

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF DUKE ENERGY INDIANA, LLC)
PURSUANT TO IND. CODE §§ 8-1-2-42.7 AND 8-1-2-61,)
FOR (1) AUTHORITY TO MODIFY ITS RATES AND)
CHARGES FOR ELECTRIC UTILITY SERVICE)
THROUGH A STEP-IN OF NEW RATES AND CHARGES)
USING A FORECASTED TEST PERIOD; (2) APPROVAL)
OF NEW SCHEDULES OF RATES AND CHARGES,)
GENERAL RULES AND REGULATIONS, AND RIDERS;)
(3) APPROVAL OF A FEDERAL MANDATE)
CERTIFICATE UNDER IND. CODE § 8-1-8.4-1; (4))
APPROVAL OF REVISED ELECTRIC DEPRECIATION)
RATES APPLICABLE TO ITS ELECTRIC PLANT IN)
SERVICE; (5) APPROVAL OF NECESSARY AND)
APPROPRIATE ACCOUNTING DEFERRAL RELIEF;)
AND (6) APPROVAL OF A REVENUE DECOUPLING)
MECHANISM FOR CERTAIN CUSTOMER CLASSES)

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INDIANA UTILITY
REGULATORY COMMISSION

CAUSE NO. 45253

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

TESTIMONY OF

DAVID DISMUKES – PUBLIC'S EXHIBIT NO. 10

OCTOBER 30, 2019

Respectfully submitted,



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PUBLIC EXHIBIT NO. 10

TESTIMONY OF OUCC WITNESS

DAVID E. DISMUKES, PH.D.

October 30, 2019

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1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR FULL NAME, ADDRESS, AND OCCUPATION.**

3 A. My name is David E. Dismukes. My business address is 5800 One Perkins Place,
4 Suite 5-F, Baton Rouge, Louisiana, 70808. I am a Consulting Economist with the Acadian
5 Consulting Group, LLC (“ACG”), a research and consulting firm that specializes in the
6 analysis of regulatory, economic, financial, accounting, statistical, and public policy issues
7 associated with regulated and energy industries. ACG is a Louisiana-registered
8 partnership, formed in 1995, which is located in Baton Rouge, Louisiana.

9 **Q. DO YOU HOLD ANY ACADEMIC POSITIONS?**

10 A. Yes. I am a full Professor, Executive Director, and Director of Policy Analysis at
11 the Center for Energy Studies, Louisiana State University (“LSU”). I am also a full
12 Professor in the Department of Environmental Sciences and Director of the Coastal
13 Marine Institute in the College of the Coast and Environment at LSU. I also serve as an
14 Adjunct Professor in the E. J. Ourso College of Business (Department of Economics),
15 and I am a full member of the graduate research faculty at LSU. Appendix A provides my
16 academic vitae, which includes a full listing of my publications, presentations, pre-filed
17 expert witness testimony, expert reports, expert legislative testimony, and affidavits.

18 **Q. FOR WHOM ARE YOU APPEARING AND WHAT IS THE SCOPE OF YOUR**
19 **TESTIMONY IN THIS PROCEEDING?**

20 A. I have been retained by the Indiana Office of Utility Consumer Counsel (“OUCC”)
21 to provide an expert opinion on certain policy and ratemaking issues raised in the Duke
22 Energy Indiana, LLC (“Duke” or the “Company”) request for an increase in its electric
23 rates. My direct testimony will specifically address the Company’s proposed revenue

1 decoupling mechanism ("RDM"). My direct testimony also provides an expense and
2 investment benchmarking analyses that compares the Company's historic and projected
3 costs to a peer group of regional utilities. My direct testimony and the 16 schedules
4 included with my direct testimony were prepared by me or under my direct supervision
5 and control.

6 **Q. HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?**

7 A. My testimony is organized into the following sections:

- 8 • Section II: Summary of recommendations
- 9 • Section III: Overview of Company's RDM
- 10 • Section IV: State decoupling policies
- 11 • Section V: The proposed RDM is not needed
- 12 • Section VI: The proposed RDM is inconsistent with Commission policy
- 13 • Section VII: The proposed RDM is inconsistent with other Commission
- 14 approved mechanisms
- 15 • Section VIII: RDM design deficiencies
- 16 • Section IX: Benchmarking analysis
- 17 • Section X: Conclusions and Recommendations

18 **II. SUMMARY OF RECOMMENDATIONS**

19 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS**
20 **REGARDING THE COMPANY'S PROPOSED RDM.**

21 A. The Company's RDM proposal should be rejected for a number of reasons. First,
22 the Company's proposed RDM is inconsistent with the Commission's past policies
23 regarding decoupling mechanisms for electric utilities and the Sales Reconciliation

1 Component ("SRC") approved for natural gas utilities. Second, the Company has not
2 been able to show that its efficiency activities or proposed rate design changes have, or
3 will have, a negative financial impact on its ability to earn its allowed rate of return. On a
4 historical basis, the Company's past efficiency efforts have not significantly impacted its
5 ability to earn its allowed return on equity ("ROE"), particularly because the Company
6 already has a mechanism in place that allows for it to recover lost revenues associated
7 with these activities. The Company has not provided in this proceeding any projections
8 that quantify any specific future earnings challenges, raising questions about its validity
9 and whether or not the Company will, in fact, see financial impacts that differ significantly
10 from those experienced over the past five years. Lastly, the Indiana Code already
11 provides that lost revenues associated with energy efficiency ("EE") and demand side
12 management ("DSM") activities can be recovered through a lost revenue adjustment
13 mechanism ("LRAM"). The Company has already taken advantage of this opportunity
14 awarded through legislation and, as a result, does not currently have any disincentive to
15 promote energy efficiency or DSM measures. The Company does not expect revenue
16 losses from its dynamic pricing pilot programs to be significant¹ and, in regards to its
17 volt/VAR optimization program, its cost benefit analysis showed the overall program
18 resulted in a net benefit.² Therefore, the Company's proposed RDM is not needed to
19 address the Company's purported concerns. Further, under the Company's proposed
20 RDM it is not clear if there will be an EM&V or reconciliation process evaluating the

¹ Company's response to OUCC 36.4.

² Cause No. 44720, Direct Testimony of William H. Fowler, Petitioner's Exhibit 2-G (WHF), pp. 2-3.; See also: Company's response to OUCC 1.28, Confidential Attachment OUCC 1.28A.

performance of the Company's energy efficiency programs or any other external factors causing a reduction in the usage of residential and small commercial customers.

Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE COMPANY'S FORECASTED TEST YEAR PLANT BALANCES AND EXPENSES AS A RESULT OF YOUR BENCHMARKING ANALYSIS?

A. The benchmarking analysis that I have undertaken shows that a number of the Company's forecasted test year plant expenditures are not in line with, and in many instances exceed historical expenditures. The results of my analysis show:

- The projected annual growth rate of 10.3 percent in production O&M expenses per MWh far outpaces the five year growth rate of 0.3 percent.
- The projected annual growth rate of 15.2 percent in net distribution plant per MWh far outpaces the Company's five year average of 9.9 percent. Further, the Company's distribution O&M expense growth rate per MWh of 10 percent per year over the past five years has far outpaced the peer group average of 1.2 percent.
- Finally, while the Company projects its administrative and general O&M expenses will decrease, the Company's net general plant per MWh is projected to grow by 24 percent per year through 2020, much more than its five year average growth rate of 15.2 percent.

I conclude that the Commission should require the Company to undertake an in-depth review of its production and distribution O&M expenses. I further suggest the Commission initiate a Collaborative Proceeding in which the Company, the Commission and other interested stakeholders can create, analyze and discuss appropriate benchmarking metrics for the Company in these areas.

1 **III. OVERVIEW OF COMPANY’S RDM**

2 **Q. PLEASE EXPLAIN THE COMPANY’S PROPOSED RDM.**

3 A. The Company’s RDM is constructed on a revenue per-customer (“RPC”) basis and
4 is designed to recover any differences between actual post-rate case per-customer
5 revenues and those authorized in the current proceeding.³ Under the RDM, if annual
6 revenues are less than those allowed in this proceeding, ratepayers will be assessed a
7 surcharge to make up this difference. If the revenues are more than those allowed at the
8 end of this rate case, ratepayers would receive a rate credit.⁴ The Company is proposing
9 the RDM for an initial five-year term with the possibility for continuation after the five-year
10 period if the Commission approves an extension.⁵

11 **Q. WHAT IS THE COMPANY’S RATIONALE FOR PROPOSING THE RDM?**

12 A. The Company states that the RDM is intended to allow it to recover any residential
13 and small commercial customer lost revenues arising from its current and proposed
14 efficiency activities that includes its proposed dynamic pricing tariffs, rate design changes,
15 energy efficiency measures, volt/VAR initiatives, among others.⁶ The Company states
16 that it currently has a disincentive to encourage customers to use electricity efficiently
17 since it loses revenues in the process.⁷ According to the Company, this volumetric or
18 “throughput” disincentive is created by the fact that fixed costs are primarily recovered
19 through volumetric charges.⁸ The Company is proposing an RDM in order to eliminate
20 this throughput disincentive.⁹ The Company argues that receiving approval for its RDM

³ Revised Direct Testimony of Maria T. Diaz, 39:8-11.

⁴ Direct Testimony of Daniel G. Hansen, 12:10-21.

⁵ Direct Testimony of Daniel G. Hansen, 20:4-8.

⁶ Direct Testimony of Daniel G. Hansen, 1:18-2:2.

⁷ Direct Testimony of Daniel Hansen, 6:21-7:1.

⁸ Direct Testimony of Brian Davey, 23:19-20

⁹ Direct Testimony of Daniel G. Hansen, 8:1-4.

1 is particularly important in this proceeding given its proposal to implement dynamic pricing
2 pilot program tariffs for its residential and small commercial customers which it states may
3 lower revenues between rate cases.¹⁰

4 **IV. STATE DECOUPLING POLICES**

5 **Q. IS REVENUE DECOUPLING A NEW METHOD FOR DEALING WITH CHANGES** 6 **IN SALES RESULTING FROM ENERGY EFFICIENCY?**

7 A. No. Revenue decoupling dates back to the late 1980s and early 1990s and was
8 included as a regulatory review requirement in the Energy Policy Act of 1992 (“EPAct
9 1992”).¹¹ During this period, revenue decoupling initiatives were driven primarily by the
10 electric utility industry, as well as many of the same energy efficiency and environmental
11 advocates promoting the mechanism today. Most revenue decoupling mechanisms
12 adopted during this period were eliminated during the electric restructuring process that
13 also began in the early 1990s and accelerated through the better part of the decade.
14 While several states have re-instated revenue decoupling for electric utilities, the policy
15 is more pervasive for natural gas distribution utilities. In Indiana, for instance, several
16 natural gas investor owned utilities (“IOUs”) including Vectren Southern Indiana Gas and
17 Electric Company (“Vectren South”), Indiana Gas Company (“Vectren North”),¹² and
18 Citizens Energy of Westfield¹³ currently have a RDM-type mechanism. Whereas, to date,
19 no jurisdictional electric utility has an approved decoupling mechanism.

20 **Q. HAVE YOU PREPARED A SCHEDULE THAT DEPICTS THE CURRENT** 21 **STATUS OF REVENUE DECOUPLING ADOPTION?**

¹⁰ Direct Testimony of Brian Davey, 24:10-14.

¹¹ Public Law 102-486, § 115(b)(4); 15 USC 3203.

¹² Cause Nos. 42943 and 43046, Order, December 1, 2006.

¹³ Cause No. 44731, Order, April 26, 2017.

1 A. Yes. Schedule DED-1 has a map indicating which states have electric and natural
2 gas utility revenue decoupling. This map, since it is done on a statewide basis, can tend
3 to distort the pervasiveness of the use of this regulatory mechanism. On a utility-specific
4 basis, only 35 electric utilities, out of 151 investor-owned electric utilities¹⁴ have an active
5 revenue decoupling mechanism (23 percent of total electric utilities) and only 56 natural
6 gas utilities, out of 252 investor-owned gas utilities¹⁵ have similar mechanisms (22 percent
7 of total gas utilities).

8 **Q. WHAT FACTORS HAVE MOTIVATED RENEWED INTEREST IN REVENUE**
9 **DECOUPLING?**

10 A. Revenue decoupling mechanisms, like the Company's proposed RDM, attained a
11 new level of interest around 2004 and 2005 primarily due to (1) increases in natural gas
12 prices which reduced overall usage and (2) the acceleration of state-driven energy
13 efficiency goals and targets. Schedule DED-2 shows that the adoption of revenue
14 decoupling mechanisms across time and shows the strong correlation between the
15 mechanisms' adoption and natural gas prices. On an incremental basis, few states have
16 been moving forward with adopting revenue decoupling over the past several years.
17 Many states that were early adopters of revenue decoupling policies have maintained their
18 use, but those states that have not adopted the mechanism do not appear to be rushing
19 in that direction.

20 **Q. ARE DECREASES IN SALES DUE TO ENERGY EFFICIENCY THE ONLY**
21 **REASON THAT TEST YEAR REVENUES AND ACTUAL REVENUES MAY DIFFER?**

¹⁴ Energy Information Administration Form 861.

¹⁵ Energy Information Administration Form 176.

1 A. No. There are a variety of factors that can influence sales between rate cases
2 which can lead to differences between actual retail sales and revenues and those in a
3 utility's test year used to establish rates. Test year retail sales and revenues in a rate
4 case are usually based upon a "typical" year, and as such, they are based upon factors
5 such as the weather, the economy, and prices, among other factors. In any given year,
6 the actual performance of the economy may differ from the test year. Weather may be
7 colder or warmer than the historical normal weather trends included in the test year, and
8 other factors may occur that could impact sales differently than what was anticipated in
9 the test year determination. The differences in sales created by weather, the economy,
10 commodity prices, and other factors usually account for greater changes in revenue than
11 those resulting from utility-sponsored energy efficiency programs.

12 **Q. IS THE COMPANY'S RDM APPROPRIATE?**

13 A. No. The Company's RDM suffers from a number of shortcomings that include:

- 14 • The Company has not shown a need for its decoupling mechanism.
- 15 • The proposal is not needed since it is inconsistent with Indiana statute regarding
16 recovery of lost revenues associated with energy efficiency plans.
- 17 • The proposal is inconsistent with past Commission revenue adjustment policies.
- 18 • The RDM proposal is inconsistent with other Commission approved mechanisms.
- 19 • The RDM has a number of design deficiencies.

20 **V. THE PROPOSED RDM IS NOT NEEDED**

21 **a. The Company already has a lost revenue adjustment mechanism**

22 **Q. PLEASE DESCRIBE THE COMPANY'S CURRENT LOST REVENUE**
23 **ADJUSTMENT MECHANISM ("LRAM").**

24 A. The Company is currently allowed to recover lost revenues associated with its
25 energy efficiency programs as measured by the Evaluation, Measurement, and

1 Verification ("EM&V") process that itself is part of the Company's Energy Efficiency
2 Revenue Adjustment ("EERA") Rider.¹⁶ The Company has referred to this lost revenue
3 adjustment as a LRAM.¹⁷ The Company's LRAM is applicable to residential and small
4 commercial customers as well as other customers taking service from the Company.¹⁸
5 The Company's LRAM only recovers costs associated with lost revenues due to
6 measurable sales reductions arising from Company-sponsored EE programs. It does not
7 provide for cost recovery of all lost revenues associated with any change in sales,
8 regardless of the reason, as the Company is proposing with its RDM.¹⁹ Thus, the LRAM
9 is a much more targeted, specific mechanism that allows the Company to recover
10 revenues from its own efficiency actions, not revenue losses arising from other
11 exogenous or outside forces.

12 **Q. IS THE COMPANY PROPOSING TO DISCONTINUE ITS LRAM UNDER ITS**
13 **EERAR RIDER IF ITS PROPOSED RDM IS APPROVED?**

14 A. Yes, but only for residential and small commercial customers. The Company
15 states that the RDM, if approved, would completely replace the LRAM in the EERA rider
16 for residential and small commercial customers.²⁰ However, the Company proposes to
17 maintain the LRAM for all other applicable customer classes.²¹ The Company also
18 proposes that if the RDM is approved, it be allowed to continue to recover EE program
19 costs (including the cost of EM&V) and performance incentives. The Company states it

¹⁶ Direct Testimony of Daniel G. Hansen, 6:8-14.

¹⁷ Direct Testimony of Daniel G. Hansen, 6:8-14.

¹⁸ Direct Testimony of Daniel G. Hansen, 6:8-14. See also, Duke Energy Indiana, LLC, IURC No. 14, Eleventh Revised Sheet No. 66-A, Standard Contract Rider No. 66-A Energy Efficiency Revenue Adjustment Applicable to Retail Rate Schedules, p. 5.

¹⁹ Direct Testimony of Daniel G. Hansen, 6:8-17.

²⁰ Direct Testimony of Daniel G. Hansen, 7:7-8.

²¹ Direct Testimony of Daniel G. Hansen, 7:8-11.

1 will continue to make reconciliations or re-reconciliations of lost revenues due to the
2 Company's approved retrospective application of new EM&V received related to
3 programs offered to residential and commercial customers up through the effective date
4 of the new base rates approved in this proceeding.²²

5 **Q. HOW IS THE LRAM DIFFERENT THAN THE COMPANY'S PROPOSED RDM?**

6 A. Revenue decoupling is a relatively blunt instrument for addressing energy
7 efficiency incentives. Revenue decoupling mechanisms, like the proposed RDM, allow
8 utilities to recover all revenue losses, regardless of the reason for those losses. The
9 Company's current LRAM, however, directly links revenue recovery to the Company's
10 energy efficiency activities, allowing the Company to recover only lost revenues that are
11 verifiably associated with sales reductions resulting from those activities. Revenue
12 decoupling has no such feature and, in fact, shifts a large part of the revenue losses
13 verified from efficiency activities away from program participants and onto non-
14 participating customers with little benefit.

15 **Q. DOES THE COMPANY'S PROPOSED RDM INCLUDE ANY EM&V OR**
16 **RECONCILIATION PROCESS?**

17 A. The Company's proposal is not clear. Indiana Code provides for an EM&V process
18 for the recovery of lost revenues associated with energy efficiency programs approved by
19 the Commission. The state statute provides:

20 If forecasted data is used, the retail rate adjustment
21 mechanism must include a reconciliation mechanism to
22 correct for any variance between forecasted program costs
23 (including reasonable lost revenues and financial incentives)
24 and the actual program costs (including reasonable lost
25 revenues and financial incentives based on the evaluation,

²² Direct Testimony of Diana L. Douglas, 79:3-8.

1 measurement and verification of the energy efficiency
2 programs under the plan).²³

3 The Company is proposing the RDM to replace its current LRAM for residential
4 and small commercial customers. The Company's proposed RDM uses forecasted data
5 in its determination of RDM deferrals. The Company in its testimony does not appear to
6 include any EM&V process in which there would be an evaluation or reconciliation of lost
7 revenues associated with the Company's EE programs²⁴ or any other external factors
8 causing reductions in usage in any prior period if the RDM is approved. However, the
9 Company's proposed RDM tariff appears to indicate otherwise stating that "Projected and
10 actual recoveries under the RDM are reconciled, with any under or over recovery being
11 recovered or returned over a subsequent twelve-month period."²⁵ These discrepancies
12 by the Company lead to uncertainties of, if and to what extent, a reconciliation process
13 will be implemented.

14 **Q. IS THE COMPANY'S LRAM A MORE APPROPRIATE MECHANISM TO**
15 **ADDRESS THE COMPANY'S PURPORTED LOST REVENUES DUE TO EE AND DSM**
16 **INITIATIVES THAN THE PROPOSED RDM?**

17 A. Yes. The proposed RDM is based upon the position that (1) the Company has a
18 large amount of fixed costs and (2) revenue collections are heavily weighted towards
19 variable, volumetric-oriented charges.²⁶ The Company argues that without decoupling, it
20 will effectively "strand" a certain degree of these fixed distribution costs by promoting

²³ Indiana Code §8-1-8.5-10 (o)(2). (emphasis added)

²⁴ See: Direct Testimony of Daniel G. Hansen, 8:17-18; and Direct Testimony of Diana L. Douglas, pp. 79-80.

²⁵ Direct Testimony of Maria T. Diaz, Exhibit 7-(I) (MTD).

²⁶ Company's response to OUC 1.42.

1 EE/DSM programs and dynamic pricing tariffs.²⁷ The Company's proposed remedy, the
2 RDM, however, will allow it to recover revenue losses attributable to any reason, not just
3 the "stranding" of distribution related-capacity. The RDM would permit recovery of
4 revenue losses from commodity price changes, shifts in the regional economy, weather,
5 and other factors that are unrelated to its energy efficiency activities. The Company's
6 current LRAM, in contrast, only allows for the recovery of revenue losses when a verifiable
7 loss of capacity requirements or sales has occurred as a result of the Company's EE and
8 DSM programs. The Company purports that the RDM is necessary to make the Company
9 "indifferent to the effects of customer demand response to dynamic pricing pilots,
10 modifications to the current default rate designs, implementation of volt/VAR optimization,
11 and successful implementation of energy efficiency programs."²⁸ The Company's current
12 LRAM does just that: allows cost recovery for lost revenues attributable to the Company's
13 energy efficiency programs and DSM efforts. The Company's proposed RDM is
14 unnecessary because the Company already has a mechanism in place to address its EE
15 and DSM lost revenue concerns.

16 **Q. PLEASE ADDRESS THE COMPANY'S CLAIMS THAT THE RDM IS NEEDED**
17 **TO ACCOUNT FOR REVENUE LOSSES ASSOCIATED WITH ITS PROPOSED**
18 **DYNAMIC PRICING TARIFFS AND VOLT/VAR OPTIMIZATION EFFORTS.**

19 A. The Company states that the RDM is needed to recover lost revenues that may be
20 associated with the implementation of its proposed dynamic pricing pilot tariffs²⁹ and its
21 volt/VAR optimization efforts.³⁰ However, the Company has failed to acknowledge in this

²⁷ Direct Testimony of Daniel G. Hansen, 2:12-18.

²⁸ Direct Testimony of Daniel G. Hansen, 2:12-18.

²⁹ Direct Testimony of Brian P. Davey, 24:10-15.

³⁰ Direct Testimony of Daniel G. Hansen, 5:11-17.

1 proceeding that if these programs are designed and implemented appropriately these
2 efforts should result in avoided fuel costs, which would offset these purported lost
3 revenues. In fact, the Company in Cause No. 44720, noted in its cost-benefit analysis
4 that its proposed volt/VAR optimization efforts would result in fuel savings of over \$75
5 million on a present value revenue requirement basis over the next 20 years.³¹ Further,
6 the Company has stated that the revenue losses associated with its dynamic pricing tariffs
7 are not expected to be significant.³² The Company's proposed RDM appears to be a
8 solution in search of a problem and, therefore, is not necessary.

9 **b. The Company has not shown that its current or proposed energy**
10 **efficiency efforts have resulted in a negative financial impact.**

11 **Q. HAS THE COMPANY'S EFFICIENCY ACTIVITIES CHALLENGED ITS ABILITY**
12 **TO EARN A REASONABLE RETURN ON ITS INVESTMENTS?**

13 A. No. Schedule DED-3 shows the Company's adjusted achieved ROE over the past
14 decade. As shown in Schedule DED-3, the Company's earnings have ranged from a high
15 of 10.2 percent in 2010 to a low of 7.3 percent in 2009, averaging 9.4 percent over the
16 last decade. The Company's ROE has remained pretty steady over the last five years
17 averaging about 9.7 percent over this time period. Thus, the Company's earnings
18 performance shows that it has performed fairly well and that its past energy efficiency
19 initiatives have had little impact on its ability to earn a reasonable return.

20 **Q. HAVE YOU EXAMINED THE COMPANY'S HISTORIC ROE IN RELATION TO**
21 **ITS ENERGY SAVINGS?**

³¹ Cause No. 44720, Direct Testimony of William H. Fowler, Petitioner's Exhibit 2-G (WHF), pp. 2-3.; See also: Company's response to OUCC 1.28, Confidential Attachment OUCC 1.28A.

³² Company's response to OUCC 36.4.

1 A. Yes. Schedule DED-4 presents a comparison of the Company's annual
2 incremental energy savings and the Company's adjusted earned ROE for the period
3 2014-2018. A comparison of these two series does not suggest any strong or pervasive
4 deterioration in the Company's achieved ROE as a result of its energy efficiency efforts.
5 In other words, there is no inverse relationship between the Company's achieved ROE
6 and its energy efficiency savings; in fact, if anything, the relationship would appear to be
7 more positive since earnings and savings appear to be moving more in tandem than in
8 opposition, particularly over the years 2016-2018.

9 **Q. HAS THE COMPANY PREPARED ANY ANALYSIS EVALUATING THE IMPACT**
10 **THAT ITS PROPOSED DYNAMIC PRICING PILOT PROGRAMS, FUTURE EE**
11 **INITIATIVES, OR VOLT/VAR IMPROVEMENTS WILL HAVE ON ITS EARNINGS?**

12 A. No. The Company has not provided any empirical evidence or estimates that a
13 negative financial impact will arise and has, furthermore, objected to performing any such
14 analysis.³³ Further, the Company appears to be putting the cart before the horse in its
15 RDM proposal since it has stated that revenue erosion from its dynamic pricing pilot
16 programs "is not expected to be significant"³⁴, given this expectation, the Commission
17 should defer from making any decision on the RDM until lost revenues from programs
18 like this become a reality.

19 **Q. HAS THE COMPANY PROVIDED ANY EVIDENCE THAT ITS CURRENT OR**
20 **FUTURE ENERGY EFFICIENCY EFFORTS OR PROGRAMS WILL HAVE A**
21 **NEGATIVE FINANCIAL IMPACT?**

³³ Company's response to OUCC 1.27, OUCC 1.36, and OUCC 1.38. See: DED-16 for responses.

³⁴ Company's response to OUCC 1.36.

1 A. No. The Company has not provided any details regarding the impact that its future
2 energy efficiency programs may have on revenue losses as the Company has assumed
3 these revenue losses to be zero as it currently recovers these losses through its LRAM
4 in its EE Rider.³⁵ Thus, the Company's proposed RDM is clearly not needed to provide
5 the Company an incentive to promote energy efficiency and DSM measures as no
6 disincentive currently exists.

7 **Q. HAS THE COMPANY PROVIDED ANY REVENUE LOSS ESTIMATES THAT**
8 **COULD ARISE FROM ITS VOLT/VAR OPTIMIZATION EFFORTS?**

9 A No, but the Company does note that its volt/VAR optimization efforts will result in
10 a billed sales reduction of only one to two percent.³⁶ Further, the Company's own cost
11 benefit analysis ("CBA"), filed in Cause No. 44720, found the benefits of undertaking its
12 optimization efforts exceeded costs, with a net benefit of almost \$17 million over the next
13 20 years.³⁷

14 **Q. HAVE YOU PREPARED AN ANALYSIS OF THE IMPACT THAT THE**
15 **COMPANY'S REVENUE LOSSES HAVE HAD ON THE ITS ROE?**

16 A. Yes. Schedule DED-5 provides an estimate of the financial impact of the
17 Company's estimated lost revenues over the period 2014 – 2018, had decoupling been
18 in place over this period of time. This analysis simply takes the Company's "back-cast"
19 of lost revenues of residential and small commercial customers that would have arisen
20 over this time period (with RDM) and estimates the ROE impact of these estimated lost
21 revenues, keeping in mind that these lost revenues are total lost revenues, those that

³⁶ Direct Testimony of Daniel G. Hansen, 5:14.

³⁷ Cause No. 44720, Direct Testimony of William H. Fowler, Petitioner's Exhibit 2-G (WHF), pp. 2-3.; See also: Company's response to OUCC 1.28, Confidential Attachment OUCC 1.28A.

1 arise from not just the Company's efficiency efforts, but any other factors as well. The
2 financial analysis estimates that, on a historic basis, revenue losses would have had, on
3 average, as little as a 0.04 percent impact on the Company's achieved ROE. This number
4 represents a relatively small impact indicating that the Company's overall estimated
5 revenue losses (arising from efficiency losses and other factors), at least on a net historic
6 basis, would not have significantly compromised its ability to earn its allowed ROE.

7 **Q. DOES THE COMPANY HAVE A CERTAIN LEVEL OF REVENUE STABILITY**
8 **AS A RESULT OF ANY OTHER SURCHARGE RIDERS OR MECHANISMS?**

9 A. Yes. The Company currently has a high level of revenue stability as a result of
10 various other rider mechanisms that guarantee cost recovery and revenue streams
11 between rate cases.³⁸ For example, Duke Energy recovers a return of and on incremental
12 infrastructure investments through its Transmission and Distribution ("T&D")
13 Infrastructure Improvement Cost Adjustment Rider ("TDSIC Rider"). Also, the Company
14 receives a steady stream of revenues through its fuel cost adjustment rider and direct
15 recovery of its energy efficiency program costs and lost revenues in its EE Rider, in
16 addition to a number other cost recovery riders.³⁹ These various riders help to
17 substantially insulate the Company from financial risk, the approval of the RDM in addition
18 to these riders would essentially guarantee the Company its revenue requirement further
19 shielding it from nearly any financial risk. The Company's proposed RDM if approved will
20 shift risk from the Company and its shareholders onto ratepayers.

³⁸ Company's response to OUCC 1.22, Attachment OUCC 1.22-A.

³⁹ Company's response to OUCC 1.22, Attachment OUCC 1.22-A.

VI. THE PROPOSED RDM IS INCONSISTENT WITH COMMISSION POLICY

Q. PLEASE DESCRIBE THE COMMISSION'S PAST REVENUE ADJUSTMENT POLICIES.

A. The Commission has approved revenue decoupling mechanisms referred to as the Sales Reconciliation Component ("SRC") for natural gas utilities operating in Indiana.⁴⁰ The Commission, to date, has not approved a full decoupling mechanism for any electric utility. However, the Commission has approved the recovery of energy efficiency related lost base revenues through a LRAM for electric utilities including Southern Indiana Gas and Electric Company ("Vectren South"), Indiana Michigan Power Company, Northern Indiana Public Service Company, and Duke. These natural gas and electric lost revenue recovery mechanisms are contained within each of the referenced utilities' EE riders.

Q. HAS THE COMMISSION ACKNOWLEDGED THAT A UTILITY HAS AN OBLIGATION TO CONSERVE RESOURCES?

A. Yes. The Commission has clearly noted that this obligation is subsumed within the "regulatory compact." The Commission has noted that this "regulatory compact" gives the utility a monopoly franchise area and a reasonable opportunity to earn a return on and of their prudently incurred investment, as well as cost recovery of their prudently-incurred expenses, in return for providing safe, economic, and reliable service at reasonable rates.⁴¹ The Commission reiterated this sentiment in its Order in Cause No. 43566, stating that:

⁴⁰ Cause Nos. 42943 and 43046, Order, December 1, 2006.; Cause No. 42767, Order, August 29, 2007.; and Cause No. 44453, Order, July 30, 2014.

⁴¹ Cause No. 43566, Order, dated July 28, 2010, p. 43.

1 Indiana law declares this traditional monopoly structure to be
2 "in the public interest" and unalterable by the authority granted
3 to the Commission in Ind. Code § 8-1-2.5 *et seq.* Ind. Code
4 §§ 8-1-2.3-1; 8-1-2.5-11. The Service Area Act [The Electricity
5 Suppliers' Service Area Assignments Act, Ind. Code § 8-1-
6 2.3 *et seq.*] is a cornerstone of Indiana's retail electric utility
7 service framework. Assigned service areas were created to
8 provide for the "orderly development of coordinated statewide
9 electric service at retail, to eliminate or avoid unnecessary
10 duplication of electric utility facilities, to prevent the waste of
11 material and resources, and to promote economical, efficient,
12 and adequate electric service to the public.⁴²

13 **Q. HAS THE COMMISSION RE-ITERATED THIS POSITION IN ANY OTHER**
14 **INDIANA REGULATORY PROCEEDINGS?**

15 A Yes. The Commission further acknowledged a utility's obligation to conserve
16 resources in its rejection of a decoupling mechanism proposed by Vectren South Electric.
17 This time, rather than tying this obligation directly to the regulatory compact, the
18 Commission noted that a utility's obligation to conserve resources is simply in the public
19 interest.

20 [A utility operates] "in the public interest" not only because it
21 provides basic and necessary customer service, but also
22 because it extracts and utilizes valuable natural resources in
23 providing that service...intentionally wasting those natural
24 resources is inconsistent with this public interest standard and
25 the promotion of inefficient sales for profit is simply
26 inconsistent with an underlying public interest principle of
27 close to 100 years of utility regulation. We agree, whether
28 Vectren South receives a particular cost recovery mechanism
29 or not, it remains obligated to conserve resources as part of
30 its regulatory bargain.⁴³

⁴² Cause No. 43566, Order, dated July 28, 2010, p. 43. (emphasis added)

⁴³ Cause No. 43839, Order, dated April 27, 2011, p. 83. (emphasis added)

1 **Q. DOES THE COMPANY’S ASSERTION THAT IT HAS A DISINCENTIVE TO**
2 **ENCOURAGE CUSTOMERS TO REDUCE USAGE CONTRADICT THE**
3 **COMMISSION’S POLICIES AND REGULATIONS?**

4 A. Yes. The Company’s position is entirely contradictory to the Commission’s policies
5 that utilities have obligations, and incentives, to promote efficiency. Any utility not
6 attempting to pursue all cost-effective energy efficiency activities would be operating in a
7 fashion inconsistent with clearly articulated past Commission policies. In addition to
8 Commission policies, there is also state statutes that set a mandatory requirement for
9 Indiana utilities to reduce energy usage through the filing of energy efficiency plans.⁴⁴
10 These statutes provide for financial incentives to help promote these mandates.⁴⁵ Given
11 this direction, the Commission established energy efficiency performance incentives,
12 most recently for Duke Energy in 2018, in Cause No. 43955 DSM-6, with incentives not
13 accruing until the Company achieves at a minimum 75 percent of targeted savings.⁴⁶
14 Thus, no additional ratemaking mechanisms are needed.

15 **Q. HAS THE COMMISSION RECOGNIZED THE EXTREME NATURE OF**
16 **REVENUE DECOUPLING MECHANISMS?**

17 A. Yes. The Commission has recognized that revenue decoupling mechanisms go
18 beyond simply recovering lost base revenues from its efficiency activities and can
19 reimburse utilities for revenue losses not associated with its energy efficiency initiatives
20 or programs.⁴⁷ The Commission has clearly recognized that a utility’s ratepayers should
21 not be forced to reimburse the Company for revenue losses caused by factors not

⁴⁴ Indiana Code §8-1-8.5-9 and §8-1-8.5-10.

⁴⁵ Indiana Code §8-1-8.5-10 (o)(1).

⁴⁶ Cause No. 43955 DSM 6, Order, December 19, 2018, p. 4.

⁴⁷ Cause No. 43839, Order, dated April 27, 2011, p. 85.

1 associated with a utility's programs.⁴⁸ The Commission has further elaborated on its
2 position stating that, particularly during an economic downturn, it would not be "equitable"
3 for a utility to recover lost revenues from its ratepayers "for energy savings caused by the
4 ratepayers' own responsible efforts to conserve."⁴⁹ Further, traditional regulation
5 provides a utility an opportunity to request recovery of non-energy efficiency related lost
6 revenues through a rate case proceeding if a utility's plant investments and operating
7 expenses exceed its revenues; thereby, impeding its ability to earn its authorized return
8 on its investments.

9 **Q. HAS THE COMMISSION RECOGNIZED THE RISK SHIFTING NATURE OF**
10 **REVENUE DECOUPLING MECHANISMS?**

11 A. Yes. The Commission noted in Cause No. 43180 that "decoupling mechanisms
12 clearly shift risk from the utility to ratepayers, and that reduction of risk should be
13 considered in determining the appropriate return on equity."⁵⁰

14 **Q. DOES THE COMPANY'S PROPOSED RDM MAKE ANY ADJUSTMENTS TO**
15 **ACCOUNT FOR OUTSIDE FACTORS NOT ASSOCIATED WITH ENERGY**
16 **EFFICIENCY OR DEMAND RESPONSE MEASURES THAT MAY IMPACT ITS**
17 **REVENUES?**

18 A. No. The Company's proposed RDM goes far beyond simply recovering lost base
19 revenues from its efficiency activities and includes revenue losses from any change in
20 sales which may be the result of weather; electric and natural gas commodity price
21 changes; economic conditions; exogenous shocks; efficiency changes; or technological

⁴⁸ Cause No. 43839, Order, dated April 27, 2011, p. 85.

⁴⁹ Cause No. 43839, Order, dated April 27, 2011, p. 85.

⁵⁰ Cause No. 43180, Order, dated October 21, 2010, p. 10.

change to name a few. The Company's proposed decoupling mechanism will hold ratepayers responsible for all revenue losses regardless of cause which is inconsistent with the Commission's precedent and does not balance the interests of ratepayers and the Company and its shareholders.

VII. THE PROPOSED RDM IS INCONSISTENT WITH OTHER COMMISSION APPROVED MECHANISMS

Q. PLEASE EXPLAIN THE SRC DECOUPLING MECHANISM THAT HAS BEEN APPROVED FOR A NUMBER OF INDIANA NATURAL GAS UTILITIES.

A. The Commission first adopted the SRC for Vectren South and Vectren North in 2006,⁵¹ followed by Citizens Gas (2007)⁵², Citizens Gas of Westfield (formerly Westfield Gas) (2010)⁵³, Fountaintown Gas (2011)⁵⁴, South Eastern Indiana Natural Gas (2011)⁵⁵, Indiana Utilities (2011)⁵⁶, Midwest Natural Gas (2011)⁵⁷, Boonville Natural Gas (2011)⁵⁸, Switzerland County Natural Gas (2011)⁵⁹, Community Natural Gas (2011)⁶⁰, and Indiana Natural Gas (2011)⁶¹.⁶² The purpose of the SRC was to address the purported issues associated with natural gas utilities' incentive for adopting energy efficiency programs and measures particularly during the 2004-2006 time period when natural gas utilities were experiencing overall reduced usage as a result of increases in natural gas prices.⁶³

⁵¹ Cause Nos. 42943 and 43046, Order, December 1, 2006.

⁵² Cause No. 42767, Order, August 29, 2007.

⁵³ Cause No. 43624, Order, March 10, 2010.

⁵⁴ Cause No. 43995, Order, November 30, 2011.

⁵⁵ Cause No. 43995, Order, November 30, 2011.

⁵⁶ Cause No. 43995, Order, November 30, 2011.

⁵⁷ Cause No. 43995, Order, November 30, 2011.

⁵⁸ Cause No. 43995, Order, November 30, 2011.

⁵⁹ Cause No. 43995, Order, November 30, 2011.

⁶⁰ Cause No. 43995, Order, November 30, 2011.

⁶¹ Cause No. 43995, Order, November 30, 2011.

⁶² Note the SRC mechanisms approved for Citizens Energy, Fountaintown Gas, South Eastern Indiana Natural Gas, Indiana Utilities, Midwest Natural Gas, Boonville Natural Gas, Switzerland County Natural Gas, Community Natural Gas, and Indiana Natural Gas are no longer active.

⁶³ Cause No. 42767, Order, August 29, 2007, pp. 20-21.

1 **Q. DO ANY OF THE SRC MECHANISMS APPROVED FOR THE GAS UTILITIES**
2 **IN THE STATE HAVE ANY RATEPAYER PROTECTION MECHANISM SUCH AS**
3 **CAPS ON RECOVERY OR DEFERRALS?**

4 A. Yes, the approved SRC mechanisms approved for Vectren South, Vectren North,
5 and Citizens Gas have a four percent cap above the prior year margins. The SRC
6 mechanism approved for Citizens Gas of Westfield provides for an eight percent cap
7 above the prior year margins. Any amount that exceeds this four or eight percent cap is
8 deferred for recovery until the next EE rider annual filing provided that it does not result
9 in exceeding the cap for that year, or it is deferred until the next base rate case.⁶⁴ The
10 Commission stated that it approved this cap on the SRC as a mechanism to protect
11 customers against rate volatility.⁶⁵

12 **Q. DID THE COMMISSION ORIGINALLY LIMIT THE LOST MARGINS ALLOWED**
13 **TO BE RECOVERED IN THE SRC?**

14 A. Yes. The Commission, when it initially approved the SRC mechanism for Vectren
15 South and Vectren North, only allowed the recovery of 85 percent of its lost margins.⁶⁶
16 The Commission found that the adjustment reflects the fact that some reduction in
17 margins will occur without implementation of the company's programs.⁶⁷ However, it
18 should be noted that this limitation of recovery to 85 percent of lost margins is no longer
19 in place.

