planning Resource Auction Results.

Finally, substituting PIRA's base capacity price for NIPSCO's results in a final portfolio cost nearly identical to the costs of an IRP portfolio in which the Company acquires natural gas combined cycle units rather than market energy. This suggests that the PIRA base capacity prices are much closer to a representation of a replacement NGCC "proxy" originally intended by NIPSCO's assessment.

For these reasons, I believe that NIPSCO should have relied on the PIRA capacity price forecasts in its retirement analysis.

Q Have you previously presented a capacity price forecast before this Commission?

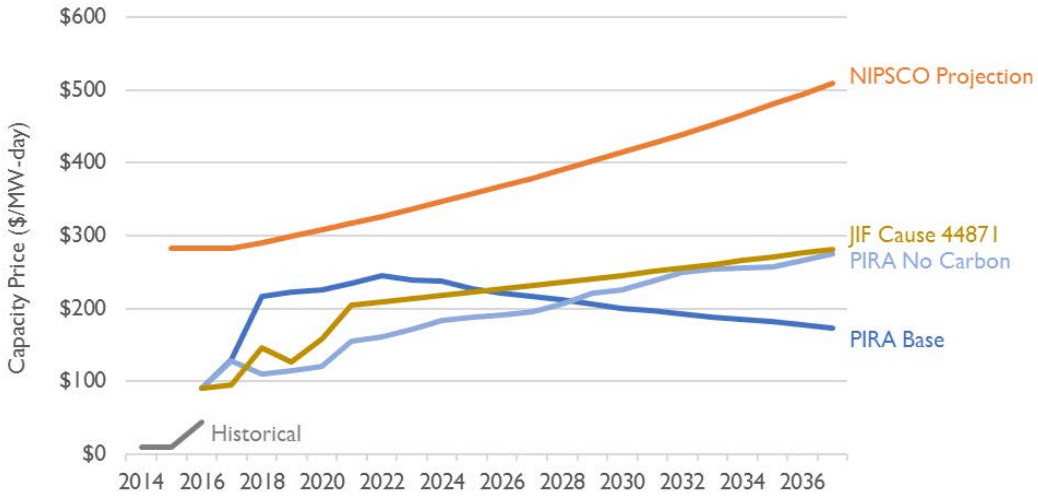
A Yes, I submitted direct testimony in Cause Number 48871 that included what I described as a "relatively conservative" capacity price forecast for the PJM region.[47] That forecast made use of recent PJM auction clearing prices, which have generally been higher than clearing prices in the MISO region.

Q How do PIRA's capacity price forecasts compare to the capacity price forecast you presented in Cause Number 44871?

A Although the capacity price forecast I presented in Cause Number 44871 applies to a different regional capacity market, we would expect that over the long run, prices near the PJM/MISO boundary might converge as generators seek higher pricing opportunities between the two regions. My forecast, relative to PIRA and NIPSCO's forecasts are presented in Figure 6, below.

[47] Exhibit JIF-22, Cause No. 44871 before the Indiana Utility Regulatory Commission. Direct Testimony of Jeremy I. Fisher, February 3, 2017, Pages 34-36.

Figure 6. NIPSCO capacity price assumptions relative to PIRA forecasts and JIF Cause 44871.



It is notable that my prior forecast is fairly similar to PIRA's Base and Base No Carbon forecasts. PIRA's Base forecast is higher than my prior forecast in the short term, and lower beyond 2025. PIRA's Base No Carbon forecast is consistently lower than the forecast I submitted in Cause Number 44871, but the two forecasts converge over time.

Q What is the result of using PIRA's internally consistent capacity price forecast in NIPSCO's assessment?

A The scenarios in which coal is replaced with market energy and capacity are substantially less expensive than as portrayed by Mr. Douglas in Attachment 5-A. Thus the cost of the replacement portfolios are lower, and the relative benefit of the coal retirements substantially higher. Relative to the Company's preferred Portfolio 4, the incremental retirement of Schahfer 14 & 15 (Portfolio 5) would save ratepayers $621 million, while the incremental retirement of Schahfer 14 & 15 and Michigan City results in a ratepayer benefit of $753 million. The results of this re-assessment are shown in Table 44, below.

Table 4. Net present value (NPV) of NIPSCO portfolios (Base Case) in million 2016$; As Filed, and with PIRA capacity prices. Cost/(savings) relative to Portfolio 4.

Portfolio	As Filed	*Relative to Portfolio 4*	PIRA Capacity Prices	*Relative to Portfolio 4*
1: No Retirement	$12,743	*$269*	$12,600	*$591*
2: Retire Bailly (2023)	$12,692	*$217*	$12,506	*$497*
3: Retire Bailly (2018)	$12,510	*$36*	$12,304	*$295*
4: Retire Bailly (2018), Schahfer 17, 18 (2023)	$12,474	*$0*	$12,009	*$0*
5: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023)	$12,148	*($326)*	$11,388	*($621)*
6: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023) MI City (2023)	$12,148	*($326)*	$11,256	*($753)*

5. SCHAHFER IS STILL NON-ECONOMIC IN THE ABSENCE OF CCR AND ELG RULES

Q Is the expected poor economic condition of the Schahfer power plant exclusively a function of the compliance obligations with the CCR and ELG rules?

A No. As demonstrated by recent history and the expected performance of the Schahfer power plant through the Company's study period (see Figure 1, above), Schahfer is—and is expected to remain—non-economic relative to the market and alternative options. As I described previously, a large thermal power plant may not be able to recover its fixed costs if its energy revenues are low. Therefore, Schahfer is already in trouble— irrespective of the capital compliance requirement.

Q But if the ELG and CCR projects weren't required, NIPSCO should still keep operating Schahfer?

A Actually, no. The Company's modeling is remarkably decisive. The entire Schahfer plant loses money for ratepayers year-on-year, irrespective of the ELG and CCR requirements. The environmental compliance obligations serve, in this case, as a trigger to assess the forward-looking economics of NIPSCO's coal fleet, but do not really change the fundamental math.

Q Were you able to assess the value of Schahfer in the absence of the ELG and CCR rules?