20 **Q. DOES THE COMPANY'S PROPOSED RDM INCLUDE ANY CAPS?**

⁶⁴ Cause No. 44598, Order, Approved September 9, 2015, p. 6; and Cause No. 44731, Order, Approved April 26, 2017, p. 21.

⁶⁵ Cause No. 44598, Order, Approved September 9, 2015, p. 8.

⁶⁶ Cause Nos. 42943 and 43046, Order, December 1, 2006, p. 42.

⁶⁷ Cause Nos. 42943 and 43046, Order, December 1, 2006, p. 42.

1 A. No. The Company's proposed RDM does not include any cap or limitation on the
2 amount of lost revenues or margins that the Company can recover in any period. The
3 Company appears to believe that a cap is not needed since it "expects that the RDM will
4 lead to rate increases and decreases from year-to-year and prefers a symmetric approach
5 to the resulting RDM credits and surcharges."⁶⁸

6 **Q. DO YOU AGREE WITH THE COMPANY'S STATEMENT THAT THE RDM IS**
7 **"SYMMETRIC"?**

8 A. No. The proposed RDM would provide a tangible benefit to Duke Energy in the
9 form of revenue stability, regardless of the volume of electricity sold. The proposed RDM,
10 however, offers no comparable nor tangible benefits to ratepayers. Ratepayers will not
11 see contemporaneous surcharges and rebates on monthly utility bills trueing up any
12 revenue shortage or over-collection, but rather such revenue deviations are calculated on
13 an annual basis and applied to the following year's customer bills. Therefore, the
14 proposed RDM would not alleviate higher than average bills that ratepayers may face in
15 any given month due to situations like warmer than expected summer weather. Rebates
16 would not arise until the year following the reconciliation, and even then, are spread
17 across an entire 12-month period, not one select month. Therefore, decoupling may
18 make it more difficult for ratepayers to predict year-to-year budgeting requirements for
19 electric utility service. Likewise, the proposed RDM can lead to active financial hardship
20 for ratepayers as a year with milder than average seasonal usage may be followed by a
21 harsher than average year, creating a RDM surcharge on top of customers already facing
22 higher than average bills.

⁶⁸ Company's response to OUC 1.31.

Q. HAS THE COMMISSION FOUND THAT DECOUPLING MECHANISMS ARE NOT WELL SUITED FOR ELECTRIC UTILITIES?

A. Yes. The Commission has ruled in the past that “distribution only” utilities, such as natural gas local distribution companies (“LDC”), have fixed costs that are considerably less than electric utilities.⁶⁹ Therefore, decoupling the distribution revenues of a LDC from its sales has minimal impact on customers because a customer who implements energy efficiency measures can realize significant savings since the majority of its bill is commodity related. The Commission found that because fixed costs are much higher for an electric utility, representing 75 percent of the bill, the commodity costs are a much smaller portion of the customer’s bill and, as such, a reduction in usage will not result in a proportional reduction in an electric customer’s bill.⁷⁰

VIII. RDM DESIGN DEFICIENCIES

Q. IS THE DESIGN OF DECOUPLING MECHANISMS UNIFORM FOR THOSE STATES THAT HAVE APPROVED DECOUPLING MECHANISMS?

A. No. Approved mechanisms differ in the types of ratepayer protection mechanisms that are included as part of the decoupling mechanism. While there are some mechanisms that do not include any ratepayer protections, a large number of approved mechanisms include protections such as limitations on recovery or caps on deferrals, earnings tests, DSM or EE targets, limitation on recovery period (pilot basis), and review or compliance filings. Schedule DED-6 presents a table that outlines the various ratepayer protection mechanism components of each approved decoupling mechanism.

⁶⁹ Cause No. 43839, Order, dated April 27, 2011, p. 86.

⁷⁰ Cause No. 43839, Order, dated April 27, 2011, p. 86.

1 **Q. DOES THE COMPANY'S PROPOSED DECOUPLING MECHANISM SUFFER**
2 **FROM ANY DESIGN DEFICIENCIES?**

3 A. Yes. The Company's proposed RDM proposal suffers from a number of design
4 deficiencies that include the omission of limitations on the amount of lost margin recovery
5 or an accrual cap and does not include any energy efficiency savings targets.

6 **Q. PLEASE ADDRESS THE FIRST ISSUE REGARDING THE COMPANY'S**
7 **FAILURE TO INCLUDE ANY LOST MARGIN RECOVERY LIMITATIONS?**

8 A. Some decoupling mechanisms limit the utility's range of revenue recovery in order
9 to account for the non-efficiency related factors that can impact a utility's annual
10 revenues. Other protections restrict the amount of revenue that can be collected in a
11 given period. Examples of this would be Oregon's original approach that limits revenue
12 recovery to only 90 percent of the difference between actual and allowed margins,⁷¹ and,
13 as previously discussed, Indiana's initial provisions that restricted revenue recovery to
14 only 85 percent of the difference between allowed and actual margins for Vectren North
15 and Vectren South gas operations.⁷²

16 **Q. DOES THE PROPOSED RDM INCLUDE A CAP ON THE AMOUNT OF**
17 **REVENUES THAT CAN BE RECOVERED IN A PERIOD?**

18 A. No. As previously discussed, the proposed RDM does not include any cap similar
19 to the four percent or eight percent cap that is included in the SRC mechanism of Indiana's
20 gas utilities. These caps serve an important purpose in limiting the degree to which rates
21 can increase due to a large revenue decoupling surcharge balance that can arise for

⁷¹ In the Matter of Northwest Natural Gas Company; Application for Public Purposes Funding and Distribution Margin Normalization, Oregon Public Utilities Commission, Order No. 02-634, Docket No. UG 143, September 12, 2002, p 3.

⁷² Cause Nos. 42943 and 43046. December 1, 2006. p 42.

1 reasons that have nothing to do with the utility's efficiency efforts. For instance, revenue
2 decoupling mechanisms true up revenue shortfalls regardless of reason and can include
3 shortfalls that can arise as a result of an economic contraction. If the economy were to
4 go into a recession, decoupling balances could become very large, resulting in significant
5 rate shock to ratepayers at a time in which those rate increases are least affordable.

6 **Q. ARE THERE ANY REAL-WORLD EXAMPLES OF HOW REVENUE**
7 **DECOUPLING CAN LEAD TO SERIOUS PROBLEMS DURING AN ECONOMIC**
8 **CONTRACTION?**

9 A. Yes, one of the more widely-recognized failures of revenue decoupling occurred
10 in Maine during the early 1990s. The program, known as "ERAM" ("Electric Revenue
11 Adjustment Mechanism"), was put into place for a three-year trial period to encourage
12 Central Maine Power ("CMP") to promote energy efficiency. The ERAM, like the
13 proposed RDM, had no adjustments for regional activity changes. The adoption of the
14 ERAM coincided with a recession that resulted in lower sales levels and substantial
15 revenue deferrals. CMP was entitled to recover these deferrals under the provisions of
16 the ERAM mechanism, which by the end of 1992 had reached \$52 million. Only a very
17 small portion of this amount was attributed to CMP's conservation efforts as most of the
18 deferral resulted from the economic recession. The ERAM was viewed by many as a
19 mechanism that shielded CMP from the economic impact of the recession rather than
20 furthering the intended energy efficiency and conservation incentives. CMP's ERAM was
21 terminated on November 30, 1993.⁷³

⁷³ *Report on Utility Incentives Mechanisms for the Promotion of Energy Efficiency and System Reliability.* Maine Public Utilities Commission. Presented to the Utilities and Energy Committee. February 1, 2004.

1 **Q. WHAT IS AN OVER-EARNINGS TEST?**

2 A. An over-earnings test is simply a mechanism restricting revenue decoupling
3 surcharges that result in pushing a utility's achieved rate of return above the level
4 approved in its prior rate case. Thus, utilities are denied revenue decoupling recoveries
5 if such recoveries push them to excessive earnings positions. An example of this type of
6 ratepayer protection mechanism includes Cascade Natural Gas in Oregon, which
7 provides a rebate of 33 percent of earnings over a threshold amount to its ratepayers for
8 as long as a decoupling tariff is in effect.⁷⁴

9 **Q. IS THE COMPANY SUBJECT TO ANY OVER-EARNINGS TEST?**

10 A. Yes. The Company has noted that the "impact of the decoupling proposal on
11 revenues is subject to the earnings test pursuant to Ind. Code §8-1-2-42, wherein Duke
12 Energy Indiana cannot exceed its authorized return in excess of that authorized by the
13 Commission."⁷⁵

14 **Q. HAS THE COMPANY INCLUDED ANY EE SAVINGS TARGETS OR GOALS AS**
15 **PART OF ITS RDM PROPOSAL?**

16 A. No, the Company has not tied its RDM request to any new or additional energy
17 efficiency programs and savings targets other than those already approved by the
18 Commission and implemented by the Company. The Company states that its RDM is
19 necessary in order to make the Company indifferent to promoting its proposed dynamic
20 pricing tariffs, rate design changes, energy efficiency measures and volt/VAR initiatives.
21 Yet, the Company has not made any commitment in offering any new or additional energy

⁷⁴ In the Matter of Cascade Natural Gas Corporation, Request for Authorization to Establish a Decoupling Mechanism and Approval of Tariff Sheets Nos. 30 and 30-A, Order No. 06-191, Docket No. UG 167, issued April 19, 2006, Attachment I, Appendix A, ¶ 12.

⁷⁵ Company's response to OUCG 1.14.

1 efficiency programs or savings targets and the dynamic pricing tariffs being proposed are
2 being offered on a voluntary pilot basis. The Company's proposed RDM does not offer
3 the general body of residential or commercial ratepayers any opportunity to achieve more
4 efficiency savings as no additional energy efficiency measures are being proposed in this
5 proceeding and the Company has not provided any details of the impacts of its future EE
6 programs simply stating in discovery that its "2020 – 2023 plan to be presented for
7 Commission approval in a filing this fall has not yet been finalized, so projected amounts
8 have not been included past 2019."⁷⁶ Further, the proposed RDM will hold ratepayers
9 accountable for the recovery of not only revenue losses as a result of the status quo EE
10 and DSM programs but for all other factors that will impact sales (i.e. weather, economy,
11 etc.).

12 **Q. IS IT COMMON FOR REGULATORS TO APPROVE REVENUE DECOUPLING**
13 **MECHANISMS WITHOUT ANY BONA FIDE ENERGY EFFICIENCY COMMITMENTS?**

14 A. No. While it is difficult to make sweeping generalizations about the approval of
15 revenue decoupling mechanisms across the country, one theme that appears to be
16 consistent is that their approvals tend to be contingent upon a strong and specific energy
17 efficiency commitment. A large number of states that have adopted revenue decoupling
18 programs have done so either after a utility has put into place a portfolio of meaningful
19 energy efficiency programs, or a utility has a specific proposal and commitment to a suite
20 of efficiency programs that can be reviewed in tandem with the revenue decoupling
21 mechanism request.⁷⁷ Such is the case with the Company's LRAM which recovers

⁷⁶ Company's response to OUCC 1.36 and OUCC 1.37.

⁷⁷ See Schedule DED-6.

1 verified lost revenues associated with the energy efficiency and DSM programs the
2 Company currently implements.

3 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS**
4 **REGARDING THE COMPANY'S PROPOSED RDM.**

5 A. The Company's RDM proposal should be rejected for a number of reasons. First,
6 the Company's proposed RDM is inconsistent with the Commission's past policies
7 regarding decoupling mechanisms for electric utilities and the SRC approved for natural
8 gas utilities. Second, the Company has not been able to show that its efficiency activities
9 or proposed rate design changes have, or will have, a negative financial impact on its
10 ability to earn its allowed rate of return. On a historical basis, the Company's past
11 efficiency efforts have not significantly impacted its ability to earn its allowed ROE,
12 particularly because the Company already has a mechanism in place that allows for it to
13 recover lost revenues associated with these activities. The Company has not provided in
14 this proceeding any projections that quantify any specific future earnings challenges,
15 raising questions about its validity and whether or not the Company will, in fact, see
16 financial impacts that differ significantly from those experienced over the past five years.
17 Lastly, the Indiana Code already provides that lost revenues associated with energy
18 efficiency and DSM activities can be recovered through a LRAM, the Company already
19 has taken advantage of this opportunity awarded through legislation and as a result does
20 not currently have any disincentive to promote energy efficiency or DSM measures. The
21 Company does not expect revenue losses from its dynamic pricing pilot programs to be
22 significant⁷⁸ and in regards to its volt/VAR optimization program its cost benefit analysis

⁷⁸ Company's response to OUC 36.4.

1 showed the overall program resulted in a net benefit.⁷⁹ Therefore, the Company's
2 proposed RDM is not needed to address the Company's purported concerns. Further,
3 under the Company's proposed RDM it is not clear if there will be an EM&V or
4 reconciliation process evaluating the performance of the Company's energy efficiency
5 programs or any other external factors causing a reduction in the usage of residential and
6 small commercial customers.

7 **IX. BENCHMARKING ANALYSIS**

8 **Q. HAVE YOU EXAMINED THE COMPANY'S PLANT INVESTMENT TRENDS** 9 **OVER THE PAST SEVERAL YEARS?**

10 A. Yes. My testimony includes a number of plant investment, costs, and operational
11 efficiency comparisons between the Company and a peer group of vertically-integrated
12 electric utilities operating in the Midwest, Mid-Continent, and Appalachian regions.
13 Schedule DED-7 presents a list of the peer utilities I used in my analyses and their
14 respective descriptive statistics. The data for these analyses come from the Federal
15 Energy Regulatory Commission's ("FERC") Form 1 database. All the utilities included in
16 this sample are vertically integrated; utilities which allow electric choice sales are
17 excluded.

18 **Q. HOW WERE YOUR ANALYSES DEVELOPED?**

19 A. Each analysis examines a different cost or performance metric. Unless otherwise
20 noted, each analysis is comprised of six pages. The first page includes one table
21 comparing either investment or operating costs per unit of electricity generated (per

⁷⁹ Cause No. 44720, Direct Testimony of William H. Fowler, Petitioner's Exhibit 2-G (WHF), pp. 2-3.; See also: Company's response to OUC 1.28, Confidential Attachment OUC 1.28A.

megawatt-hour or “MWh”) for each of the comparison utilities. The top row provides the Company’s statistics, the last row presents the peer-group average, and the middle rows provide the individual costs for each of the peer utilities across time (2009-2018). The table on the second page provides the rank order for each metric for each utility. A high rank number in each of these tables indicates a higher investment per MWh, or cost per MWh, relative to other firms in the sample. The fourth page and fifth page provide comparable tables for the cost or investment data per customer. The third and sixth pages simply chart the data over time.

Q. HOW DOES THE COMPANY’S NET PRODUCTION PLANT INVESTMENT COMPARE TO THAT OF ITS PEERS?

A. Schedule DED-8 provides an analysis of the Company’s production plant investment trends. The Company’s net production plant has grown from \$113.70/MWh in 2009 to \$208.04/MWh in 2018. This average annual growth rate of 9.2 percent is comparable to the peer group average of 8.6 percent. Over the past five years, the Company’s net production plant per MWh has grown by 3.4 percent per year on average, which is lower than the 5.5 percent peer group average. On a per-customer basis, the Company’s net production plant has grown by an average of 9.6 percent per year over the past ten years, but only 2.7 percent per year over the past five years, compared to 9.1 percent and 5.1 percent, respectively, for the peer group. The growth in production plant is driven almost entirely by the Edwardsport combined cycle plant which began commercial operations in 2013.⁸⁰

⁸⁰ Duke Energy Indiana FERC Form 1 for 2013. Notes to Financial Statements, p. 123.32.

Q. HOW DOES THE COMPANY'S NET TRANSMISSION PLANT INVESTMENT COMPARE TO THAT OF ITS PEERS?

A. Schedule DED-9 provides an analysis of the Company's transmission plant investment trends. The Company's net transmission plant has grown from \$21.81/MWh in 2009 to \$42.38/MWh in 2018. Nominally, the Company ranks 13th, 14th, or 15th in the peer group each year. However, nominal investment is dependent on a Company's need for transmission infrastructure. In terms of growth rates, the average annual growth rate of 10.5 percent is lower than the peer group average of 14.1 percent. Over the past five years, the Company's net transmission plant per MWh has grown by 10.1 percent per year on average, which is lower than the 12.4 percent peer group average. The Company similarly shows slower growth than the peer group on a per-customer basis, with five and ten year average annual growth rates of 9.2 and 10.9 percent, compared to peer group averages of 11.3 and 14.1 percent. Net transmission plant growth for the Company is expected to accelerate to 12.9 percent per year on a per-MWh basis, and to 10.9 percent per year on a per-customer basis in 2020.

Q. HOW DOES THE COMPANY'S NET DISTRIBUTION PLANT INVESTMENT COMPARE TO THAT OF ITS PEERS?

A. Schedule DED-10 provides an analysis of the Company's distribution plant investment trends. The Company's net distribution plant has grown from \$47.36/MWh in 2009 to \$70.84/MWh in 2018. Nominally, the Company has compared favorably with its peers, ranking 4th in the peer group since 2011. In terms of growth rates, the ten year average annual growth rate of 5.5 percent is lower than the peer group average of 6.4 percent. Over the past five years, however, the Company's net distribution plant per MWh

has grown by 9.9 percent per year on average, which is higher than the 7.0 percent peer group average. On a per-customer basis, the Company's net distribution plant has grown by an average of 5.9 percent per year over the past ten years, but 9.0 percent per year over the past five years, compared to 6.6 percent for both five and ten year averages for the peer group. However, in 2020, net distribution plant growth for the Company is expected to accelerate to 15.2 percent per year on a per-MWh basis, and to 13.1 percent per year on a per-customer basis.

Q. HOW DOES THE COMPANY'S NET GENERAL PLANT INVESTMENT COMPARE TO THAT OF ITS PEERS?

A. Schedule DED-11 provides an analysis of the Company's general plant investment trends. The Company's net general plant has grown from \$5.04/MWh in 2009 to \$10.34/MWh in 2018. Nominally, the Company has been higher than its peers, ranking from 14th to 17th in the peer group. Further, the growth of its investment has considerably outpaced that of the peer group: the ten year average annual growth rate of 11.7 percent is higher than the peer group average of 8.2 percent, and the five-year average growth rate of 15.2 percent is considerably higher than the peer group average of 9.6 percent over the same period. On a per-customer basis, the Company's net general plant has grown by an average of 12.2 percent per year over the past ten years, and 14.2 percent per year over the past five years, compared to 8.4 and 8.6 percent, respectively, for the peer group. Furthermore, net general plant growth for the Company is expected to accelerate to 24 percent per year on a per-MWh basis, and to 21.6 percent per year on a per-customer basis.

Q. HOW DO THE COMPANY'S PRODUCTION O&M EXPENSES COMPARE TO THE PEER GROUP?

A. Schedule DED-12 provides an analysis of the Company's production O&M expense trends. The Company's production expenses less fuel and purchased power have grown from \$7.55/MWh in 2009 to \$10.64/MWh in 2018, an annual average growth rate of 4.5 percent. This is higher than the peer group average of two percent. The increase in production costs for the Company coincides again with the start of commercial operations for its IGCC plant. Over the past five years, annual growth in expenses per MWh has averaged 0.3 percent for the Company and -0.3 percent for the peer group. The Company's production expenses per MWh are projected to grow by 10.3 percent per year through 2020. On a per-customer basis, the ten year average growth rate is 4.9 percent for the Company and 2.2 percent for the peer group, while the five year average growth rates are -0.3 and -0.7 percent, respectively. The Company's production expenses per customer, however, are projected to grow by 8.3 percent per year through 2020.

Q. HOW DO THE COMPANY'S TRANSMISSION O&M EXPENSES COMPARE TO THE PEER GROUP?

A. Schedule DED-13 provides an analysis of the Company's transmission O&M expense trends. The Company's transmission expenses are far below that of the peer group average, at \$3.20/MWh in 2018 vs. \$8.26/MWh for the peer group. However, the rate of growth has significantly outpaced the peer group, averaging 20.4 percent over the past five years versus only 4.1 percent for the peer group. The Company's transmission expenses on a per-MWh basis are expected to grow by 0.7 percent per year through

2020. The per-customer growth rates tell a similar story, with five year average growth rates of 19.3 percent for the Company and 4 percent for the peer group. The Company's per-customer transmission expenses are expected to decrease by 0.9 percent per year through 2020.

Q. HOW DO THE COMPANY'S DISTRIBUTION O&M EXPENSES COMPARE TO THE PEER GROUP?

A. Schedule DED-14 provides an analysis of the Company's distribution O&M expense trends. The Company's per-MWh distribution O&M expenses have generally been below average over the past 10 years. In 2018, the Company averaged \$4.07/MWh in distribution O&M expenses versus \$4.13 for the peer group. Over the past ten years, the average annual growth rate of distribution O&M expenses has been 2.2 percent for the Company compared to 1.7 percent for the peer group. However, in the past five years, the average growth rate has been 10 percent for the Company and only 1.2 percent for the peer group. The Company's per-MWh distribution expenses are expected to shrink by 0.6 percent per year through 2020. On a per-customer basis, the Company has once again outpaced the peer group in the growth rate of distribution O&M expenses over the past five years, averaging 9.1 percent per year compared to 0.9 percent for the peer group. However, the Company's distribution expenses per customer are expected to fall by 2.2 percent per year through 2020.

Q. HOW DO THE COMPANY'S ADMINISTRATIVE AND GENERAL ("A&G") O&M EXPENSES COMPARE TO THE PEER GROUP?

A. Schedule DED-15 provides an analysis of the Company's A&G O&M expense trends. The Company's A&G expenses have greatly decreased in recent years and in

2018, the Company's A&G expenses of \$5.17/MWh were over 31 percent lower than the peer group average of \$7.59/MWh. The Company's per-MWh A&G expenses have actually decreased by 1.5 percent per year over the past five years, while the peer group's A&G expenses have grown by 0.3 percent. The Company's A&G expenses are expected to decrease further by 5.8 percent per year through 2020 on a per-MWh basis. On a per-customer basis, the Company's A&G expenses have decreased by 2.1 percent per year over the past five years versus a 0.3 percent decrease for the peer group, and the Company's per-customer A&G expenses are expected to further decrease by 7.3 percent per year through 2020.

**Q. WHAT ARE YOUR CONCLUSIONS REGARDING THE COMPANY'S
FORECASTED TEST YEAR PLANT BALANCES AND EXPENSES?**

A. My conclusions are as follows:

- The projected annual growth rate of 10.3 percent in production O&M expenses per MWh far outpaces the five year growth rate of 0.3 percent.
- The projected annual growth rate of 15.2 percent in net distribution plant per MWh far outpaces the Company's five year average of 9.9 percent. Further, the Company's distribution O&M expense growth rate per MWh of 10 percent per year over the past five years has far outpaced the peer group average of 1.2 percent.
- Finally, while the Company projects its administrative and general O&M expenses will decrease, the Company's net general plant per MWh is projected to grow by 24 percent per year through 2020, is greater than its five year average growth rate of 15.2 percent.

1 **X. RECOMMENDATIONS AND CONCLUSIONS**

2 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS AND RECOMMENDATIONS**
3 **REGARDING THE COMPANY'S PROPOSED RDM.**

4 A. The Company's RDM proposal should be rejected for a number of reasons. First,
5 the Company's proposed RDM is inconsistent with the Commission's past policies
6 regarding decoupling mechanisms for electric utilities and the SRC approved for natural
7 gas utilities. Second, the Company has not been able to show that its efficiency activities
8 or proposed rate design changes have, or will have, a negative financial impact on its
9 ability to earn its allowed rate of return. On a historical basis, the Company's past
10 efficiency efforts have not significantly impacted its ability to earn its allowed ROE,
11 particularly because the Company already has a mechanism in place that allows for it to
12 recover lost revenues associated with these activities. The Company has not provided in
13 this proceeding any projections that quantify any specific future earnings challenges,
14 raising questions about its validity and whether or not the Company will, in fact, see
15 financial impacts that differ significantly from those experienced over the past five years.
16 Lastly, the Indiana Code already provides that lost revenues associated with energy
17 efficiency and DSM activities can be recovered through a LRAM. The Company has
18 already taken advantage of this opportunity awarded through legislation and, as a result,
19 does not currently have any disincentive to promote energy efficiency or DSM measures.
20 The Company does not expect revenue losses from its dynamic pricing pilot programs to
21 be significant⁸¹ and, in regards to its volt/VAR optimization program, its cost benefit

⁸¹ Company's response to OUCC 36.4.

1 analysis showed the overall program resulted in a net benefit.⁸² Therefore, the
2 Company's proposed RDM is not needed to address the Company's purported concerns.
3 Further, under the Company's proposed RDM it is not clear if there will be an EM&V or
4 reconciliation process evaluating the performance of the Company's energy efficiency
5 programs or any other external factors causing a reduction in the usage of residential and
6 small commercial customers.

7 **Q. PLEASE PROVIDE YOUR CONCLUSIONS REGARDING THE COMPANY'S**
8 **FORECASTED TEST YEAR PLANT BALANCES AND EXPENSES AS A RESULT OF**
9 **YOUR BENCHMARKING ANALYSIS?**

10 A. The benchmarking analysis that I have undertaken shows that a number of the
11 Company's forecasted test year plant expenditures are not in line with, and in many
12 instances exceed historical expenditures. The results of my analysis show:

- 13 • The projected annual growth rate of 10.3 percent in production O&M expenses per
14 MWh far outpaces the five year growth rate of 0.3 percent.
- 15 • The projected annual growth rate of 15.2 percent in net distribution plant per MWh
16 far outpaces the Company's five year average of 9.9 percent. Further, the
17 Company's distribution O&M expense growth rate per MWh of 10 percent per year
18 over the past five years has far outpaced the peer group average of 1.2 percent.
- 19 • Finally, while the Company projects its administrative and general O&M expenses
20 will decrease, the Company's net general plant per MWh is projected to grow by

⁸² Cause No. 44720, Direct Testimony of William H. Fowler, Petitioner's Exhibit 2-G (WHF), pp. 2-3.; See also: Company's response to OUC 1.28, Confidential Attachment OUC 1.28A.

1 24 percent per year through 2020, much more than its five year average growth
2 rate of 15.2 percent.

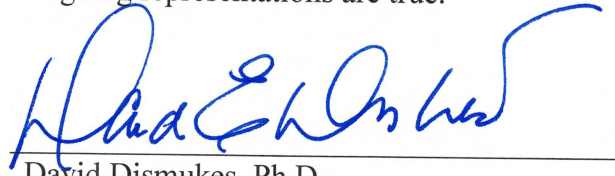
3 I conclude that the Commission should require the Company to undertake an in-depth
4 review of its production and distribution O&M expenses. I further suggest the Commission
5 initiate a Collaborative Proceeding in which the Company, the Commission and other
6 interested stakeholders can create, analyze and discuss appropriate benchmarking
7 metrics for the company in these areas.

8 **Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY FILED ON OCTOBER 30,**
9 **2019?**

10 A. Yes it does. However, I reserve the right to supplement my testimony if any
11 updated or additional information becomes available during the course of this proceeding.

AFFIRMATION

I affirm, under the penalties for perjury, that the foregoing representations are true.



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Acadian Consulting Group

Consultant for the Indiana Office of Utility
Consumer Counselor

Cause No. 45253

Duke Energy Indiana, LLC

October 30, 2019

Date

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EDUCATION

Ph.D., Economics, Florida State University, 1995.
M.S., Economics, Florida State University, 1992.
M.S., International Affairs, Florida State University, 1988.
B.A., History, University of West Florida, 1987.
A.A., Liberal Arts, Pensacola State College, 1985.

Master's Thesis: *Nuclear Power Project Disallowances: A Discrete Choice Model of Regulatory Decisions*

Ph.D. Dissertation: *An Empirical Examination of Environmental Externalities and the Least-Cost Selection of Electric Generation Facilities*

ACADEMIC APPOINTMENTS

Louisiana State University, Baton Rouge, Louisiana

Center for Energy Studies

2014-Current	Executive Director
2007-Current	Director, Division of Policy Analysis
2006-Current	Professor
2003-2014	Associate Executive Director
2001-2006	Associate Professor
1999-2001	Research Fellow and Adjunct Assistant Professor
1995-2000	Assistant Professor

College of the Coast and the Environment (Department of Environmental Studies)

2014-Current	Professor (Joint Appointment with CES)
2010-Current	Director, Coastal Marine Institute
2010-2014	Adjunct Professor

E.J. Ourso College of Business Administration (Department of Economics)

2006-Current	Adjunct Professor
2001-2006	Adjunct Associate Professor
1999-2000	Adjunct Assistant Professor

Michigan State University, East Lansing, Michigan

Institute of Public Utilities

2018-current Senior Fellow

Florida State University, Tallahassee, Florida

College of Social Sciences, Department of Economics

1995 Instructor

PROFESSIONAL EXPERIENCE

Acadian Consulting Group, Baton Rouge, Louisiana

2001-Current Consulting Economist/Principal
1995-1999 Consulting Economist/Principal

Econ One Research, Inc., Houston, Texas

1999-2001 Senior Economist

Florida Public Service Commission, Tallahassee, Florida

Division of Communications, Policy Analysis Section

1995 Planning & Research Economist

Division of Auditing & Financial Analysis, Forecasting Section

1993 Planning & Research Economist
1992-1993 Economist

Project for an Energy Efficient Florida/FlaSEIA, Tallahassee, Florida

1994 Energy Economist

Ben Johnson Associates, Inc., Tallahassee, Florida

1991-1992 Research Associate
1989-1991 Senior Research Analyst
1988-1989 Research Analyst

GOVERNMENT APPOINTMENTS

2017-Current Member, National Petroleum Council.
U.S. Department of Energy.
2007-Current Louisiana Representative, Interstate Oil and Gas Compact
Commission; Energy Resources, Research & Technology
Committee.
2007-Current Louisiana Representative, University Advisory Board
Representative; Energy Council (Center for Energy,
Environmental and Legislative Research).
2005 Member, Task Force on Energy Sector Workforce and Economic
Development (HCR 322).
2003-2005 Member, Energy and Basic Industries Task Force, Louisiana
Economic Development Council
2001-2003 Member, Louisiana Comprehensive Energy Policy Commission.

PUBLICATIONS: BOOKS AND MONOGRAPHS

1. *Power System Operations and Planning in a Competitive Market.* (2002). With Fred I. Denny. New York: CRC Press.
2. *Distributed Energy Resources: A Practical Guide for Service.* (2000). With Ritchie Priddy. London: Financial Times Energy.

PUBLICATIONS: PEER REVIEWED ACADEMIC JOURNALS

1. "A cash flow model of an integrated industrial CCS-EOR project in a petrochemical corridor: a case study in Louisiana. (2018). With Brian Snyder and Michael Layne. *International Journal of Greenhouse Gas Control.* Under final review.
2. "Understanding the Mississippi River Delta as a coupled natural-human system: research methods, challenges, and prospects. (2018). With Nina S.N. Lam, Y. Jun Xu, Kam-Biu Liu, Margaret Reams, R. Kelly Pace, Yi Qiang, Siddhartha Narra, Kenan Li, Thomas Blanchette, Heng Cei, Lei Zou, and Volodymyr Mihunov. *Water.*
3. "Understanding the challenges of industrial carbon capture and storage: an example in a U.S. petrochemical corridor." (2018). With Brian Snyder and Michael Layne. *International Journal of Sustainable Energy.*
4. "Sea level rise and coastal inundation: a case study of the Gulf Coast energy infrastructure." (2018). With Siddhartha Narra. *Natural Resources.* 9: 150-174.
5. "The energy pillars of society: perverse interactions among human resource use, the economy and environmental degradation." (2018). With Adrian R.H. Wiegman, John W. Day, Christopher F. D'Elia, Jeffrey S. Rutherford, Charles Hall. *BioPhysical Economics and Resource Quality.* 3(2) 1-16.
6. "Modeling the impacts of sea-level rise, oil price, and management strategy on the costs of sustaining Mississippi delta marshes with hydraulic dredging." (2018). with Adrian R.H. Wiegman, John W. Day, Christopher F. D'Elia, Jeffrey S. Rutherford, James T. Morris, Eric D. Roy, Robert R. Lane, and Brian F. Snyder. *Science of the Total Environment* 618 (2018): 1547-1559.
7. "Identifying Vulnerabilities of Working Coasts Supporting Critical Energy Infrastructure." (2016). With Siddhartha Narra. *Water.* 8(1).
8. "Economies of Scale, Learning Effects and Offshore Wind Development Costs" (2015). With Gregory B. Upton, Jr. *Renewable Energy.* 61-66.
9. "Economic impact of Gulf of Mexico ecosystem goods and services and integration into restoration decision-making." (2014) With Shepard, A.N., J.F. Valentine, C.F. D'Elia, D.W. Yoskowitz. *Gulf Science.*
10. "An Empirical Analysis of Differences in Interstate Oil and Natural Gas Drilling Activity." (2012). With Mark J. Kaiser and Christopher J. Peters. *Exploration & Production: Oil and Gas Review.* 30(1): 18-22.
11. "The Value of Lost Production from the 2004-2005 Hurricane Seasons in the Gulf of Mexico." (2009). With Mark J. Kaiser and Yunke Yu. *Journal of Business Valuation and Economic Loss Analysis.* 4(2).

Appendix A

12. "Estimating the Impact of Royalty Relief on Oil and Gas Production on Marginal State Leases in the US." (2006). With Jeffrey M. Burke and Dmitry V. Mesyanzhinov. *Energy Policy* 34(12): 1389-1398.
13. "Using Competitive Bidding As A Means of Securing the Best of Competitive and Regulated Worlds." (2004). With Tom Ballinger and Elizabeth A. Downer. *NRRI Journal of Applied Regulation*. 2 (November): 69-85. (Received 2005 Best Paper Award by NRRI)
14. "Deregulation of Generating Assets and the Disposition of Excess Deferred Federal Income Taxes." (2004). With K.E. Hughes II. *International Energy Law and Taxation Review*. 10 (October): 206-212.
15. "Reflections on the U.S. Electric Power Production Industry: Precedent Decisions Vs. Market Pressures." (2003). With Robert F. Cope III and John W. Yeargain. *Journal of Legal, Ethical, and Regulatory Issues*. Volume 6, Number 1.
16. "A is for Access: A Definitional Tour Through Today's Energy Vocabulary." (2001) *Public Resources Law Digest*. 38: 2.
17. "A Comment on the Integration of Price Cap and Yardstick Competition Schemes in Electrical Distribution Regulation." (2001). With Steven A. Ostrover. *IEEE Transactions on Power Systems*. 16 (4): 940 -942.
18. "Modeling Regional Power Markets and Market Power." (2001). With Robert F. Cope. *Managerial and Decision Economics*. 22:411-429.
19. "A Data Envelopment Analysis of Levels and Sources of Coal Fired Electric Power Generation Inefficiency" (2000). With Williams O. Olatubi. *Utilities Policy*. 9 (2): 47-59.
20. "Cogeneration and Electric Power Industry Restructuring" (1999). With Andrew N. Kleit. *Resource and Energy Economics*. 21:153-166.
21. "Capacity and Economies of Scale in Electric Power Transmission" (1999). With Robert F. Cope and Dmitry Mesyanzhinov. *Utilities Policy* 7: 155-162.
22. "Oil Spills, Workplace Safety, and Firm Size: Evidence from the U.S. Gulf of Mexico OCS." (1997). With O. O. Iledare, A. G. Pulsipher, and Dmitry Mesyanzhinov. *Energy Journal* 4: 73-90.
23. "A Comment on Cost Savings from Nuclear Regulatory Reform" (1997). *Southern Economic Journal*. 63:1108-1112.
24. "The Demand for Long Distance Telephone Communication: A Route-Specific Analysis of Short-Haul Service." (1996). *Studies in Economics and Finance* 17:33-45.

PUBLICATIONS: PEER REVIEWED PROCEEDINGS

1. "Hydraulic Fracturing: A Look at Efficiency and the Environmental Effects of Fracking" (2014). With Emily C. Jackson. *Environmental Science and Technology: Proceedings from the 7th International Conference on Environmental Science and Technology*. Volume 1 of 2: edited by George A. Sorial and Jihua Hong. (Houston, TX: American Science Press, ISBN: 978-0976885368): 42-46.
2. "Economic and Policy Issues in Sustaining an Adequate Oil Spill Contingency Fund in the Aftermath of a Catastrophic Incident." (2014). With Stephen R. Barnes and Gregory B.

Appendix A

- Upton. *Proceedings of the Thirty-seventh AMOP Technical Seminar on Environmental contamination and Response*. June: 506-524.
3. "Technology Based Ethical Issues Surrounding the California Energy Crisis." (2002). With Robert F. Cope III and John Yeargain. *Proceedings of the Academy of Legal, Ethical, and Regulatory Issues*. September: 17-21.
 4. "Electric Utility Restructuring and Strategies for the Future." (2001). With Scott W. Geiger. *Proceedings of the Southwest Academy of Management*. March.
 5. "Applications for Distributed Energy Resources in Oil and Gas Production: Methods for Reducing Flare Gas Emissions and Increasing Generation Availability" (2000). With Ritchie D. Priddy. *Proceedings of the International Energy Foundation – ENERGEX 2000*. July.
 6. "Power System Operations, Control, and Environmental Protection in a Restructured Electric Power Industry" (1998). With Fred I. Denny. *IEEE Proceedings: Large Engineering Systems Conference on Power Engineering*. June: 294-298.
 7. "New Paradigms for Power Engineering Education." (1997). With Fred I. Denny. *Proceedings of the International Association of Science and Technology for Development*. October: 499-504.
 8. "Safety Regulations, Firm Size, and the Risk of Accidents in E&P Operations on the Gulf of Mexico Outer Continental Shelf" (1996). With Allan Pulsipher, Omowumi Iledare, and Bob Baumann. *Proceedings of the American Society of Petroleum Engineers: Third International Conference on Health, Safety, and the Environment in Oil and Gas Exploration and Production*, June.
 9. "Comparing the Safety and Environmental Records of Firms Operating Offshore Platforms in the Gulf of Mexico." (1996). With Allan Pulsipher, Omowumi Iledare, Dmitry Mesyanzhinov, William Daniel, and Bob Baumann. *Proceedings of the American Society of Mechanical Engineers: Offshore and Arctic Operations 1996*, January.

PUBLICATIONS: OTHER SCHOLARLY PROCEEDINGS

1. "A Collaborative Investigation of Baseline and Scenario Information for Environmental Impact Statements" (2005). *Proceedings of the 23rd Annual Information Technology Meetings*. U.S. Department of the Interior, Minerals Management Service, Gulf Coast Region, New Orleans, LA. January 12, 2005.
2. "Trends and Issues in the Natural Gas Industry and the Development of LNG: Implications for Louisiana. (2004) *Proceedings of the 51st Mineral Law Institute*, Louisiana State University, Baton Rouge, LA. April 2, 2004.
3. "Competitive Bidding in the Electric Power Industry." (2003). *Proceedings of the Association of Energy Engineers*. December 2003.
4. "The Role of ANS Gas on Southcentral Alaskan Development." (2002). With William Nebesky and Dmitry Mesyanzhinov. *Proceedings of the International Association for Energy Economics: Energy Markets in Turmoil: Making Sense of It All*. October.
5. "A New Consistent Approach to Modeling Regional Economic Impacts of Offshore Oil and Gas Activities." (2002). With Vicki Zatarain. *Proceedings of the 2002 National IMPLAN Users Conference*: 241-258.

Appendix A

6. "Analysis of the Economic Impact Associated with Oil and Gas Activities on State Leases." (2002). With Dmitry Mesyanzhinov, Robert H. Baumann, and Allan G. Pulsipher. *Proceedings of the 2002 National IMPLAN Users Conference*: 149-155.
7. "Do Deepwater Activities Create Different Impacts to Communities Surrounding the Gulf OCS?" (2001). *Proceedings of the International Association for Energy Economics: 2001: An Energy Odyssey?* April.
8. "Modeling the Economic Impact of Offshore Activities on Onshore Communities." (2000). With Williams O. Olatubi. *Proceedings of the 20th Annual Information Transfer Meeting*. U.S. Department of Interior, Minerals Management Service: New Orleans, Louisiana.
9. "Empirical Challenges in Estimating the Economic Impacts of Offshore Oil and Gas Activities in the Gulf of Mexico" (2000). With Williams O. Olatubi. *Proceedings of the International Association for Energy Economics: Transforming Energy Markets*. August.
10. "Asymmetric Choice and Customer Benefits: Lessons from the Natural Gas Industry." (1999). With Rachelle F. Cope and Dmitry Mesyanzhinov. *Proceedings of the International Association for Energy Economics: The Only Constant is Change* August: 444-452.
11. "Modeling Electric Power Markets in a Restructured Environment" (1998). With Robert F. Cope and Dan Rinks. *Proceedings of the International Association for Energy Economics: Technology's Critical Role in Energy and Environmental Markets*. October: 48-56.
12. "Assessing Environmental and Safety Risks of the Expanding Role of Independents in E&P Operations on the Gulf of Mexico OCS." (1996). With Allan Pulsipher, Omowumi Iledare, Bob Baumann, and Dmitry Mesyanzhinov. *Proceedings of the 16th Annual Information Transfer Meeting*. U.S. Department of Interior, Minerals Management Service: New Orleans, Louisiana: 162-166.
13. "Comparing the Safety and Environmental Performance of Offshore Oil and Gas Operators." (1995). With Allan Pulsipher, Omowumi Iledare, Dmitry Mesyanzhinov, William Daniel, and Bob Baumann. *Proceedings of the 15th Annual Information Transfer Meeting*. U.S. Department of Interior, Minerals Management Service: New Orleans, Louisiana.

PUBLICATIONS: BOOK CHAPTERS

1. "The Role of Distributed Energy Resources in a Restructured Power Industry." (2006). In *Electric Choices: Deregulation and the Future of Electric Power*. Edited by Andrew N. Kleit. Oakland, CA: The Independent Institute (Rowman & Littlefield Publishers, Inc.), 181-208.
2. "The Road Ahead: The Outlook for Louisiana Energy." (2006). In *Commemorating Louisiana Energy: 100 Years of Louisiana Natural Gas Development*. Houston, TX: Harts Energy Publications, 68-72.
3. "Competitive Power Procurement An Appropriate Strategy in a Quasi-Regulated World." (2004). In *Electric and Natural Gas Business: Using New Strategies, Understanding the Issues*. With Elizabeth A. Downer. Edited by Robert Willett. Houston, TX: Financial Communications Company, 91-104.

Appendix A

4. "Alaskan North Slope Natural Gas Development." (2003). In *Natural Gas and Electric Industries Analysis 2003*. With William E. Nebesky, Dmitry Mesyanzhinov, and Jeffrey M. Burke. Edited by Robert Willett. Houston, TX: Financial Communications Company, 185-205.
5. "Challenges and Opportunities for Distributed Energy Resources in the Natural Gas Industry." (2002). In *Natural Gas and Electric Industries Analysis 2001-2002*. Edited by Robert Willett. With Martin J. Collette, Ritchie D. Priddy, and Jeffrey M. Burke. Houston, TX: Financial Communications Company, 114-131.
6. "The Hydropower Industry of the United States." (2000). With Dmitry Mesyanzhinov. In *Renewable Energy: Trends and Prospects*. Edited by E.W. Miller and A.I. Panah. Lafayette, PN: The Pennsylvania Academy of Science, 133-146.
7. "Electric Power Generation." (2000). In the *Macmillan Encyclopedia of Energy*. Edited by John Zumerchik. New York: Macmillan Reference.

PUBLICATIONS: BOOK REVIEWS

1. Review of ***Renewable Resources for Electric Power: Prospects and Challenges***. Raphael Edinger and Sanjay Kaul. (Westport, Connecticut: Quorum Books, 2000), pp 154. ISBN 1-56720-233-0. *Natural Resources Forum*. (2000).
2. Review of ***Electricity Transmission Pricing and Technology***, edited by Michael Einhorn and Riaz Siddiqi. (Boston: Kluwer Academic Publishers, 1996) pp. 282. ISBN 0-7923-9643-X. *Energy Journal* 18 (1997): 146-148.
3. Review of ***Electric Cooperatives on the Threshold of a New Era*** by Public Utilities Reports. (Vienna, Virginia: Public Utilities Reports, 1996) pp. 232. ISBN 0-910325-63-4. *Energy Journal* 17 (1996): 161-62.

PUBLICATIONS: TRADE AND PROFESSIONAL JOURNALS

1. "The Challenges of the Regulatory Review of Diversification Mergers." (2016). With Michael W. Deupree. *Electricity Journal*. 29 (2016): 9-14.
2. "Unconventional Natural Gas and the U.S. Manufacturing Renaissance" (2013). *BIC Magazine*. Vol. 30: No. 2, p. 76 (March).
3. "Louisiana's Tuscaloosa Marine Shale Development: Emerging Resource and Economic Potentials" (2012). *Spectrum*. January-April: 18-20.
4. "The Impact of Legacy Lawsuits on Louisiana's Conventional Drilling Activity" (2012). *LOGA Industry Report*. Spring 2012: 27-34.
5. "Value of Production Losses Tallied for 2004-2005 Storms." (2008). With Mark J. Kaiser and Yunke Yu. *Oil and Gas Journal*. Vol. 106.27: 32-26 (July 21) (part 3 of 3).
6. "Model Framework Can Aid Decision on Redevelopment." (2008). With Mark J. Kaiser and Yunke Yu. *Oil and Gas Journal*. Vol. 106.26: 49-53 (July 14) (part 2 of 3).
7. "Field Redevelopment Economics and Storm Impact Assessment." (2008). With Mark J. Kaiser and Yunke Yu. *Oil and Gas Journal*. Vol. 106.25: 42-50 (July 7) (part 1 of 3).
8. "The IRS' Latest Proposal on Tax Normalization: A Pyrrhic Victory for Ratepayers,"

Appendix A

- (2006). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 55(1): 217-236
9. "Executive Compensation in the Electric Power Industry: Is It Excessive?" (2006). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 54(4): 913-940.
 10. "Renewable Portfolio Standards in the Electric Power Industry." With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 54(3): 693-706.
 11. "Regulating Mercury Emissions from Electric Utilities: Good Environmental Stewardship or Bad Public Policy?" (2005). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 54 (2): 401-424
 12. "Using Industrial-Only Retail Choice as a Means of Moving Competition Forward in the Electric Power Industry." (2005). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 54(1): 211-223
 13. "The Nuclear Power Plant Endgame: Decommissioning and Permanent Waste Storage. (2005). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 53 (4): 981-997
 14. "Can LNG Preserve the Gas-Power Convergence?" (2005). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 53 (3):783-796.
 15. "Competitive Bidding as a Means of Securing Opportunities for Efficiency." (2004). With Elizabeth A. Downer. *Electricity and Natural Gas* 21 (4): 15-21.
 16. "The Evolving Markets for Polluting Emissions: From Sulfur Dioxide to Carbon Dioxide." (2004). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 53(2): 479-494.
 17. "The Challenges Associated with a Nuclear Power Revival: Its Past." (2004). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 53 (1): 193-211.
 18. "Deregulation of Generating Assets and The Disposition of Excess Deferred Federal Income Taxes: A 'Catch-22' for Ratepayers." (2004). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 52: 873-891.
 19. "Will Competitive Bidding Make a Comeback?" (2004). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 52: 659-674
 20. "An Electric Utility's Exposure to Future Environmental Costs: Does It Matter? You Bet!" (2003). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 52: 457-469.
 21. "White Paper or White Flag: Do FERC's Concessions Represent A Withdrawal from Wholesale Power Market Reform?" (2003). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 52: 197-207.
 22. "Clear Skies" or Storm Clouds Ahead? The Continuing Debate over Air Pollution and Climate Change" (2003). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 51: 823-848.
 23. "Economic Displacement Opportunities in Southeastern Power Markets." (2003). With Dmitry V. Mesyanzhinov. *USAAE Dialogue*. 11: 20-24.
 24. "What's Happened to the Merchant Energy Industry? Issues, Challenges, and Outlook" (2003). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 51: 635-652.
 25. "Is There a Role for the TVA in Post-Restructured Electric Markets?" (2002). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 51: 433-454.

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26. "The Role of Alaska North Slope Gas in the Southcentral Alaska Regional Energy Balance." (2002). With William Nebesky and Dmitry Mesyanzhinov. *Natural Gas Journal*. 19: 10-15.
27. "Standardizing Wholesale Markets For Energy." (2002). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 51: 207-225.
28. "Do Economic Activities Create Different Economic Impacts to Communities Surrounding the Gulf OCS?" (2002). With Williams O. Olatubi. *IAEE Newsletter*. Second Quarter: 16-20.
29. "Will Electric Restructuring Ever Get Back on Track? Texas is not California." (2002). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 50: 943-960.
30. "An Assessment of the Role and Importance of Power Marketers." (2002). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 50: 713-731.
31. "The EPA v. The TVA, et. al. Over New Source Review." (2001) With K.E. Hughes, II. *Oil, Gas and Energy Quarterly*. 50:531-543.
32. "Energy Policy by Crisis: Proposed Federal Changes for the Electric Power Industry." (2001). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 50:235-249.
33. "A is for Access: A Definitional Tour Through Today's Energy Vocabulary." (2001). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 49:947-973.
34. "California Dreaming: Are Competitive Markets Achievable?" (2001). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 49: 743-759.
35. "Distributed Energy Must Be Watched As Opportunity for Gas Companies." (2001). With Martin Collette, and Ritchie D. Priddy. *Natural Gas Journal*. January: 9-16.
36. "Clean Air, Kyoto, and the Boy Who Cried Wolf." (2000). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. December: 529-540.
37. "Energy Conservation Programs and Electric Restructuring: Is There a Conflict?" (2000). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. September: 211-224.
38. "The Post-Restructuring Consolidation of Nuclear-Power Generation in the Electric Power Industry." (2000) With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 49: 751-765.
39. "Issues and Opportunities for Small Scale Electricity Production in the Oil Patch." (2000). With Ritchie D. Priddy. *American Oil and Gas Reporter*. 49: 78-82.
40. "Distributed Energy Resources: The Next Paradigm Shift in the Electric Power Industry." (2000). With K.E. Hughes II. *Oil, Gas and Energy Quarterly*. 48:593-602.
41. "Coming to a neighborhood near you: the merchant electric power plant." (1999). With K.E. Hughes II. *Oil, Gas, and Energy Quarterly*. 48:433-441.
42. "Slow as molasses: the political economy of electric restructuring in the south." (1999). With K.E. Hughes II. *Oil, Gas, and Energy Quarterly*. 48: 163-183.
43. "Stranded investment and non-utility generation." (1999). With Michael T. Maloney. *Electricity Journal*. 12: 50-61.
44. "Reliability or profit? Why Entergy quit the Southwest Power Pool." (1998). With Fred I. Denny. *Public Utilities Fortnightly*. February 1: 30-33.

45. "Electric utility mergers and acquisitions: a regulator's guide." (1996). With Kimberly H. Dismukes. *Public Utilities Fortnightly*. January 1.

PUBLICATIONS: OPINION AND EDITORIAL ARTICLES

1. "An exceptionally uncertain time for energy markets." (2019). *10/12 Industry Report*. *Baton Rouge Business Report*, Q4.
2. "LNG's changing fortunes." (2019). *10/12 Industry Report*. *Baton Rouge Business Report*, Q3.
3. "A tenuous recovery." (2019). *10/12 Industry Report*. *Baton Rouge Business Report*, Q2.
4. "The 2019 Gulf Coast Energy Outlook." (2019). *10/12 Industry Report*. *Baton Rouge Business Report*, Q1.
5. "Why an offshore recovery may never happen." (2018). *10/12 Industry Report*. *Baton Rouge Business Report*, Q4.
6. "The dangers of trade protectionism for Louisiana energy development." (2018). *10/12 Industry Report*. *Baton Rouge Business Report*, Q3.
7. "The irrelevance of energy dominance." (2018). *10/12 Industry Report*. *Baton Rouge Business Report*, Q2.
8. "The whys and hows of maintaining the oil price rise." (2018). *10/12 Industry Report*. *Baton Rouge Business Report*, Q1.
9. "Taxing energy infrastructure." (2017). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:4.
10. "A summer of discontent." (2017). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:3.
11. "Low cost hydrocarbons continue to benefit the Gulf Coast." (2017). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:2.
12. "Reading the tea leaves for 2017's crude oil markets." (2017). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:1.
13. "The unappreciated role of energy infrastructure." (2016). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:4.
14. "Other ways in which the energy world is changing." (2016). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:3.
15. "Are oil prices bouncing back?" (2016). *Baton Rouge Business Report*, May 10 edition. (reprint of *Industry Report* article).
16. "Are we there yet? Have energy prices started to rebound?" (2016). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:2.
17. *Challenging Times for the South Louisiana Energy Economy*. (2016). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:1.
18. "Reading the Signs for the Energy Complex" (2015). *10/12 Industry Report*. *Baton Rouge Business Report*. Q:1.

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19. "Louisiana's Export Opportunities." (2015). *10/12 Industry Report*. Baton Rouge Business Report. September, 15.
20. "Don't Kill Hydraulic Fracturing: It's the Golden Goose." (2015). *Mobile Press Register*. May 22. Also carried by Alabama Media Group and the following newspapers: *Birmingham News*, *Huntsville Times*, and *Birmingham Magazine*.
21. "The Least Effective Way to Invest in Green Energy." (2014). *Wall Street Journal*. Journal Reports: Energy. New York: Dow Jones & Company, October 2.
22. "Stop Picking Winners and Losers." (2013). *Wall Street Journal*. Journal Reports: Energy. New York: Dow Jones & Company, June 18.

PUBLICATIONS: REPORTS AND OTHER MANUSCRIPTS

1. *2020 Gulf Coast Energy Outlook*. (2019). Baton Rouge, LA: LSU Center for Energy Studies, Fall 2019, ## Pp.
2. *The Urgency of PURPA Reform to Assure Ratepayer Protection*. (2019). Institute of Energy Research, 24 Pp.
3. *Integrated carbon capture and storage in the Louisiana chemical corridor*. (2019). With Mehdi Zeidouni, Muhammad Zulqarnain, Richard G Hughes, Keith B Hall, Brian F. Snyder, Michael Layne, Juan M Lorenzo, Chacko John, Brian Harder. National Energy Technology Laboratories/U.S. Department of Energy. 151 Pp.
4. *Actual Benefits of Distributed Generation in Mississippi*. (2019). Report prepared on the behalf of the Mississippi Public Service Commission. 191 Pp.
5. *2019 Gulf Coast Energy Outlook*. (2018). Baton Rouge, LA: LSU Center for Energy Studies, Fall 2018, 28 pp.
6. *MISO Grid 2033: Preparing for the Transmission Grid of the Future*. (2018). Baton Rouge, LA: LSU Center for Energy Studies, May 7, 87 pp.
7. *Opportunities and challenges in using industrial CHP as a resiliency measure in Louisiana*. (2017). Baton Rouge, LA: Louisiana Department of Natural Resources, December 17, 52 pp.
8. *Efficiency and emissions reduction opportunities at existing Louisiana combined heat and power applications*. (2017). Baton Rouge, LA: Louisiana Department of Natural Resources, December 17, 44 pp.
9. *Louisiana industrial combined heat and power applications: status and operations*. (2017). Baton Rouge, LA: Louisiana Department of Natural Resources, December 17, pp. 54.
10. *The potential economic impacts of the Washington Parish Energy Center*. (2017). With Gregory B. Upton, Jr. Report prepared on behalf of Calpine Corporation. 5 pp.
11. *Economic impact and re-employment assessment of PES Philadelphia refining complex*. (2017). Report prepared on the behalf of Philadelphia Energy Solutions. August 31, 43 pp.
12. *The potential economic impacts of the Bayou Bridge Project*. (2017). With Gregory B. Upton, Jr. Report prepared on behalf of Energy Transfer, LLC. 23 pp.
13. *Gulf Coast energy outlook (2017)*. With Christopher Coombs, Dek Terrell, and Gregory B.

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- Upton. Center for Energy Studies/Applied Economics Group, 18 pp.
14. *Potential economic impacts of the Lake Charles methanol project.* (2017). Report prepared on behalf of the Lake Charles Methanol Project, LLC. 68 pp.
 15. *Estimating the Impact of Net Metering on LPSC Jurisdictional Ratepayers.* (2015). Louisiana Public Service Commission, In re: Examination of the Comprehensive Costs and Benefits of Net Metering in Louisiana, Docket No. X-33192. Notice of Issuance of Final Report dated September 11, 2015, 187 pp.
 16. *Beyond the Energy Roadmap: Starting Mississippi's Energy-Based Economic Development Venture.* (2014). Report prepared on behalf of the Mississippi Energy Institute, 310 pp.
 17. *Combined Heat and Power in Louisiana: Status, Potentials, and Policies. Phase 4 Report: Policy and Market Opportunities and Challenges for CHP Development.* (2013). Louisiana Department of Natural Resources, Baton Rouge, Louisiana. 17 pp.
 18. *Combined Heat and Power in Louisiana: Status, Potentials, and Policies. Phase 3 Report: Empirical Results, Technical and Cost-Effectiveness Potentials.* (2013). Louisiana Department of Natural Resources, Baton Rouge, Louisiana. 65 pp.
 19. *Combined Heat and Power in Louisiana: Status, Potentials, and Policies. Phase 2 Report: Technical and Cost Effectiveness Methodologies.* (2013). Louisiana Department of Natural Resources, Baton Rouge, Louisiana. 39 pp.
 20. *Combined Heat and Power in Louisiana: Status, Potentials, and Policies. Phase 1 Report: Resource Characterization and Database.* (2013). Louisiana Department of Natural Resources, Baton Rouge, Louisiana. 62 pp.
 21. *Onshore Oil and Gas Infrastructure to Support Development in the Mid-Atlantic OCS Region.* (2014). U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study BOEM 2014-657. 360 pp.
 22. *Unconventional Resources and Louisiana's Manufacturing Development Renaissance* (2013). Baton Rouge, LA: LSU Center for Energy Studies, 93 pp.
 23. *Removing Big Wind's "Training Wheels:" The Case for Ending the Production Tax Credit* (2012). Washington, DC: American Energy Alliance, 19 pp.
 24. *The Impact of Legacy Lawsuits on Conventional Oil and Gas Drilling in Louisiana.* (2012). Baton Rouge, LA: LSU Center for Energy Studies, 62 pp.
 25. *Diversifying Energy Industry Risk in the GOM: Post-2004 Changes in Offshore Oil and Gas Insurance Markets.* (2011) With Christopher P. Peters. U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico Region, New Orleans, LA. OCS Study BOEM 2011-054. 95pp.
 26. *OCS-Related Infrastructure Fact Book. Volume I: Post-Hurricane Impact Assessment.* (2011). U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico Region, New Orleans, LA. OCS Study BOEM 2011-043. 372 pp.
 27. *Fact Book: Offshore Oil and Gas Industry Support Sectors.* (2010). U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico Region, New Orleans, LA. OCS Study BOEM 2010-042. 138pp.
 28. *The Impacts of Greenhouse Gas Regulation on the Louisiana Economy.* (2011). With

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- Michael D. McDaniel, Christopher Peters, Kathryn R. Perry, and Lauren L. Stuart. Louisiana Greenhouse Gas Inventory Project, Task 3 and 4 Report. Prepared for the Louisiana Department of Economic Development. Baton Rouge, LA: LSU Center for Energy Studies, 134 pp.
29. *Overview of States' Climate Action and/or Alternative Energy Policy Measures.* (2010). With Michael D. McDaniel, Christopher Peters, Kathryn R. Perry, and Lauren L. Stuart. Louisiana Greenhouse Gas Inventory Project, Task 2 Report. Prepared for the Louisiana Department of Economic Development. Baton Rouge, LA: LSU Center for Energy Studies, 30 pp.
 30. *Louisiana Greenhouse Gas Inventory.* (2010). With Michael D. McDaniel, Christopher Peters, Kathryn R. Perry, Lauren L. Stuart, and Jordan L. Gilmore. Louisiana Greenhouse Gas Inventory Project, Task 1 Report. Prepared for the Louisiana Department of Economic Development. Baton Rouge, LA: LSU Center for Energy Studies, 114 pp.
 31. *Opportunities for Geo-pressured Thermal Energy in Southwestern Louisiana.* (2010). Report prepared on behalf of Louisiana Geothermal, L.L.C, 41 pp.
 32. *Economic and Energy Market Benefits of the Proposed Cavern Expansions at the Jefferson Island Storage and Hub Facility.* (2009). Report prepared on behalf of Jefferson Island Storage and Hub, LLC, 28 pp.
 33. *The Benefits of Continued and Expanded Investments in the Port of Venice.* (2009). With Christopher Peters and Kathryn Perry. Baton Rouge, LA: LSU Center for Energy Studies. 83 pp.
 34. *Examination of the Development of Liquefied Natural Gas on the Gulf of Mexico.* (2008). U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA OCS Study MMS 2008-017. 106 pp.
 35. *Gulf of Mexico OCS Oil and Gas Scenario Examination: Onshore Waste Disposal.* (2007). With Michelle Barnett, Derek Vitrano, and Kristen Strellec. OCS Report, MMS 2007-051. New Orleans, LA: U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico Region.
 36. *Economic Impact Analysis of the Proposed Lake Charles Gasification Project.* (2007). Report Prepared on Behalf of Leucadia Corporation.
 37. *The Economic Impacts of New Jersey's Proposed Renewable Portfolio Standard.* (2005) Report Prepared on Behalf of the New Jersey Division of Ratepayer Advocate.
 38. *The Importance of Energy Production and Infrastructure in Plaquemines Parish.* (2006). Report Prepared on Behalf of Project Rebuild Plaquemines.
 39. *Louisiana's Oil and Gas Industry: A Study of the Recent Deterioration in-State Drilling Activity.* (2005). With Kristi A.R. Darby, Jeffrey M. Burke, and Robert H. Baumann. Baton Rouge, LA: Louisiana Department of Natural Resources.
 40. *Comparison of Methods for Estimating the NO_x Emission Impacts of Energy Efficiency and Renewable Energy Projects Shreveport, Louisiana Case Study.* (2005). With Adam Chambers, David Kline, Laura Vimmerstedt, Art Diem, and Dmitry Mesyanzhinov. Golden, Colorado: National Renewable Energy Laboratory.
 41. *Economic Opportunities for a Limited Industrial Retail Choice Plan in Louisiana.* (2004). With Elizabeth A. Downer and Dmitry V. Mesyanzhinov. Baton Rouge, LA: Louisiana

State University Center for Energy Studies.

42. *Economic Opportunities for LNG Development in Louisiana.* (2004). With Elizabeth A. Downer and Dmitry V. Mesyanzhinov. Baton Rouge, LA: Louisiana Department of Economic Development and Greater New Orleans, Inc.
43. *Marginal Oil and Gas Production in Louisiana: An Empirical Examination of State Activities and Policy Mechanisms for Stimulating Additional Production.* (2004). With Dmitry V. Mesyanzhinov, Jeffrey M. Burke, Robert H. Baumann. Baton Rouge, LA: Louisiana Department of Natural Resources, Office of Mineral Resources.
44. *Deepwater Program: OCS-Related Infrastructure in the Gulf of Mexico Fact Book.* (2004). With Louis Berger Associates, University of New Orleans National Ports and Waterways Institute, and Research and Planning Associates. MMS Study No. 1435-01-99-CT-30955. U.S. Department of the Interior, Minerals Management Service.
45. *The Power of Generation: The Ongoing Benefits of Independent Power Development in Louisiana.* With Dmitry V. Mesyanzhinov, Jeffrey M. Burke, and Elizabeth A. Downer. Baton Rouge, LA: LSU Center for Energy Studies, 2003.
46. *Modeling the Economic Impact of Offshore Oil and Gas Activities in the Gulf of Mexico: Methods and Application.* (2003). With Williams O. Olatubi, Dmitry V. Mesyanzhinov, and Allan G. Pulsipher. Prepared by the Center for Energy Studies, Louisiana State University, Baton Rouge, LA. OCS Study MMS2000-0XX. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA.
47. *An Analysis of the Economic Impacts Associated with Oil and Gas Activities on State Leases.* (2002) With Robert H. Baumann, Dmitry V. Mesyanzhinov, and Allan G. Pulsipher. Baton Rouge, LA: Louisiana Department of Natural Resources, Office of Mineral Resources.
48. *Alaska In-State Natural Gas Demand Study.* (2002). With Dmitry Mesyanzhinov, et.al. Anchorage, Alaska: Alaska Department of Natural Resources, Division of Oil and Gas.
49. *Moving to the Front of the Lines: The Economic Impacts of Independent Power Plant Development in Louisiana.* (2001). With Dmitry Mesyanzhinov and Williams O. Olatubi. Baton Rouge, LA: Louisiana State University, Center for Energy Studies.
50. *The Economic Impacts of Merchant Power Plant Development in Mississippi.* (2001). Report Prepared on Behalf of the US Oil and Gas Association, Alabama and Mississippi Division. Houston, TX: Econ One Research, Inc.
51. *Energy Conservation and Electric Restructuring in Louisiana.* (2000). With Dmitry Mesyanzhinov, Ritchie D. Priddy, Robert F. Cope III, and Vera Tabakova. Baton Rouge, LA: Louisiana State University, Center for Energy Studies.
52. *Assessing the Environmental and Safety Risks of the Expanded Role of Independents in Oil and Gas E&P Operations on the U.S. Gulf of Mexico OCS.* (1996). With Allan Pulsipher, Omowumi Iledare, Dmitry Mesyanzhinov, William Daniel, and Bob Baumann. Baton Rouge, LA: Louisiana State University, Center for Energy Studies.
53. *Restructuring the Electric Utility Industry: Implications for Louisiana.* (1996). With Allan Pulsipher and Kimberly H. Dismukes. Baton Rouge, LA: Louisiana State University, Center for Energy Studies.

GRANT RESEARCH

1. *Co-investigator*. Estimating offshore Gulf of Mexico carbon capture, sequestration, and utilization opportunities. (2018). With Southern States Energy Board, Advanced Resources International, Argonne Laboratories, University of Alabama, University of South Carolina, and Oklahoma State University. U.S. Department of Energy, National Energy Technology Laboratory. \$731,031 (LSU share of \$4.0 million project, three years, in progress).
2. *Principal Investigator*. Understanding MISO long term infrastructure needs and stakeholder positions. (2017). Midcontinent Independent System Operator. Total Project: \$9,500, six months. Status: In Progress.
3. *Principal Investigator*. Offshore oil and gas activity impacts on ecosystem services in the Gulf of Mexico. (2017) With Brian F. Snyder. U.S. Department of the Interior, Bureau of Ocean Energy Management. Total Project: \$240,982, two years. Status: In Progress.
4. *Principal Investigator*. Economic Impacts of the Bayou Bridge pipeline. (2017). With Gregory B. Upton, Jr., Energy Transfer Corporation. \$9,900. Status: Completed.
5. *Principal Investigator*. Integrated carbon capture, storage and utilization in the Louisiana chemical corridor. (2017). U.S. Department of Energy/National Energy Technology Laboratory. Total funding: \$1,300,000 (18 months). Status: In progress
6. *Co-Principal Investigator*. Gulf coast energy outlook and analysis. (2016). With Gregory B. Upton and Mallory Vachon. Regions Bank. Total funding: \$20,000, one year. Status: Completed.
7. *Principal Investigator*. GOM energy infrastructure trends and factbook update. (2016). With Gregory B. Upton and Mallory Vachon. U.S. Department of the Interior, Bureau of Ocean Energy Management ("BOEM"). Total funding: \$224,995, two years. Status: In progress.
8. *Principal Investigator*. Examining Louisiana's Industrial Carbon Sequestration Potential. Phase 2: Follow-up and estimation. (2016). With Brian F. Snyder. Southern States Energy Board. Total Project: \$69,990, three months. Status: Completed.
9. *Principal Investigator*. Examining Louisiana's Industrial Carbon Sequestration Potential. Phase 1: Scoping and Identification. (2016). With Brian F. Snyder. Southern States Energy Board. Total Project: \$29,919, three months. Status: Completed.
10. *Principal Investigator*. Energy efficiency building codes for Louisiana. (2016). With Brian F. Snyder. Louisiana Department of Natural Resources. Total Project: \$50,000, one year. Status: Completed.
11. *Principal Investigator*. An update of Louisiana's combined heat and power potentials, current utilizations, and barriers to improved operating efficiencies. (2016). Louisiana Department of Natural Resources. Total Project: \$90,000, one year. Status: Completed.
12. *Principal Investigator*. Combined Heat and Power Stakeholder Meeting. (2016). Southeastern Energy Efficiency Council. Total Project \$9,160, two months. Status: Completed.
13. *Co-Investigator*. "Expanding Ecosystem Service Provisioning from Coastal Restoration to Minimize Environmental and Energy Constraints" (2015). With John Day and Chris D'Elia.

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- Gulf Research Program. Total Project: \$147,937. Status: Completed.
14. *Principal Investigator.* “Coastal Marine Institute Administrative Grant” (2104). U.S. Department of the Interior. Total Project \$45,000. Status: Completed.
 15. *Principal Investigator.* “Analysis of the Potential for Combined Heat and Power (CHP) in Louisiana.” (2013). Louisiana Department of Natural Resources. Total Project: \$90,000. Status: Completed.
 16. *Co-Investigator.* “CNH: A Tale of Two Louisianas: Coupled Natural-Human Dynamics in a Vulnerable Coastal System” (2013) With Nina Lam, Margaret Reams, Kam-Biu Liu, Victor Rivera, Yi-Jun Xu and Kelley Pace. National Science Foundation. Total Project: \$1.5 million. Status: In Progress (Sept 2012-Feb 2017).
 17. *Principal Investigator.* “Examination of Unconventional Natural Gas and Industrial Economic Development” (2012). America’s Natural Gas Alliance. Total Project: \$48,210. Status: Completed.
 18. *Principal Investigator.* “Investigation of the Potential Economic Impacts Associated with Shell’s Proposed Gas-To-Liquids Project” (2012). Shell Oil Company, North America. Total Project: \$76,708. Status: Completed.
 19. *Principal Investigator.* “Analysis of the Federal Wind Energy Production Tax Credit.” American Energy Alliance. Total Project: \$20,000. Status: Completed.
 20. *Principal Investigator.* “Energy Sector Impacts Associated with the Deepwater Horizon Oil Spill.” Louisiana Department of Economic Development. Total Project: approximately \$50,000. Status: Completed.
 21. *Principal Investigator.* “Economic Contributions and Benefits Support by the Port of Venice.” Port of Venice Coalition. Total Project: \$20,000. Status: Completed.
 22. *Principal Investigator.* “Energy Policy Development in Louisiana.” Louisiana Department of Natural Resources. Total Project: \$150,000. Status: Completed.
 23. *Principal Investigator.* “Preparing Louisiana for the Possible Federal Regulation of Greenhouse Gas Regulation.” With Michael D. McDaniel. Louisiana Department of Economic Development. Total Project: \$98,543. Status: Completed.
 24. *Principal Investigator.* “OCS Studies Review: Louisiana and Texas Oil and Gas Activity and Production Forecast; Pipeline Position Paper; and Geographical Units for Observing and Modeling Socioeconomic Impact of Offshore Activity.” (2008). With Mark J. Kaiser and Allan G. Pulsipher. U.S. Department of the Interior, Minerals Management Service. Total Project: \$377,917 (3 years). Status: Completed.
 25. *Principal Investigator.* “State and Local Level Fiscal Effects of the Offshore Petroleum Industry.” (2007). With Loren C. Scott. U.S. Department of the Interior, Minerals Management Service. Total Project: \$241,216 (2.5 years). Status: Completed.
 26. *Principal Investigator.* “Understanding Current and Projected Gulf OCS Labor and Ports Needs.” (2007). With Allan. G. Pulsipher, Kristi A. R. Darby. U.S. Department of the Interior, Minerals Management Service. Total Project: \$169,906. (one year). Status: Completed.
 27. *Principal Investigator.* “Structural Shifts and Concentration of Regional Economic Activity Supporting GOM Offshore Oil and Gas Activities.” (2007). With Allan. G. Pulsipher,

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- Michelle Barnett. U.S. Department of the Interior, Minerals Management Service. Total Project: \$78,374 (one year). Status: Awarded, In Progress.
28. *Principal Investigator*. "Plaquemine Parish's Role in Supporting Critical Energy Infrastructure and Production." (2006). With Seth Cureington. Plaquemines Parish Government, Office of the Parish President and Plaquemines Association of Business and Industry. Total Project: \$18,267. Status: Completed.
 29. *Principal Investigator*. "Diversifying Energy Industry Risk in the Gulf of Mexico." (2006). With Kristi A. R. Darby. U.S. Department of the Interior, Minerals Management Service. Total Project: \$65,302 (two years). Status: Awarded, In Progress.
 30. *Principal Investigator*. "Post-Hurricane Assessment of OCS-Related Infrastructure and Communities in the Gulf of Mexico Region." (2006). U.S. Department of the Interior, Minerals Management Service. Total Project Funding: \$244,837. Status: In Progress.
 31. *Principal Investigator*. "Ultra-Deepwater Road Mapping Process." (2005). With Kristi A. R. Darby, Subcontract with the Texas A&M University, Department of Petroleum Engineering. Funded by the Gas Technology Institute. Total Project Funding: \$15,000. Status: Completed.
 32. *Principal Investigator*. "An Examination of the Opportunities for Drilling Incentives on State Leases." (2004). With Robert H. Baumann and Kristi A. R. Darby. Louisiana Office of Mineral Resources. Total Project Funding: \$75,000. Status: Completed.
 33. *Principal Investigator*. "An Examination on the Development of Liquefied Natural Gas Facilities on the Gulf of Mexico." (2004). With Dmitry V. Mesyanzhinov and Mark J. Kaiser. U.S. Department of the Interior, Minerals Management Service. Total Project Funding \$101,054. Status: Completed.
 34. *Principal Investigator*. "Examination of the Economic Impacts Associated with Large Customer, Industrial Retail Choice." (2004). With Dmitry V. Mesyanzhinov. Louisiana Mid-Continent Oil and Gas Association. Total Project Funding: \$37,000. Status: Completed.
 35. *Principal Investigator*. "Economic Opportunities from LNG Development in Louisiana." (2003). With Dmitry V. Mesyanzhinov. Metrovision/New Orleans Chamber of Commerce and the Louisiana Department of Economic Development. Total Project Funding: \$25,000. Status: Completed.
 36. *Principal Investigator*. "Marginal Oil and Gas Properties on State Leases in Louisiana: An Empirical Examination and Policy Mechanisms for Stimulating Additional Production." (2002). With Robert H. Baumann and Dmitry V. Mesyanzhinov. Louisiana Office of Mineral Resources. Total Project Funding: \$72,000. Status: Completed.
 37. *Principal Investigator*. "A Collaborative Investigation of Baseline and Scenario Information for Environmental Impact Statements." (2002). With Dmitry V. Mesyanzhinov and Williams O. Olatubi. U.S. Department of Interior, Minerals Management Service. Total Project Funding: \$557,744. Status: Awarded, In Progress.
 38. *Co-Principal Investigator*. "An Analysis of the Economic Impacts of Drilling and Production Activities on State Leases." (2002). With Robert H. Baumann, Allan G. Pulsipher, and Dmitry V. Mesyanzhinov. Louisiana Office of Mineral Resources. Total Project Funding: \$8,000. Status: Completed.

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39. *Principal Investigator*. “Cost Profiles and Cost Functions for Gulf of Mexico Oil and Gas Development Phases for Input Output Modeling.” (1998). With Dmitry Mesyanzhinov and Allan G. Pulsipher. U.S. Department of Interior, Minerals Management Service. Total Project Funding: \$244,956. Status: Completed.
40. *Principal Investigator*. “An Economic Impact Analysis of OCS Activities on Coastal Louisiana.” (1998). With Dmitry Mesyanzhinov and David Hughes. U.S. Department of Interior, Minerals Management Service. Total Project Funding: \$190,166. Status: Completed.
41. *Principal Investigator*. “Energy Conservation and Electric Restructuring in Louisiana.” (1997). Louisiana Department of Natural Resources.” Petroleum Violation Escrow Program Funds. Total Project Funding: \$43,169. Status: Completed.
42. *Principal Investigator*. “The Industrial Supply of Electricity: Commercial Generation, Self-Generation, and Industry Restructuring.” (1996). With Andrew Kleit. Louisiana Energy Enhancement Program, LSU Office of Research and Development. Total Project Funding: \$19,948. Status: Completed.
43. *Co-Principal Investigator*. “Assessing the Environmental and Safety Risks of the Expanded Role of Independents in Oil and Gas E&P Operations on the U.S. Gulf of Mexico OCS.” (1996). With Allan Pulsipher, Omowumi Iledare, Dmitry Mesyanzhinov, William Daniel, and Bob Baumann. U.S. Department of Interior, Minerals Management Service, Grant Number 95-0056. Total Project Funding: \$109,361. Status: Completed.

ACADEMIC CONFERENCE PAPERS/PRESENTATIONS

1. “The changing nature of Gulf of Mexico energy infrastructure.” (2017). Session 3B: New Directions in Social Science Research. 27th Gulf of Mexico Region Information Technology Meetings. U.S. Department of the Interior, Bureau of Ocean Energy Management, Environmental Studies Program. New Orleans, LA. August 24.
2. “Capacity utilization, efficiency trends, and economic risks for modern CHP installations.” (2017). U.S. Department of Energy, 2017 Industrial Energy Technology Conference, New Orleans, LA June 21.
3. “The Impact of Infrastructure Cost Recovery Mechanisms on Pipeline Replacements and Leaks.” (2015). With Gregory Upton. Southern Economic Association Meeting 2015. New Orleans, Louisiana. November 23.
4. “The Impact of Infrastructure Cost Recovery Mechanisms on Pipeline Replacements and Leaks” (2015). With Gregory Upton. 38th IAEE International Conference, Antalya, Turkey. May 26.
5. “Modifying Renewables Policies to Sustain Positive Economic and Environmental Change” (2015). IEEE Annual Green Technologies (“Greentech”) Conference. April 17.
6. “The Gulf Coast Industrial Investment Renaissance and New CHP Development Opportunities.” (2014). Industrial Energy and Technology Conference, New Orleans, Louisiana. May 20.
7. “Estimating Critical Energy Infrastructure Value at Risk from Coastal Erosion” (2014). With Siddhartha Narra. American’s Estuaries: 7th Annual Summit on Coastal and Estuarine Habitat Restoration. Washington, D.C., November 3-6.

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8. "Economies of Scale, Learning Curves, and Offshore Wind Development Costs" (2012). With Gregory Upton. Southern Economic Association Annual Conference, New Orleans, LA November 17.
9. "Analysis of Risk and Post-Hurricane Reaction." (2009). 25th Annual Information Transfer Meeting. U.S. Department of the Interior, Minerals Management Service. January 7.
10. "Legacy Litigation, Regulation, and Other Determinants of Interstate Drilling Activity Differentials." (2008). With Christopher Peters and Mark Kaiser. 28th Annual USAEE/IAEE North American Conference: Unveiling the Future of Future of Energy Frontiers. New Orleans, LA, December 3.
11. "Gulf Coast Energy Infrastructure Renaissance: Overview." (2008). 28th Annual USAEE/IAEE North American Conference: Unveiling the Future of Future of Energy Frontiers. New Orleans, LA, December 3.
12. "Understanding the Impacts of Katrina and Rita on Energy Industry Infrastructure." (2008). American Chemical Society National Meetings, New Orleans, Louisiana. April 7.
13. "Determining the Economic Value of Coastal Preservation and Restoration on Critical Energy Infrastructure." (2007). With Kristi A. R. Darby and Michelle Barnett. International Association for Energy Economics, Wellington, New Zealand, February 19.
14. "Regulatory Issues in Rate Design, Incentives, and Energy Efficiency." (2007). 34th Annual Public Utilities Research Center Conference, University of Florida. Gainesville, FL. February 16.
15. "An Examination of LNG Development on the Gulf of Mexico." (2007). With Kristi A.R. Darby. US Department of the Interior, Minerals Management Service. 24th Annual Information Technology Meeting. New Orleans, LA. January 9.
16. "OCS-Related Infrastructure on the GOM: Update and Summary of Impacts." (2007). U.S. Department of the Interior, Minerals Management Service. 24th Annual Information Technology Meeting. New Orleans, LA. January 10.
17. "The Economic Value of Coastal Preservation and Restoration on Critical Energy Infrastructure." (2006). With Michelle Barnett. Third National Conference on Coastal and Estuarine Habitat Restoration. Restore America's Estuaries. New Orleans, Louisiana, December 11.
18. "The Impact of Implementing a 20 Percent Renewable Portfolio Standard in New Jersey." (2006). With Seth E. Cureington. Mid-Continent Regional Science Association 37th Annual Conference, Purdue University, Lafayette, Indiana, June 9.
19. "The Impacts of Hurricane Katrina and Rita on Energy infrastructure Along the Gulf Coast." (2006). Environment Canada: 2006 Arctic and Marine Oilspill Program. Vancouver, British Columbia, Canada.
20. "Hurricanes, Energy Markets, and Energy Infrastructure in the Gulf of Mexico: Experiences and Lessons Learned." (2006). With Kristi A.R. Darby and Seth E. Cureington. 29th Annual IAEE International Conference, Potsdam, Germany, June 9.
21. "An Examination of the Opportunities for Drilling Incentives on State Leases in Louisiana." (2005). With Kristi A.R. Darby. 28th Annual IAEE International Conference, Taipei, Taiwan (June).