A Yes. Using the Company's model data, I was able to back out both the capital and O&M costs for the ELG and CCR rules in Portfolios 4, 5, and 6. I did not have sufficient information to perform the same operation on Portfolios 1, 2, and 3.

While removing the costs of the ELG and CCR rules substantially affected the relative economics of Portfolios 4-6, the change was not sufficient to overcome the negative cash flow inherent in Schahfer plant. Table 55, below, shows the value of Portfolios 4-6 after removing the ELG and CCR obligations.

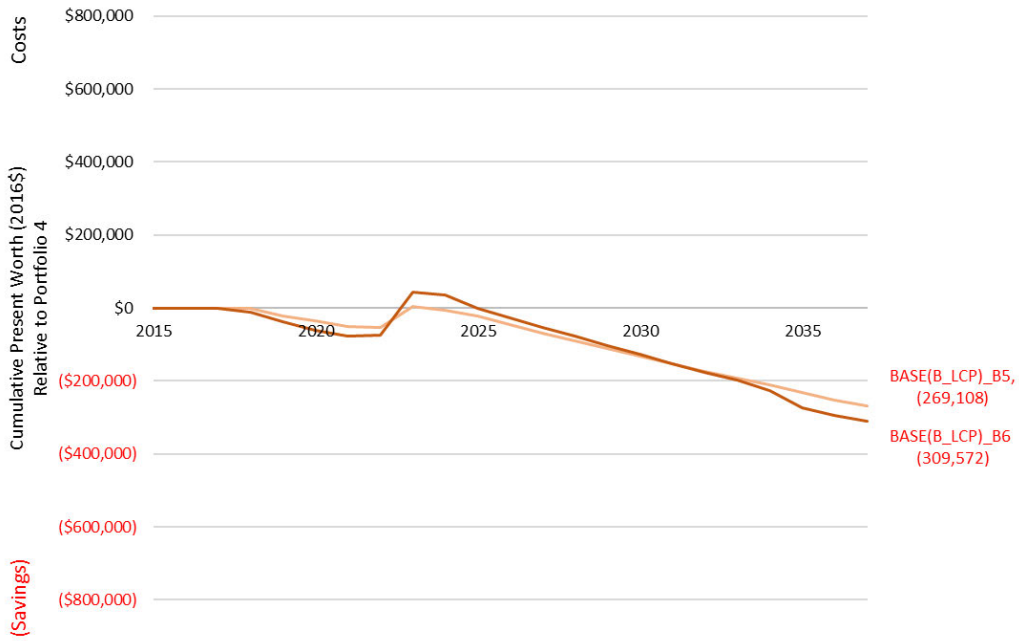
Table 5. Net present value (NPV) of NIPSCO portfolios (Base Case) in million 2016$ with PIRA capacity prices; no ELG/CCR requirement. Cost/(savings) relative to Portfolio 4.

Portfolio	PIRA Capacity Prices	*Relative to Portfolio 4*	No ELG or CCR	*Relative to Portfolio 4*
4: Retire Bailly (2018), Schahfer 17, 18 (2023)	$12,009	*$0*	$11,539	*$0*
5: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023)	$11,388	*($621)*	$11,270	*($269)*
6: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023) MI City (2023)	$11,256	*($753)*	$11,229	*($310)*

Figure 7, below, shows the stream of values for the cumulative present worth of Portfolios 5 and 6 relative to Portfolio 4. The graph demonstrates that Portfolios 5 and 6 offer substantial customer benefits—both over the short term and over the

long run. The brief positive value (i.e., relative cost) is the decommissioning cost, incurred in 2023 when Schahfer retires.

Figure 7. Cumulative present worth (CPW) of NIPSCO environmental compliance scenarios, absent ELG and CCR costs (M 2016$)



6. SCORECARD-BASED DECISION IS MISLEADING AND DEFICIENT

Q What is the basis by which the Company selected Portfolio 4—the retirement of Bailly 7 & 8 and Schahfer 14 & 15, and retrofits at Schahfer 17 & 18, and Michigan City 12?

A The Company relied upon a scorecard, presented on page 17 of witness Douglas's testimony, to evaluate the various portfolios and justify the selection of Portfolio 4. The scorecard assesses five evaluation measures: (1) the cost to customers, or the net present value of revenue requirements, (2) the generation source "diversity" of the portfolio, (3) the number of NIPSCO coal plant employees that

could be reassigned or displaced,[48] (4) the trajectory of carbon dioxide (CO_2) emissions, and (5) impact on the communities affected by coal plant retirements.

Q What is your opinion on the Company's decision scorecard used to select Portfolio 4?

A The Company's scorecard is poorly constructed, suffers from severe bias, and is incomplete. The measures selected for the scorecard are flawed, and the measures are used incorrectly. It should not be relied upon for decision-making purposes. I'll briefly describe the general difficulties of scorecards, then discuss how NIPSCO constructed its scorecard as used in this case. Finally, I'll discuss the individual measures relied upon by NIPSCO in the scorecard and provide some context for the Company's decisions.

Q What is the purpose of using a scorecard in decision-making?

A Scorecards are mechanisms by which a relatively dense amount of information can be condensed and summarized, and can be made indicative and useful—if used correctly. For example, it is common to use scorecards in the evaluation of Requests for Proposals ("RFPs") for services where costs, skills, reputation, and methods, amongst other measures, need to be simultaneously assessed. As both issuers and respondents to RFPs know, choosing a reasonable set of measures and weights can be critical to a good outcome.

Scorecards as decision-making tools require an extraordinary amount of care to prevent inadvertent selection bias. There are two factors that are critical to any scorecard exercise: the selection of measures in the card, and the weighting of those measures. The selection of measures is important to ensure that a balanced and reasonable set of measures are assessed. The weighting of those measures

[48] Exhibit JIF-23, SC 1-012 Supplemental Attachment A, Employee Leave Behind One Sheeter – Final, ("[Q] Will any employees lose their jobs as we retire generation units? [A] The company's goal is to offer work opportunities for all existing employees.")

determines their relative importance. Both selection and weighting must be explicit.

To be used correctly, the selection of evaluation measures and assignment of weights to those measures must be made firm prior to knowing the outcome of the analysis that populates the scorecard. If a scorecard is designed after the outcome of the analysis is known, it is remarkably simple to select measures and weights that favor a pre-selected outcome—whether inadvertent or not.