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22. "Fiscal Mechanisms for Stimulating Oil and Gas Production on Marginal Leases." (2004). With Jeffrey M. Burke. International Association of Energy Economics Annual Conference, Washington, D.C. (July).
23. "GIS and Applied Economic Analysis: The Case of Alaska Residential Natural Gas Demand." (2003). With Dmitry V. Mesyanzhinov. Presented at the Joint Meeting of the East Lakes and West Lakes Divisions of the Association of American Geographers in Kalamazoo, MI, October 16-18.
24. "Are There Any In-State Uses for Alaska Natural Gas?" (2002). With Dmitry V. Mesyanzhinov and William E. Nebesky. IAEE/USAEE 22nd Annual North American Conference: "Energy Markets in Turmoil: Making Sense of It All." Vancouver, British Columbia, Canada. October 7.
25. "The Economic Impact of State Oil and Gas Leases on Louisiana." (2002). With Dmitry V. Mesyanzhinov. 2002 National IMPLAN Users' Conference. New Orleans, Louisiana, September 4-6.
26. "Moving to the Front of the Lines: The Economic Impact of Independent Power Plant Development in Louisiana." (2002). With Dmitry V. Mesyanzhinov and Williams O. Olatubi. 2002 National IMPLAN Users' Conference. New Orleans, Louisiana, September 4-6.
27. "New Consistent Approach to Modeling Regional Economic Impacts of Offshore Oil and Gas Activities in the Gulf of Mexico." (2002). With Vicki Zatarain. 2002 National IMPLAN Users' Conference. New Orleans, Louisiana, September 4-6.
28. "Distributed Energy Resources, Energy Efficiency, and Electric Power Industry Restructuring." (1999). American Society of Environmental Science Fourth Annual Conference. Baton Rouge, Louisiana. December.
29. "Estimating Efficiency Opportunities for Coal Fired Electric Power Generation: A DEA Approach." (1999). With Williams O. Olatubi. Southern Economic Association Sixty-ninth Annual Conference. New Orleans, November.
30. "Applied Approaches to Modeling Regional Power Markets." (1999.) With Robert F. Cope. Southern Economic Association Sixty-ninth Annual Conference. New Orleans, November 1999.
31. "Parametric and Non-Parametric Approaches to Measuring Efficiency Potentials in Electric Power Generation." (1999). With Williams O. Olatubi. International Atlantic Economic Society Annual Conference, Montreal, October.
32. "Asymmetric Choice and Customer Benefits: Lessons from the Natural Gas Industry." (1999). With Rachelle F. Cope and Dmitry Mesyanzhinov. International Association of Energy Economics Annual Conference. Orlando, Florida. August.
33. "Modeling Regional Power Markets and Market Power." (1999). With Robert F. Cope. Western Economic Association Annual Conference. San Diego, California. July.
34. "Economic Impact of Offshore Oil and Gas Activities on Coastal Louisiana" (1999). With Dmitry Mesyanzhinov. Annual Meeting of the Association of American Geographers. Honolulu, Hawaii. March.

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35. "Empirical Issues in Electric Power Transmission and Distribution Cost Modeling." (1998). With Robert F. Cope and Dmitry Mesyanzhinov. Southern Economic Association. Sixty-Eighth Annual Conference. Baltimore, Maryland. November.
36. "Modeling Electric Power Markets in a Restructured Environment." (1998). With Robert F. Cope and Dan Rinks. International Association for Energy Economics Annual Conference. Albuquerque, New Mexico. October.
37. "Benchmarking Electric Utility Distribution Performance." (1998) With Robert F. Cope and Dmitry Mesyanzhinov. Western Economic Association, Seventy-sixth Annual Conference. Lake Tahoe, Nevada. June.
38. "Power System Operations, Control, and Environmental Protection in a Restructured Electric Power Industry." (1998). With Fred I. Denny. IEEE Large Engineering Systems Conference on Power Engineering. Nova Scotia, Canada. June.
39. "Benchmarking Electric Utility Transmission Performance." (1997). With Robert F. Cope and Dmitry Mesyanzhinov. Southern Economic Association, Sixty-seventh Annual Conference. Atlanta, Georgia. November 21-24.
40. "A Non-Linear Programming Model to Estimate Stranded Generation Investments in a Deregulated Electric Utility Industry." (1997). With Robert F. Cope and Dan Rinks. Institute for Operations Research and Management Science Annual Conference. Dallas Texas. October 26-29.
41. "New Paradigms for Power Engineering Education." (1997). With Fred I. Denny. International Association of Science and Technology for Development, High Technology in the Power Industry Conference. Orlando, Florida. October 27-30
42. "Cogeneration and Electric Power Industry Restructuring." (1997). With Andrew N. Kleit. Western Economic Association, Seventy-fifth Annual Conference. Seattle, Washington. July 9-13.
43. "The Unintended Consequences of the Public Utilities Regulatory Policies Act of 1978." (1997). National Policy History Conference on the Unintended Consequences of Policy Decisions. Bowling Green State University. Bowling Green, Ohio. June 5-7.
44. "Assessing Environmental and Safety Risks of the Expanding Role of Independents in E&P Operations on the Gulf of Mexico OCS." (1996). With Allan Pulsipher, Omowumi Iledare, Dmitry Mesyanzhinov, and Bob Baumann. U.S. Department of Interior, Minerals Management Service, 16th Annual Information Transfer Meeting. New Orleans, Louisiana.
45. "Empirical Modeling of the Risk of a Petroleum Spill During E&P Operations: A Case Study of the Gulf of Mexico OCS." (1996). With Omowumi Iledare, Allan Pulsipher, and Dmitry Mesyanzhinov. Southern Economic Association, Sixty-Sixth Annual Conference. Washington, D.C.
46. "Input Price Fluctuations, Total Factor Productivity, and Price Cap Regulation in the Telecommunications Industry" (1996). With Farhad Niami. Southern Economic Association, Sixty-Sixth Annual Conference. Washington, D.C.
47. "Recovery of Stranded Investments: Comparing the Electric Utility Industry to Other Recently Deregulated Industries" (1996). With Farhad Niami and Dmitry Mesyanzhinov. Southern Economic Association, Sixty-Sixth Annual Conference. Washington, D.C.

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48. "Spatial Perspectives on the Forthcoming Deregulation of the U.S. Electric Utility Industry." (1996) With Dmitry Mesyanzhinov. Southwest Association of American Geographers Annual Meeting. Norman, Oklahoma.
49. "Comparing the Safety and Environmental Performance of Offshore Oil and Gas Operators." (1995). With Allan Pulsipher, Omowumi Iledare, Dmitry Mesyanzhinov, William Daniel, and Bob Baumann. U.S. Department of Interior, Minerals Management Service, 15th Annual Information Transfer Meeting. New Orleans, Louisiana.
50. "Empirical Determinants of Nuclear Power Plant Disallowances." (1995). Southern Economic Association, Sixty-Fifth Annual Conference. New Orleans, Louisiana.
51. "A Cross-Sectional Model of IntraLATA MTS Demand." (1995). Southern Economic Association, Sixty-Fifth Annual Conference. New Orleans, Louisiana.

ACADEMIC SEMINARS AND PRESENTATIONS

1. Panelist. "Fuel Security, Resource Adequacy & Value of Transmission." (2019). 6th Annual Electricity Dialogue at Northwestern University: Energy and Capacity: Transitions? Northwestern University Center of Law, Regulation, and Economic Growth.
2. "Air Emissions Regulation and Policy: The Recently Proposed Cross State Air Pollution Rule and the Implications for Louisiana Power Generation." Lecture before School of the Coast & Environment. November 5, 2011.
3. "Energy Regulation: Overview of Power and Gas Regulation." Lecture before School of the Coast & Environment, Course in Energy Policy and Law. October 5, 2009.
4. "Trends and Issues in Renewable Energy." Presentation before the School of the Coast & Environment, Louisiana State University. Spring Guest Lecture Series. May 4, 2007.
5. "CES Research Projects and Status." Presentation before the U.S. Department of the Interior, Minerals Management Service, Outer Continental Shelf Scientific Committee Meeting, New Orleans, LA May 22, 2007.
6. "Hurricane Impacts on Energy Production and Infrastructure." Presentation Before the 53rd Mineral Law Institute, Louisiana State University. April 7, 2006.
7. "Trends and Issues in the Natural Gas Industry and the Development of LNG: Implications for Louisiana. (2004) 51st Mineral Law Institute, Louisiana State University, Baton Rouge, LA. April 2, 2004.
8. "Electric Restructuring and Conservation." (2001). Presentation before the Department of Electrical Engineering, McNeese State University. Lake Charles, Louisiana. May 2, 2001.
9. "Electric Restructuring and the Environment." (1998). Environment 98: Science, Law, and Public Policy. Tulane University. Tulane Environmental Law Clinic. March 7, New Orleans, Louisiana.
10. "Electric Restructuring and Nuclear Power." (1997). Louisiana State University. Department of Nuclear Science. November 7, Baton Rouge, Louisiana.
11. "The Empirical Determinants of Co-generated Electricity: Implications for Electric Power Industry Restructuring." (1997). With Andrew N. Kleit. Florida State University. Department of Economics: Applied Microeconomics Workshop Series. October 17,

Tallahassee, Florida.

PROFESSIONAL AND CIVIC PRESENTATIONS

1. “Reforming PURPA: implications for ratepayers.” (2019). Thomas Jefferson Institute for Public Policy, Annual Energy Summit, State Policy Network Annual Meeting. Colorado Springs, CO, October 28.
2. “Natural gas outlook: supply, demand and prices.” (2019). National Association of State Utility Consumer Advocates, Natural Gas Committee Monthly Meeting. July 30, 2019.
3. “The economic impacts and outlook for LNG development on the Gulf Coast.” (2019). 73rd Annual Meeting of the Southern Legislative Conference of the Council of State Governments. New Orleans, LA, July 14. (prepared presentation, hurricane cancellation)
4. “Natural gas outlook: supply, demand, and prices.” (2019). NASUCA Mid-Year Meeting. Portland, OR, June 20.
5. “Overview of Louisiana LNG issues and trends.” (2019). Berlin: LNG, Energy Security, and Diversity Reporting Tour, LSU Center for Energy Studies. Baton Rouge, LA, May 9.
6. “Overview of Louisiana energy issues and outlook.” (2019). Australian Media Visit, Greater New Orleans, Inc./Baton Rouge Area Foundation. Baton Rouge, LA, April 29.
7. “Gulf Coast Energy Outlook 2019: Regional trends and outlook.” (2019). Women’s Energy Network. Baton Rouge, LA, April 23.
8. “MISO Grid Vision 2033.” (2019). 2019 Spring Regulator and Policymaker Forum. New Orleans, LA, April 15-16.
9. “Ratepayer benefits of reforming PURPA.” (2019). LSU Center for Energy Studies Industry Advisory Council Meeting. March 27.
10. “Incentives, risk, and the changing nature of regulation.” (2019). NASUCA Water Committee monthly meeting/webinar. March 13.
11. “Gulf Coast Energy Outlook 2019: Production, trade and infrastructure trends.” (2019). 66th Annual Mineral Board Institute Meetings. Baton Rouge, LA, March 14.
12. “A golden age: energy outlook 2019.” (2019). Engineering News Record Webinar. February 13.
13. Panelist. (2019). Baton Route Advocate, 2019 Economic Outlook Summit. Baton Rouge Advocate. January 8.
14. “MISO Grid Vision 2033.” (2018). 2018 Winter Regulatory and Policymaker Forum. New Orleans, LA, December 11.
15. “Gulf Coast Energy Outlook 2019.” (2018). LSU Center for Energy Studies, Baton Rouge, LA, Fall 2018.
16. “How LNG is transforming Louisiana’s energy economy.” (2018). Louisiana State Bar Association, Public Utility Section. Baton Rouge, LA, November 30.
17. “Overview of Louisiana LNG issues and trends.” (2018). Kean Miller Law Firm: Energy and Environmental Practice Group. Baton Rouge, LA, November 28.

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18. “Infrastructure and capacity: challenges for development.” (2018). Society of Utility and Regulatory Financial Analysts (SURFA) Annual Meeting, New Orleans, LA, April 20.
19. “Louisiana industrial cogeneration trends.” (2018). Annual Louisiana Solid Waste Association Conference, Lafayette, LA, March 16.
20. “Gulf Coast industrial development: overview of trends and issues.” (2018). Gulf Coast Power Association Meetings, New Orleans, LA, February 8.
21. “Energy outlook – reflection on market trends and Louisiana implications.” (2017). IberiaBank Corporation Bank Board of Directors Meeting, New Orleans, LA. November 15.
22. “Integrated carbon capture and storage in the Louisiana chemical corridor.” (2017). Industry Associates Advisory Council Meeting, Baton Rouge, LA. November 7.
23. “The outlook for natural gas and energy development on the Gulf Coast.” (2017). Louisiana Chemical Association, Annual Meeting, New Orleans, LA. October 26.
24. “Critical energy infrastructure: the big picture on resiliency research.” (2017). National Academies of Science, Engineering, and Medicine. New Orleans, LA. September 18.
25. “The changing nature of Gulf of Mexico energy infrastructure.” (2017). 27th Gulf of Mexico Region Information Technology Meetings, New Orleans, LA, August 24.
26. “Capacity utilization, efficiency trends, and economic risks for modern CHP installations.” (2017). Industrial Energy Technology Conference, New Orleans, LA. June 21.
27. “Crude oil and natural gas outlook: Where are we and where are we going?” (2017). CCREDC Economic Trends Panel. Corpus Christi, TX, June 15.
28. “Navigating through the energy landscape.” (2017). Baton Rouge Rotary Luncheon. Baton Rouge, LA, May 24.
29. “The 2017-2018 Louisiana energy outlook.” (2017). Junior Achievement of Greater New Orleans, JA BizTown Speaker Series. New Orleans, LA, May 12.
30. “The Gulf Coast energy economy: trends and outlook.” (2017). Society for Municipal Analysts. New Orleans, LA, April 21.
31. “Gulf coast energy outlook.” (2017). E.J. Ourso College of Business, Dean’s Advisory Council, Energy Committee Meeting. Baton Rouge, LA, March 31.
32. “Recent trends in energy: overview and impact for the banking community.” (2017). Oil and Gas Industry Update, Louisiana Bankers Association. Baton Rouge, LA, March 24.
33. “How supply, demand and prices have influenced unconventional development.” (2016). Energy Annual Meeting, CLEER-University Advisory Board Lecture. New Orleans, LA, September 17.
34. “The Basics of Natural Gas Production, Transportation, and Markets.” (2016). Center for Energy Studies. Baton Rouge, LA, August 1.
35. “Gulf Coast industrial development: trends and outlook.” (2016). Investor Relations Group Meeting, Edison Electric Institute. New Orleans, LA, June 23.
36. “The future of policy and regulation: Unlocking the Treasures of Utility Regulation.” (2016). Annual Meeting, National Conference of Regulatory Attorneys. Tampa, FL, June 20.

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37. "Utility mergers: where's the beef?". (2016). National Association of State Utility Consumer Advocates Mid-Year Meetings. New Orleans, LA, June 6.
38. "Overview of the Clean Power Plan and its application to Louisiana." (2016). Shell Oil Company Internal Meeting. April 12.
39. "Energy and economic development on the Gulf Coast: trends and emerging challenges." (2016). Gas Processors Association Meeting. New Orleans, LA, April 11.
40. "Unconventional Oil and Gas Drilling Trends and Issues." (2016). French Delegation Visit, LSU Center for Energy Studies. March 16.
41. "Gulf Coast Industrial Growth: Passing clouds or storms on the horizon?" (2016). Gulf Coast Power Association Meetings. New Orleans, LA, February 18.
42. "The Transition to Crisis: What do the recent changes in energy markets mean for Louisiana?" (2016). Louisiana Independent Study Group. February 2.
43. "Regulatory and Ratepayer Issues in the Analysis of Utility Natural Gas Reserves Purchases" (2016). National Association of State Utility Consumer Advocates Gas Consumer Monthly Meeting. January 25.
44. "Emerging Issues in Fuel Procurement: Opportunities & Challenges in Natural Gas Reserves Investment." (2015). National Association of State Utility Consumer Advocates Annual Meeting. Austin, Texas. November 9.
45. "Trends and Issues in Net Metering and Solar Generation." (2015). Louisiana Rural Electric Cooperative Meeting. November 5.
46. "Electric Power: Industry Overview, Organization, and Federal/State Distinctions." (2015). EUCI. October 16.
47. "Natural Gas 101: The Basics of Natural Gas Production, Transportation, and Markets." (2015). Council of State Governments Special Meeting on Gas Markets. New Orleans, LA. October 14.
48. "Update and General Business Matters." (2015). CES Industry Associates Meeting. Baton Rouge, Louisiana. Fall 2015.
49. "The Impact of Infrastructure Cost Recovery Mechanisms on Pipeline Replacements and Leaks." (2015). 38th IAEE 2015 International Conference. Antalya, Turkey. May 26.
50. "Industry on the Move – What's Next?" (2015). Event Sponsored by Regional Bank and 1012 Industry Report. May 5.
51. "The State of the Energy Industry and Other Emerging Issues." (2015). Lex Mundi Energy & Natural Resources Practice Group Global Meeting. May 5.
52. "Energy, Louisiana, and LSU." (2015). LSU Science Café. Baton Rouge, Louisiana. April 28.
53. "Energy Market Changes and Impacts for Louisiana." (2015). Kinetica Partners Shippers Meeting, New Orleans, Louisiana. April 22.
54. "Incentives, Risk and the Changing Nature of Utility Regulation." (2015). NARUC Staff Subcommittee on Accounting and Finance Meetings, New Orleans, Louisiana. April 22.
55. "Modifying Renewables Policies to Sustain Positive and Economic Change." (2015). IEEE

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- Annual Green Technologies (“Greentech Conference”). April 17.
56. “Louisiana’s Changing Energy Environment.” (2015). John P. Laborde Energy Law Center Advisory Board Spring Meeting, Baton Rouge, Louisiana. March 27.
 57. “The Latest and the Long on Energy: Outlooks and Implications for Louisiana.” (2015). Iberia Bank Advisory Board Meeting, Baton Rouge, Louisiana. February 23.
 58. “A Survey of Recent Energy Market Changes and their Potential Implications for Louisiana.” (2015). Vistage Group, New Orleans, Louisiana. February 4.
 59. “Energy Prices and the Outlook for the Tuscaloosa Marine Shale.” (2015). Baton Rouge Rotary Club, Baton Rouge, Louisiana. January 28.
 60. “Trends in Energy & Energy-Related Economic Development.” (2014). Miller and Thompson Presentation, Baton Rouge, Louisiana. December 30.
 61. “Overview EPA’s Proposed Rule Under Section 111(d) of the Clean Air Act: Impacts for Louisiana.” (2014). Louisiana State Bar: Utility Section CLE Annual Meeting, Baton Rouge, Louisiana. November 7.
 62. “Overview EPA’s Proposed Clean Power Plan and Impacts for Louisiana.” (2014). Clean Cities Coalition Meeting, Baton Rouge, Louisiana. November 5.
 63. “Impacts on Louisiana from EPA’s Proposed Clean Power Plan.” (2014). Air & Waste Management Annual Environmental Conference (Louisiana Chapter), Baton Rouge, Louisiana. October 29, 2014.
 64. “A Look at America’s Growing Demand for Natural Gas.” (2014). Louisiana Chemical Association Annual Meeting, New Orleans, Louisiana. October 23.
 65. “Trends in Energy & Energy-Related Economic Development.” (2014). 2014 Government Finance Officer Association Meetings, Baton Rouge, Louisiana. October 9.
 66. “The Conventional Wisdom Associated with Unconventional Resource Development.” (2014). National Association for Business Economics Annual Conference, Chicago, Illinois. September 28.
 67. Unconventional Oil & Natural Gas: Overview of Resources, Economics & Policy Issues. (2014). Society of Environmental Journalists Annual Meeting. New Orleans, Louisiana. September 4.
 68. “Natural Gas Leveraged Economic Development in the South.” (2014). Southern Governors Association Meeting, Little Rock, Arkansas. August 16.
 69. “The Past, Present and Future of CHP Development in Louisiana.” (2014). Louisiana Public Service Commission CHP Workshop, Baton Rouge, Louisiana. June 25.
 70. “Regional Natural Gas Demand Growth: Industrial and Power Generation Trends.” (2014). Kinetica Partners Shippers Meeting, New Orleans, Louisiana. April 30.
 71. “The Technical and Economic Potential for CHP in Louisiana and the Impact of the Industrial Investment Renaissance on New CHP Capacity Development.” (2014). Electric Power 2014, New Orleans, Louisiana. April 1.
 72. “Industry Investments and the Economic Development of Unconventional Development.” (2014). Tuscaloosa Marine Shale Conference & Expo, Natchez, Mississippi. March 31.

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73. Discussion Panelist. Energy Outlook 2035: The Global Energy Industry and Its Impact on Louisiana, (2014). Grow Louisiana Coalition, Baton Rouge, Louisiana. March 18.
74. "Natural Gas and the Polar Vortex: Has Recent Weather Led to a Structural Change in Natural Gas Markets?" (2014). National Association of State Utility Consumer Advocates Monthly Gas Committee Meeting. February 19.
75. "Some Unconventional Thoughts on Regional Unconventional Gas and Power Generation Requirements." (2014). Gulf Coast Power Association Special Briefing, New Orleans, Louisiana. February 6.
76. "Leveraging Energy for Industrial Development." (2013). 2013 Governor's Energy Summit, Jackson, Mississippi. December 5.
77. "Natural Gas Line Extension Policies: Ratepayer Issues and Considerations." (2013). National Association of State Utility Consumer Advocates Annual Meeting, Orlando, Florida. November 19.
78. "Replacement, Reliability & Resiliency: Infrastructure & Ratemaking Issues in the Power & Natural Gas Distribution Industries." (2013). Louisiana State Bar, Public Utility Section Meetings. November 15.
79. "Natural Gas Markets: Leveraging the Production Revolution into an Industrial Renaissance." (2013). International Technical Conference, Houston, TX. October 11.
80. "Natural Gas, Coal & Power Generation Issues and Trends." (2013). Southeast Labor and Management Public Affairs Committee Conference, Chattanooga, Tennessee. September 27.
81. "Recent Trends in Pipeline Replacement Trackers." (2013). National Association of State Utility Consumer Advocates Monthly Gas Committee Meeting. September 19.
82. Discussion Panelist (2013). Think About Energy Summit, America's Natural Gas Alliance, Columbus Ohio. September 16-17.
83. "Future Test Years: Issues to Consider." (2013). National Regulatory Research Institute, Teleseminar on Future Test Years. August 28.
84. "Industrial Development Outlook for Louisiana." (2013). Louisiana Water Synergy Project Meetings, Jones Walker Law Firm, Baton Rouge, Louisiana. July 30.
85. "Natural Gas & Electric Power Coordination Issues and Challenges." (2013). Utilities State Government Organization Conference, Pointe Clear, Alabama. July 9.
86. "Natural Gas Market Issues & Trends." (2013). Western Conference of Public Service Commissioners, Santa Fe, New Mexico. June 3.
87. "Louisiana Unconventional Natural Gas and Industrial Redevelopment." (2013). Louisiana Chemical Association/Louisiana Chemical Industry Alliance Annual Legislative Conference, Baton Rouge, Louisiana. May 8.
88. "Infrastructure Cost Recovery Mechanism: Overview of Issues." (2013). Energy Bar Association Annual Meeting, Washington, D.C. May 1.
89. "GOM Offshore Oil and Gas." (2013). Energy Executive Roundtable, New Orleans, Louisiana. March 27.
90. "Louisiana Unconventional Natural Gas and Industrial Redevelopment." (2013). Risk

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Management Association Luncheon, March 21.

91. "Natural Gas Market Update and Emerging Issues." (2013). NASUCA Gas Committee Conference Call/Webinar, March 12.
92. "Unconventional Resources and Louisiana's Manufacturing Development Renaissance." (2013). Baton Rouge Press Club, De La Ronde Hall, Baton Rouge, LA, January 28.
93. "New Industrial Operations Leveraged by Unconventional Natural Gas." (2013) American Petroleum Institute-Louisiana Chapter. Lafayette, LA, Petroleum Club, January 14.
94. "What's Going on with Energy? How Unconventional Oil and Gas Development is Impacting Renewables, Efficiency, Power Markets, and All that Other Stuff." (2012). Atlanta Economics Club Monthly Meeting. Atlanta, GA. December 11.
95. "Trends, Issues, and Market Changes for Crude Oil and Natural Gas." (2012). East Iberville Community Advisory Panel Meeting. St. Gabriel, LA. September 26.
96. "Game Changers in Crude and Natural Gas Markets." (2012). Chevron Community Advisory Panel Meeting. Belle Chase, LA, September 17.
97. "The Outlook for Renewables in a Changing Power and Natural Gas Market." (2012). Louisiana Biofuels and Bioprocessing Summit. Baton Rouge, LA. September 11.
98. "The Changing Dynamics of Crude and Natural Gas Markets." (2012). Chalmette Refining Community Advisory Panel Meeting. Chalmette, LA, September 11.
99. "The Really Big Game Changer: Crude Oil Production from Shale Resources and the Tuscaloosa Marine Shale." (2012). Baton Rouge Chamber of Commerce Board Meeting. Baton Rouge, LA, June 27.
100. "The Impact of Changing Natural Gas Prices on Renewables and Energy Efficiency." (2012). NASUCA Gas Committee Conference Call/Webinar. 12 June 2012.
101. "Issues in Gas-Renewables Coordination: How Changes in Natural Gas Markets Potentially Impact Renewable Development" (2012). Energy Bar Association, Louisiana Chapter, Annual Meeting, New Orleans, LA. April 12, 2012.
102. "Issues in Natural Gas End-Uses: Are We Really Focusing on the Real Opportunities?" (2012). Energy Bar Association, Louisiana Chapter, Annual Meeting, New Orleans, LA. April 12, 2012.
103. "The Impact of Legacy Lawsuits on Conventional Oil and Gas Drilling in Louisiana." (2012). Louisiana Oil and Gas Association Annual Meeting, Lake Charles, LA. February 27, 2012.
104. "The Impact of Legacy Lawsuits on Conventional Oil and Gas Drilling in Louisiana." (2012) Louisiana Oil and Gas Association Annual Meeting. Lake Charles, Louisiana. February 27, 2012.
105. "Louisiana's Unconventional Plays: Economic Opportunities, Policy Challenges. Louisiana Mid-Continent Oil and Gas Association 2012 Annual Meeting. (2012) New Orleans, Louisiana. January 26, 2012.
106. "EPA's Recently Proposed Cross State Air Pollution Rule ("CSAPR") and Its Impacts on Louisiana." (2011). Bossier Chamber of Commerce. November 18, 2011.
107. "Facilitating the Growth of America's Natural Gas Advantage." (2011). BASF U.S. Shale

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- Gas Workshop Management Meeting. Florham Park, New Jersey. November 1, 2011.
108. "CSAPR and EPA Regulations Impacting Louisiana Power Generation." (2011). Air and Waste Management Association (Louisiana Section) Fall Conference. Environmental Focus 2011: a Multi-Media Forum. Baton Rouge, LA. October 25, 2011.
 109. "Natural Gas Trends and Impact on Industrial Development." (2011). Central Gulf Coast Industrial Alliance Conference. Arthur R. Outlaw Convention Center. Mobile, AL. September 22, 2011.
 110. "Energy Market Changes and Policy Challenges." (2011). Southeast Manpower Tripartite Alliance ("SEMTA") Summer Conference. Nashville, TN September 2, 2011.
 111. "EPA Regulations, Rates & Costs: Implications for U.S. Ratepayers." (2011). Workshop: "A Smarter Approach to Improving Our Environment." 38th Annual American Legislative Exchange Council ("ALEC") Meetings. New Orleans, LA. August 5, 2011.
 112. Panelist/Moderator. Workshop: "Why Wait? Start Energy Independence Today." 38th Annual American Legislative Exchange Council ("ALEC") Meetings. New Orleans, LA. August 4, 2011.
 113. "Facilitating the Growth of America's Natural Gas Advantage." Texas Chemical Council, Board of Directors Summer Meeting. San Antonio, TX. July 28, 2011.
 114. "Creating Ratepayer Benefits by Reconciling Recent Gas Supply Opportunities with Past Policy Initiatives." National Association of State Utility Consumer Advocates ("NASUCA"), Monthly Gas Committee Meeting. July 12, 2011.
 115. "Energy Market Trends and Policies: Implications for Louisiana." (2011). Lakeshore Lion's Club Monthly Meeting. Baton Rouge, Louisiana. June 20, 2011.
 116. "America's Natural Gas Advantage: Securing Benefits for Ratepayers Through Paradigm Shifts in Policy." Southeastern Association of Regulatory Commissioners ("SEARUC") Annual Meeting. Nashville, Tennessee. June 14, 2011.
 117. "Learning Together: Building Utility and Clean Energy Industry Partnerships in the Southeast." (2011). American Solar Energy Society National Solar Conference. Raleigh Convention Center, Raleigh, North Carolina. May 20, 2011.
 118. "Louisiana Energy Outlook and Trends." (2011). Executive Briefing. Consul General of Canada. LSU Center for Energy Studies, Baton Rouge, Louisiana. May 24, 2011.
 119. "Louisiana's Natural Gas Advantage: Can We Hold It? Grow It? Or Do We Need to be Worrying About Other Problems?" (2011). Louisiana Chemical Association Annual Legislative Conference, Baton Rouge, Louisiana, May 5, 2011.
 120. "Energy Outlook and Trends: Implications for Louisiana. (2011). Executive Briefing, Legislative Staff, Congressman William Cassidy. LSU Center for Energy Studies, Baton Rouge, Louisiana. March 25, 2011.
 121. "Regulatory Issues in Inflation Adjustment Mechanisms and Allowances." (2011). Gas Committee, National Association of State Utility Consumer Advocates ("NASUCA"). February 15, 2011.
 122. "Regulatory Issues in Inflation Adjustment Mechanisms and Allowances." (2010). 2010 Annual Meeting, National Association of State Utility Consumer Advocates ("NASUCA"), Omni at CNN Center, Atlanta, Georgia, November 16, 2010.

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123. "How Current and Proposed Energy Policy Impacts Consumers and Ratepayers." (2010). 122nd Annual Meeting, National Association of Regulatory Utility Commissioners ("NARUC"), Omni at CNN Center, Atlanta, Georgia, November 15, 2010.
124. "Energy Outlook: Trends and Policies." (2010). 2010 Tri-State Member Service Conference; Arkansas, Louisiana, and Mississippi Electric Cooperatives. L'Auberge du Lac Casino Resort, Lake Charles, Louisiana, October 14, 2010.
125. "Deepwater Moratorium and Louisiana Impacts." (2010). The Energy Council Annual Meeting. Gulf of Mexico Deepwater Horizon Accident, Response, and Policy. Beau Rivage Conference Center. Biloxi, Mississippi. September 25, 2010.
126. "Overview on Offshore Drilling and Production Activities in the Aftermath of Deepwater Horizon." (2010) Jones Walker Banking Symposium. The Oil Spill: What Will it Mean for Banks in the Region? New Orleans, Louisiana. August 31, 2010.
127. "Long-Term Energy Sector Impacts from the Oil Spill." (2010). Second Annual Louisiana Oil & Gas Symposium. The BP Gulf Oil Spill: Long-Term Impacts and Strategies. Baton Rouge Geological Society. August 16, 2010.
128. "Overview and Issues Associated with the Deepwater Horizon Accident." (2010). Global Interdependence Meeting on Energy Issues. Baton Rouge, LA. August 12, 2010.
129. "Overview and Issues Associated with the Deepwater Horizon Accident." (2010). Regional Roundtable Webinar. National Association for Business Economics. August 10, 2010.
130. "Deepwater Moratorium: Overview of Impacts for Louisiana." Louisiana Association of Business and Industry Meeting. Baton Rouge, LA. June 25, 2010.
131. Moderator. Senior Executive Roundtable on Industrial Energy Efficiency. U.S. Department of Energy Conference on Industrial Efficiency. Office of Renewable Energy and Energy Efficiency. Royal Sonesta Hotel, New Orleans, LA. May 21, 2010.
132. "The Energy Outlook: Trends and Policies Impacting Southeastern Natural Gas Supply and Demand Growth." Second Annual Local Economic Analysis and Research Network ("LEARN") Conference. Federal Reserve Bank of Atlanta. March 29, 2010.
133. "Natural Gas Supply Issues: Gulf Coast Supply Trends and Implications for Louisiana." Energy Bar Association, New Orleans Chapter Meeting. Jones Walker Law Firm. January 28, 2010, New Orleans, LA.
134. "Potential Impacts of Federal Greenhouse Gas Legislation on Louisiana Industry." LCA Government Affairs Committee Meeting. November 10, 2009. Baton Rouge, LA
135. "Regulatory and Ratemaking Issues Associated with Cost and Revenue Tracker Mechanisms." National Association of State Utility Consumer Advocates ("NASUCA") Annual Meeting. November 10, 2009.
136. "Louisiana's Stakes in the Greenhouse Gas Debate." Louisiana Chemical Association and Louisiana Chemical Industry Alliance Annual Meeting: The Billing Dollar Budget Crisis: Catastrophe or Change? New Orleans, LA.
137. "Gulf Coast Energy Outlook: Issues and Trends." Women's Energy Network, Louisiana Chapter. September 17, 2009. Baton Rouge, LA.
138. "Gulf Coast Energy Outlook: Issues and Trends." Natchez Area Association of Energy Service Companies. September 15, 2009, Natchez, MS.

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139. "The Small Picture: The Cost of Climate Change to Louisiana." Louisiana Association of Business and Industry, U.S. Chamber of Commerce, Louisiana Oil and Gas Association, and LSU Center for Energy Studies Conference: Can Louisiana Make a Buck After Climate Change Legislation? August 21, 2009. Baton Rouge, LA.
140. "Carbon Legislation and Clean Energy Markets: Policy and Impacts." National Association of Conservation Districts, South Central Region Meeting. August 14, 2009. Baton Rouge, LA.
141. "Evolving Carbon and Clean Energy Markets." The Carbon Emissions Continuum: From Production to Consumption." Jones Walker Law Firm and LSU Center for Energy Studies Workshop. June 23, 2009. Baton Rouge, LA
142. "Potential Impacts of Cap and Trade on Louisiana Ratepayers: Preliminary Results." (2009). Briefing before the Louisiana Public Service Commission. Business and Executive Meeting, May 12, 2009. Baton Rouge, LA.
143. "Natural Gas Outlook." (2009). Briefing before the Louisiana Public Service Commission. Business and Executive Meeting, May 12, 2009. Baton Rouge, LA.
144. "Gulf Coast Energy Outlook: Issues and Trends." (2009). ISA-Lafayette Technical Conference & Expo. Cajundome Conference Center. Lafayette, Louisiana. March 12, 2009.
145. "The Cost of Energy Independence, Climate Change, and Clean Energy Initiatives on Utility Ratepayers." (2009). National Association of Business Economics (NABE). 25th Annual Washington Economic Policy Conference: Restoring Financial and Economic Stability. Arlington, VA March 2, 2009.
146. Panelist, "Expanding Exploration of the U.S. OCS" (2009). Deep Offshore Technology International Conference and Exhibition. PennWell. New Orleans, Louisiana. February 4, 2009.
147. "Gulf Coast Energy Outlook." (2008.) Atmos Energy Regional Management Meeting. Louisiana and Mississippi Division. New Orleans, Louisiana. October 8, 2008.
148. "Background, Issues, and Trends in Underground Hydrocarbon Storage." (2008). Presentation before the LSU Center for Energy Studies Industry Advisory Board Meeting. Baton Rouge, Louisiana. August 27, 2008.
149. "Greenhouse Gas Regulations and Policy: Implications for Louisiana." (2008). Presentation before the Praxair Customer Seminar. Houston, Texas, August 14, 2008.
150. "Market and Regulatory Issues in Alternative Energy and Louisiana Initiatives." (2008). Presentation before the 2008 Statewide Clean Cities Coalition Conference: Making Sense of Alternative Fuels and Advanced Technologies. New Orleans, Louisiana, March 27, 2008.
151. "Regulatory Issues in Rate Design, Incentives, and Energy Efficiency." (2007) Presentation before the New Hampshire Public Utilities Commission. Workshop on Energy Efficiency and Revenue Decoupling. November 7, 2007.
152. "Regulatory Issues for Consumer Advocates in Rate Design, Incentives, and Energy Efficiency." (2007). National Association of State Utility Consumer Advocates, Mid-Year Meeting. June 12, 2007.

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153. "Regulatory and Policy Issues in Nuclear Power Plant Development." (2007). LSU Center for Energy Studies Industry Advisory Council Meeting. Baton Rouge, LA. March 23, 2007.
154. "Oil and Gas in the Gulf of Mexico: A North American Perspective." (2007). Canadian Consulate, Heads of Mission EnerNet Workshop, Houston, Texas. March 20, 2007.
155. "Regulatory Issues for Consumer Advocates in Rate Design, Incentives & Energy Efficiency." (2007). National Association of State Utility Consumer Advocates ("NASUCA") Gas Committee Monthly Meeting. February 13, 2006.
156. "Recent Trends in Natural Gas Markets." (2006). National Association of Regulatory Utility Commissioners, 118th Annual Convention. Miami, FL November 14, 2006.
157. "Energy Markets: Recent Trends, Issues & Outlook." (2006). Association of Energy Service Companies (AESC) Meeting. Petroleum Club, Lafayette, LA, November 8, 2006.
158. "Energy Outlook" (2006). National Business Economics Issues Council. Quarterly Meeting, Nashville, TN, November 1-2, 2006.
159. "Global and U.S. Energy Outlook." (2006). Energy Virginia Conference. Virginia Military Institute, Lexington, VA October 17, 2006.
160. "Interdependence of Critical Energy Infrastructure Systems." (2006). Cross Border Forum on Energy Issues: Security and Assurance of North American Energy Systems. Woodrow Wilson Center for International Scholars. Washington, DC, October 13, 2006.
161. "Determining the Economic Value of Coastal Preservation and Restoration on Critical Energy Infrastructure." (2006) The Economic and Market Impacts of Coastal Restoration: America's Wetland Economic Forum II. Washington, DC September 28, 2006.
162. "Relationships between Power and Other Critical Energy Infrastructure." (2006). Rebuilding the New Orleans Region: Infrastructure Systems and Technology Innovation Forum. United Engineering Foundation. New Orleans, LA, September 24-25, 2006.
163. "Outlook, Issues, and Trends in Energy Supplies and Prices." (2006.) Presentation to the Southern States Energy Board, Associate Members Meeting. New Orleans, Louisiana. July 14, 2006.
164. "Energy Sector Outlook." (2006). Baton Rouge Country Club Meeting. Baton Rouge, Louisiana. July 11, 2006.
165. "Oil and Gas Industry Post 2005 Storm Events." (2006). American Petroleum Institute, Teche Chapter. Production, Operations, and Regulations Annual Meeting. Lafayette, Louisiana. June 29, 2006.
166. "Concentration of Energy Infrastructure in Hurricane Regions." (2006). Presentation before the National Commission on Energy Policy Forum: Ending the Stalemate on LNG Facility Siting. Washington, DC. June 21, 2006.
167. "LNG—A Premier." (2006). Presentation Given to the U.S. Department of Energy's "LNG Forums." Los Angeles, California. June 1, 2006.
168. "Regional Energy Infrastructure, Production and Outlook." (2006). Executive Briefing for Board of Directors, Louisiana Oil and Gas Plc., Enhanced Exploration, Inc. and Energy Self-Service, Inc. Covington, Louisiana, May 12, 2006.
169. "The Impacts of the Recent Hurricane Season on Energy Production and Infrastructure

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- and Future Outlook.” Presentation before the Industrial Energy Technology Conference 2006. New Orleans, Louisiana, May 9, 2006.
170. “Update on Regional Energy Infrastructure and Production.” (2006). Executive Briefing for Delegation Participating in U.S. Department of Commerce Gulf Coast Business Investment Mission. Baton Rouge, Louisiana May 5, 2006.
 171. “Hurricane Impacts on Energy Production and Infrastructure.” (2006). Presentation before the Interstate Natural Gas Association of America Mid-Year Meeting. Hyatt Regency Hill Country. April 21, 2006.
 172. “LNG—A Premier.” Presentation Given to the U.S. Department of Energy’s “LNG Forums.” Astoria, Washington. April 28, 2006.
 173. Natural Gas Market Outlook. Invited Presentation Given to the Georgia Public Service Commission and Staff. Georgia Institute of Technology, Atlanta, Georgia. March 10, 2006.
 174. The Impacts of Hurricanes Katrina and Rita on Louisiana’s Energy Industry. Presentation to the Louisiana Economic Development Council. Baton Rouge, Louisiana. March 8, 2006.
 175. Energy Markets: Hurricane Impacts and Outlook. Presentation to the 2006 Louisiana Independent Oil and Gas Association Annual Conference. L’Auberge du Lac Resort and Casino. Lake Charles, Louisiana. March 6, 2006
 176. Energy Market Outlook and Update on Hurricane Damage to Energy Infrastructure. Presentation to the Energy Council 2005 Global Energy and Environmental Issues Conference. Santa Fe, New Mexico, December 10, 2005.
 177. “Putting Our Energy Infrastructure Back Together Again.” Presentation Before the 117th Annual Convention of the National Association of Regulatory Utility Commissioners (NARUC). November 15, 2005. Palm Springs, CA
 178. “Hurricanes and the Outlook for Energy Markets.” Presentation before the Baton Rouge Rotary Club. November 9, 2005, Baton Rouge, LA.
 179. “Hurricanes, Energy Supplies and Prices.” Presentation before the Louisiana Department of Natural Resources and Atchafalaya Basin Committee Meeting. November 8, 2005. Baton Rouge, LA.
 180. “The Impact of the Recent Hurricane’s on Louisiana’s Energy Industry.” Presentation before the Louisiana Independent Oil and Gas Association Board of Directors Meeting. November 8, 2005. Baton Rouge, LA.
 181. “The Impact of the Recent Hurricanes on Louisiana’s Infrastructure and National Energy Markets.” Presentation before the Baton Rouge City Club Distinguished Speaker Series. October 13, 2005. Baton Rouge, LA.
 182. “The Impact of the Recent Hurricanes on Louisiana’s Infrastructure and National Energy Markets.” Presentation before Powering Up: A Discussion About the Future of Louisiana’s Energy Industry. Special Lecture Series Sponsored by the Kean Miller Law Firm. October 13, 2005. Baton Rouge, LA.

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183. "The Impact of Hurricane Katrina on Louisiana's Energy Infrastructure and National Energy Markets." Special Lecture on Hurricane Impacts, LSU Center for Energy Studies, September 29, 2005.
184. "Louisiana Power Industry Overview." Presentation before the Clean Air Interstate Rule Implementation Stakeholders Meeting. August 11, 2005. Louisiana Department of Environmental Quality.
185. "CES 2005 Legislative Support and Outlook for Energy Markets and Policy." Presentation before the LMOGA/LCA Annual Post-Session Legislative Committee Meeting. August 10-13, 2005. Perdido Key, Florida.
186. "Electric Restructuring: Past, Present, and Future." Presentation to the Southeastern Association of Tax Administrators Annual Conference. Sheraton Hotel and Conference Facility. New Orleans, LA July 12, 2005.
187. "The Outlook for Energy." Lagniappe Studies Continuing Education Course. Baton Rouge, LA. July 11, 2005.
188. "The Outlook for Energy." Sunshine Rotary Club. Baton Rouge, LA. April 27, 2005.
189. "Background and Overview of LNG Development." Energy Council Workshop on LNG/CNG. Biloxi, Ms: Beau Rivage Resort and Hotel, April 9, 2005.
190. "Natural Gas Supply, Prices, and LNG: Implications for Louisiana Industry." Cytec Corporation Community Advisory Panel. Fortier, LA January 14, 2005.
191. "The Economic Opportunities for a Limited Industrial Retail Choice Plan." Louisiana Department of Economic Development. Baton Rouge, Louisiana. November 19, 2004.
192. "Energy Issues for Industrial Customers of Gas and Power." Louisiana Association of Business and Industry, Energy Council Meeting. Baton Rouge, Louisiana. October 11, 2004.
193. "Energy Issues for Industrial Customers of Gas and Power." Annual Meeting of the Louisiana Chemical Association and the Louisiana Chemical Industry Alliance. Point Clear, Alabama. October 8, 2004.
194. "Energy Issues for Industrial Customers of Gas and Power." American Institute of Chemical Engineers – New Orleans Section. New Orleans, LA. September 22, 2004.
195. "Natural Gas Supply, Prices and LNG: Implications for Louisiana Industry." Dow Chemical Company Community Advisory Panel Meeting. Plaquemine, LA. August 9, 2004.
196. "Energy Issues for Industrial Customers of Gas and Power." Louisiana Chemical Association Post-Legislative Meeting. Springfield, LA. August 9, 2004.
197. "LNG In Louisiana." Joint Meeting of the Louisiana Economic Development Council and the Governors Cabinet Advisory Council. Baton Rouge, LA. August 5, 2004.
198. "Louisiana Energy Issues." Louisiana Mid-Continent Oil and Gas Association Post Legislative Meetings. Sandestin, Florida. July 28, 2004.
199. "The Gulf South: Economic Opportunities Related to LNG." Presentation before the Energy Council's 2004 State and Provincial Energy and Environmental Trends Conference. Point Clear, AL, June 26, 2004.

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200. "Natural Gas and LNG Issues for Louisiana." Presentation before the Rhodia Community Advisory Panel. May 20, 2004, Baton Rouge, LA.
201. "The Economic Opportunities for LNG Development in Louisiana." Presentation before the Louisiana Chemical Association Plant Managers Meeting. May 27, 2004. Baton Rouge, LA.
202. "The Economic Opportunities for LNG Development in Louisiana." Presentation before the Louisiana Chemical Association/Louisiana Chemical Industry Alliance Legislative Conference. May 26, 2004. Baton Rouge, LA.
203. "The Economic Opportunities for LNG Development in Louisiana." Presentation before the Petrochemical Industry Cluster, Greater New Orleans, Inc. May 19, 2004, Destrehan, LA.
204. "Industry Development Issues for Louisiana: LNG, Retail Choice, and Energy." Presentation before the LSU Center for Energy Studies Industry Associates. May 14, 2004, Baton Rouge, LA.
205. "The Economic Opportunities for LNG Development in Louisiana." Presentation before the Board of Directors, Greater New Orleans, Inc. May 13, 2004, New Orleans, LA.
206. "Natural Gas Outlook: Trends and Issues for Louisiana." Presentation before the Louisiana Joint Agricultural Association Meetings. January 14, 2004, Hotel Acadiana, Lafayette, Louisiana.
207. "Natural Gas Outlook" Presentation before the St. James Parish Community Advisory Panel Meeting. January 7, 2004, IMC Production Facility, Convent, Louisiana.
208. "Competitive Bidding in the Electric Power Industry." Presentation before the Association of Energy Engineers. Business Energy Solutions Expo. December 11-12, 2003, New Orleans, Louisiana.
209. "Regional Transmission Organization in the South: The Demise of SeTrans" Presentation before the LSU Center for Energy Studies Industry Associates Advisory Council Meeting. December 9, 2003. Baton Rouge, Louisiana.
210. "Affordable Energy: The Key Component to a Strong Economy." Presentation before the National Association of Regulatory Utility Commissioners ("NARUC"), November 18, 2003, Atlanta, Georgia.
211. "Natural Gas Outlook." Presentation before the Louisiana Chemical Association, October 17, 2003, Pointe Clear, Alabama.
212. "Issues and Opportunities with Distributed Energy Resources." Presentation before the Louisiana Biomass Council. April 17, 2003, Baton Rouge, Louisiana.
213. "What's Happened to the Merchant Energy Industry? Issues, Challenges, and Outlook" Presentation before the LSU Center for Energy Studies Industry Associates Advisory Council Meeting. November 12, 2002. Baton Rouge, Louisiana.
214. "An Introduction to Distributed Energy Resources." Presentation before the U.S. Department of Energy, Office of Renewable Energy and Energy Efficiency, State Energy Program/Rebuild America Conference, August 1, 2002, New Orleans, Louisiana.

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215. "Merchant Energy Development Issues in Louisiana." Presentation before the Program Committee of the Center for Legislative, Energy, and Environmental Research (CLEER), Energy Council. April 19, 2002.
216. "Merchant Power Plants and Deregulation: Issues and Impacts." Presentation before 24th Annual Conference on Waste and the Environment. Sponsored by the Louisiana Department of Environmental Quality. Lafayette, Louisiana, Cajundome. March 18, 2002.
217. "Merchant Power and Deregulation: Issues and Impacts." Presentation before the Air and Waste Management Association Annual Meeting. Baton Rouge, LA, November 15, 2001.
218. "Moving to the Front of the Lines: The Economic Impact of Independent Power Production in Louisiana." Presentation before the LSU Center for Energy Studies Merchant Power Generation and Transmission Conference, Baton Rouge, LA. October 11, 2001.
219. "Economic Impacts of Merchant Power Plant Development in Mississippi." Presentation before the U.S. Oil and Gas Association Annual Oil and Gas Forum. Jackson, Mississippi. October 10, 2001.
220. "Economic Opportunities for Merchant Power Development in the South." Presentation before the Southern Governor's Association/Southern State Energy Board Meetings. Lexington, KY. September 9, 2001.
221. "The Changing Nature of the Electric Power Business in Louisiana." Presentation before the Louisiana Department of Environmental Quality. Baton Rouge, LA, August 27, 2001.
222. "Power Business in Louisiana: Background and Issues." Presentation before the Louisiana Interagency Group on Merchant Power Development. Baton Rouge, LA, July 16, 2001.
223. "The Changing Nature of the Electric Power Business in Louisiana: Background and Issues." Presentation before the Louisiana Office of the Governor. Baton Rouge, LA, July 16, 2001.
224. "The Changing Nature of the Electric Power Business in Louisiana: Background and Issues." Presentation before the Louisiana Department of Economic Development. Baton Rouge, LA, July 3, 2001.
225. "The Economic Impacts of Merchant Power Plant Development In Mississippi." Presentation before the Mississippi Public Service Commission. Jackson, Mississippi, March 20, 2001.
226. "Energy Conservation and Electric Restructuring." With Ritchie D. Priddy. Presentation before the Louisiana Department of Natural Resources. Baton Rouge, Louisiana, October 23, 2000.
227. "Pricing and Regulatory Issues Associated with Distributed Energy." Joint Conference by Econ One Research, Inc., the Louisiana State University Distributed Energy Resources Initiative, and the University of Houston Energy Institute: "Is the Window Closing for Distributed Energy?" Houston, Texas, October 13, 2000.
228. "Electric Reliability and Merchant Power Development Issues." Technical Meetings of the Louisiana Public Service Commission. Baton Rouge, LA. August 29, 2000.

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229. "A Introduction to Distributed Energy Resources." Summer Meetings, Southeastern Association of Regulatory Utility Commissioners (SEARUC). New Orleans, LA. June 27, 2000.
230. Roundtable Moderator/Discussant. Mid-South Electric Reliability Summit. U.S. Department of Energy. New Orleans, Louisiana. April 24, 2000.
231. "Electricity 101: Definitions, Precedents, and Issues." Energy Council's 2000 Federal Energy and Environmental Matters Conference. Loews L'Enfant Plaza Hotel, Washington, D.C. March 11-13, 2000.
232. "LSU/CES Distributed Energy Resources Initiatives." Los Alamos National Laboratories. Office of Energy and Sustainable Systems. Los Alamos, New Mexico. February 16, 2000.
233. "Distributed Energy Resources Initiatives." Louisiana State University, Center for Energy Studies Industry Associates Meeting. Baton Rouge, Louisiana. December 15, 1999.
234. "Merchant Power Opportunities in Louisiana." Louisiana Mid-Continent Oil and Gas Association (LMOGA) Power Generation Committee Meetings. Baton Rouge, Louisiana. November 10, 1999.
235. Roundtable Discussant. "Environmental Regulation in a Restructured Market" The Big E: How to Successfully Manage the Environment in the Era of Competitive Energy. PUR Conference. New Orleans, Louisiana. May 24, 1999.
236. "The Political Economy of Electric Restructuring In the South" Southeastern Electric Exchange, Rate Section Annual Conference. New Orleans, Louisiana. May 7, 1999.
237. "The Dynamics of Electric Restructuring in Louisiana." Joint Meeting of the American Association of Energy Engineers and the International Association of Facilities Managers. Metairie, Louisiana. April 29, 1999.
238. "The Implications of Electric Restructuring on Independent Oil and Gas Operations." Petroleum Technology Transfer Council Workshop: Electrical Power Cost Reduction Methods in Oil and Gas Field Operations. Lafayette, Louisiana, March 24, 1999.
239. "What's Happened to Electricity Restructuring in Louisiana?" Louisiana State University, Center for Energy Studies Industry Associates Meeting. March 22, 1999.
240. "A Short Course on Electric Restructuring." Central Louisiana Electric Company. Sales and Marketing Division. Mandeville, Louisiana, October 22, 1998.
241. "The Implications of Electric Restructuring on Independent Oil and Gas Operations." Petroleum Technology Transfer Council Workshop: Electrical Power Cost Reduction Methods in Oil and Gas Field Operations. Shreveport, Louisiana, October 13, 1998.
242. "How Will Utility Deregulation Affect Tourism." Louisiana Travel Promotion Association Annual Meeting, Alexandria, Louisiana. January 15, 1998.
243. "Reflections and Predictions on Electric Utility Restructuring in Louisiana." With Fred I. Denny. Louisiana State University, Center for Energy Studies Industry Associates Meeting. November 20, 1997.
244. "Electric Utility Restructuring in Louisiana." Hammond Chamber of Commerce, Hammond, Louisiana. October 30, 1997.

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245. "Electric Utility Restructuring." Louisiana Association of Energy Engineers. Baton Rouge, Louisiana. September 11, 1997.
246. "Electric Utility Restructuring: Issues and Trends for Louisiana." Opelousas Chamber of Commerce, Opelousas, Louisiana. June 24, 1997.
247. "The Electric Utility Restructuring Debate In Louisiana: An Overview of the Issues." Annual Conference of the Public Affairs Research Council of Louisiana. Baton Rouge, Louisiana. March 25, 1997.
248. "Electric Restructuring: Louisiana Issues and Outlook for 1997." Louisiana State University, Center for Energy Studies Industry Associates Meeting, Baton Rouge, Louisiana, January 15, 1997.
249. "Restructuring the Electric Utility Industry." Louisiana Propane Gas Association Annual Meeting, Alexandria, Louisiana, December 12, 1996.
250. "Deregulating the Electric Utility Industry." Eighth Annual Economic Development Summit, Baton Rouge, Louisiana, November 21, 1996.
251. "Electric Utility Restructuring in Louisiana." Jennings Rotary Club, Jennings, Louisiana, November 19, 1996.
252. "Electric Utility Restructuring in Louisiana." Entergy Services, Transmission and Distribution Division, Energy Centre, New Orleans, Louisiana, September 12, 1996.
253. "Electric Utility Restructuring" Louisiana Electric Cooperative Association, Baton Rouge, Louisiana, August 27, 1996.
254. "Electric Utility Restructuring -- Background and Overview." Louisiana Public Service Commission, Baton Rouge, Louisiana, August 14, 1996.
255. "Electric Utility Restructuring." Sunshine Rotary Club Meetings, Baton Rouge, Louisiana, August 8, 1996.
256. Roundtable Moderator, "Stakeholder Perspectives on Electric Utility Stranded Costs." Louisiana State University, Center for Energy Studies Seminar on Electric Utility Restructuring in Louisiana, Baton Rouge, May 29, 1996.
257. Panelist, "Deregulation and Competition." American Nuclear Society: Second Annual Joint Louisiana and Mississippi Section Meetings, Baton Rouge, Louisiana, April 20, 1996.

EXPERT WITNESS, LEGISLATIVE, AND PUBLIC TESTIMONY; EXPERT REPORTS, RECOMMENDATIONS, AND AFFIDAVITS

1. Expert Testimony. Docket No. 16-036-FR. (2019). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filings of Entergy Arkansas, Inc., Pursuant to APSC Docket No. 15-015-U*. Issues: rate design, reliability, and formula rate plan.
2. Expert Testimony. Docket No. 19-019-U. (2019). Before the Arkansas Public Service Commission. *In the Matter of the Petition of Entergy Arkansas, LLC for Approval of a Build-Own-Transfer Arrangement for a Renewable Resource and for all other Related Approvals*. Issues: Solar project approval, ratepayer risk, cost allocation.

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3. Expert Testimony. Docket No. 17-010-FR. (2019). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filings of Centerpoint Energy Resources Corp. D/B/A Centerpoint Energy Arkansas Gas Pursuant to APSC Docket No. 15-098-U*. Issues: retail rates, leak analysis, revenue deficiency, investments.
4. Expert Testimony. Case No. U-20471. (2019). Before the Michigan Public Service Commission. *In the matter of the Application of DTE Electric Company for approval of its Integrated Resource Plan pursuant to MCL 460.6t, and for other relief*. Issues: load forecasting, least-cost system planning.
5. Expert Report. Docket No. 18-004422. (2019). Before the State of Florida Division of Administrative Hearings. *Peoples Gas System vs. South Sumter Gas Company, LLC and the City of Leesburg*. Issues: retail rates, customer growth, sales trends and forecasts, policy, cost of service, socio-economic trends and forecasts.
6. Expert Testimony. Docket Nos. GO18101112 and EO18101113. (2019). Before the New Jersey Board of Public Utilities. *In the Matter of the Public Service Electric and Gas Company for Approval of its Clean Energy Future-Energy Efficiency ("CEF-EE") Program on a Regulated Basis*. Issues: economic impact, cost benefit analysis, decoupling mechanisms.
7. Expert Testimony. Docket Nos. EO18060629 and GO18060630. (2019). Before the New Jersey Board of Public Utilities. *In the Matter of the Public Service Electric and Gas Company for Approval of the Second Energy Strong Program (Energy Strong II)*. Issues: economic impact, cost benefit analysis, infrastructure replacement, cost recovery tracker mechanisms.
8. Expert Report. Docket No. 2011-AD-2. (2019). On Behalf of the Mississippi Public Service Commission. *Order Establishing Docket to Investigate the Development and Implementation of Net Metering Programs and Standards*. Issues: Net-metering, distributed generation.
9. Expert Testimony. Docket No. D2018.2.12. (2018). Before the Public Service Commission of the State of Montana. *In the Matter of NorthWestern Energy's Application for Authority to Increase Retail Electric Utility Service Rates and for Approval of Electric Service Schedules and Rules and Allocated Cost of Service and Rate Design*. Issues: Net-metering, cost of service, revenue distribution, rate design.
10. Expert Testimony. Docket No. 19-SEPE-054-MER. (2018). Before the Kansas Corporation Commission. *In the Matter of the Joint Application of Sunflower Electric Power Corporation and Mid-Kansas Electric Company, Inc. for an Order Approving the Merger of Mid-Kansas Electric Company, Inc. into Sunflower Electric Power Corporation*. Issues: merger impacts, rates, tariffs.
11. Expert Testimony. Docket No. 18-046-FR. (2018). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filings of Oklahoma Gas and Electric Company Pursuant to APSC Docket No. 16-052-U*. Issues: formula rate plan, plant investment and expenses benchmarking analysis, reliability.
12. Expert Testimony. Docket No. 16-036-FR. (2018). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filings of Entergy Arkansas, Inc., Pursuant to APSC Docket No. 15-015-U*. Issues: rate design, reliability, and formula rate plan.

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13. Expert Testimony. Docket No. 2017-AD-0112. (2018). Before the Mississippi Public Service Commission. *In Re: Encouraging Stipulation of Matters in Connection with the Kemper County IGCC Project*. Issues: cost of service and rate design.
14. Expert Affidavit. Docket No. 87011-E. (2018). Before the 16th Judicial District Court Parish of St. Martin State of Louisiana. *Bayou Bridge Pipeline, LLC versus 38.00 Acres, More or Less, Located in St. Martin Parish; Barry Scott Carline, et al.* Issues: economic impacts.
15. Expert Testimony. Docket No. QO18080843. (2018). Before the New Jersey Board of Public Utilities. *In the Matter of the Petition of Nautilus Offshore Wind, LLC for the Approval of the State Waters Wind Project and Authorizing Offshore Wind Renewable Energy Certificates*. Issues: regulatory policy and cost-benefit analyses.
16. Expert Testimony. Docket No. ER18010029 and GR18010030. (2018). Before the New Jersey Board of Public Utilities. *In the Matter of the Petition of Public Service Electric and Gas Company for Approval of an Increase in Electric and Gas Rates and for Changes in the Tariffs for Electric and Gas Service, B.P.U.N.J. No. 16 Electric and B.P.U.N.J. No. 16 Gas, and for Changes in Depreciation Rates, Pursuant to N.J.S.A. 48:2-18, N.J.S.A. 48:2-21 and N.J.S.A. 48:2-21.1, and for Other Appropriate Relief*. Issues: rate proposal, revenue decoupling, regulatory policy, cost benchmarking.
17. Expert Testimony. Docket No. T-34695. (2018). Before the Louisiana Public Service Commission. *In re: Application for a rate increase on service originating at Grand isle and termination at St. James for Crude Petroleum as currently outlined in LPSC Tariff No. 75.2*. Issues: cost of service, rate design, and alternative regulation.
18. Expert Testimony. Docket No. 17-071-U. (2018). Before the Arkansas Public Service Commission. *In the Matter of the Application of Black Hills Energy Arkansas, Inc. for Approval of a General Change in Rates and Tariffs*. Issues: cost of service, rate design, billing determinates.
19. Expert Testimony. Docket No. 17-010-FR. (2018). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filing of CenterPoint Energy Resources Corp. D/B/A CenterPoint Energy Arkansas Gas Pursuant to APSC Docket No. 15-098-U*. Issues: cost of service, rate design, alternative regulation, formula rate plan.
20. Expert Testimony. Case No. PU-17-398. (2018). Before the North Dakota Public Service Commission. *In the Matter of the Application of Otter Tail Power Company for Authority to Increase Rates for Electric Utility Service in North Dakota*. Issues: cost of service, marginal cost of service, and rate design.
21. Expert Testimony. Docket No. 20170179-GU. (2018). Before the Florida Public Service Commission. *In re: Petition for rate increase and approval of depreciation study by Florida City Gas*. On Behalf of the Citizens of the State of Florida. Issues: policy issues concerning long-term gas capacity procurement.
22. Expert Testimony. Docket No. 18-KCPE-095-MER. (2018). Before the Kansas Corporation Commission. *In the Matter of the Joint Application of Great Plains Energy Incorporated, Kansas City Power & Light Company, and Westar Energy, Inc. for Approval of the Merger of Westar, Inc. and Great Plains Energy Incorporated*. On the Behalf of the Kansas Electric Power Cooperative, Inc. Issues: merger/acquisition policy, financial risk, and ring-fencing.
23. Expert Testimony. Docket No. GR17070776. (2018). Before the New Jersey Board of

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- Public Utilities. In the Matter of the Petition of Public Service Electric and Gas Company for Approval of the Next Phase of the Gas System Modernization Program and Associated Cost Recovery Mechanism ("GSMP II"). Issues: economic impact, infrastructure replacement program rider, pipeline replacement, leak rate comparisons and cost benefit analysis.
24. Expert Affidavit. Case No. 18-489. (2018). Before the Civil District Court for the Parish of Orleans, State of Louisiana. *Bayou Bridge Pipeline, LLC versus The White Castle Lumber and Shingle Company Limited and Jeanerette Lumber & Shingle CO. L.L.C.* Issues: economic impact of crude oil pipeline development.
 25. Expert Testimony. Docket No. 16-036-FR. (2017). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filings of Entergy Arkansas, Inc., Pursuant to APSC Docket No. 15-015-U.* On behalf of the Office of the Arkansas Attorney General Leslie Rutledge. Issue: cost of service, rate design, alternative regulation, formula rate plan.
 26. Expert Testimony. Docket No. 2017-AD-0112. (2017). Before the Mississippi Public Service Commission. *In re: Encouraging Stipulation of Matters in Connection with the Kemper County IGCC Project.* On Behalf of the Mississippi Public Utilities Staff. Issues: financial analysis, rates and cost trends, economic impacts of proposal.
 27. Expert Testimony. Case No. 2017-00179. (2017). Before the Public Service Commission, Commonwealth of Kentucky. *Electronic Application of Kentucky power Company For (1) A General Adjustment of Its Rates for Electric Service; (2) An Order Approving Its 2017 Environmental Compliance Plan; (3) An Order Approving Its Tariffs and Riders; (4) An Order Approving Accounting Practices to Establish a Regulatory Asset or Liability Related to the Big Sandy 1 Operation Rider; and (5) An Order Granting All Other Required Approvals and Relief.* Issues: rate design, revenue allocation, economic development.
 28. Expert Testimony. Docket No. 17-010-FR. (2017). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filing of CenterPoint Energy Resources Corp. D/B/A CenterPoint Energy Arkansas Gas Pursuant to APSC Docket No. 15-098-U.* Issues: cost of service, rate design, alternative regulation, formula rate plan.
 29. Expert Testimony. Formal Case No. 1142. (2017). Before the Public Service Commission of the District of Columbia. *In the Matter of the Merger of AltaGas Ltd. and WGL Holdings, Inc.* On Behalf of the Office of the People's Counsel. Issues: merger/acquisition policy, financial risk, ring-fencing, and reliability.
 30. Expert Testimony. D.P.U. 17-05. (2017). Before the Massachusetts Department of Public Utilities. *Petition of NSTAR Electric Company and Western Massachusetts Electric Company each d/b/a Eversource Energy for Approval of an Increase in Base Distribution Rates for Electric Service Pursuant to G.L. c. 164, § 94 and 220 C.M.R. § 5.00.* On Behalf of the Massachusetts Office of the Attorney General Office of Ratepayer Advocacy. Issues: performance-based ratemaking, multi-factor productivity estimation.
 31. Deposition and Testimony. (2017) Before the Nebraska Section 70, Article 13 Arbitration Panel. *Northeast Nebraska Public Power District, City of South Sioux City Nebraska; City of Wayne, Nebraska; City of Valentine, Nebraska; City of Beatrice, Nebraska; City of Scribner, Nebraska; Village of Walthill, Nebraska, vs. Nebraska Public Power District.* On the Behalf of Baird Holm LLP for the Plaintiffs. Issues: rate discounts; cost of service; utility regulation, economic harm.

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32. Expert Testimony. Docket No. 16-052-U. (2017). Before the Arkansas Public Service Commission. *In the Matter of the Application of the Oklahoma Gas and Electric Company for Approval of a General Change in Rates, Charges and Tariffs*. On the Behalf of the Office of Arkansas Attorney General Leslie Rutledge. Issues: cost of service, rate design, alternative regulation, formula rate plan.
33. Expert Testimony. Docket No. 16-KCPE-593-ACQ. (2016). Before the Kansas Corporation Commission. *In the Matter of the Joint Application of Great Plains Energy Incorporated, Kansas City Power & Light Company, and Westar Energy, Inc. for Approval of the Acquisition of Westar, Inc. by Great Plains Energy Incorporated*. On the Behalf of the Kansas Electric Power Cooperative, Inc. Issues: merger/acquisition policy, financial risk, and ring-fencing.
34. Expert Testimony. Formal Case No. 1139. (2016). Before the Public Service Commission of the District of Columbia. *In the Matter of the Application of Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service*. On the Behalf of the Office of the People's Counsel for the District of Columbia. Issues: cost of service, rate design, alternative regulation.
35. Expert Affidavit. Docket No. CP15-558-000 (2016). Before the United States of America Federal Energy Regulatory Commission. *PennEast Pipeline Company, LLC*. Affidavit and Reply Affidavit. On the Behalf of the New Jersey Division of Rate Counsel. Issues: pipeline capacity, peak day requirements.
36. Expert Testimony. Docket No. RPU-2016-0002. (2016). Before the Iowa Utilities Board. *In re: Iowa American Water Company application for revision of rates*. On behalf of the Citizens of the State of Florida. Issue: revenue stabilization mechanism, revenue decoupling.
37. Expert Testimony. Docket No. 15-015-U. (2016). Before the Arkansas Public Service Commission. *In the Matter of the Formula Rate Plan Filings of Entergy Arkansas, Inc., Pursuant to APSC Docket No. 15-015-U*. On behalf of the Office of the Arkansas Attorney General Leslie Rutledge. Issue: formula rate plan evaluation.
38. Expert Testimony. Docket Nos. 160021-EI, 160061-EI, 160062-EI, and 160088-EI. (2016). Before the Florida Public Service Commission. *In re: Petition for rate increase by Florida Power & Light Company (consolidated)*. On behalf of the Office of Consumer Advocate, Iowa Department of Justice. Issue: load forecasting.
39. Expert Testimony. Docket Nos. 160021-EI, 160061-EI, 160062-EI, and 160088-EI. (2016). Before the Florida Public Service Commission. *In re: Petition for rate increase by Florida Power & Light Company (consolidated)*. On behalf of the Citizens of the State of Florida. Issue: off-system sales incentives.
40. Expert Testimony. Project No. 5-103. (2016). United States of America Federal Energy Regulatory Commission. *Confederated Salish and Kootenai Tribes Energy Keepers, Incorporated*. On behalf of the Flathead, Mission, and Jocko Valley Irrigation Districts and the Flathead Joint Board of Control of the Flathead, Mission, and Jocko Valley Irrigation Districts.
41. Expert Testimony. Docket No. 15-098-U. (2016). Before the Arkansas Public Service Commission. *In the Matter of the Application of CenterPoint Energy Resources Corp. d/b/a CenterPoint Energy Arkansas Gas for a General Change or Modification in its Rates*,

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- Charges and Tariffs.* On behalf of the Office of the Arkansas Attorney General. Issues: formula rate plan, cost of service and rate design.
42. Expert Testimony. BPU Docket No. GM15101196. (2016). *In the Matter of the Merger of Southern Company and AGL Resources, Inc.* On behalf of the New Jersey Division of Rate Counsel. Issues: merger standards of review, customer dividend contributions, synergy savings and costs to achieve, ratemaking treatment of merger-related costs.
 43. Expert Testimony. Docket No. 15-078-U. (2015). Before the Arkansas Public Service Commission. *In the Matter of the Joint Application of SourceGas Inc., SourceGas LLC, SourceGas Holdings LLC and Black Hills Utility Holdings, Inc. for all Necessary Authorizations and Approvals for Black Hills Utility Holdings, Inc. to Acquire SourceGas Holdings LLC.* On behalf of the Office of the Arkansas Attorney General. Issues: public policy and regulatory policy associated with the acquisition.
 44. Expert Testimony. Docket No. 15-031-U. (2015). Before the Arkansas Public Service Commission. *In the Matter of the Application of SourceGas Arkansas Inc. for an Order Approving the Acquisition of Certain Storage Facilities and the Recovery of Investments and Expenses Associated Therewith.* On behalf of the Office of the Arkansas Attorney General. Issues: cost-benefit analysis, transmission cost analysis, and a due diligence analysis.
 45. Expert Testimony. Docket No. 15-015-U. (2015). Before the Arkansas Public Service Commission. *In the Matter of the Application of Entergy Arkansas, Inc. for Approval of Changes in Rates for Retail Electric Service.* On behalf of the Office of the Arkansas Attorney General. Issues: economic development riders and production plant cost allocation.
 46. Expert Testimony. Docket No. 7970. (2015). Before the Vermont Public Service Board. *Petition of Vermont Gas Systems, Inc., for a certificate of public good pursuant to 30 V.S.A. § 248, authorizing the construction of the "Addison Natural Gas Project" consisting of approximately 43 miles of new natural gas transmission pipeline in Chittenden and Addison Counties, approximately 5 miles of new distribution mainlines in Addison County, together with three new gate stations in Williston, New Haven, and Middlebury, Vermont.* On behalf of AARP-Vermont. Issues: net economic benefits of proposed natural gas transmission project.
 47. Expert Testimony. File No. ER-2014-0370 (2015). Before the Public Service Commission of the State of Missouri. *In the Matter of Kansas City Power & Light Company for Authority Implement A General Rate Increase for Electric Service.* On behalf of the Missouri Office of the People's Counsel. Issues: customer charges, rate design, revenue distribution, class cost of service, and policy and ratemaking considerations in connection with electric vehicle charging stations.
 48. Expert Testimony. File No. ER-2014-0351 (2015). Before the Public Service Commission of the State of Missouri. *In the Matter of The Empire District Electric Company for Authority To File Tariffs Increasing Rates for Electric Service Provided to Customers In the Company's Missouri Service Area.* On behalf of the Missouri Office of the People's Counsel. Issues: customer charges, rate design, revenue distribution, and class cost of service.
 49. Expert Testimony. D.P.U. 14-130 (2015). Before the Massachusetts Department of Public Utilities. *Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil for approval by*

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- the Department of Public Utilities of the Company's 2015 Gas System Enhancement Program Plan, pursuant to G.L. c. 164, § 145, and for rates effective May 1, 2015. On behalf of the Attorney General's Office. Issues: ratepayer protections, cost allocations, rate design, performance metrics.*
50. Expert Testimony. D.P.U. 14-131 (2015). Before the Massachusetts Department of Public Utilities. *Petition of The Berkshire Gas Company for approval by the Department of Public Utilities of the Company's Gas System Enhancement Program Plan for 2015, pursuant to G.L. c. 164, § 145, and for rates effective May 1, 2015. On behalf of the Attorney General's Office. Issues: ratepayer protections, cost allocations, rate design, performance metrics.*
 51. Expert Testimony. D.P.U. 14-132 (2015). Before the Massachusetts Department of Public Utilities. *Petition of Boston Gas Company and Colonial Gas Company d/b/a National Grid for approval by the Department of Public Utilities of the Companies' Gas System Enhancement Program for 2015, pursuant to G.L. c. 164, § 145, and for rates effective May 1, 2015. On behalf of the Attorney General's Office. Issues: ratepayer protections, cost allocations, rate design, performance metrics.*
 52. Expert Testimony. D.P.U. 14-133 (2015). Before the Massachusetts Department of Public Utilities. *Petition of Liberty Utilities for approval by the Department of Public Utilities of the Company's Gas System Enhancement Program Plan for 2015, pursuant to G.L. c. 164, § 145, and for rates effective May 1, 2015. On behalf of the Attorney General's Office. Issues: ratepayer protections, cost allocations, rate design, performance metrics.*
 53. Expert Testimony. D.P.U. 14-134 (2015). Before the Massachusetts Department of Public Utilities. *Petition of Bay State Gas Company d/b/a Columbia Gas of Massachusetts for approval by the Department of Public Utilities of the Company's Gas System Enhancement Program Plan for 2015, pursuant to G.L. c. 164, § 145, and for rates to be effective May 1, 2015. On behalf of the Attorney General's Office. Issues: ratepayer protections, cost allocations, rate design, performance metrics.*
 54. Expert Testimony. D.P.U. 14-135 (2015). Before the Massachusetts Department of Public Utilities. *Petition of NSTAR Gas Company for approval by the Department of Public Utilities of the Company's Gas System Enhancement Program Plan for 2015, pursuant to G.L. c. 164, § 145, and for rates to be effective May 1, 2015. On behalf of the Attorney General's Office. Issues: ratepayer protections, cost allocations, rate design, performance metrics.*
 55. Expert Report. Docket No. X-33192 (2015). Before the Louisiana Public Service Commission. *Examination of the Comprehensive Costs and Benefits of Net Metering in Louisiana. On behalf of the Louisiana Public Service Commission. Issues: cost-benefit, cost of service, rate impact.*
 56. Expert Testimony. F.C. 1119 (2014). Before the District of Columbia Public Service Commission. *In the Matter of the Merger of Exelon Corporation, Pepco Holdings, Inc., Potomac Electric Power Company, Exelon Energy Delivery Company, LLC, and new Special Purpose Entity, LLC. On behalf of the Office of the People's Counsel. Issues: economic impact analysis, reliability, consumer investment fund, regulatory oversight, impacts to competitive electricity markets.*
 57. Expert Report. Civil Action 1:08-cv-0046 (2014). Before the U.S. District Court for the Southern District of Ohio. *Anthony Williams, et al., v. Duke Energy International, Inc., et al. On behalf of Markovits, Stock & DeMarco, Attorneys & Counselors at Law. Issues:*

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public utility regulation, electric power markets, economic harm.

58. Expert Testimony. D.P.U. 14-64 (2014). Before the Massachusetts Department of Public Utilities. *NSTAR Gas Company/HOPCO Gas Services Agreement. On behalf of the Office of the Public Advocate.* Issues: certain ratemaking features associated with the proposed Gas Service Agreement.
59. Expert Testimony. Docket Nos. 14-0224 and 14-0225 (2014). Before the Illinois Commerce Commission. *In the Matter of the Peoples Gas Light and Coke Company and North Shore Gas Company Proposed General Increase in Rates for Gas Service (consolidated).* On behalf of the People of the State of Illinois. Issues: test year expenses, cost benchmarking analysis, pipeline replacement, and leak rate comparisons.
60. Expert Testimony. Docket 8191 (2014). Before the Vermont Public Service Board. *In Re: Petition of Green Mountain Power Corporation for Approval of a Successor Alternative Regulation Plan.* On the behalf of AARP-Vermont. Issues: Alternative Regulation.
61. Expert Testimony. Docket No. 2013-00168 (2014). Before the Maine Public Utilities Commission. *In the Matter of the Request for Approval of an Alternative Rate Plan (ARP 2014) Pertaining to Central Maine Power Company.* On behalf of the Office of the Public Advocate. Issues: class cost of service study, marginal cost of service study, revenue distribution and rate design.
62. Expert Testimony. D.P.U. 13-90 (2013). Before the Massachusetts Department of Public Utilities. *Petition of Fitchburg Gas and Electric Light Company (Electric Division) d/b/a Unitil to the Department of Public Utilities for approval of the rates and charges and increase in base distribution rates for electric service.* On behalf of the Office of the Ratepayer Advocate. Issues: capital cost adjustment mechanism and performance-based regulation.
63. Expert Testimony. BPU Docket Nos. EO13020155 and GO13020156. (2013). Before the State of New Jersey Board of Public Utilities. *I/M/O The Petition of Public Service Electric & Gas Company for the Approval of the Energy Strong Program.* On behalf of the Division of Rate Counsel. Issues: economic impact, infrastructure replacement program rider, pipeline replacement, leak rate comparisons and cost benefit analysis.
64. Expert Testimony. D.P.U. 13-75 (2013). Before the Massachusetts Department of Public Utilities. *Investigation by the Department of Public Utilities on its Own Motion as to the Propriety of the Rates and Charges by Bay State Gas Company d/b/a Columbia Gas of Massachusetts set forth in Tariffs M.D.P.U. Nos. 140 through 173, and Approval of an Increase in Base Distribution Rates for Gas Service Pursuant to G.L. c. 164, § 94 and 220 C.M.R. § 5.00 et seq., filed with the Department on April 16, 2013, to be effective May 1, 2013.* On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Issues: Target infrastructure replacement program rider, pipeline replacement, and leak rate comparisons; environmental benefits analysis; O&M offset; and cost benchmarking analysis.
65. Expert Testimony. Docket No. 13-115 (2013). Before the Delaware Public Service Commission. *In the Matter of the Application of Delmarva Power & Light Company FOR an Increase in Electric Base Rates and Miscellaneous Tariff Changes* (Filed March 22, 2013). On the Behalf of Division of the Public Advocate. Issues: pro forma infrastructure proposal, class cost of service study, revenue distribution, and rate design.