Evaluation measures must also be carefully constructed. Scorecards can suffer from selection bias (using a set of measures that affirm a pre-determined outcome), red herrings (largely meaningless measures that are meant to dilute an outcome), and double-counting (the use of two or more measures that are fully co-dependent), amongst other flaws.

Q Is the Company's scorecard reasonably constructed?

A No, not at all. The Company's scorecard fails to provide weightings, suffers from double-counting, and inaccurately assesses the values of each measure—even by its own accounting.

The Company scores each measure with a color, stating "a red measure is viewed as worse; a yellow is better; and a green measure is viewed as good."[49] The Company states that it selected Portfolio 4, representing 50% retirement as the preferred portfolio[50] because it "balanced stakeholder risk through fuel diversity and duration of commitment to the communities it serves."[51]

The fact that all of the measures are compressed into these three scores—red, yellow, and green—gives no sense of the relative importance of each measure or the spread of the measures. As I'll discuss, the "Portfolio Diversity" measure is neither indicative of the actual expected diversity benefits of each Portfolio nor

[49] Direct Testimony of Daniel Douglas, page 17 at 1-2.
[50] *Id.*, page 17 at 7-10.
[51] *Id*.

supported by any form of quantitative analysis, the "Employees" and "Communities and Local Economy" measures double count each other, and the "Environmental Compliance" measure is not representative of actual legal compliance obligations. The scorecard takes into account some indirect and external costs, but fails to include other social costs, providing a distorted view of social impacts.

Most disconcertingly, by failing to report weightings, the Company dilutes the importance of the ratepayer savings between the Portfolios. The Company fails to disclose that their own analysis find that Portfolio 4 is over $280 million more expensive to ratepayers than the next cheapest option.

Q What are the weightings used by the Company in evaluating the scorecard?

A The Company claims no particular weighting on the factors, yet the factors are clearly weighted to arrive at the selection of Portfolio 4. To get at the Company's actual weighting, the color coding of the Company can be replaced with values of one (1) to three (3) for green to red, respectively, as in the table below.

Figure 8. NIPSCO Portfolio score table, as per Douglas page 17

	Portfolio 1	Portfolio 2	Portfolio 3	Portfolio 4	Portfolio 5	Portfolio 6
Cost to Customer	3	3	2	2	1	1
Portfolio Diversity	3	2	2	1	2	3
Employees	1	2	2	2	3	3
Environmental Compliance	3	3	3	1	1	1
Communities & Local Economy	1	2	2	2	3	3

While we cannot assess the exact weighting used by the Company, we can readily assess that the Company substantially undervalues the cost of the portfolios to customers. To have assessed Portfolio 4 as the preferred option, the measure of "Cost to Customer," which represents the present value of revenue requirements (PVRR), NIPSCO had to provide a weight of 50% or less of the total—and likely much less. In other words, NIPSCO evaluated the actual cost to customers—the primary basis upon which utility resource planning is conducted—as of equal importance to the churn of its employees and a vague sense of "portfolio

diversity."[52] This is a critical error: low-cost planning for the benefit of ratepayers should be the foundation of utility resource planning.

If all of the other measures aside from "Cost to Customer" were assigned an equal weight, the "Cost to Customer" could not account for more than forty-two percent (42%) of the total score and still result in a favorable finding for Portfolio 4. This would represent a severe undervaluing of customer impacts, and an unexplained departure from traditional lowest-cost option planning. At the end of the day, I think that it is likely that the Company either failed to actually examine weightings at all—simply selecting Portfolio 4 by its lack of a red color, or applying a uniform weight to each of these measures.[53] By any regard, the Company's use of a scorecard here is deficient.

Q Why does "Portfolio Diversity" measure?

A Mr. Douglas explains in his testimony that "the diversity of each environmental compliance portfolio was evaluated from fuel, technology and duration of commitments perspectives."[54] In most circumstances, this would imply a risk valuation—the financial and customer risks imparted by overreliance on a particular fuel or technology. Instead, the Company's assessment of "Portfolio Diversity" appears to simply be a rough rule of thumb based on a single graphic. It is notable that "Portfolio Diversity" is the only measure in which Portfolio 4

[52] The measures "environmental compliance" and "communities and local economy" do not change this assessment at all.

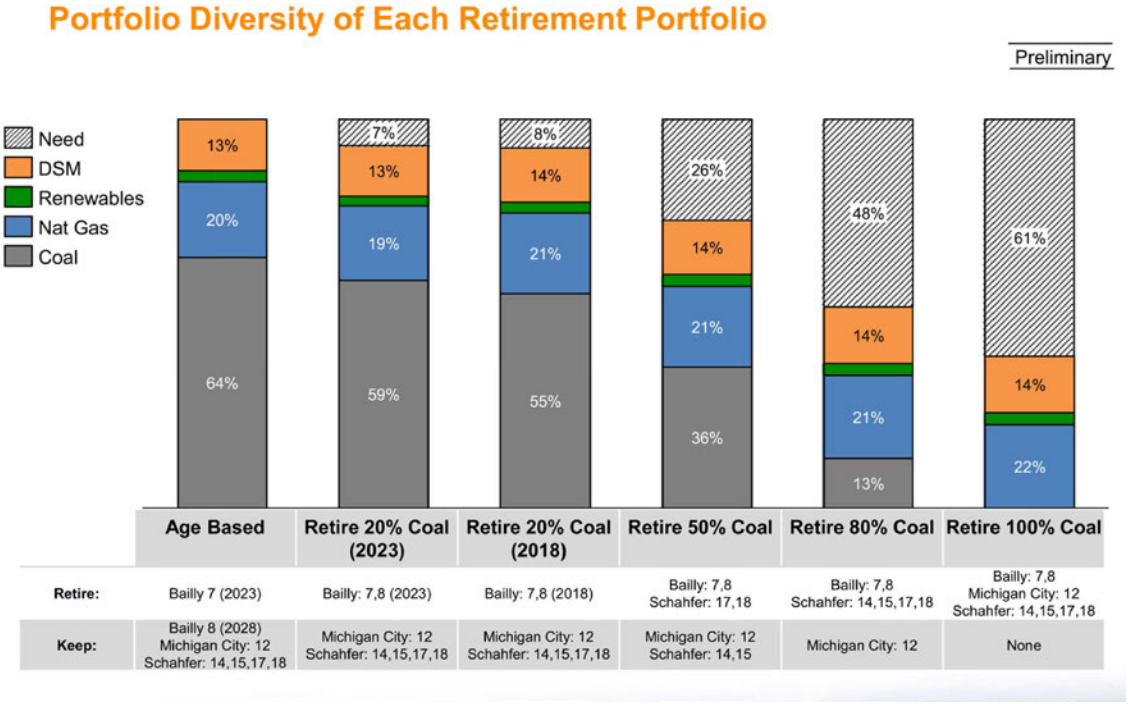
[53] In SC Request 1-011, Exhibit JIF-24, Sierra Club asked if "the Company conduct[ed] an overall quantitative analysis of each portfolio that incorporated all five "measures" identified by the Company," and if so, to "provide all workpapers underlying this analysis in native format" and "identify the relative weight that the Company assigned to each measure." The Company responded that Mr. Douglas's testimony, pages 14-17, provided the "full discussion of the qualitative and quantitative criteria and methodology used to select the preferred portfolio." The only discussion of the weighting is where Mr. Douglas states that "selecting an environmental compliance portfolio with a red measure may have significant difficulties or hurdles to overcome. No environmental compliance combination has a green score across all measures, but combination 4 scores best among all combinations." This response implies that Mr. Douglas completely failed to consider weights at all.