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66. Expert Testimony. Formal Case No. 1103 (2013). Before the Public Service Commission of the District of Columbia. *In the Matter of the Application of the Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service*. On the Behalf of the Office of the People's Counsel of the District of Columbia. Issues: Pro forma adjustment for reliability investments.
67. Expert Testimony. Case No. 9326 (2013). Before the Public Service Commission of Maryland. *In the Matter of the Application of Baltimore Gas and Electric Company for Adjustments to its Electric and Gas Base Rates*. On the Behalf of the Maryland Office of the People's Counsel. Issues: Electric Reliability Investment ("ERI") initiatives, pro forma gas infrastructure proposal, tracker mechanisms, class cost of service study, revenue distribution, and rate design
68. Rulemaking Testimony. (2013). Before the Louisiana Tax Commission. Examination of Louisiana Assessors' Association Well Diameter Analysis, economic development policies regarding midstream assets and industrial development.
69. Expert Testimony. Case No. 9317 (2013). Before the Public Service Commission of Maryland. *In the Matter of the Application of Delmarva Power & Light Company for Adjustments to its Retail Rates for the Distribution of Electric Energy*. Direct, and Surrebuttal. On the Behalf of the Maryland Office of the People's Counsel. Issues: Grid Resiliency Charge, tracker mechanisms, pipeline replacement, class cost of service study, revenue distribution, and rate design.
70. Expert Testimony. Case No. 9311 (2013). Before the Public Service Commission of Maryland. *In the Matter of the Application of Potomac Electric Power Company for an Increase in its Retail Rates for the Distribution of Electric Energy*. Direct, and Surrebuttal. On the Behalf of the Maryland Office of the People's Counsel. Issues: Grid Resiliency Charge, tracker mechanisms, pipeline replacement, class cost of service study, revenue distribution, and rate design.
71. Expert Testimony. Docket No. 12AL-1268G (2013). Before the Public Utilities Commission of the State of Colorado. *In the Matter of the Tariff Sheets Filed by Public Service Company of Colorado with Advice No. 830 – Gas. Answer*. On the Behalf of the Colorado Office of Consumer Counsel. Issues: Pipeline System Integrity Adjustment, tracker mechanisms, pipeline replacement and leak rate comparisons.
72. Expert Testimony. BPU Docket No. EO12080721 (2013). Before the New Jersey Board of Public Utilities. *In the Matter of the Public Service Electric & Gas Company for Approval of an Extension of Solar Generation Program*. On the Behalf of the New Jersey Division of Rate Counsel. Direct, Rebuttal, Surrebuttal. Issues: solar energy market design, solar energy market conditions, solar energy program design and net economic benefits.
73. Expert Testimony. BPU Docket No. EO12080726 (2013). Before the New Jersey Board of Public Utilities. *In the Matter of the Petition of Public Service Electric & Gas Company for Approval of a Solar Loan III Program*. On the Behalf of the New Jersey Division of Rate Counsel. Direct, Rebuttal and Surrebuttal. Issues: solar energy market design, solar energy market conditions, solar energy program design.
74. Expert Testimony. BPU Docket No. EO11050314V. (2012). Before the New Jersey Board of Public Utilities. *In the Matter of the Petition of Fishermen's Atlantic City Windfarm, LLC for the Approval of the State Waters Project and Authorizing Offshore Wind Renewable Energy Certificates*. On the Behalf of the New Jersey Division of Rate

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- Counsel. December 17, 2012. Issues: approval of offshore wind project and ratepayer financial support for the proposed project.
75. Expert Testimony. D.P.U. 12-25. (2012). Before the Massachusetts Department of Public Utilities. *In the Matter of Bay State Gas Company d/b/a/ Columbia Gas Company of Massachusetts Request for Increase in Rates*. On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Issues: Target infrastructure replacement program rider, pipeline replacement and leak rate comparisons.
 76. Expert Testimony. Docket Nos. UE-120436, et.al. (consolidated). (2012). Before the Washington Utilities and Transportation Commission. *Washington Utilities and Transportation Commission v. Avista Corporation D/B/A Avista Utilities*. On the Behalf of the Washington Attorney General, Office of the Public Counsel. Issues: Revenue Decoupling, lost revenues, tracker mechanisms, attrition adjustments.
 77. Expert Testimony. Case No. 9286. (2012) Before the Public Service Commission of Maryland. *In Re: Potomac Electric Power Company ("Pepco") General Rate Case*. On the Behalf of the Maryland Office of the People's Counsel. Issues: Capital tracker mechanisms/reliability investment mechanisms, reliability issues, regulatory lag, class cost of service, revenue distribution, rate design.
 78. Expert Testimony. Case No 9285. (2012) Before the Public Service Commission of Maryland. *In Re: the Delmarva Power and Light Company General Rate Case*. On the Behalf of the Maryland Office of the People's Counsel. Issues: Capital tracker mechanisms/reliability investment mechanisms, reliability issues, regulatory lag, class cost of service, revenue distribution, rate design.
 79. Expert Testimony. Docket Nos. UE-110876 and UG-110877 (consolidated). (2012). Before the Washington Utilities and Transportation Commission. *Washington Utilities and Transportation Commission v. Avista Corporation D/B/A Avista Utilities*. On the Behalf of the Washington Attorney General, Office of the Public Counsel. Issues: Revenue Decoupling, lost revenues, tracker mechanisms.
 80. Expert Testimony. BPU Docket No. EO11050314V. (2012). Before the New Jersey Board of Public Utilities. *In the Matter of the Petition of Fishermen's Atlantic City Windfarm, LLC for the Approval of the State Waters Project and Authorizing Offshore Wind Renewable Energy Certificates*. On the Behalf of the New Jersey Division of Rate Counsel. February 3, 2012. Issues: approval of offshore wind project and ratepayer financial support for the proposed project.
 81. Expert Testimony. Docket No. NG 0067. (2012). Before the Public Service Commission of Nebraska. *In the Matter of the Application of SourceGas Distribution, LLC Approval of a General Rate Increase*. On the Behalf of the Public Advocate. January 31, 2012. Issues: Revenue Decoupling, Customer Adjustments, Weather Normalization Adjustments, Class Cost of Service Study, Rate Design.
 82. Expert Testimony. Docket No. G-04204A-11-0158. (2011). Before the Arizona Corporation Commission. On the Behalf of the Arizona Corporation Commission Staff. *In the Matter of the Application of UNS Gas, Inc. for the Establishment of Just and Reasonable Rates and Charges Designed to Realize a Reasonable Rate of Return on the Fair Value of Its Arizona Properties*. Issues: Revenue Decoupling; Class Cost of Service Modeling; Revenue Distribution; Rate Design.

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83. Expert Testimony. Formal Case Number 1087. (2011). Before the Public Service Commission of the District of Columbia. On the Behalf of the Office of the People's Counsel of the District of Columbia. *In the Matter of the Application of Potomac Electric Power Company for Authority to Increase Existing Retail Rates and Charges for Electric Distribution Service*. Issues: Regulatory lag, ratemaking principles, reliability-related capital expenditure tracker proposals.
84. Expert Affidavit. Case No. 11-1364. (2011). *The State of Louisiana, the Louisiana Department of Environmental Quality, and the Louisiana Public Service Commission v. United States Environmental Protection Agency and Lisa P. Jackson*. Before the United States Court of Appeals for the District of Columbia Circuit. On the behalf of the State of Louisiana, the Louisiana Department of Environmental Quality, and the Louisiana Public Service Commission. Issues: Impacts of environmental costs on electric utilities, compliance requirements, investment cost of mitigation equipment, multi-area dispatch modeling and plant retirements.
85. Expert Affidavit. Docket No. EPA-HQ-OAR-2009-0491. (2011). Before the U.S. Environmental Protection Agency. *Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals*. On the Behalf of the Louisiana Public Service Commission. Issues: Impacts of environmental costs on electric utilities, compliance requirements, investment cost of mitigation equipment, multi-area dispatch modeling and plant retirements.
86. Expert Testimony. Case No. 9296. (2011). Before the Maryland Public Service Commission. *On the Behalf of the Maryland Office of People's Counsel. In the Matter of the Application of Washington Gas Light Company for Authority to Increase Existing Rates and Charges and Revise its Terms and Conditions for Gas Service*. Issues: Infrastructure Cost Recovery Rider; Class Cost of Service Modeling; Revenue Distribution; Rate Design.
87. Expert Testimony. Docket No. G-01551A-10-0458. (2011). Before the Arizona Corporation Commission. On the Behalf of the Arizona Corporation Commission Staff. *In the Matter of the Application of Southwest Gas Corporation for the Establishment of Just and Reasonable Rates and Charges Designed to Realize A Reasonable Rate of Return on the Fair Value of its Properties throughout Arizona*. Issues: Revenue Decoupling; Class Cost of Service Modeling; Revenue Distribution; Rate Design.
88. Expert Testimony. Docket No. 11-0280 and 11-0281. (2011). Before the Illinois Commerce Commission. On the Behalf of the Illinois Attorney General, the Citizens Utility Board, and the City of Chicago, Illinois. *In re: Peoples Gas Light and Coke Company and North Shore Natural Gas Company*. Issues: Revenue Decoupling and Rate Design. (Direct and Rebuttal)
89. Expert Testimony. D.P.U. 11-01. (2011). Before the Massachusetts Department of Public Utilities. On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. *Petition of the Fitchburg Electric and Gas Company (Electric Division) for Approval of A General Increase in Electric Distribution Rates and Approval of a Revenue Decoupling Mechanism*. Issues: Capital Cost Rider, Revenue Decoupling.
90. Expert Testimony. D.P.U. 11-02. (2011). Before the Massachusetts Department of Public Utilities. On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. *Petition of the Fitchburg Electric and Gas Company (Gas Division) for Approval of A General Increase in Electric Distribution Rates and Approval of a Revenue*

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Decoupling Mechanism. Issues: Pipeline Replacement Rider, Revenue Decoupling.

91. Expert Affidavit. Docket No. EL-11-13 (2011). Before the Federal Energy Regulatory Commission. Petition for Preliminary Ruling, Atlantic Grid Operations. On the Behalf of the New Jersey Division of Rate Counsel. Issues: Offshore wind generation development, offshore wind transmission development, ratemaking treatment of development costs, transmission development incentives.
92. Expert Opinion. Case No. CI06-195. (2011). Before the District Court of Jefferson County, Nebraska. On the Behalf of the City of Fairbury, Nebraska and Michael Beachler. In re: Endicott Clay Products Co. vs. City of Fairbury, Nebraska and Michael Beachler. Issues: rate design and ratemaking, time of use and time differentiated rate structures, empirical analysis of demand and usage trends for tariff eligibility requirements.
93. Expert Testimony. D.P.U. 10-114. (2010). Before the Massachusetts Department of Public Utilities. On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Petition of the New England Gas Company for Approval of A General Increase in Electric Distribution Rates and Approval of a Revenue Decoupling Mechanism. Issues: infrastructure replacement rider.
94. Expert Testimony. D.P.U. 10-70. (2010). Before the Massachusetts Department of Public Utilities. Petition of the Western Massachusetts Electric Company for Approval of A General Increase in Electric Distribution Rates and Approval of a Revenue Decoupling Mechanism. On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Issues: Revenue decoupling; infrastructure replacement rider; performance-based regulation; inflation adjustment mechanisms; and rate design.
95. Expert Testimony. G.U.D. Nos. 998 & 9992. (2010). Before the Texas Railroad Commission. In the Matter of the Rate Case Petition of Texas Gas Services, Inc. On the Behalf of the City of El Paso, Texas. Issues: Cost of service, revenue distribution, rate design, and weather normalization.
96. Expert Testimony. B.P.U Docket No. GR10030225. (2010). Before the New Jersey Board of Public Utilities. In the Matter of the Petition of New Jersey Natural Gas Company for Approval of Regional Greenhouse Gas Initiative Programs and Associated Cost Recovery Mechanisms Pursuant to N.J.S.A. 48:3-98.1. On the Behalf of the Department of the Public Advocate, Division of Rate Counsel. Issues: solar energy proposals, solar securitization issues, solar energy policy issues.
97. Expert Testimony. D.P.U. 10-55. (2010). Before the Massachusetts Department of Public Utilities. Investigation Into the Propriety of Proposed Tariff Changes for Boston Gas Company, Essex Gas Company, and Colonial Gas Company. (d./b./a. National Grid). On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Issues: Revenue decoupling; pipeline-replacement rider; performance-based regulation; partial productivity factor estimates, inflation adjustment mechanisms; and rate design.
98. Expert Testimony. Cause No.43839. (2010). Before the Indiana Utility Regulatory Commission. In the Matter of Southern Indiana Gas and Electric Company d/b/a/ Vectren Energy Delivery of Indiana, Inc. (Vectren South-Electric). On the behalf of the Indiana Office of Utility Consumer Counselor (OUCC). Issues: revenue decoupling, variable production cost riders, gains on off-system sales, transmission cost riders.
99. Congressional Testimony. Before the United States Congress. (2010). U.S. House of

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- Representatives, Committee on Natural Resources. Hearing on the Consolidated Land, Energy, and Aquatic Resources Act. June 30, 2010.
100. Expert Testimony. Before the City Counsel of El Paso, Texas; Public Utility Regulatory Board. (2010). On the Behalf of the City of El Paso. In Re: Rate Application of Texas Gas Services, Inc. Issues: class cost of service study (minimum system and zero intercept analysis), rate design proposals, weather normalization adjustment, and its cost of service adjustment clause, conservation adjustment clause proposals, and other cost tracker policy issues.
 101. Expert Testimony. Docket 09-00183. (2010). Before the Tennessee Regulatory Authority. In the Matter of the Petition of Chattanooga Gas Company for a General Rate Increase, Implementation of the EnergySMART Conservation Programs, and Implementation of a Revenue Decoupling Mechanism. On the Behalf of Tennessee Attorney General, Consumer Advocate & Protection Division. Issues: revenue decoupling and energy efficiency program review and cost effectiveness analysis.
 102. Expert Testimony and Exhibits. Docket No. 10-240. (2010). Before the Louisiana Office of Conservation. In Re: Cadeville Gas Storage, LLC. On the Behalf of Cardinal Gas Storage, LLC. Issues: alternative uses and relative economic benefits of conversion of depleted hydrocarbon reservoir for natural gas storage purposes.
 103. Expert Testimony. Docket No. 09505-El. (2010). Before the Florida Public Service Commission. In Re: Review of Replacement Fuel Costs Associated with the February 26, 2008 outage on Florida Power & Light's Electrical System. On the Behalf of the Florida Office of Public Counsel for the Citizens of the State of Florida. Issues: Replacement costs for power outage, regulatory policy/generation development incentives, renewable and energy efficiency incentives.
 104. Expert Testimony. Docket 09-00104. (2009). Before the Tennessee Regulatory Authority. In the Matter of the Petition of Piedmont Natural Gas Company, Inc. to Implement a Margin Decoupling Tracker Rider and Related Energy Efficiency and Conservation Programs. On the Behalf of the Tennessee Attorney General, Consumer Advocate & Protection Division. Issues: revenue decoupling, energy efficiency program review, weather normalization.
 105. Expert Testimony. Docket Number NG-0060. (2009). Before the Nebraska Public Service Commission. In the Matter of SourceGas Distribution, LLC Approval for a General Rate Increase. On the Behalf of the Nebraska Public Advocate. October 29, 2009. Issues: revenue decoupling, inflation trackers, infrastructure replacement riders, customer adjustment rider, weather normalization rider, weather normalization adjustments, estimation of normal weather for ratemaking purposes.
 106. Expert Report and Deposition. Before the 23rd Judicial District Court, Parish of Assumption, State of Louisiana. On the Behalf of Dow Hydrocarbons and Resources, Inc. September 1, 2009. (Deposition, November 23-24, 2009). Issues: replacement and repair costs for underground salt cavern hydrocarbon storage.
 107. Expert Testimony. D.P.U. 09-39. Before the Massachusetts Department of Public Utilities. (2009). Investigation Into the Propriety of Proposed Tariff Changes for Massachusetts Electric Company and Nantucket Electric Company (d./b./a. National Grid). On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Issues: Revenue decoupling; infrastructure rider; performance-based regulation; inflation adjustment mechanisms; revenue distribution; and rate design.

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108. Expert Testimony. D.P.U. 09-30. Before the Massachusetts Department of Public Utilities. (2009). In the Matter of Bay State Gas Company Request for Increase in Rates. On the Behalf of the Office of the Attorney General, Office of Ratepayer Advocacy. Issues: Revenue decoupling; target infrastructure replacement program rider; revenue distribution; and rate design.
109. Expert Testimony. Docket EO09030249. (2009). Before the New Jersey Board of Public Utilities. In the Matter of the Petition of Public Service Electric and Gas Company for Approval of a Solar Loan II Program and An Associated Cost Recovery Mechanism. On the Behalf of the Department of the Public Advocate, Division of Rate Counsel. Issues: solar energy market design, renewable portfolio standards, solar energy, and renewable financing/loan program design.
110. Expert Testimony. Docket EO0920097. (2009). Before the New Jersey Board of Public Utilities. In the Matter of the Verified Petition of Rockland Electric Company for Approval of an SREC-Based Financing Program and An Associated Cost Recovery Mechanism. On the Behalf of the Department of the Public Advocate, Division of Rate Counsel. Issues: solar energy market design; renewable energy portfolio standards; solar energy.
111. Expert Rebuttal Report. Civil Action No.: 2:07-CV-2165. (2009). Before the U.S. District Court, Western Division of Louisiana, Lake Charles Division. Prepared on the Behalf of the Transcontinental Pipeline Corporation. Issues: expropriation and industrial use of property.
112. Expert Testimony. Docket EO06100744. (2008). Before the New Jersey Board of Public Utilities. In the Matter of the Renewable Portfolio Standard – Amendments to the Minimum filing Requirements for Energy Efficiency, Renewable Energy, and Conservation Programs and For Electric Distribution Company Submittals of Filings in connection with Solar Financing (Atlantic City Electric Company). On the Behalf of the Department of the Public Advocate, Division of Rate Counsel. Issues: Solar energy market design; renewable energy portfolio standards; solar energy. (Rebuttal and Surrebuttal)
113. Expert Testimony. Docket EO08090840. (2008). Before the New Jersey Board of Public Utilities. In the Matter of the Renewable Portfolio Standard – Amendments to the Minimum filing Requirements for Energy Efficiency, Renewable Energy, and Conservation Programs and For Electric Distribution Company Submittals of Filings in connection with Solar Financing (Jersey Central Power & Light Company). On the Behalf of the Department of the Public Advocate, Division of Rate Counsel. Issues: Solar energy market design; renewable energy portfolio standards; solar energy. (Rebuttal and Surrebuttal)
114. Expert Testimony. Docket UG-080546. (2008). Before the Washington Utilities and Transportation Commission. On the Behalf of the Washington Attorney General (Public Counsel Section). Issues: Rate Design, Cost of Service, Revenue Decoupling, Weather Normalization.
115. Congressional Testimony. (2008). Senate Republican Conference: Panel on Offshore Drilling in the Restricted Areas of the Outer Continental Shelf. September 18, 2008.
116. Expert Testimony. Appeal Number 2007-125 and 2007-299. (2008). Before the Louisiana Tax Commission. On the Behalf of Jefferson Island Storage and Hub, LLC (AGL Resources). Issues: Valuation Methodologies, Underground Storage Valuation, LTC Guidelines and Policies, Public Purpose of Natural Gas Storage. July 15, 2008 and August

- 20, 2008.
117. Expert Testimony. Docket Number 07-057-13. (2008). Before the Utah Public Service Commission. In the Matter of the Application of Questar Gas Company to File a General Rate Case. On the Behalf of the Utah Committee of Consumer Services. Issues: Cost of Service, Rate Design. August 18, 2008 (Direct, Rebuttal, Surrebuttal).
 118. Rulemaking Testimony. (2008). Before the Louisiana Tax Commission. Examination of Replacement Cost Tables, Depreciation and Useful Lives for Oil and Gas Properties. Chapter 9 (Oil and Gas Properties) Section. August 5, 2008.
 119. Legislative Testimony. (2008). Examination of Proposal to Change Offshore Natural Gas Severance Taxes (HB 326 and Amendments). Joint Finance and Appropriations Committee of the Alabama Legislature. March 13, 2008.
 120. Public Testimony. (2007). Issues in Environmental Regulation. Testimony before Gubernatorial Transition Committee on Environmental Regulation (Governor-Elect Bobby Jindal). December 17, 2007.
 121. Public Testimony. (2007). Trends and Issues in Alternative Energy: Opportunities for Louisiana. Testimony before Gubernatorial Transition Committee on Natural Resources (Governor-Elect Bobby Jindal). December 13, 2007.
 122. Expert Report and Recommendation: Docket Number S-30336 (2007). Before the Louisiana Public Service Commission. In re: Entergy Gulf States, Inc. Application for Approval of Advanced Metering Pilot Program. Issues: pilot program for demand response programs and advanced metering systems.
 123. Expert Testimony. Docket EO07040278 (2007). Before the New Jersey Board of Public Utilities. In the Matter of the Petition of Public Service Electric & Gas Company for Approval of a Solar Energy Program and An Associated Cost Recovery Mechanism. On the Behalf of the Department of the Public Advocate, Division of Rate Counsel. Issues: renewable energy market development, solar energy development, SREC markets, rate impact analysis, cost recovery issues.
 124. Expert Testimony: Docket Number 05-057-T01 (2007). Before the Utah Public Service Commission. In the Matter of: Joint Application of Questar Gas Company, the Division of Public Utilities, and Utah Clean Energy for Approval of the Conservation Enabling Tariff Adjustment Options and Accounting Orders. On the behalf of the Utah Committee of Consumer Services. Issues: Revenue Decoupling, Demand-side Management; Energy Efficiency policies. (Direct, Rebuttal, and Surrebuttal Testimony)
 125. Expert Testimony (Non-sworn rulemaking testimony) Docket Number RR-2008, (2007). Before the Louisiana Tax Commission. In re: Commission Consideration of Amendment and/or Adoption of Tax Commission Real/Personal Property Rules and Regulations. Issues: Louisiana oil and natural gas production trends, appropriate cost measures for wells and subsurface property, economic lives and production decline curve trends.
 126. Expert Report, Recommendation, and Proposed Rule: Docket Number R-29213 & 29213-A, ex parte, (2007). Before the Louisiana Public Service Commission. In re: Investigation to determine if it is appropriate for LPSC jurisdictional electric utilities to provide and install time-based meters and communication devices for each of their customers which enable such customers to participate in time-based pricing rate schedules and other demand response programs. On the behalf of the Louisiana Public

Appendix A

- Service Commission Staff. Report and Recommendation. Issues: demand response programs, advanced meter systems, cost recovery issues, energy efficiency issues, regulatory issues.
127. Expert Report, Recommendation, and Proposed Rule: Docket Number R-29712, ex parte, (2007) Before the Louisiana Public Service Commission. In re: Investigation into the ratemaking and generation planning implications of nuclear construction in Louisiana. On the behalf of the Louisiana Public Service Commission Staff. Report and Recommendation. Issues: nuclear cost power plant development, generation planning issues, and cost recovery issues.
 128. Expert Testimony, Case Number U-14893, (2006). Before the Michigan Public Service Commission. In the Matter of SEMCO Energy Gas Company for Authority to Redesign and Increase Its Rates for the Sale and Transportation of Natural Gas In its MPSC Division and for Other Relief. On the behalf of the Michigan Attorney General. Issues: Rate Design, revenue decoupling, financial analysis, demand-side management program and energy efficiency policy. (Direct and Rebuttal Testimony).
 129. Expert Report, Recommendation, and Proposed Rule: Docket Number R-29380, ex parte, (2006). Before the Louisiana Public Service Commission. In re: An Investigation Into the Ratemaking and Generation Planning Implications of the U.S. EPA Clean Air Interstate Rule. On the behalf of the Louisiana Public Service Commission Staff. Report and Recommendation. Issues: environmental regulation and cost recovery; allowance allocations and air credit markets; ratepayer impacts of new environmental regulations.
 130. Expert Affidavit Before the Louisiana Tax Commission (2006). On behalf of ANR Pipeline, Tennessee Gas Transmission and Southern Natural Gas Company. Issues: Competitive nature of interstate and intrastate transportation services.
 131. Expert Affidavit Before the 19th Judicial District Court (2006). Suit Number 491, 453 Section 26. On behalf of Transcontinental Pipeline Corporation, et.al. Issues: Competitive nature of interstate and intrastate transportation services.
 132. Expert Testimony: Docket Number 05-057-T01 (2006). Before the Utah Public Service Commission. In the Matter of: Joint Application of Questar Gas Company, the Division of Public Utilities, and Utah Clean Energy for Approval of the Conservation Enabling Tariff Adjustment Options and Accounting Orders. On the behalf of the Utah Committee of Consumer Services. Issues: Revenue Decoupling, Demand-side Management; Energy Efficiency policies. (Rebuttal and Supplemental Rebuttal Testimony)
 133. Legislative Testimony (2006). Senate Committee on Natural Resources. Senate Bill 655 Regarding Remediation of Oil and Gas Sites, Legacy Lawsuits, and the Deterioration of State Drilling.
 134. Expert Report: Rulemaking Docket (2005). Before the New Jersey Bureau of Public Utilities. In re: Proposed Rulemaking Changes Associated with New Jersey's Renewable Portfolio Standard. Expert Report. The Economic Impacts of New Jersey's Proposed Renewable Portfolio Standard. On behalf of the New Jersey Office of Ratepayer Advocate. Issues: Renewable Portfolio Standards, rate impacts, economic impacts, technology cost forecasts.
 135. Expert Testimony: Docket Number 2005-191-E. (2005). Before the South Carolina Public Service Commission. On behalf of NewSouth Energy LLC. In re: General Investigation

Appendix A

- Examining the Development of RFP Rules for Electric Utilities. Issues: Competitive bidding; merchant development. (Direct and Rebuttal Testimony).
136. Expert Testimony: Docket No. 05-UA-323. (2005). Before the Mississippi Public Service Commission. On the behalf of Calpine Corporation. In re: Entergy Mississippi's Proposed Acquisition of the Attala Generation Facility. Issues: Asset acquisition; merchant power development; competitive bidding.
 137. Expert Testimony: Docket Number 050045-EI and 050188-EI. (2005). Before the Florida Public Service Commission. On the behalf of the Citizens of the State of Florida. In re: Petition for Rate Increase by Florida Power & Light Company. Issues: Load forecasting; O&M forecasting and benchmarking; incentive returns/regulation.
 138. Expert Testimony (non-sworn, rulemaking): Comments on Decreased Drilling Activities in Louisiana and the Role of Incentives. (2005). Louisiana Mineral Board Monthly Docket and Lease Sale. July 13, 2005
 139. Legislative Testimony (2005). Background and Impact of LNG Facilities on Louisiana. Joint Meeting of Senate and House Natural Resources Committee. Louisiana Legislature. May 19, 2005.
 140. Public Testimony. Docket No. U-21453. (2005). Technical Conference before the Louisiana Public Service Commission on an Investigation for a Limited Industrial Retail Choice Plan.
 141. Expert Testimony: Docket No. 2003-K-1876. (2005). On Behalf of Columbia Gas Transmission. Expert Testimony on the Competitive Market Structure for Gas Transportation Service in Ohio. Before the Ohio Board of Tax Appeals.
 142. Expert Report and Testimony: Docket No. 99-4490-J, *Lafayette City-Parish Consolidated Government, et. al. v. Entergy Gulf States Utilities, Inc. et. al.* (2005, 2006). On behalf of the City of Lafayette, Louisiana and the Lafayette Utilities Services. Expert Rebuttal Report of the Harborfront Consulting Group Valuation Analysis of the LUS Expropriation. Filed before 15th Judicial District Court, Lafayette, Louisiana.
 143. Expert Testimony: ANR Pipeline Company v. Louisiana Tax Commission (2005), Number 468,417 Section 22, 19th Judicial District Court, Parish of East Baton Rouge, State of Louisiana Consolidated with Docket Numbers: 480,159; 489,776; 480,160; 480,161; 480,162; 480,163; 480,373; 489,776; 489,777; 489,778; 489,779; 489,780; 489,803; 491,530; 491,744; 491,745; 491,746; 491,912; 503,466; 503,468; 503,469; 503,470; 515,414; 515,415; and 515,416. In re: Market structure issues and competitive implications of tax differentials and valuation methods in natural gas transportation markets for interstate and intrastate pipelines.
 144. Expert Report and Recommendation: Docket No. U-27159. (2004). On Behalf of the Louisiana Public Service Commission Staff. Expert Report on Overcharges Assessed by Network Operator Services, Inc. Before the Louisiana Public Service Commission.
 145. Expert Testimony: Docket Number 2004-178-E. (2004). Before the South Carolina Public Service Commission. On behalf of Columbia Energy LLC. In re: Rate Increase Request of South Carolina Electric and Gas. (Direct and Surrebuttal Testimony)
 146. Expert Testimony: Docket Number 040001-EI. (2004). Before the Florida Public Service Commission. On behalf of Power Manufacturing Systems LLC, Thomas K. Churbuck, and

Appendix A

- the Florida Industrial Power Users Group. In re: Fuel Adjustment Proceedings; Request for Approval of New Purchase Power Agreements. Company examined: Florida Power & Light Company.
147. Expert Affidavit: Docket Number 27363. (2004). Before the Public Utilities Commission of Texas. Joint Affidavit on Behalf of the Cities of Texas and the Staff of the Public Utilities Commission of Texas Regarding Certified Issues. In Re: Application of Valor Telecommunications, L.P. For Authority to Establish Extended Local Calling Service (ELCS) Surcharges For Recovery of ELCS Surcharge.
 148. Expert Report and Testimony. Docket 1997-4665-PV, 1998-4206-PV, 1999-7380-PV, 2000-5958-PV, 2001-6039-PV, 2002-64680-PV, 2003-6231-PV. (2003) Before the Kansas Board of Tax Appeals. (2003). In the Matter of the Appeals of CIG Field Services Company from orders of the Division of Property Valuation. On the Behalf of CIG Field Services. Issues: the competitive nature of natural gas gathering in Kansas.
 149. Expert Report and Testimony: Docket Number U-22407. Before the Louisiana Public Service Commission (2002). On the Behalf of the Louisiana Public Service Commission Staff. Company examined: Louisiana Gas Services, Inc. Issues: Purchased Gas Acquisition audit, fuel procurement and planning practices.
 150. Expert Testimony: Docket Number 000824-EI. Before the Florida Public Service Commission. (2002). On the Behalf of the Citizens of the State of Florida. Company examined: Florida Power Corporation. Issues: Load Forecasts and Billing Determinants for the Projected Test Year.
 151. Public Testimony: Louisiana Board of Commerce and Industry (2001). Testimony on the Economic Impacts of Merchant Power Generation.
 152. Expert Testimony: Docket Number 24468. (2001). On the Behalf of the Texas Office of Public Utility Counsel. Public Utility Commission of Texas Staff's Petition to Determine Readiness for Retail Competition in the Portion of Texas Within the Southwest Power Pool. Company examined: AEP-SWEPCO.
 153. Expert Report. (2001) On Behalf of David Liou and Pacific Richland Products, Inc. to Review Cogeneration Issues Associated with Dupont Dow Elastomers, L.L.C. (DDE) and the Dow Chemical Company (Dow).
 154. Expert Testimony: Docket Number 01-1049, Docket Number 01-3001. (2001) On behalf the Nevada Office of Attorney General, Bureau of Consumer Protection. Petition of Central Telephone Company-Nevada D/b/a Sprint of Nevada and Sprint Communications L.P. for Review and Approval of Proposed Revised Performance Measures and Review and Approval of Performance Measurement Incentive Plans. Before the Public Utilities Commission of Nevada.
 155. Expert Affidavit: Multiple Dockets (2001). Before the Louisiana Tax Commission. On the Behalf of Louisiana Interstate Pipeline Companies. Testimony on the Competitive Nature of Natural Gas Transportation Services in Louisiana.
 156. Expert Affidavit before the Federal District Court, Middle District of Louisiana (2001). Issues: Competitive Nature of the Natural Gas Transportation Market in Louisiana. On behalf of a Consortium of Interstate Natural Gas Transportation Companies.
 157. Public Testimony: Louisiana Board of Commerce and Industry (2001). Testimony on the

Appendix A

Economic and Ratepayer Benefits of Merchant Power Generation and Issues Associated with Tax Incentives on Merchant Power Generation and Transmission.

158. Expert Testimony: Docket Number 01-1048 (2001). Before the Public Utilities Commission of Nevada. On the Behalf of the Nevada Office of the Attorney General, Bureau of Consumer Protection. Company analyzed: Nevada Bell Telephone Company. Issues: Statistical Issues Associated with Performance Incentive Plans.
159. Expert Testimony: Docket 22351 (2001). Before the Public Utility Commission of Texas. On the Behalf of the City of Amarillo. Company analyzed: Southwestern Public Service Company. Issues: Unbundled cost of service, affiliate transactions, load forecasting.
160. Expert Testimony: Docket 991779-EI (2000). Before the Florida Public Service Commission. On the Behalf of the Citizens of the State of Florida. Companies analyzed: Florida Power & Light Company; Florida Power Corporation; Tampa Electric Company; and Gulf Power Company. Issues: Competitive Nature of Wholesale Markets, Regional Power Markets, and Regulatory Treatment of Incentive Returns on Gains from Economic Energy Sales.
161. Expert Testimony: Docket 990001-EI (1999). Before the Florida Public Service Commission. On the Behalf of the Citizens of the State of Florida. Companies analyzed: Florida Power & Light Company; Florida Power Corporation; Tampa Electric Company; and Gulf Power Company. Issues: Regulatory Treatment of Incentive Returns on Gains from Economic Energy Sales.
162. Expert Testimony: Docket 950495-WS (1996). Before the Florida Public Service Commission. On the Behalf of the Citizens of the State of Florida. Company analyzed: Southern States Utilities, Inc. Issues: Revenue Repression Adjustment, Residential and Commercial Demand for Water Service.
163. Legislative Testimony. Louisiana House of Representatives, Special Subcommittee on Utility Deregulation. (1997). On Behalf of the Louisiana Public Service Commission Staff. Issue: Electric Restructuring.
164. Expert Testimony: Docket 940448-EG -- 940551-EG (1994). Before the Florida Public Service Commission. On the Behalf of the Legal Environmental Assistance Foundation. Companies analyzed: Florida Power & Light Company; Florida Power Corporation; Tampa Electric Company; and Gulf Power Company. Issues: Comparison of Forecasted Cost-Effective Conservation Potentials for Florida.
165. Expert Testimony: Docket 920260-TL, (1993). Before the Florida Public Service Commission. On the Behalf of the Florida Public Service Commission Staff. Company analyzed: BellSouth Communications, Inc. Issues: Telephone Demand Forecasts and Empirical Estimates of the Price Elasticity of Demand for Telecommunication Services.
166. Expert Testimony: Docket 920188-TL, (1992). Before the Florida Public Service Commission. On the Behalf of the Florida Public Service Commission Staff. Company analyzed: GTE-Florida. Issues: Telephone Demand Forecasts and Empirical Estimates of the Price Elasticity of Demand for Telecommunication Services.

REFEREE AND EDITORIAL APPOINTMENTS

Contributor, 2014-2018, *Wall Street Journal*, *Journal Reports*, *Energy*

Editorial Board Member, 2015-2017, *Utilities Policy*

Referee, 2014-Current, *Utilities Policy*

Referee, 2010-Current, *Economics of Energy & Environmental Policy*

Referee, 1995-Current, *Energy Journal*

Contributing Editor, 2000-2005, *Oil, Gas and Energy Quarterly*

Referee, 2005, *Energy Policy*

Referee, 2004, *Southern Economic Journal*

Referee, 2002, *Resource & Energy Economics*

Committee Member, IAEE/USAEE Student Paper Scholarship Award Committee, 2003

PROPOSAL TECHNICAL REVIEWER

California Energy Commission, Public Interest Energy Research (PIER) Program (1999).

PROFESSIONAL ASSOCIATIONS

American Economic Association, American Statistical Association, Southern Economic Association, Western Economic Association, International Association of Energy Economists ("IAEE"), United States Association of Energy Economics ("USAEE"), the National Association for Business Economics ("NABE"), and the Energy Bar Association (National and Louisiana Chapter; current Board member of LA chapter).

HONORS AND AWARDS

National Association of Regulatory Utility Commissioners (NARUC). Best Paper Award for papers published in the *Journal of Applied Regulation* (2004).

Baton Rouge Business Report, Selected as "Top 40 Under 40" (2003).

Omicron Delta Epsilon (1992-Current).

Interstate Oil and Gas Compact Commission (IOGCC) "Best Practice" Award for Research on the Economic Impact of Oil and Gas Activities on State Leases for the Louisiana Department of Natural Resources (2003).

Distinguished Research Award, Academy of Legal, Ethical and Regulatory Issues, Allied Academics (2002).

Florida Public Service Commission, Staff Excellence Award for Assistance in the Analysis of Local Exchange Competition Legislation (1995).

TEACHING EXPERIENCE

Energy and the Environment (Survey Course)

Principles of Microeconomic Theory

Principles of Macroeconomic Theory

Lecturer, Environmental Management and Permitting. Lecture in Natural Gas Industry, LNG and

Markets.

Lecturer, Electric Power Industry Environmental Issues, Field Course on Energy and the Environment. (Dept. of Environmental Studies).

Lecturer, Electric Power Industry Trends, Principles Course in Power Engineering (Dept. of Electric Engineering).

Lecturer, LSU Honors College, Senior Course on "Society and the Coast."

Continuing Education. Electric Power Industry Restructuring for Energy Professionals.

"The Gulf Coast Energy Situation: Outlook for Production and Consumption." Educational Course and Lecture Prepared for the Foundation for American Communications and the Society for Professional Journalists, New Orleans, LA, December 2, 2004

"The Impact of Hurricane Katrina on Louisiana's Energy Infrastructure and National Energy Markets." Educational Course and Lecture Prepared for the Foundation for American Communications and the Society for Professional Journalists, Houston, TX, September 13, 2005.

"Forecasting for Regulators: Current Issues and Trends in the Use of Forecasts, Statistical, and Empirical Analyses in Energy Regulation." Instructional Course for State Regulatory Commission Staff. Institute of Public Utilities, Kellogg Center, Michigan State University. July 8-9, 2010.

"Regulatory and Ratemaking Issues with Cost and Revenue Trackers." Michigan State University, Institute of Public Utilities. Advanced Regulatory Studies Program. September 29, 2010.

"Demand Modeling and Forecasting for Regulators." Michigan State University, Institute of Public Utilities. Advanced Regulatory Studies Program. September 30, 2010.

"Demand Modeling and Forecasting for Regulators." Michigan State University, Institute of Public Utilities, Forecasting Workshop, Charleston, SC. March 7-9, 2011.

"Regulatory and Cost Recovery Approaches for Smart Grid Applications." Michigan State University, Institute of Public Utilities, Smart Grid Workshop for Regulators. Charleston, SC. March 7-11, 2011.

"Regulatory and Ratemaking Issues Associated with Cost and Expense Adjustment Mechanisms." Michigan State University, Institute of Public Utilities, Advanced Regulatory Studies Program. Lansing, Michigan. September 28, 2011.

"Utility Incentives, Decoupling, and Renewable Energy Programs." Michigan State University, Institute of Public Utilities, Advanced Regulatory Studies Program. Lansing, Michigan. September 29, 2011.

"Regulatory and Cost Recovery Approaches for Smart Grid Applications." Michigan State University, Institute of Public Utilities, Smart Grid Workshop for Regulators. Charleston, SC. March 6-8, 2012.

"Traditional and Incentive Ratemaking Workshop." New Mexico Public Utilities Commission Staff. Santa Fe, NM October 18, 2012.

"Traditional and Incentive Ratemaking Workshop." New Jersey Board of Public Utilities Staff. Newark, NJ. March 1, 2013.

Appendix A

“Natural Gas Issues and Recent Market Trends.” Michigan State University Institute of Public Utilities, GridSchool Regulatory Studies Program, East Lansing, Mich., March 29, 2017.

“Gas Supply Planning and Procurement: Regulatory Overview and issues.” Michigan State University Institute of Public Utilities, Basic Regulatory Studies Program, East Lansing, Mich., Aug 17, 2017.

“Natural Gas Supply Issues and Challenges.” Michigan State University Institute of Public Utilities, Basic Regulatory Studies Program, East Lansing, Mich., Aug 17, 2017.

“Incentives, Risk and Changes in the Nature of Regulation.” Michigan State University Institute of Public Utilities, Basic Regulatory Studies Program, East Lansing, Mich., Aug 18, 2017.

“Traditional and Alternative Forms of Regulation: Background and Overview.” Michigan State University Institute of Public Utilities, Advanced Regulatory Studies Program, East Lansing, Mich., October 2, 2017.

“Traditional and Alternative Forms of Regulation: Utility and policy motivations for risk and change.” Michigan State University Institute of Public Utilities, Advanced Regulatory Studies Program, East Lansing, Mich., October 2, 2017.

“Traditional and Alternative Forms of Regulation: Incentives and Formula Based Methods.” Michigan State University Institute of Public Utilities, Advanced Regulatory Studies Program, East Lansing, Mich., October 2, 2017.

THESIS/DISSERTATIONS COMMITTEES

Active:

- 1 Thesis Committee Memberships (Environmental Studies)
- 2 Ph.D. Dissertation Committee (Economics)

Completed:

- 8 Thesis Committee Memberships (Environmental Studies, Geography)
- 4 Doctoral Committee Memberships (Information Systems & Decision Sciences, Agricultural and Resource Economics, Economics, Education and Workforce Development).
- 2 Doctoral Examination Committee Membership (Information Systems & Decision Sciences, Education and Workforce Development)
- 1 Senior Honors Thesis (Journalism, Loyola University)

LSU SERVICE AND COMMITTEE MEMBERSHIPS

Committee Member, Energy Education Curriculum Committee. E.J. Ourso College of Business. LSU (2016-Current).