[54] Direct Testimony of Daniel Douglas, page 15 at 15-16.

appears to surpass any other Portfolio, and thus is of outsized importance in the Company's choice of preferred portfolio.

In response to discovery asking NIPSCO to "describe the quantitative process used or relied upon by Mr. Douglas to assess the diversity of each environmental compliance portfolio," the Company simply provided a slide from an August 2016 IRP stakeholder presentation showing NIPSCO's resource mix under each portfolio in 2025.[55]

Figure 9. NIPSCO fleet composition in 2025, SC DR 2-007 Attachment A.



Q Is the composition of NIPSCO's fleet in 2025 a reasonable proxy for "Portfolio Diversity"?

A No. First of all, the largest component of NIPSCO's fleet in Portfolios 5 & 6 is labeled "Need" and represents an open proxy with capacity "purchased in MISO's market and priced at MISO's cost of new entry ("CONE")" and energy purchased

[55] See Exhibit JIF-25, NIPSCO written response to SC DR 2-007 and Exhibit JIF-26, SC Request 2-007 Attachment A.

in the market.[56] As I discussed earlier, this represents the highest possible cost of capacity and energy potentially available to NISPCO, and not a real replacement portfolio. Had NIPSCO conducted reasonable resource planning, the utility could have identified a wide variety of resources to fill that need, including renewable energy, purchases, and new thermal generation, if required. The market, representing a wide array of resources selling into MISO is, by definition, diverse—and NIPSCO's failure to assess a reasonable replacement portfolio does not mean that the resource gap of Portfolios 5 & 6 should be considered a single resource.

Second, the value of resource diversity can actually be quantified, but NIPSCO failed to assess that value. The value of fuel diversity is the avoidance of price shocks and widening fuel spreads. Both of these phenomena can be modeled with reasonable sensitivities and stochastic risk assessments. The value of technology diversity can similarly be modeled by assessing capital cost and/or fixed operations and maintenance cost uncertainty. The Company opted not to examine the value of portfolio diversity,[57] instead taking a shortcut and simply eyeing the size of bars on a graph.

Q What does "Environmental Compliance" measure?

A According to the Company, "Environmental Compliance" tests if "the path meet[s] potential carbon dioxide emission limits as envisioned in the Clean Power Plan." While I appreciate the importance of utilities assessing their environmental impacts, this measure is as meaningless as "Portfolio Diversity" for three reasons.

First, Clean Power Plan ("CPP") targets are set for the state, not for individual utilities. While NIPSCO's plants would have to find a pathway to reduce emissions, this could include active trading either in-state, or even across state

[56] Corrected Direct Testimony of Daniel Douglas, Revised Page 14 at 4-8.
[57] See Exhibit JIF-25, NIPSCO written response to SC DR 2-007(e) and (f), stating "a Value at Risk analysis for the environmental compliance portfolios was not performed," and "a stochastic analysis on the environmental compliance portfolios was not performed."

lines if the state was to choose a trading-ready mechanism. There is not a binary compliance obligation on NIPSCO for the CPP as represented in the scorecard: NIPSCO neither meets nor fails to meet CPP targets. Instead, it either meets or exceeds its targets and sells excess allowances—mass or rate-based (if a liquid market exists)—or it requires excess allowances. The notion that retiring plants achieves compliance while not retiring plants causes noncompliance is neither accurate to the rule nor a reasonable representation of compliance pathways.

Second, NIPSCO has already represented compliance with the CPP, or some equivalency, through the implementation of a carbon dioxide (CO_2) price in Strategist modeling. The price represents, by definition, an active trading market by which NIPSCO realizes an opportunity cost (or real price) for emissions of CO_2.

Finally, due to low market prices and the poor expected dispatch of Bailly, Schahfer, and Michigan City, NIPSCO's modeling predicts that the utility will meet CPP targets on a *pro rata* basis. Overall, the "Environmental Compliance" measure does not quantify (or qualitatively assess) compliance with the CPP.

Q Please explain the relationship between the "Employees" and "Communities and Local Economy" measures.

A The "Employees" measure represents a count of employees working at the coal generation plants that would be subject to some form of disruption if the plants retired, "e.g., potential for reductions, churn, bumping and costs; number of affected employees."[58] The "Communities and Local Impacts" measure refers to reduced property taxes and "an economic multiplier effect from lost NIPSCO jobs."[59]

Both employee reductions and the economic multiplier effects resulting from lost NIPSCO jobs are two measures of the same thing—the immediate local impacts

[58] Exhibit JIF-27, SC DR 1-011, Attachment A.
[59] *Id.*

of retiring a non-economic plant. In a flat weighting scheme for the scorecard, these measures double count the impact of a closure.

Unlike "Portfolio Diversity" as characterized and "Environmental Compliance," "Employees" measures a real—and potentially impactful—indirect effect of the Company's decisions on employees, and bears closer consideration. The Commission will be left with a pertinent question: what is the balance between ratepayer bills and the jobs held by NIPSCO employees? While utilities do not typically seek to use resource planning to run ratepayer-subsidized jobs programs, the degree to which NIPSCO's fleet will change could be substantial, and the effects concentrated. Therefore, my next section of testimony will focus on the treatment of employment impacts and how the Commission should consider these effects relative to ratepayer costs and benefits.

Q You stated that that the scorecard takes into account some indirect and external costs, but fails to include other social costs, providing a distorted view of social impacts. What is missing from the Company's assessment?

A The Company has opted to include measures accounting for employee churn and indirect impacts on local taxes, but stops short of evaluating impacts beyond these two factors. There are two notable measures that are missing from the Company's assessment: induced employment and indirect health impacts.

Induced Employment

Induced employment impacts take into account the effect of lowering or increasing customer bills. Lower bills allow customers to redirect spending towards other local businesses. That local spending translates into local jobs, and the effect is not insubstantial. Decisions made by utilities with a large industrial consumer base can have particularly outsized induced employment impacts: industrial customers, facing lower electric bills, are able to lower costs, increase

production and hire employees. Conversely, manufacturers with rising electric bills might reduce production and their workforce, or shutter factories.[60]

The difference between NIPSCO Portfolios 4 and Portfolios 5 or 6 is considerable. For example, Portfolio 5 is less expensive by $621 million on a net present value basis (2016$) after using PIRA's capacity price projection. This amounts to an average of $57 million in savings year-on-year from 2018 to 2037 (2016$)—or considered differently, a cash injection of $57 million into the economy of Northern Indiana. The impacts of those savings are not taken into account in NIPSCO's scorecard.

Indirect Health Impacts

NIPSCO's portfolios also result in substantially different health outcomes for communities around the power plants, an impact not scored by NIPSCO. While substantially cleaner than a decade ago, NIPSCO's power plants are still large sources of air pollution. NIPSCO projects that their power plants will release over 6,500 tons of nitrogen oxides ("NOx") and between 4,000-5,000 tons of sulfur dioxide ("SO_2") in 2018. A large body of research has assessed the damages incurred from power plant emissions.[61] Emissions from plants that reside near population centers are far more problematic from a public health perspective than plants in rural areas (although some ozone and secondary particulates are formed many miles downwind). The Michigan City plant sits less than a mile from much of downtown Michigan City, and most of the urban area is within three miles of

[60] The effect of losing industrial load for industry-heavy utilities like NIPSCO can be considerable: as load retreats or defects, remaining customers and industries are left facing higher fixed costs, thus marginalizing more customers and a spiraling of the impact.

[61] Examples include, Heo, J., P. Adams, H.O. Gao. 2016. Public Health Costs of Primary $PM_{2.5}$ and Inorganic $PM_{2.5}$ Precursor Emissions in the United States. *Environmental Science and Technology*. Buonocore, J., X. Dong, J. Spengler et al. 2014. Using the Community Multiscale Air Quality (CMAQ) model to estimate public health impacts of $PM_{2.5}$ from individual power plants. *Environment International*. 68:200-208; Levy, J., L. Baxter, J. Schwartz. 2009. Uncertainty and Variability in Health-Related Damages from Coal-Fired Power Plants in the United States. *Risk Analysis*. 29:7.

the plant's stack. In a recent study, the National Association for the Advancement of Colored People ("NAACP") ranked Michigan City among the 50 most harmful plants on an environmental justice scale, accounting for its criteria pollutant emissions and proximity to population centers.[62]

In 2009, the National Academy of Sciences and National Research Council ("NRC") published a detailed study modeling the dispersion of pollution from specific power plants, the populations exposed to that pollution, and the incremental health impacts from pollution exposure.[63] Using values published by the NRC, I estimate that the Company's current fleet results in—at the low end—a total increased risk to local populations of seven statistical lives per year from 2018 to 2030, or a total of 75 statistical lives lost to air pollution.[64] The incremental benefit of Portfolio 6 over the Company's preferred Portfolio 4 is 19 statistical lives.

Q Mr. Douglas states that factors outside of the power supply costs to customers should be taken into account when making resource planning decisions (page 6 at 3-8). Do you agree?

A Only with a substantial note of caution. I believe that, if included, indirect impacts and externalities should be comprehensive, quantified, account for externalities, and social impacts. Under most circumstances, power supply costs to customers should be the predominant measure in resource planning. The measures put forward by the Company fail to tell a full story and are incomplete. For example, NIPSCO has pledged to its existing employees that it would seek to offer work

[62] Coal Blooded: Putting Profits Before People. 2016. NAACP. http://www.naacp.org/wp-content/uploads/2016/04/CoalBlooded.pdf.
[63] Exhibit JIF-28, National Research Council. 2009. Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use. National Academies Press. Executive Summary.
[64] A "statistical life" is the term used in risk exposure research. It represents the incremental risk to a population multiplied by the size of the population. So if a population of 100,000 has a 0.1% increased chance of mortality from exposure each year, the exposure would result in a value of 10 statistical lives lost. Data from Company Strategist outputs on a unit-specific basis, provided in SC 1-006.

opportunities,[65] and is moving to increase its investments in other parts of infrastructure, including $4.2 billion over the next two decades on grid modernization.[66] Similarly, the existing plant sites at Bailly, Schahfer, and Michigan City are well placed for infrastructure redevelopment, thus allowing for alternative future employment and revenues. In addition, NIPSCO's analysis ignores both the impact of increased rates on local employment and coal plant impacts on the health and wellbeing of other Hoosiers.

Q Please summarize your conclusions with respect to the scorecard.

A It is my opinion that NIPSCO's scorecard, used to justify the selection of Portfolio 4 over Portfolios 5 and 6 is poorly constructed, inappropriately weighted, incomplete, and biased toward the selection of Portfolio 4. Fundamentally, the Company's scorecard departs from lowest-cost utility planning. It should not be used for decision-making purposes by this Commission.