Chairman, LSU Energy Initiative/LSU Energy Council (2014-Current).

Co-Director & Steering Committee Member, LSU Coastal Marine Institute (2009-2014).

CES Promotion Committee, Division of Radiation Safety (2006).

Search Committee Chair (2006), Research Associate 4 Position.

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Search Committee Member (2005), Research Associate 4 Position.

Search Committee Member (2005), CES Communications Manager.

LSU Graduate Research Faculty, Associate Member (1997-2004); Full Member (2004-2010); Affiliate Member with Full Directional Rights (2011-2014); Full Member (2014-current).

LSU Faculty Senate (2003-2006).

Conference Coordinator. (2005-Current) Center for Energy Studies Conference on Alternative Energy.

LSU CES/SCE Public Art Selection Committee (2003-2005).

Conference Coordinator. Center for Energy Studies Annual Energy Conference/Summit. (2003-Current).

Conference Coordinator. Center for Energy Studies Seminar Series on Electric Utility Restructuring and Wholesale Competition. (1996-2003).

Co-Chairman, Review Committee, Louisiana Port Construction and Development Priority Program Rules and Regulations, On Behalf of the LSU Ports and Waterways Institute. (1997).

LSU Main Campus Cogeneration/Turbine Project, (1999-2000).

LSU InterCollege Environmental Cooperative. (1999-2001).

LSU Faculty Senate Committee on Public Relations (1997-1999).

LSU Faculty Senate Committee on Student Retention and Recruitment (1999-2003).

PROFESSIONAL SERVICE

Board Member (2018). Energy Bar Association, Louisiana Chapter.

Program Committee Member (2017). Gulf Coast Power Association Conference. New Orleans, LA.

Program Committee Member (2016). Gulf Coast Power Association Conference. New Orleans, LA.

Program Committee Member (2015). Gulf Coast Power Association Workshop/Special Briefing. "Gulf Coast Disaster Readiness: A Past, Present and Future Look at Power and Industry Readiness in MISO South."

Advisor (2008). National Association of Regulatory Utility Commissioners ("NARUC"). Study Committee on the Impact of Executive Drilling Moratoria on Federal Lands.

Steering Committee Member, Louisiana Representative (2008-Current). Southeast Agriculture & Forestry Energy Resources Alliance. Southern Policies Growth Board.

Advisor (2007-Current). National Association of State Utility Consumer Advocates ("NASUCA"), Natural Gas Committee.

Program Committee Chairman (2007-2008). U.S. Association of Energy Economics ("USAEE") Annual Conference, New Orleans, LA

Finance Committee Chairman (2007-2008). USAEE Annual Conference, New Orleans, LA

Committee Member (2006), International Association for Energy Economics ("IAEE") Nominating

Committee.

Founding President (2005-2007) Louisiana Chapter, USAEE.

Secretary (2001) Houston Chapter, USAEE.

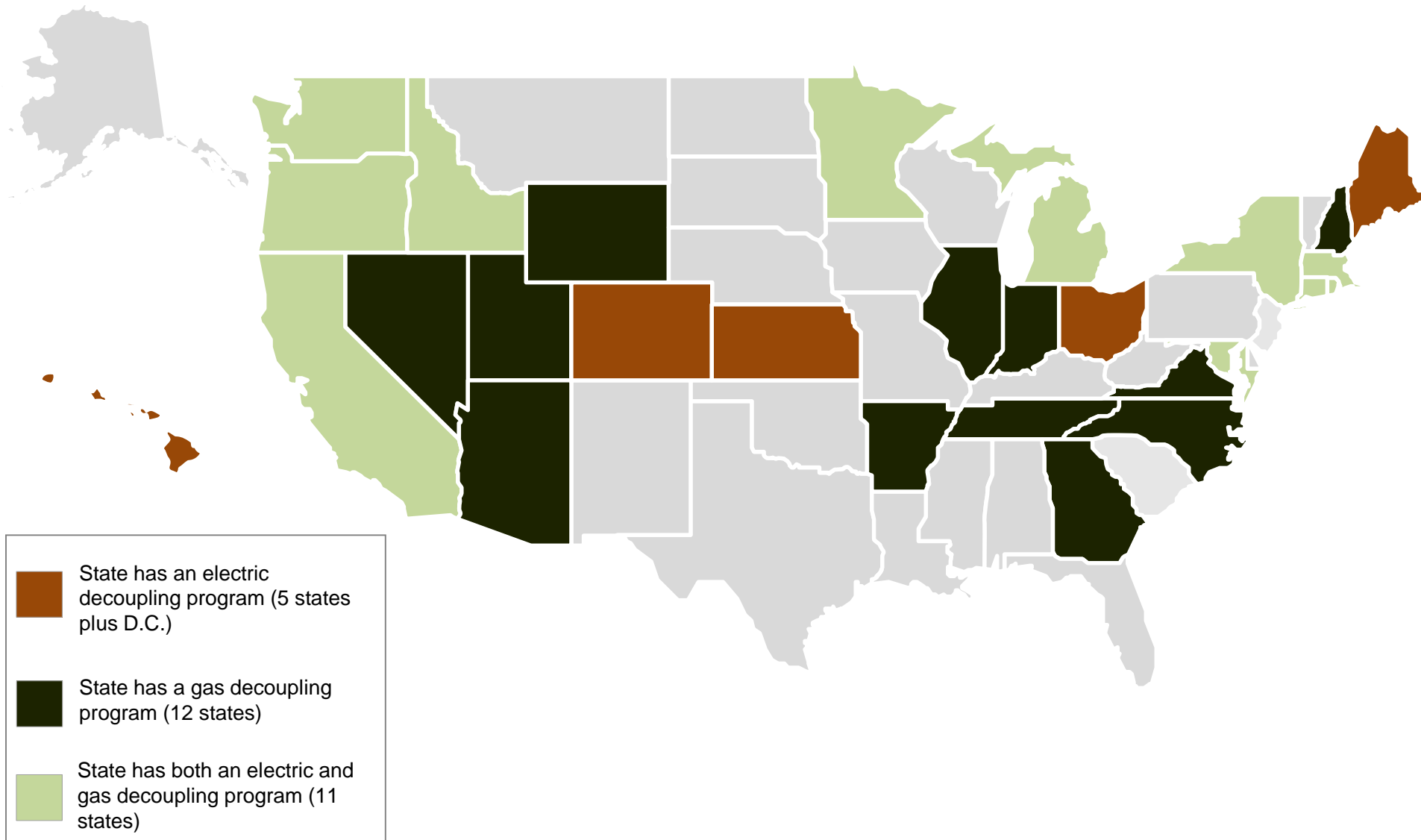
Advisor, Louisiana LNG Buyers/Developers Summit, Office of the Governor/Louisiana Department of Economic Development/Louisiana Department of Natural Resources, and Greater New Orleans, Inc. (2004).

Table of Schedules

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Historic Energy Efficiency Savings vs. Achieved ROE (2014-2018)	Schedule DED-4
RDM Financial Impact (2014-2018)	Schedule DED-5
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Benchmarking Analysis Peer Group	Schedule DED-7
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Duke Energy Indiana's Responses to Discovery	Schedule DED-16

Electric and Gas Decoupling Programs

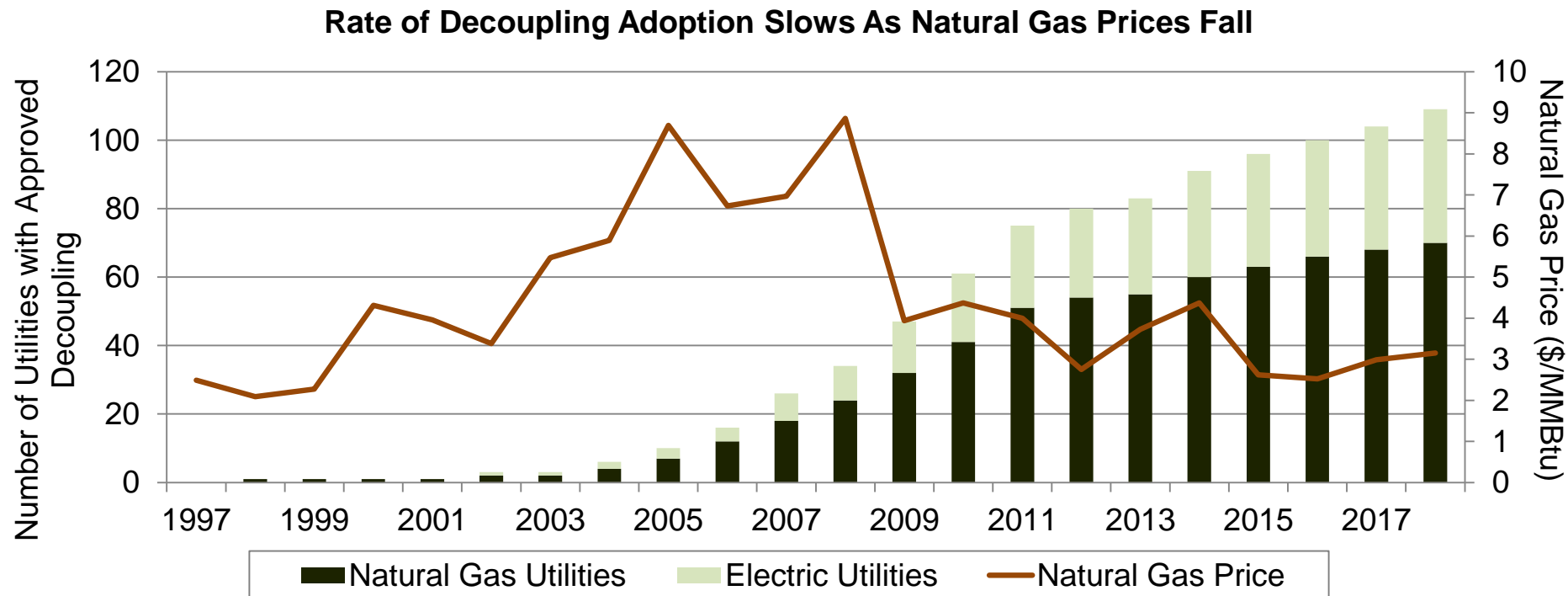
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Note: ACEE State EERS Policy Brief last updated in July of 2019.

Source: State Commission Orders. American Council for an Energy-Efficient Economy, State EERS Policy Brief.

Rate of Decoupling and Natural Gas Price Trends

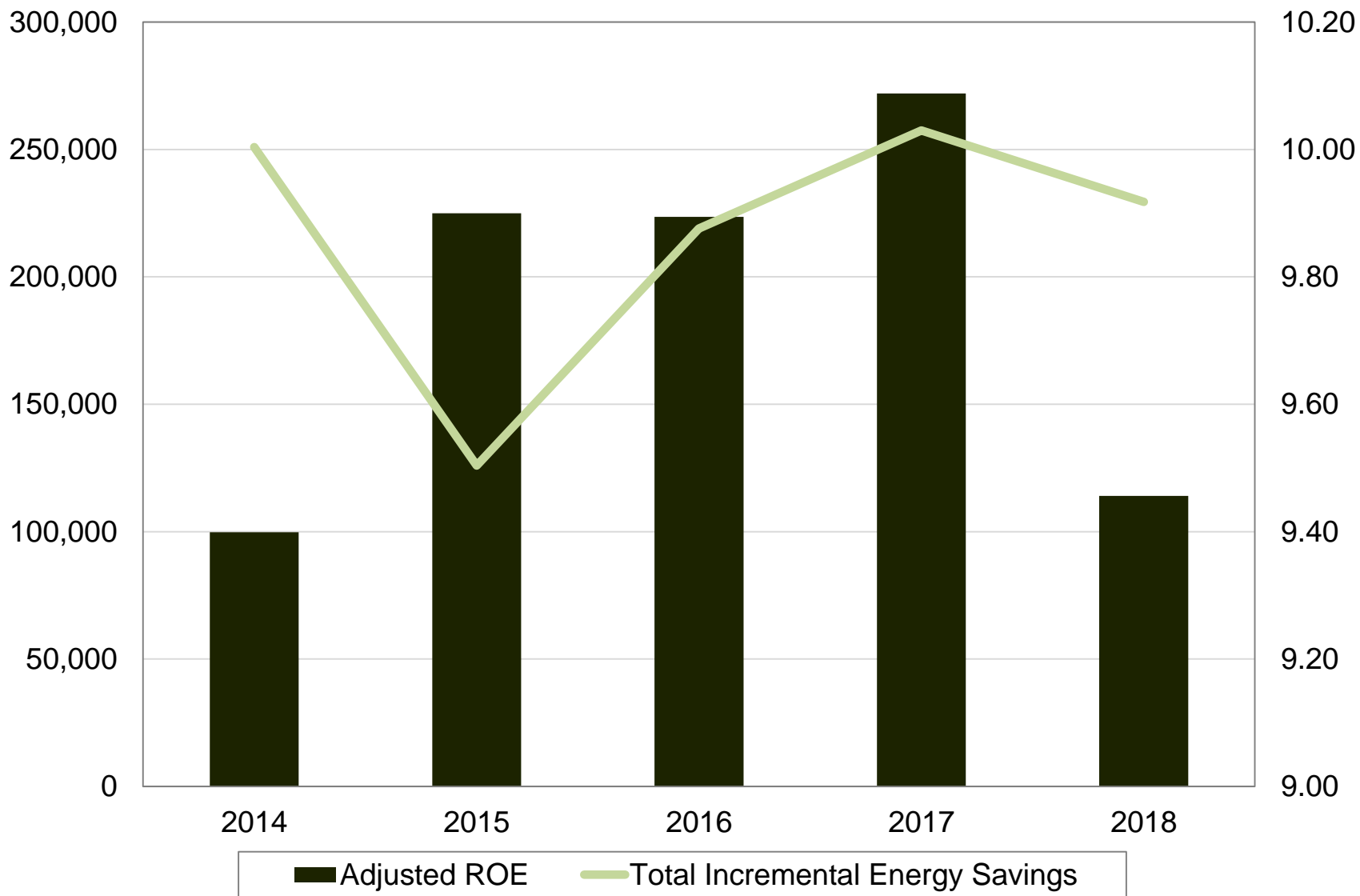


Comparison of Company's Allowed ROE and Achieved ROE (2009-2018)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Company's Allowed ROE	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%
Company's Achieved ROE	7.3%	10.2%	8.3%	10.0%	9.6%	9.4%	9.9%	9.9%	10.1%	9.5%
Difference	-3.0%	-0.1%	-2.0%	-0.3%	-0.7%	-0.9%	-0.4%	-0.4%	-0.2%	-0.8%

Historic Energy Efficiency Savings vs. Achieved ROE (2014-2018)

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RDM Financial Impact (2014-2018)

	2014	2015	2016	2017	2018
<u>Electric</u>					
RDM Deferral in Revenues (Residential and Commercial)	(\$19,386)	(\$789)	\$7,198	\$24,024	(\$19,667)
Change to After-Tax Income	(\$11,687)	(\$478)	\$4,380	\$14,659	(\$14,624)
Equity Balance	\$3,894,000	\$3,842,000	\$3,952,000	\$4,094,000	\$4,230,000
Return on Equity Impact	-0.3%	0.0%	0.1%	0.4%	-0.3%

Electric and Gas Utility Decoupling Mechanism Components

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Company	Utility Type - Gas/ Electric	Decoupling - Gas/ Electric	Date of Decision	Active Yes/No	Decision Type	Limited Recovery / Cap on Accruals	Check on Over Earnings	DSM or EE Targets	Pilot or Trial Period	Compliance Review
Arkansas Oklahoma Gas (AR)	Gas	Gas	11/20/2007	Yes	Settlement		XXX			
Arkansas Western Gas (AR)	Gas	Gas	6/1/2007	Yes	Settlement		XXX		XXX	
CenterPoint Energy (AR)	Gas	Gas	10/25/07	No	Settlement		XXX			
Southwest Gas (AZ)	Gas	Gas	1/6/2012	Yes	Settlement	XXX	XXX			XXX
Pacific Gas & Electric (CA)	Electric & Gas	Electric & Gas	5/27/2004	Yes	Settlement		XXX	XXX		
San Diego Gas & Electric (CA)	Electric & Gas	Electric & Gas	3/17/2005	Yes	Settlement		XXX	XXX		
Southern California Gas (CA)	Gas	Gas	3/17/2005	Yes	Settlement		XXX	XXX		
Southern California Edison (CA)	Electric	Electric	4/22/2002	Yes	Order		XXX	XXX		
Southwest Gas (CA)	Gas	Gas	3/16/2004	Yes	Order		XXX	XXX		
PSC of Colorado (CO)	Electric	Electric	6/21/2017	Yes	Order	XXX			XXX	XXX
Connecticut Light & Power (CT)	Electric	Electric	12/17/2014	Yes	Order					
Connecticut Natural Gas (CT)	Gas	Gas	1/22/2014	Yes	Order					XXX
Southern Connecticut Gas (CT)	Gas	Gas	12/13/2017	Yes	Settlement					
United Illuminating (CT)	Electric	Electric	2/4/2009	Yes	Order	XXX		XXX		XXX
Potomac Electric Power Company (DC)	Electric	Electric	9/28/2009	Yes	Order	XXX				XXX
Atmos Energy/Liberty Utilities (GA)	Gas	Gas	12/27/2011	Yes	Settlement		XXX			XXX
HECO Companies (HI)*	Electric	Electric	8/31/2010	Yes	Order		XXX			XXX
Avista Utilities (ID)	Electric & Gas	Electric & Gas	12/18/2015	Yes	Settlement	XXX				XXX
Idaho Power (ID)	Electric	Electric	3/12/2007	Yes	Settlement	XXX		XXX	XXX	
Ameren Illinois (IL)	Electric & Gas	Gas	12/9/2015	Yes	Order					
Liberty Utilities (IL)	Electric & Gas	Gas	5/24/2017	Yes	Order					
North Shore Gas Company (IL)	Gas	Gas	7/15/2014	Yes	Order	XXX				XXX
Peoples Gas Light and Coke (IL)	Electric & Gas	Gas	7/15/2014	Yes	Order	XXX				XXX
Boonville Natural Gas Corporation (IN)	Gas	Gas	11/30/2011	No	Settlement			XXX	XXX	
Citizens Gas (IN)	Gas	Gas	8/29/2007	No	Settlement	XXX			XXX	
Citizens Gas of Westfield (IN)	Gas	Gas	3/10/2010	Yes	Order	XXX			XXX	
Community Natural Gas Company (IN)	Gas	Gas	11/30/2011	No	Settlement			XXX	XXX	
Fountaintown Gas (IN)	Gas	Gas	11/30/2011	No	Settlement	XXX		XXX	XXX	
Indiana Natural Gas (IN)	Gas	Gas	11/30/2011	No	Settlement	XXX		XXX	XXX	
Indiana Utilities Corporation (IN)	Gas	Gas	11/30/2011	No	Settlement			XXX	XXX	
Midwest Natural Gas Corporation (IN)	Gas	Gas	11/30/2011	No	Settlement			XXX	XXX	
South Eastern Indiana Natural Gas Company (IN)	Gas	Gas	11/30/2011	No	Settlement			XXX	XXX	
Switzerland County Natural Gas Company (IN)	Gas	Gas	11/30/2011	No	Settlement			XXX	XXX	
Vectren Southern Indiana Gas (IN)	Electric & Gas	Gas	12/1/2006	Yes	Settlement	XXX			XXX	
Vectren Indiana Gas (IN)	Electric & Gas	Gas	12/1/2006	Yes	Settlement	XXX			XXX	
Kansas City Power & Light (KS)	Electric	Electric	6/22/2017	Yes	Order					

Note: *HECO Companies include Hawaiian Electric, Hawaii Electric Light, and Maui Electric Company.

Source: Commission Orders.

Electric and Gas Utility Decoupling Mechanism Components

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Company	Utility Type - Gas/ Electric	Decoupling - Gas/ Electric	Date of Decision	Active Yes/No	Decision Type	Limited Recovery / Cap on Accruals	Check on Over Earnings	DSM or EE Targets	Pilot or Trial Period	Compliance Review
Bay State Gas (MA)	Gas	Gas	10/30/2009	Yes	Order	XXX				
Boston Gas dba National Grid (MA)	Gas	Gas	11/2/2010	Yes	Order	XXX				
Colonial Gas dba National Grid (MA)	Gas	Gas	11/2/2010	Yes	Order	XXX				
Fitchburg Gas & Electric (MA)	Electric & Gas	Electric & Gas	8/1/2011	Yes	Order	XXX				
Massachusetts Electric (MA)	Electric	Electric	11/30/2009	Yes	Order	XXX	XXX			
Nantucket Electric (MA)	Electric	Electric	11/30/2009	Yes	Order	XXX	XXX			
NSTAR dba Eversource Energy (MA)	Electric & Gas	Electric & Gas	10/30/2015 & 1/5/2018	Yes	Order	XXX				
New England Gas (MA)	Gas	Gas	3/31/2011	Yes	Order	XXX				
Western Massachusetts Electric (MA)	Electric	Electric	1/11/2011	Yes	Order	XXX				
Baltimore Gas & Electric (MD)	Electric & Gas	Electric & Gas	2/27/1998 & 2013	Yes	Settlement					
Delmarva Power & Light (MD)	Electric	Electric	7/19/2007	Yes	Settlement					
PEPCO (MD)	Electric	Electric	7/19/2007	Yes	Settlement					
Washington Gas (MD)	Gas	Gas	8/11/2005	Yes	Settlement					
Central Maine Power (ME)	Electric	Electric	8/25/2014	Yes	Settlement	XXX				
Consumers Energy (MI)	Electric & Gas	Gas	4/21/2016	Yes	Settlement					
Detroit Edison (MI)	Electric	Electric	01/11/10	No	Order			XXX	XXX	XXX
Indiana Michigan Power (MI)	Electric	Electric	4/12/2018	Yes	Order	XXX				
Michigan Consolidated Gas (MI)	Gas	Gas	06/03/10	No	Order			XXX	XXX	XXX
Michigan Gas Utilities (MI)	Gas	Gas	07/01/10	No	Order			XXX	XXX	XXX
CenterPoint Energy (MN)	Gas	Gas	7/20/2018	Yes	Settlement	XXX		XXX	XXX	XXX
Great Plains Natural Gas (MN)	Gas	Gas	9/6/2016	Yes	Order	XXX			XXX	XXX
MERC (MN)	Gas	Gas	7/13/2012	Yes	Order	XXX			XXX	XXX
Northern States Power dba Xcel Energy (MN)	Electric & Gas	Electric	5/8/2015	Yes	Order	XXX		XXX	XXX	XXX
NorthWestern Energy (MT)	Electric & Gas	Electric	01/07/10	No	Order				XXX	XXX
Piedmont Natural Gas (NC)	Gas	Gas	10/24/2008	Yes	Settlement			XXX	XXX	
Public Service Co. of NC (NC)	Gas	Gas	10/24/2008	Yes	Settlement			XXX		
EnergyNorth Natural Gas (NH)	Gas	Gas	4/27/2018	Yes	Order					
Southwest Gas (NV)	Gas	Gas	11/3/2009	Yes	Order			XXX		
Consolidated Edison (NY)	Electric & Gas	Electric & Gas	9/25/07 & 3/25/08	Yes	Settlement			XXX	XXX	
National Gas Distribution (NY)	Gas	Gas	9/20/2007	Yes	Order			XXX		
Orange and Rockland (NY)	Electric & Gas	Electric & Gas	7/23/2008	Yes	Order					
Central Hudson Gas & Elec. (NY)	Electric & Gas	Electric & Gas	6/18/2010	Yes	Settlement					

Electric and Gas Utility Decoupling Mechanism Components

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Company	Utility Type - Gas/ Electric	Decoupling - Gas/ Electric	Date of Decision	Active Yes/No	Decision Type	Limited Recovery / Cap on Accruals	Check on Over Earnings	DSM or EE Targets	Pilot or Trial Period	Compliance Review
Coming Natural Gas (NY)	Gas	Gas	7/17/2009	Yes	Settlement					
National Grid - KEDNY & KEDLI (NY)	Gas	Gas	12/22/2009	Yes	Settlement					
NYSEG and Rochester G&E (NY)	Electric & Gas	Electric & Gas	9/21/2010	Yes	Settlement					
Niagara Mohawk (NY)	Electric & Gas	Electric & Gas	5/15/2009 & 1/24/2011	Yes	Settlement					
St. Lawrence Gas (NY)	Gas	Gas	12/18/2009	Yes	Order					
American Electric Power (OH)	Electric	Electric	12/14/2011	Yes	Settlement	XXX			XXX	
Dayton Power & Light (OH)	Electric	Electric	9/26/2018	Yes	Order					
Duke Energy (OH)	Electric	Electric	5/30/2012	Yes	Order	XXX			XXX	
Vectren (OH)	Gas	Gas	09/13/06	No	Settlement			XXX	XXX	XXX
Avista (OR)	Gas	Gas	2/29/2016	Yes	Order	XXX			XXX	XXX
Cascade Natural Gas (OR)	Gas	Gas	4/19/2006	Yes	Settlement		XXX	XXX	XXX	XXX
Northwest Natural (OR)	Gas	Gas	9/12/2002	Yes	Settlement	XXX		XXX	XXX	
Portland General Electric (OR)	Electric	Electric	1/22/2009	Yes	Order	XXX		XXX	XXX	XXX
National Grid (RI)	Electric & Gas	Electric & Gas	5/25/2012	Yes	Order					
Chattanooga Natural Gas (TN)	Gas	Gas	11/8/2010	Yes	Order	XXX			XXX	XXX
Questar Gas (UT)	Gas	Gas	10/5/06 & 11/5/07	Yes	Order			XXX	XXX	XXX
Virginia Natural Gas (VA)	Gas	Gas	12/23/2008	Yes	Settlement			XXX	XXX	XXX
Columbia Gas of Virginia (VA)	Gas	Gas	12/4/2009	Yes	Settlement			XXX	XXX	XXX
Washington Gas Light (VA)	Gas	Gas	3/26/2010	Yes	Order			XXX		
Green Mountain Power (VT)	Electric	Electric	12/22/2006	No	Order					
Avista (WA)	Electric & Gas	Electric & Gas	11/25/2014	Yes	Settlement					
Cascade Natural Gas (WA)	Gas	Gas	1/12/2007	Yes	Settlement		XXX	XXX	XXX	XXX
Pacific Power (WA)	Electric	Electric	9/1/2016	Yes	Order	XXX	XXX	XXX		XXX
Puget Sound Energy (WA)	Electric & Gas	Electric & Gas	6/25/2013	Yes	Order	XXX				
Wisconsin Public Service (WI)	Electric & Gas	Electric & Gas	12/30/08	No	Settlement	XXX		XXX	XXX	XXX
Questar Gas (WY)	Gas	Gas	6/17/2009	Yes	Order			XXX	XXX	XXX

Benchmarking Analysis Peer Group

Company	2018 Retail Sales (MWh)	2018 Retail Customers
Duke Energy Indiana, LLC	28,630,670	830,270
Appalachian Power Company	28,894,678	955,578
Duke Energy Kentucky, Inc.	4,133,607	142,393
Empire District Electric Company	4,891,522	173,041
Indiana Michigan Power Company	18,488,640	595,192
Indianapolis Power & Light Company	13,850,563	498,193
Interstate Power and Light Company	14,707,168	490,245
Kansas City Power & Light Company	15,297,776	548,398
Kansas Gas and Electric Company	9,899,906	330,082
KCP&L Greater Missouri Operations Company	8,385,396	326,627
Kentucky Power Company	5,847,628	166,603
Kentucky Utilities Company	19,124,695	552,923
Louisville Gas and Electric Company	12,063,888	411,711
Madison Gas and Electric Company	3,292,722	154,488
MidAmerican Energy Company	25,927,688	779,803
Monongahela Power Company	12,292,728	391,872
Northern Indiana Public Service Company	16,333,672	469,914
Northern States Power Company - WI	6,987,962	259,379
Southern Indiana Gas and Electric Company	4,958,022	146,305
Union Electric Company	33,699,583	1,223,736
Westar Energy (KPL)	10,031,643	382,092
Wisconsin Electric Power Company	25,546,478	1,130,435
Wisconsin Power and Light Company	11,072,736	473,646
Wisconsin Public Service Corporation	11,067,870	444,647

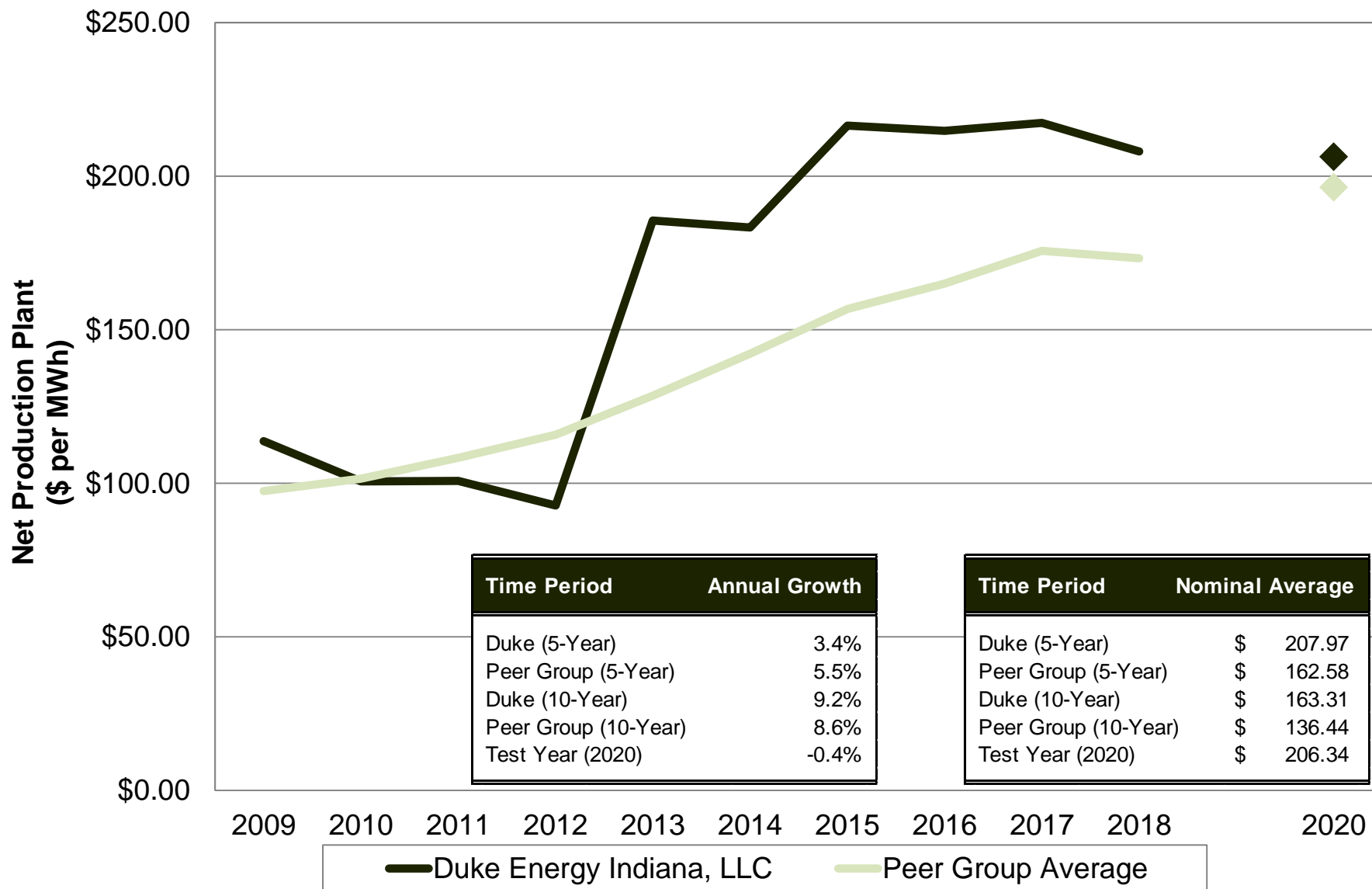
Net Production Plant per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/MWh)										
Duke Energy Indiana, LLC	\$ 113.70	\$ 100.55	\$ 100.77	\$ 92.75	\$ 185.52	\$ 183.28	\$ 216.45	\$ 214.71	\$ 217.35	\$ 208.04	\$ 206.34
Appalachian Power Company	84.09	91.59	108.09	120.81	144.52	142.04	142.31	144.26	147.30	138.71	137.08
Duke Energy Kentucky, Inc.	92.90	84.89	85.59	88.90	85.55	88.74	112.86	101.46	117.89	144.90	190.75
Empire District Electric Company	103.39	161.60	163.44	166.85	161.67	187.52	189.78	224.22	226.37	204.86	214.33
Indiana Michigan Power Company	79.35	79.88	88.14	93.44	102.20	109.61	114.39	126.92	153.10	167.85	212.45
Indianapolis Power & Light Company	87.87	81.55	93.05	91.06	88.27	90.61	108.14	117.79	137.17	174.60	255.53
Interstate Power and Light Company	90.06	94.99	89.98	86.09	89.07	107.30	117.42	114.36	163.09	152.95	185.49
Kansas City Power & Light Company	134.51	191.47	190.61	192.88	197.95	209.79	257.14	260.82	265.71	253.21	279.42
Kansas Gas and Electric Company	124.82	113.88	124.19	127.18	140.40	167.26	236.22	240.36	248.38	234.05	280.79
KCP&L Greater Missouri Operations Company	93.13	124.53	126.73	130.08	128.17	127.54	139.71	145.03	144.69	133.91	137.25
Kentucky Power Company	44.48	41.21	41.52	42.68	133.80	147.77	114.93	129.74	131.98	123.92	113.91
Kentucky Utilities Company	86.34	100.66	142.51	148.79	147.64	173.50	225.76	224.31	226.92	211.38	234.46
Louisville Gas and Electric Company	94.16	85.38	104.56	104.26	104.56	133.06	190.94	213.48	222.36	211.39	273.61
Madison Gas and Electric Company	56.28	52.48	49.79	47.49	109.26	148.88	152.67	157.23	161.06	173.11	187.19
MidAmerican Energy Company	183.99	164.12	200.67	221.14	220.16	263.18	294.14	311.12	334.28	365.33	436.23
Monongahela Power Company	93.70	87.02	80.41	81.88	129.04	129.64	134.90	141.24	144.73	135.61	138.74
Northern Indiana Public Service Company	82.59	76.59	73.71	77.13	95.48	98.45	124.50	123.13	123.15	134.18	158.52
Northern States Power Company - WI	27.55	25.76	25.56	27.07	26.78	25.28	27.80	26.53	25.89	24.67	24.37
Southern Indiana Gas and Electric Company	137.50	125.64	124.61	130.55	128.34	124.66	131.62	133.68	144.01	133.30	137.92
Union Electric Company	119.73	128.42	126.84	132.64	130.12	140.05	145.83	163.33	166.95	160.51	172.23
Westar Energy (KPL)	182.91	168.58	171.24	201.50	204.11	220.23	223.39	224.16	272.21	257.85	279.87
Wisconsin Electric Power Company	62.09	57.85	70.32	102.53	119.16	128.33	119.94	117.54	122.08	87.28	73.32
Wisconsin Power and Light Company	71.61	94.25	110.57	159.98	154.28	173.94	168.84	189.34	191.59	194.21	205.53
Wisconsin Public Service Corporation	108.29	101.97	98.31	87.96	115.35	133.03	132.44	164.81	168.98	167.67	189.50
Peer Group Average	\$ 97.45	\$ 101.49	\$ 108.28	\$ 115.78	\$ 128.52	\$ 142.19	\$ 156.77	\$ 164.99	\$ 175.65	\$ 173.28	\$ 196.46

Net Production Plant per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	18	14	12	10	21	20	19	18	17	18	15
Appalachian Power Company	8	11	14	14	17	14	13	11	10	8	4
Duke Energy Kentucky, Inc.	12	8	7	8	2	2	3	2	2	9	13
Empire District Electric Company	16	21	21	21	20	21	17	20	19	17	17
Indiana Michigan Power Company	6	6	8	11	6	6	4	7	11	13	16
Indianapolis Power & Light Company	10	7	10	9	3	3	2	5	6	15	19
Interstate Power and Light Company	11	13	9	6	4	5	6	3	13	10	10
Kansas City Power & Light Company	21	24	23	22	22	22	23	23	22	22	21
Kansas Gas and Electric Company	20	17	16	15	16	17	22	22	21	21	23
KCP&L Greater Missouri Operations Company	13	18	18	16	11	8	12	12	8	5	5
Kentucky Power Company	2	2	2	2	15	15	5	8	5	3	3
Kentucky Utilities Company	9	15	20	19	18	18	21	21	20	19	18
Louisville Gas and Electric Company	15	9	13	13	7	12	18	17	18	20	20
Madison Gas and Electric Company	3	3	3	3	8	16	15	13	12	14	11
MidAmerican Energy Company	24	22	24	24	24	24	24	24	24	24	24
Monongahela Power Company	14	10	6	5	13	10	11	10	9	7	7
Northern Indiana Public Service Company	7	5	5	4	5	4	8	6	4	6	8
Northern States Power Company - WI	1	1	1	1	1	1	1	1	1	1	1
Southern Indiana Gas and Electric Company	22	19	17	17	12	7	9	9	7	4	6
Union Electric Company	19	20	19	18	14	13	14	14	14	11	9
Westar Energy (KPL)	23	23	22	23	23	23	20	19	23	23	22
Wisconsin Electric Power Company	4	4	4	12	10	9	7	4	3	2	2
Wisconsin Power and Light Company	5	12	15	20	19	19	16	16	16	16	14
Wisconsin Public Service Corporation	17	16	11	7	9	11	10	15	15	12	12

Net Production Plant per MWh 2009 – 2018



Net Production Plant per Customer 2009 – 2018

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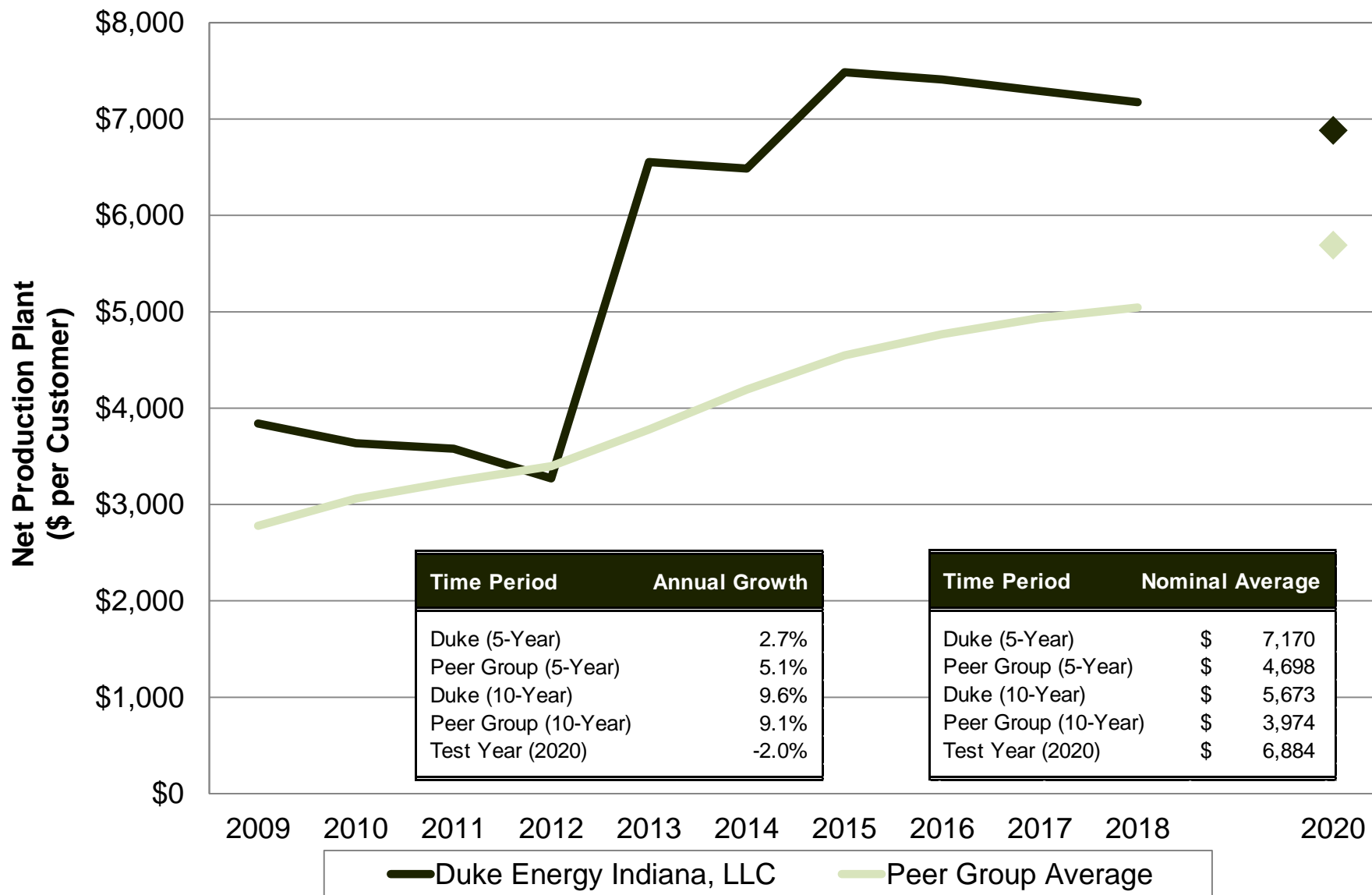
Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 3,840	\$ 3,635	\$ 3,580	\$ 3,272	\$ 6,553	\$ 6,486	\$ 7,487	\$ 7,410	\$ 7,292	\$ 7,174	\$ 6,884
Appalachian Power Company	2,665	3,047	3,437	3,748	4,515	4,475	4,303	4,288	4,252	4,194	4,063
Duke Energy Kentucky, Inc.	2,645	2,584	2,540	2,606	2,516	2,615	3,284	2,970	3,303	4,206	5,487
Empire District Electric Company	2,807	4,638	4,632	4,554	4,448	5,222	5,166	6,073	5,949	5,791	6,106
Indiana Michigan Power Company	2,405	2,566	2,819	2,948	3,198	3,437	3,509	3,966	4,641	5,214	6,562
Indianapolis Power & Light Company	2,647	2,545	2,828	2,710	2,612	2,653	3,073	3,310	3,690	4,854	6,868
Interstate Power and Light Company	2,547	2,758	2,620	2,511	2,601	3,137	3,407	3,411	4,795	4,589	5,651
Kansas City Power & Light Company	3,870	5,789	5,662	5,609	5,711	6,031	7,199	7,264	7,160	7,063	7,668
Kansas Gas and Electric Company	3,729	3,613	3,969	3,962	4,243	5,106	7,060	7,185	7,352	7,020	8,336
KCP&L Greater Missouri Operations Company	2,349	3,324	3,321	3,354	3,329	3,302	3,500	3,633	3,548	3,438	3,509
Kentucky Power Company	1,796	1,735	1,670	1,645	5,081	5,644	4,204	4,505	4,402	4,349	3,850
Kentucky Utilities Company	2,941	3,687	5,074	5,270	5,293	6,311	7,900	7,742	7,512	7,311	7,890
Louisville Gas and Electric Company	2,748	2,661	3,089	3,137	3,095	3,950	5,598	6,301	6,271	6,194	7,953
Madison Gas and Electric Company	1,286	1,243	1,182	1,117	2,529	3,398	3,402	3,476	3,420	3,690	3,848
MidAmerican Energy Company	5,135	4,903	6,015	6,607	6,686	8,042	9,023	9,812	10,658	12,147	15,246
Monongahela Power Company	2,448	2,410	2,198	2,222	3,606	3,812	3,974	4,194	4,308	4,254	4,500
Northern Indiana Public Service Company	2,705	2,714	2,716	2,825	3,496	3,749	4,469	4,460	4,405	4,664	5,233
Northern States Power Company - WI	665	625	656	697	695	672	725	687	676	665	661
Southern Indiana Gas and Electric Company	4,748	4,826	4,771	4,876	4,793	4,735	4,862	4,930	4,716	4,517	4,414
Union Electric Company	3,538	4,144	3,988	4,083	4,024	4,321	4,347	4,441	4,339	4,420	4,471
Westar Energy (KPL)	4,693	4,558	4,680	5,430	5,376	5,866	5,814	5,825	6,896	6,770	7,292
Wisconsin Electric Power Company	1,437	1,415	1,708	2,467	2,731	2,757	2,725	2,707	2,708	1,972	1,692
Wisconsin Power and Light Company	1,549	2,092	2,487	3,602	3,484	3,989	3,847	4,416	4,402	4,540	4,854
Wisconsin Public Service Corporation	2,586	2,515	2,436	2,168	2,814	3,230	3,210	4,075	4,119	4,174	4,783
Peer Group Average	\$ 2,780	\$ 3,060	\$ 3,239	\$ 3,398	\$ 3,777	\$ 4,194	\$ 4,548	\$ 4,768	\$ 4,936	\$ 5,045	\$ 5,693

Source: Federal Energy Regulatory Commission, Form 1; S&P Global Market Intelligence; Company response to data request OUC 2.4, 2.5, and 2.6.