7. NIPSCO COULD CONTINUE TO PAY FULL COMPENSATION TO AFFECTED EMPLOYEES AND FULL PROPERTY TAXES ASSOCIATED WITH RETIRED UNITS, AND WOULD STILL BENEFIT RATEPAYERS BY RETIRING ALL SCHAHFER UNITS

Q How did NIPSCO account for employment impacts in the analysis underlying this application?

NIPSCO included "Employees" as one of the five categories in the scorecard that it used to determine its preferred portfolio. NIPSCO assigned scores of "Best" to Portfolio 1, "Better" to Portfolios 3, 4, and 5, and "Worse" to Portfolios 5 and 6.[67] These scores are evidently based on NIPSCO's assumptions regarding the number of NIPSCO employees "impacted" under each Portfolio.

[65] Exhibit JIF-23, Sierra Club 1-012 Supplemental Attachment A, "Employee Leave Behind One Sheeter – Final."
[66] Exhibit JIF-29, SC DR 2-009, "NI 2017 Investor Day – FINAL," page 21.
[67] Direct Testimony of Mr. Daniel L. Douglas, page 17 at 5-6.

Q What does NIPSCO mean by "impacts" on employees?

A NIPSCO's definition of an "impact" appears to vary by source. In Mr. Douglas's direct testimony, he states twice that "impacts include the loss of work for NIPSCO employees and its service providers/suppliers."[68] NIPSCO modifies Mr. Douglas's description in discovery responses where the impact on employees is described as "employee disruption: e.g., potential for reductions, churn, bumping and costs; number of affected employees."[69]

Q Does NIPSCO's employee impact score assess the jobs impact of replacement generation?

A No. According to NIPSCO, "Employee" refers only to jobs at existing power stations, and does not refer to potential jobs at replacement power stations.[70] The Company further states that "this analysis doesn't look at technologies, per se, but at NIPSCO employees. So [a] transition to a different technology or purchase through a PPA *[sic]* – impacts NIPSCO employees – it is a NIPSCO retention story."[71]

Q Does NIPSCO's employee impact score assess the jobs impact of lowering or increasing customer bills?

A No.[72] NIPSCO is clear that "under the Employee score, the Company did not consider changes in customer utility bills, customer non-electricity spending, the economic competitiveness of local businesses, or impacts on employees of companies that provide goods and services to NIPSCO's generation fleet."

[68] Direct Testimony of Mr. Daniel L. Douglas, page 6 at 3-5; page 16 at 10-11.
[69] Exhibit JIF-27, Sierra Club Request 1-011 Attachment A.
[70] Exhibit JIF-30, Response to Sierra Club Request 2-004(c) and (d).
[71] Exhibit JIF-31, NIPSCO 2016 IRP. Appendix A, Exhibit 3. Page 8.
[72] Exhibit JIF-30, Response to Sierra Club Request 2-004(c) and (d).

Q Do the electricity rates paid by customers impact local jobs aside from those at NIPSCO's generating units?

A Absolutely. As customers spend more on electricity services, their opportunity for re-spending elsewhere in the economy drops. Local businesses spending more on their electric bill have fewer dollars available for other uses, and are less able to hire or retain employees. Large industrial customers are particularly sensitive to energy prices, which can be a large fraction of the cost of business. NIPSCO serves nearly 20% of the state's industrial energy demand,[73] a disproportionately high fraction. We would expect the jobs created—or lost—by these customers to be substantially impacted by both short and long-term energy prices.

NIPSCO's employment impacts assessment neither takes into account replacement generation nor customer bill impacts, focusing exclusively on current NIPSCO generation plant employees.

Q How many NIPSCO generating plant employees are affected by the planned and potential coal plant retirements, and when?

A NIPSCO provided a table of estimated employee impacts in response to discovery. The relevant portion of that table is reproduced in Table 26, below.

Table 6. NIPSCO assumption of employees impacted by retirement portfolio[74]

	Portfolio					
	1	2	3	4	5	6
Employees Impacted	0	115	115	115-275	430	538

This chart suggests that 115 employees work at Bailly 7&8, 315 at Schahfer's coal units, and 108 at Michigan City.

It is notable that in Portfolio 4, NIPSCO is uncertain how many generation employees would be impacted if only two units of Schahfer are closed, providing

[73] US Energy Information Administration. Form 861, 2015. Sales to ultimate customers, MWh.
[74] Exhibit JIF-27, Sierra Club Request 1-011 Attachment A.

a range from 115 to 275 employees impacted, or no Schahfer employees at the low end to 160 employees—or 50% of the workforce—at the upper end. In response to comments in the 2016 IRP, NIPSCO gives slightly different numbers, stating that "the 50% coal retirement option [Portfolio 4] would affect 240 employees,"[75] or about 40% of the workforce at Schahfer.

The Company's scorecard, shown in Figure 8 (above) provides the same employee impact score for Portfolio 4 as Portfolio 3, implying that he Company believes—for the purposes of this decisive scorecard—that no employees would be affected at Schahfer if units 17 and 18 are retired. These internal inconsistencies render it difficult to assess the likely generation employment churn associated with the incremental retirement of Schahfer 14 & 15 relative to the Company's preferred portfolio. Such details are important to assess the value that this Commission puts behind NIPSCO employee job retention as a decisive factor in this CPCN, even putting aside the other flaws in NIPSCO's employment analysis.

Q Did NIPSCO make any effort to monetize its assumed employment impacts, or otherwise compare those impacts directly to the cost impacts of its alternative portfolios?

A Evidently not. In any case, NIPSCO did not provide any such analysis either in its testimony, workpapers, 2016 IRP, or in responses to multiple discovery requests regarding its assessment of employment impacts.

Q Did you perform further analysis using NIPSCO's employee impact assumptions?

A Yes. I estimated the cost to NIPSCO of continuing to fully compensate all of its identified impacted employees, regardless of whether the plant at which they currently work continues to operate. One way to think of this is as a generous

[75] Exhibit JIF-31, NIPSCO 2016 IRP, Appendix A, Exhibit 3. Page 3.

pension plan, in which all affected employees continue to be compensated with their current wages and benefits, even after their jobs no longer exist.[76] As elsewhere, my analysis focused on comparing Portfolio 5, in which all Schahfer units retire in 2023, to Portfolio 4, in which Schahfer Units 14 and 15 continue to operate through the end of their age-based lives.

Q What assumptions did you use in your pension plan analysis?

A I made several conservative assumptions, such that this analysis effectively represents a "worst case" in terms of the employee impacts of Portfolio 5 relative to Portfolio 4. Some of the more significant assumptions include that:

- All "impacted" employees lose their jobs entirely, and provide no further paid services to NIPSCO. This is, in fact, quite unlikely as there are many uses to which NIPSCO might put its skilled generation employees. These could include work on NIPSCO investments in renewable energy, energy efficiency, transmission, or natural gas projects. As discussed previously, it is very unlikely that NIPSCO would not replace at least some retired coal capacity with new resources of its own, and these alternative resources would bring with them new jobs.
- "Impacted" employees are unable to find alternative new local employment and rely only on the NIPSCO pension.
- All employees at Schahfer would continue to retain their jobs when units 17 and 18 are retired in Portfolio 4, and every employee at Schahfer would take the pension if the full plant is retired.
- There is no attrition; every employee is either working for NIPSCO or provided a full pension with benefits through the end of the unit's book life.

[76] Average Indiana Power Plant Operator wage $66,360 (2015$) from U.S. BLS Occupational Employment Statistics. https://www.bls.gov/oes/current/oes_in.htm; Average utility industry compensation : wage ratio (accounting for benefits) of 1.34 from U.S. BEA National Income and Product Accounts Tables 6.2D and 6.3D. http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1.

Q What were the conclusions of your pension plan analysis?

A I estimate that even if NIPSCO were to continue to fully compensate all affected employees—including benefits—Portfolio 5 (i.e., retiring all four Schahfer) would still save ratepayers approximately $434 million relative to Portfolio 4. In addition, Portfolio 6, in which all NIPSCO coal units retire by 2023, would still save $512 million relative to NIPSCO's preferred Portfolio 4, even with full compensation of all affected employees. In other words, NIPSCO could retire its entire coal fleet, continue to pay a pension to each employee though the end of the plant's depreciable life, and still net a substantial benefit to ratepayers.

In fact, the discrepancy between ratepayer savings and expected employee impacts is so large that NIPSCO could pay impacted employees a pension of $282,000 per year and still net a benefit to ratepayers under Portfolio 5.

Table 7 (below) shows the key results of the pension plan analysis.

Q Are you recommending that NIPSCO's ratepayers pay for the full compensation of all coal plant employees that are displaced through these retirements?

A No. In practice, there are many potential arrangements that NIPSCO could reach with its coal-plant employees that would be more cost-effective than this full-pension plan while still ensuring that employees are not negatively impacted by the retirement of NIPSCO's coal fleet. For example, NIPSCO could invest in re-training those employees and re-assign them to other projects, such as renewable energy development. Or NIPSCO could reach a deal with local businesses whereby those businesses hire the affected employees, and NIPSCO covers a portion of its former employees' salaries. The important conclusion is that the cost savings of Portfolio 5 relative to Portfolio 4 are so great that there are many alternative Northern Indiana jobs programs implementable by NIPSCO that would be more cost-effective than continuing to operate coal units at Schahfer and Michigan City.

Q How did NIPSCO account for "community impacts" in the analysis underlying this application?

A NIPSCO included "Communities & Local Economy" as one of the five categories in the scorecard that it used to determine its preferred portfolio. NIPSCO assigned scores of "Best" to Portfolio 1, "Better" to Portfolios 3, 4, and 5, and "Worse" to Portfolios 5 and 6.[77] Discovery responses provided by NIPSCO indicate that these scores are largely based on reductions in property taxes paid to local governments by NIPSCO. [78]

Q Did NIPSCO quantify the reductions in property tax payments associated with each of its portfolios?

A Not explicitly. In any case, NIPSCO did not provide any such quantification in its responses to multiple discovery requests regarding its assessment of community and local economic impacts. However, NIPSCO's workpapers do contain the data necessary to conduct such an analysis, and use that data to calculate the savings from all tax reductions under each portfolio.[79]

Q Did you quantify the reductions in property tax payments associated with each portfolio?

Yes. Using NIPSCO's assumptions, I quantified the reductions in property tax payments under each NIPSCO portfolio. I then evaluated the impact on each portfolio's costs of "adding back" those tax payments, such that NIPSCO is assumed to continue to pay the same level of property taxes regardless of whether its coal plants continue to operate. One way to think of this is as a Payment in lieu of taxes (PILOT) arrangement, whereby NIPSCO agrees to a consistent effective property tax payment schedule independent of the continued operation of its coal plants.

[77] Direct Testimony of Mr. Daniel L. Douglas, page 17 at 5-6.
[78] Exhibit JIF-27, Sierra Club Request 1-011 Attachment A.
[79] Sierra Club Request 1-008 Attachment A, tab "Assumptions."

Q What were the conclusions of your PILOT plan analysis?

A I conclude that even if NIPSCO were to continue to pay full property taxes as if its coal plants continued to operate—in addition to fully compensating all affected employees—Portfolio 5 would still save ratepayers approximately $362 million relative to Portfolio 4. In addition, Portfolio 6, in which all NIPSCO coal units retire by 2023, would still save $419 million relative to Portfolio 4. Table 77 shows the results of this analysis.

Table 7. Net present value (NPV) of NIPSCO portfolios (Base Case) in million 2016$ with PIRA capacity prices; providing full pensions; providing full pensions and PILOTs to local communities. Cost/(savings) relative to Portfolio 4.

Portfolio	Provide Full Pensions	*Relative to Portfolio 4*	Full Pensions & PILOTs	*Relative to Portfolio 4*
1: No Retirement	$12,520	*$511*	$12,648	*$419*
2: Retire Bailly (2023)	$12,464	*$455*	$12,607	*$378*
3: Retire Bailly (2018)	$12,304	*$295*	$12,473	*$245*
4: Retire Bailly (2018), Schahfer 17, 18 (2023)	$12,009	*$0*	$12,229	*$0*
5: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023)	$11,575	*($434)*	$11,867	*($362)*
6: Retire Bailly (2018), Schahfer 14, 15, 17, 18 (2023) MI City (2023)	$11,498	*($512)*	$11,810	*($419)*

Q Are you recommending that NIPSCO arrange to pay PILOT payments that fully cover any reductions in NIPSCO-paid property taxes caused by coal plant retirements?

A Not necessarily. I am merely demonstrating that the cost savings of Portfolio 5 relative to Portfolio 4 are so great that retiring Schahfer Units 14 and 15 would make sense even if NIPSCO paid these full-scale PILOT payments. In reality, whatever entity owns the land underlying NIPSCO's coal plants following the retirement of those plants will likely pay some level of property taxes, and to the extent that NIPSCO re-develops these locations for new generation and/or

transmission projects, much of the value may be preserved. Therefore, PILOT payments required to ensure that coal plant retirements do not negatively impact local government revenues are likely less than the level of payment contemplated in my analysis.

Furthermore, my analysis makes clear that NIPSCO's reliance on "Community and Economic Impacts" is not a relevant or deciding factor for determining whether to retire or retrofit its Schahfer coal plant. Rather, the Northwest Indiana community and economy would clearly benefit from retiring the Schahfer plant entirely. Rather than invest ratepayer dollars in an uneconomic coal plant, those dollars could support plant workers and Jasper County in their economic transition and reduce the burden on ratepayers.

8. RETIRING ALL SCHAHFER UNITS WOULD RESULT IN LOWER AVERAGE ELECTRIC BILLS

Q Did NIPSCO's analysis account for the impacts of its alternate portfolios on customer electric rates and bills?

A Not explicitly. NIPSCO did analyze the relative cost impacts of its alternative portfolios, but did not convert those system cost differences into relative rate and bill impacts.

Q Did you analyze the rate and bill impacts of NIPSCO's proposal?

A Yes. I conducted a rough analysis of the likely residential rate and bill impacts of NIPSCO's proposal, relative to the other options considered by NIPSCO. First, I calculated the average annual rate impact across all NIPSCO customers by dividing the difference in portfolio costs by NIPSCO's forecasted retail sales. Second, I multiplied the average rate impact by NIPSCO's forecasted average residential customer electricity consumption to estimate average annual residential bill impacts.

Q What were the results of your rate and bill impact analysis?

A I found that retiring all Schahfer units rather than just two units would lower rates by approximately $0.344/kWh relative to the Company's preferred Portfolio 4, reducing the average household's electric bill by $30 per year (on average) between 2018 and 2037. In addition, I found that retiring all NIPSCO coal units would roughly reduce a typical household's average annual electric bill by approximately $37 relative to NIPSCO's preferred Portfolio 4.[80] My findings are summarized in Table 8, below.

Table 8. Average annual rate and bill savings of Portfolios 5 and 6 relative to Portfolio 4, 2018-2037[81]

	Portfolio 5 (80% Retirement)	Portfolio 6 (100% Retirement)
Average rate reduction (2016 c/kWh)	0.34	0.42
Average annual residential bill reduction (2016$)	$30	$37

Overall, NIPSCO faces large fleet-wide decisions over the next years, but the right decision could result in substantial savings to its customers.

Q Does this conclude the basis of your findings?

A It does. My overall findings and recommendations to this Commission are as stated at the start of my testimony.

[80] Assumes relative savings are divided ratably amongst customers; does not allocate via a cost of service study.
[81] Residential customer load and customer forecasts from NIPSCO 2016 IRP.

VERIFICATION

I, Jeremy I. Fisher, PhD, affirm under penalties of perjury that the forgoing representations are true and correct to the best of my knowledge, information and belief.

Jeremy I. Fisher, PhD

4/2/2017

Date

EXHIBIT JIF-1

QUALIFICATIONS

Q Please state your name, business address, and position.

A My name is Jeremy I. Fisher. I am a Principal Associate with Synapse Energy Economics, Inc. ("Synapse"), which is located at 485 Massachusetts Avenue, Suite 2, in Cambridge, Massachusetts.

Synapse Energy Economics is a research and consulting firm specializing in energy and environmental issues and policies for electricity sector issues, including fossil generation, efficiency, renewable energy, ratemaking and rate design, restructuring and market power issues, and environmental regulations.

Q Please summarize your work experience and educational background.

A I've worked in electricity system energy planning for a decade, evaluating and helping to shape resource plans, performing planning on behalf of states and municipalities, helping regulators navigate environmental rules, and assisting states craft or revise resource planning rules. I lead the resource planning group at Synapse, which engages in the assessment of planning processes across a wide cohort of states and regions.

I have provided consulting services for a wide variety of public sector and public interest clients, including the U.S. Environmental Protection Agency ("EPA"), the National Association of Regulatory Utility Commissioners ("NARUC"), the National Association of State Utility Consumer Advocates ("NASUCA"), National Rural Electric Cooperative Association ("NRECA"), the energy offices and public utility commissions of Alaska, Arkansas, Michigan, and Utah, the Commonwealth of Puerto Rico, Tennessee Valley Authority Office of Inspector General ("TVA OIG"), the California Division of Ratepayer Advocates ("CADRA"), the California Energy Commission ("CEC"), the Regulatory Assistance Project ("RAP"), the Western Grid Group, the Union of Concerned Scientists ("UCS"), Sierra Club, Earthjustice, Natural Resources Defense Council ("NRDC"), and other organizations.

I have provided testimony in electricity planning and general rate case dockets in California, Indiana, Kansas, Kentucky, Louisiana, Nevada, New Mexico, Oklahoma, Oregon, Puerto Rico, Utah, Washington, Wisconsin, and Wyoming.

I hold a doctorate in Geological Sciences from Brown University, and I received my bachelor degrees from University of Maryland in Geology and Geography.

Q Have you engaged in other states on long-term resource planning issues?

A Yes. I have been involved in numerous long-term resource planning dockets, including integrated resource plans ("IRP"), CPCN, and prudence reviews in rate case dockets. I have provided training to federal regulators on resource planning practice and issues. I recently led an intensive statewide planning process on behalf of the Michigan Public Service Commission ("MPSC") and continue to work on behalf of the recently appointed Puerto Rico Energy Commission ("CEPR") in an intensive review of the Commonwealth's first public resource plan.