Net Production Plant per Customer 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	----- (\$/Customer) -----										
Duke Energy Indiana, LLC	20	17	16	13	23	23	22	22	21	22	18
Appalachian Power Company	13	14	15	16	17	15	13	11	8	6	6
Duke Energy Kentucky, Inc.	11	10	8	8	2	2	5	3	3	7	13
Empire District Electric Company	16	21	19	19	16	18	17	18	17	17	15
Indiana Michigan Power Company	7	9	11	11	9	9	9	8	14	16	16
Indianapolis Power & Light Company	12	8	12	9	5	3	3	4	6	15	17
Interstate Power and Light Company	9	13	9	7	4	5	7	5	16	13	14
Kansas City Power & Light Company	21	24	23	23	22	21	21	21	20	21	20
Kansas Gas and Electric Company	19	16	17	17	15	17	20	20	22	20	23
KCP&L Greater Missouri Operations Company	6	15	14	14	10	7	8	7	5	3	3
Kentucky Power Company	5	4	3	3	19	19	12	15	11	9	5
Kentucky Utilities Company	17	18	22	21	20	22	23	23	23	23	21
Louisville Gas and Electric Company	15	11	13	12	8	12	18	19	18	18	22
Madison Gas and Electric Company	2	2	2	2	3	8	6	6	4	4	4
MidAmerican Energy Company	24	23	24	24	24	24	24	24	24	24	24
Monongahela Power Company	8	6	5	5	13	11	11	10	9	8	9
Northern Indiana Public Service Company	14	12	10	10	12	10	15	14	13	14	12
Northern States Power Company - WI	1	1	1	1	1	1	1	1	1	1	1
Southern Indiana Gas and Electric Company	23	22	21	20	18	16	16	16	15	11	7
Union Electric Company	18	19	18	18	14	14	14	13	10	10	8
Westar Energy (KPL)	22	20	20	22	21	20	19	17	19	19	19
Wisconsin Electric Power Company	3	3	4	6	6	4	2	2	2	2	2
Wisconsin Power and Light Company	4	5	7	15	11	13	10	12	12	12	11
Wisconsin Public Service Corporation	10	7	6	4	7	6	4	9	7	5	10

Net Production Plant per Customer 2009 – 2018



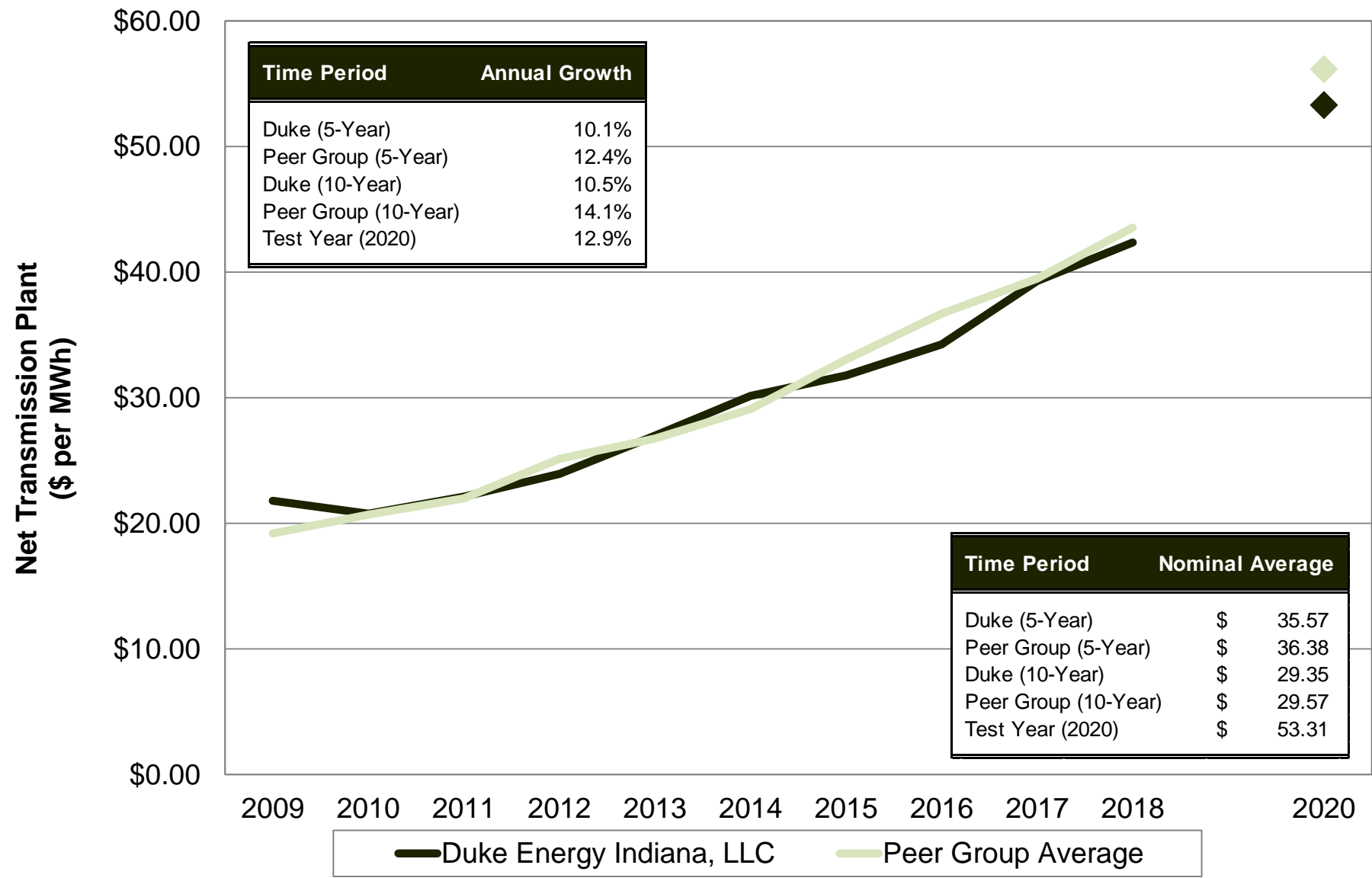
Net Transmission Plant per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/MWh)										
Duke Energy Indiana, LLC	\$ 21.81	\$ 20.78	\$ 22.13	\$ 23.94	\$ 26.99	\$ 30.15	\$ 31.77	\$ 34.25	\$ 39.30	\$ 42.38	\$ 53.31
Appalachian Power Company	40.88	39.39	43.66	47.35	49.95	50.95	58.80	73.33	83.43	89.75	123.91
Duke Energy Kentucky, Inc.	4.58	4.21	4.17	4.61	6.53	8.08	9.22	9.01	9.79	9.36	10.11
Empire District Electric Company	29.36	30.37	32.80	37.09	38.31	42.78	49.67	53.23	58.69	58.81	69.83
Indiana Michigan Power Company	36.78	35.74	37.17	40.25	42.01	44.18	47.32	50.10	55.05	58.31	67.64
Indianapolis Power & Light Company	6.03	6.84	6.68	7.20	7.39	7.88	9.64	15.70	16.18	16.15	24.62
Interstate Power and Light Company	-	-	-	-	-	-	-	-	-	-	-
Kansas City Power & Light Company	14.00	15.06	15.20	15.92	16.88	17.29	18.23	19.06	20.09	20.37	22.19
Kansas Gas and Electric Company	27.30	29.57	33.52	46.70	51.57	58.70	67.89	71.50	74.63	83.54	101.21
KCP&L Greater Missouri Operations Company	24.10	24.44	25.93	29.17	30.80	31.54	32.86	34.33	35.21	36.09	38.69
Kentucky Power Company	42.01	40.47	43.51	50.34	52.95	59.41	62.32	65.09	67.47	67.17	71.55
Kentucky Utilities Company	11.51	15.33	17.17	18.92	20.51	22.03	24.94	28.53	32.23	36.28	48.01
Louisville Gas and Electric Company	10.43	11.80	13.07	13.86	15.13	17.14	19.96	22.85	23.83	25.26	31.24
Madison Gas and Electric Company	-	-	-	-	-	-	-	-	-	-	-
MidAmerican Energy Company	20.46	20.87	21.87	28.05	28.24	30.74	36.92	52.33	54.45	54.24	74.97
Monongahela Power Company	16.22	16.03	18.39	18.83	19.64	20.11	21.20	21.67	23.54	25.68	29.25
Northern Indiana Public Service Company	26.80	25.60	24.79	24.58	24.91	25.46	28.59	29.64	35.20	70.26	132.06
Northern States Power Company - WI	39.13	46.90	50.54	57.65	65.19	74.31	107.86	115.09	114.83	136.55	193.73
Southern Indiana Gas and Electric Company	39.25	47.53	47.60	59.48	60.08	61.46	62.86	64.15	74.39	73.74	81.11
Union Electric Company	11.83	11.68	13.20	13.55	14.94	17.97	18.69	25.04	27.02	26.95	33.68
Westar Energy (KPL)	40.79	53.99	56.69	64.64	70.32	79.20	82.96	93.36	102.31	113.31	137.70
Wisconsin Electric Power Company	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.02)	-	-
Wisconsin Power and Light Company	-	-	-	-	-	-	-	-	-	-	-
Wisconsin Public Service Corporation	-	-	-	-	-	-	-	-	-	-	-
Peer Group Average	\$ 19.19	\$ 20.69	\$ 22.00	\$ 25.14	\$ 26.75	\$ 29.10	\$ 33.04	\$ 36.70	\$ 39.49	\$ 43.56	\$ 56.15

Net Transmission Plant per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014 (\$/MWh)	2015	2016	2017	2018	2020
Duke Energy Indiana, LLC	14	13	14	13	14	14	14	14	15	14	14
Appalachian Power Company	23	20	21	20	19	19	19	22	22	22	21
Duke Energy Kentucky, Inc.	6	6	6	6	6	7	6	6	6	6	6
Empire District Electric Company	18	18	17	17	17	17	18	18	18	17	16
Indiana Michigan Power Company	19	19	19	18	18	18	17	16	17	16	15
Indianapolis Power & Light Company	7	7	7	7	7	6	7	7	7	7	8
Interstate Power and Light Company	2	2	2	2	2	2	2	2	2	1	1
Kansas City Power & Light Company	11	10	10	10	10	9	8	8	8	8	7
Kansas Gas and Electric Company	17	17	18	19	20	20	22	21	21	21	20
KCP&L Greater Missouri Operations Company	15	15	16	16	16	16	15	15	14	12	12
Kentucky Power Company	24	21	20	21	21	21	20	20	19	18	17
Kentucky Utilities Company	9	11	11	12	12	12	12	12	12	13	13
Louisville Gas and Electric Company	8	9	8	9	9	8	10	10	10	9	10
Madison Gas and Electric Company	2	2	2	2	2	2	2	2	2	1	1
MidAmerican Energy Company	13	14	13	15	15	15	16	17	16	15	18
Monongahela Power Company	12	12	12	11	11	11	11	9	9	10	9
Northern Indiana Public Service Company	16	16	15	14	13	13	13	13	13	19	22
Northern States Power Company - WI	20	22	23	22	23	23	24	24	24	24	24
Southern Indiana Gas and Electric Company	21	23	22	23	22	22	21	19	20	20	19
Union Electric Company	10	8	9	8	8	10	9	11	11	11	11
Westar Energy (KPL)	22	24	24	24	24	24	23	23	23	23	23
Wisconsin Electric Power Company	1	1	1	1	1	1	1	1	1	1	1
Wisconsin Power and Light Company	2	2	2	2	2	2	2	2	2	1	1
Wisconsin Public Service Corporation	2	2	2	2	2	2	2	2	2	1	1

Net Transmission Plant per MWh 2009 – 2018



Source: Federal Energy Regulatory Commission, Form 1; S&P Global Market Intelligence; Company response to data request OUC 2.4, 2.5, and 2.6.

Net Transmission Plant per Customer 2009 – 2018

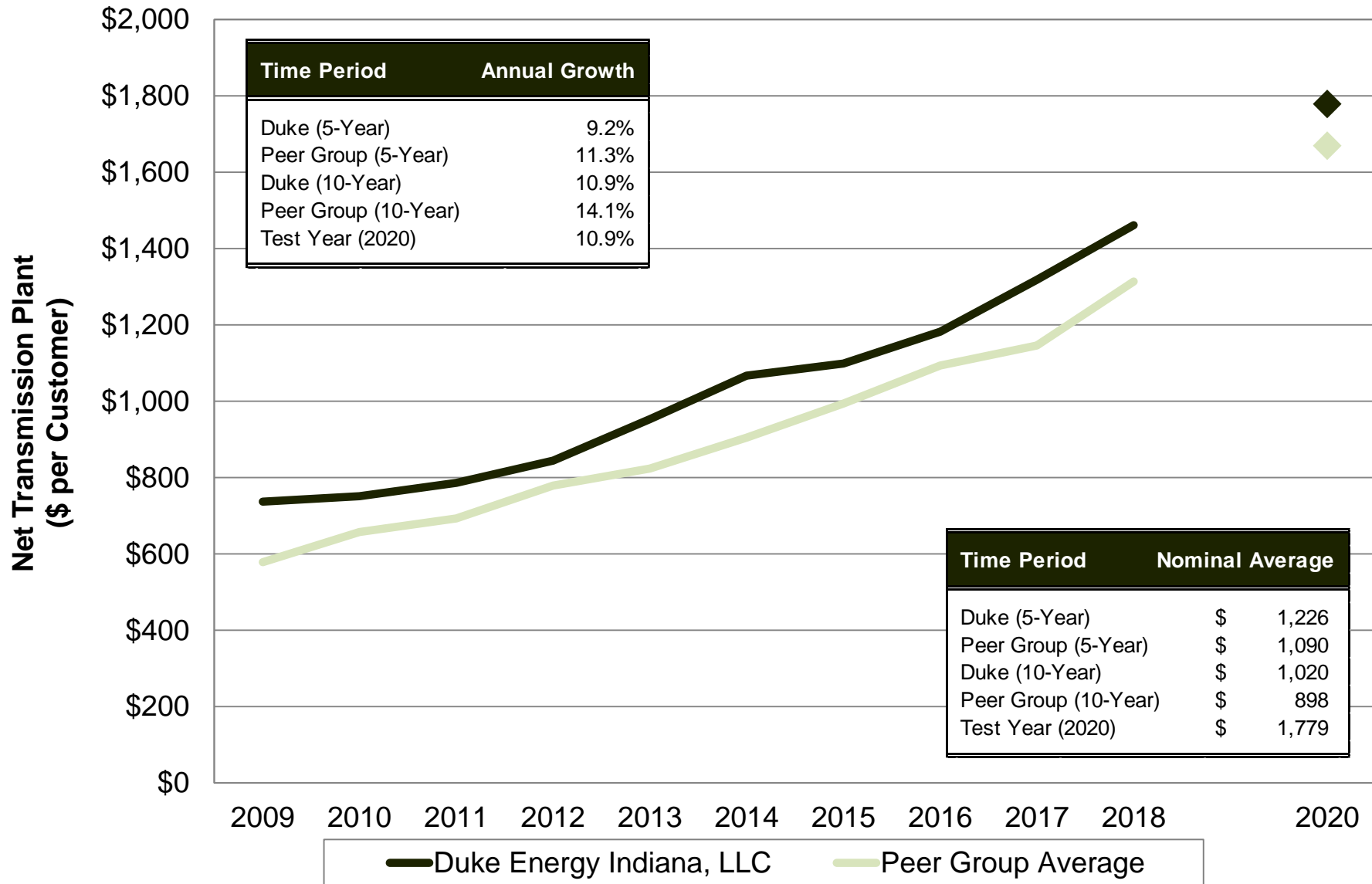
Witness Dismukes
Cause No. 45253
Schedule DED-9
Page 4 of 6

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 737	\$ 751	\$ 786	\$ 844	\$ 953	\$ 1,067	\$ 1,099	\$ 1,182	\$ 1,318	\$ 1,461	\$ 1,779
Appalachian Power Company	1,295	1,310	1,388	1,469	1,560	1,605	1,778	2,180	2,408	2,714	3,651
Duke Energy Kentucky, Inc.	131	128	124	135	192	238	268	264	274	272	291
Empire District Electric Company	797	872	930	1,012	1,054	1,191	1,352	1,442	1,542	1,662	1,991
Indiana Michigan Power Company	1,114	1,148	1,189	1,270	1,314	1,385	1,452	1,565	1,669	1,811	2,090
Indianapolis Power & Light Company	182	213	203	214	219	231	274	441	435	449	661
Interstate Power and Light Company	-	-	-	-	-	-	-	-	-	-	-
Kansas City Power & Light Company	403	455	451	463	487	497	511	531	541	568	609
Kansas Gas and Electric Company	816	938	1,071	1,455	1,559	1,792	2,029	2,137	2,209	2,505	3,004
KCP&L Greater Missouri Operations Company	608	652	680	752	800	817	823	860	863	927	989
Kentucky Power Company	1,697	1,703	1,750	1,941	2,011	2,269	2,280	2,260	2,251	2,358	2,403
Kentucky Utilities Company	392	561	611	670	735	801	873	985	1,067	1,255	1,610
Louisville Gas and Electric Company	305	368	386	417	448	509	585	674	672	740	908
Madison Gas and Electric Company	-	-	-	-	-	-	-	-	-	-	-
MidAmerican Energy Company	571	623	656	838	858	939	1,132	1,650	1,736	1,803	2,633
Monongahela Power Company	424	444	503	511	549	591	625	643	701	806	952
Northern Indiana Public Service Company	878	907	913	900	912	970	1,026	1,074	1,259	2,442	4,296
Northern States Power Company - WI	945	1,138	1,296	1,484	1,690	1,974	2,811	2,980	2,998	3,679	5,267
Southern Indiana Gas and Electric Company	1,355	1,825	1,822	2,222	2,244	2,334	2,322	2,366	2,436	2,499	2,587
Union Electric Company	350	377	415	417	462	555	557	681	702	742	868
Westar Energy (KPL)	1,046	1,460	1,549	1,742	1,852	2,109	2,159	2,426	2,592	2,975	3,585
Wisconsin Electric Power Company	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	-	-
Wisconsin Power and Light Company	-	-	-	-	-	-	-	-	-	-	-
Wisconsin Public Service Corporation	-	-	-	-	-	-	-	-	-	-	-
Peer Group Average	\$ 579	\$ 658	\$ 693	\$ 779	\$ 824	\$ 905	\$ 994	\$ 1,094	\$ 1,146	\$ 1,313	\$ 1,669

Net Transmission Plant per Customer 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	15	15	15	15	16	16	15	15	15	14	14
Appalachian Power Company	22	21	21	20	20	19	19	20	21	22	22
Duke Energy Kentucky, Inc.	6	6	6	6	6	7	6	6	6	6	6
Empire District Electric Company	16	16	17	17	17	17	17	16	16	15	15
Indiana Michigan Power Company	21	20	19	18	18	18	18	17	17	17	16
Indianapolis Power & Light Company	7	7	7	7	7	6	7	7	7	7	8
Interstate Power and Light Company	2	2	2	2	2	2	2	2	2	1	1
Kansas City Power & Light Company	11	11	10	10	10	8	8	8	8	8	7
Kansas Gas and Electric Company	17	18	18	19	19	20	20	19	19	21	20
KCP&L Greater Missouri Operations Company	14	14	14	13	13	13	12	12	12	12	12
Kentucky Power Company	24	23	23	23	23	23	22	21	20	18	17
Kentucky Utilities Company	10	12	12	12	12	12	13	13	13	13	13
Louisville Gas and Electric Company	8	8	8	8	8	9	10	10	9	9	10
Madison Gas and Electric Company	2	2	2	2	2	2	2	2	2	1	1
MidAmerican Energy Company	13	13	13	14	14	14	16	18	18	16	19
Monongahela Power Company	12	10	11	11	11	11	11	9	10	11	11
Northern Indiana Public Service Company	18	17	16	16	15	15	14	14	14	19	23
Northern States Power Company - WI	19	19	20	21	21	21	24	24	24	24	24
Southern Indiana Gas and Electric Company	23	24	24	24	24	24	23	22	22	20	18
Union Electric Company	9	9	9	9	9	10	9	11	11	10	9
Westar Energy (KPL)	20	22	22	22	22	22	21	23	23	23	21
Wisconsin Electric Power Company	1	1	1	1	1	1	1	1	1	1	1
Wisconsin Power and Light Company	2	2	2	2	2	2	2	2	2	1	1
Wisconsin Public Service Corporation	2	2	2	2	2	2	2	2	2	1	1

Net Transmission Plant per Customer 2009 – 2018



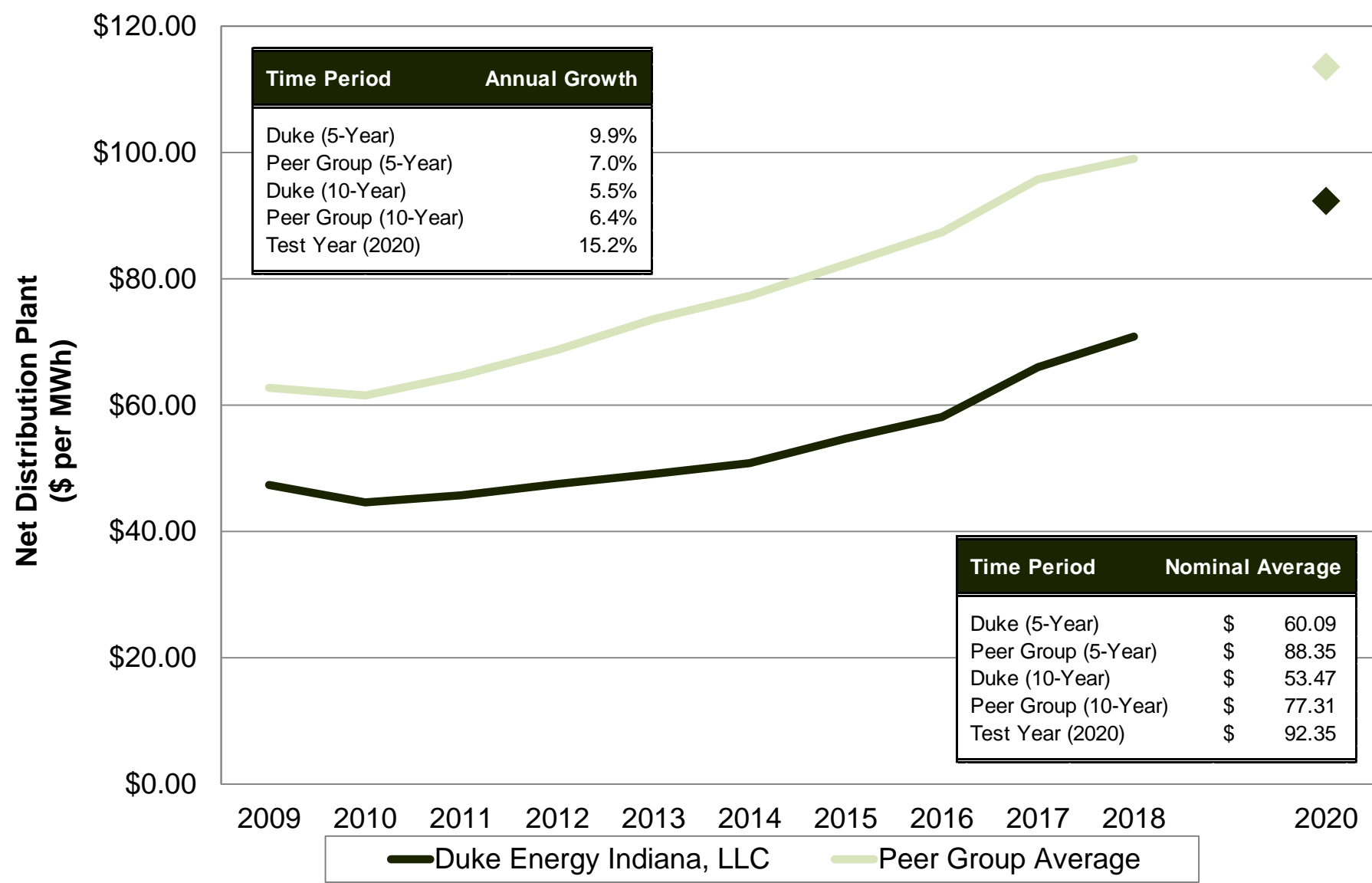
Net Distribution Plant per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/MWh)										
Duke Energy Indiana, LLC	\$ 47.36	\$ 44.60	\$ 45.73	\$ 47.49	\$ 49.09	\$ 50.81	\$ 54.69	\$ 58.10	\$ 66.00	\$ 70.84	\$ 92.35
Appalachian Power Company	61.82	60.20	64.63	69.51	72.09	73.23	78.83	83.28	90.19	91.05	102.14
Duke Energy Kentucky, Inc.	53.25	51.62	54.04	56.72	58.23	60.45	64.09	66.27	74.83	80.33	93.55
Empire District Electric Company	86.28	83.40	90.05	98.02	96.53	101.77	105.46	108.53	117.21	112.53	118.48
Indiana Michigan Power Company	51.94	50.81	53.90	58.35	61.47	63.68	68.52	71.37	81.41	87.35	103.59
Indianapolis Power & Light Company	21.58	19.92	19.76	19.09	17.53	17.42	17.94	20.91	25.59	27.28	35.01
Interstate Power and Light Company	77.30	80.95	87.09	93.71	98.56	107.03	112.49	123.69	139.55	150.26	180.60
Kansas City Power & Light Company	73.76	72.21	76.16	79.36	82.85	88.90	98.17	101.29	107.50	107.63	118.97
Kansas Gas and Electric Company	53.60	51.23	52.45	56.55	59.68	63.22	69.38	75.90	84.87	88.83	106.82
KCP&L Greater Missouri Operations Company	77.96	75.75	79.87	83.83	86.73	89.31	96.60	100.62	107.58	107.49	118.43
Kentucky Power Company	60.66	59.71	64.37	72.18	77.82	80.85	87.43	94.83	101.99	100.81	113.25
Kentucky Utilities Company	41.55	40.40	44.03	47.15	48.04	49.81	53.76	57.71	62.16	63.06	71.44
Louisville Gas and Electric Company	43.88	43.44	49.33	52.90	55.62	59.54	64.35	67.69	74.98	76.70	87.76
Madison Gas and Electric Company	86.97	88.88	96.95	101.83	158.52	168.35	174.86	181.11	194.51	201.86	221.95
MidAmerican Energy Company	64.21	60.99	62.48	59.04	60.86	63.97	66.45	67.27	69.82	72.33	77.05
Monongahela Power Company	66.64	65.31	69.52	85.36	86.81	88.42	93.29	97.80	103.11	104.06	113.27
Northern Indiana Public Service Company	43.30	39.51	37.34	38.87	40.67	41.44	47.22	53.33	58.79	66.97	87.61
Northern States Power Company - WI	49.56	51.56	53.83	56.34	57.78	59.84	63.99	67.52	69.86	72.52	80.21
Southern Indiana Gas and Electric Company	58.76	53.76	56.04	60.10	61.09	61.76	65.25	67.65	83.97	90.33	111.24
Union Electric Company	67.63	63.73	66.57	70.54	71.65	74.15	78.25	90.14	96.83	93.80	106.22
Westar Energy (KPL)	61.71	60.43	61.90	65.07	68.93	74.86	85.50	96.62	104.96	108.59	133.05
Wisconsin Electric Power Company	83.47	80.73	83.77	87.81	95.84	106.90	106.41	110.33	121.02	125.17	135.87
Wisconsin Power and Light Company	107.55	112.95	116.80	120.08	125.02	128.63	133.44	137.23	150.29	155.92	172.47
Wisconsin Public Service Corporation	49.84	47.58	47.62	48.56	50.50	54.60	61.31	68.36	81.39	92.13	123.79
Peer Group Average	\$ 62.75	\$ 61.53	\$ 64.72	\$ 68.74	\$ 73.60	\$ 77.31	\$ 82.30	\$ 87.37	\$ 95.76	\$ 99.00	\$ 113.60

Net Distribution Plant per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	5	5	4	4	4	4	4	4	4	4	7
Appalachian Power Company	14	13	15	14	15	13	14	13	13	12	9
Duke Energy Kentucky, Inc.	9	10	10	9	8	8	7	5	7	8	8
Empire District Electric Company	22	22	22	22	21	20	20	20	20	20	17
Indiana Michigan Power Company	8	7	9	10	12	11	11	11	10	9	10
Indianapolis Power & Light Company	1	1	1	1	1	1	1	1	1	1	1
Interstate Power and Light Company	19	21	21	21	22	22	22	22	22	22	23
Kansas City Power & Light Company	18	18	18	17	17	18	19	19	18	18	18
Kansas Gas and Electric Company	10	8	7	8	9	10	12	12	12	10	12
KCP&L Greater Missouri Operations Company	20	19	19	18	18	19	18	18	19	17	16
Kentucky Power Company	12	12	14	16	16	16	16	15	15	15	14
Kentucky Utilities Company	2	3	3	3	3	3	3	3	3	2	2
Louisville Gas and Electric Company	4	4	6	6	6	6	8	9	8	7	6
Madison Gas and Electric Company	23	23	23	23	24	24	24	24	24	24	24
MidAmerican Energy Company	15	15	13	11	10	12	10	6	5	5	3
Monongahela Power Company	16	17	17	19	19	17	17	17	16	16	15
Northern Indiana Public Service Company	3	2	2	2	2	2	2	2	2	3	5
Northern States Power Company - WI	6	9	8	7	7	7	6	7	6	6	4
Southern Indiana Gas and Electric Company	11	11	11	12	11	9	9	8	11	11	13
Union Electric Company	17	16	16	15	14	14	13	14	14	14	11
Westar Energy (KPL)	13	14	12	13	13	15	15	16	17	19	20
Wisconsin Electric Power Company	21	20	20	20	20	21	21	21	21	21	21
Wisconsin Power and Light Company	24	24	24	24	23	23	23	23	23	23	22
Wisconsin Public Service Corporation	7	6	5	5	5	5	5	10	9	13	19

Net Distribution Plant per MWh 2009 – 2018



Source: Federal Energy Regulatory Commission, Form 1; S&P Global Market Intelligence; Company response to data request OUC 2.4, 2.5, and 2.6.

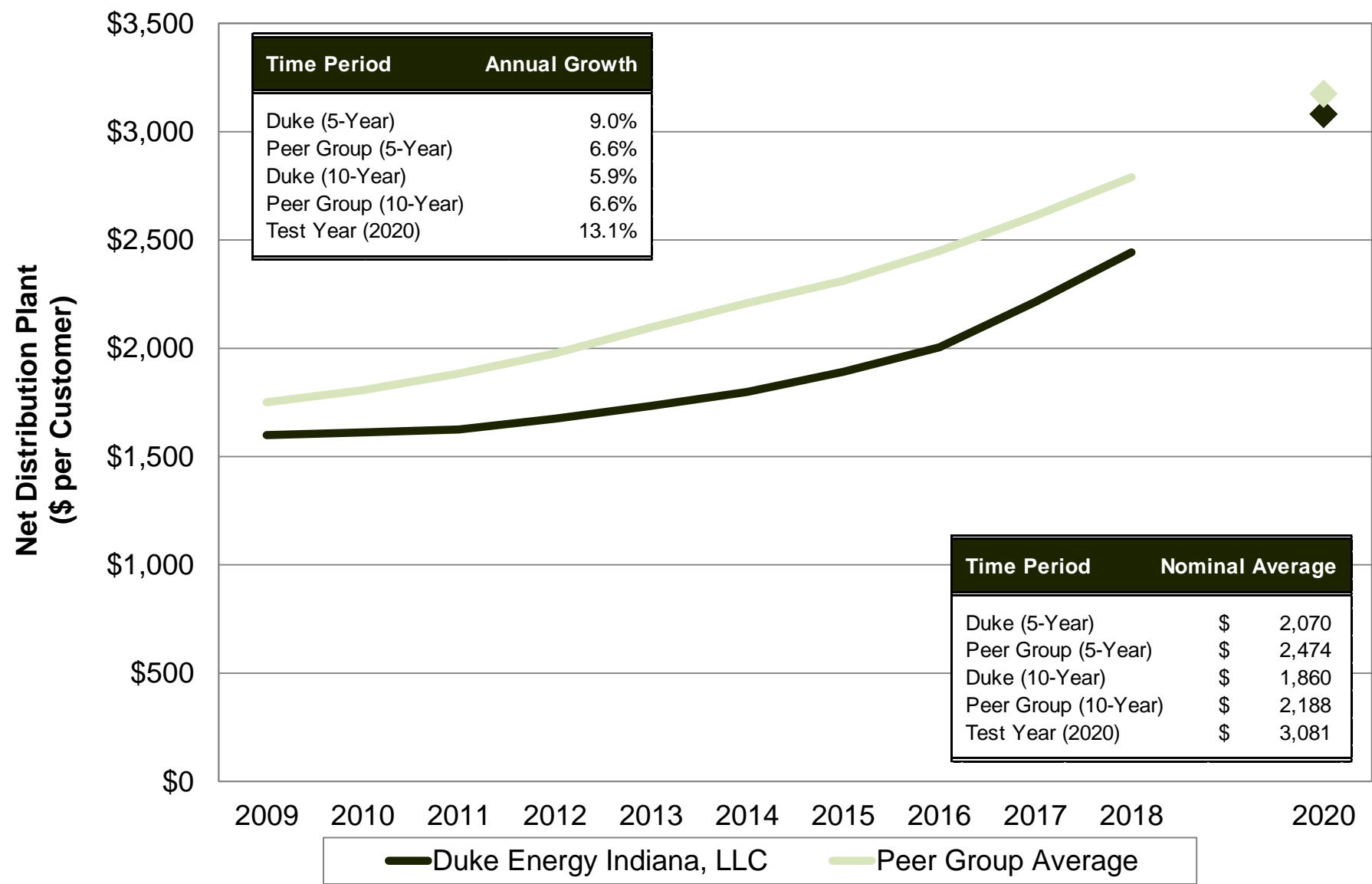
Net Distribution Plant per Customer 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 1,600	\$ 1,612	\$ 1,625	\$ 1,675	\$ 1,734	\$ 1,798	\$ 1,892	\$ 2,005	\$ 2,214	\$ 2,443	\$ 3,081
Appalachian Power Company	1,959	2,003	2,055	2,156	2,252	2,307	2,383	2,475	2,603	2,753	3,020
Duke Energy Kentucky, Inc.	1,516	1,572	1,604	1,663	1,713	1,781	1,865	1,940	2,096	2,332	2,693
Empire District Electric Company	2,343	2,394	2,552	2,675	2,655	2,834	2,870	2,939	3,080	3,181	3,376
Indiana Michigan Power Company	1,574	1,632	1,724	1,841	1,923	1,997	2,102	2,230	2,468	2,713	3,200
Indianapolis Power & Light Company	650	622	601	568	519	510	510	588	688	759	943
Interstate Power and Light Company	2,186	2,350	2,536	2,734	2,878	3,129	3,264	3,690	4,102	4,508	5,501
Kansas City Power & Light Company	2,122	2,183	2,262	2,307	2,390	2,556	2,748	2,821	2,897	3,002	3,265
Kansas Gas and Electric Company	1,601	1,625	1,676	1,762	1,804	1,930	2,073	2,269	2,512	2,664	3,171
KCP&L Greater Missouri Operations Company	1,966	2,022	2,093	2,162	2,253	2,312	2,420	2,520	2,638	2,760	3,027
Kentucky Power Company	2,450	2,513	2,589	2,783	2,955	3,088	3,198	3,293	3,402	3,538	3,796
Kentucky Utilities Company	1,415	1,480	1,568	1,670	1,722	1,812	1,881	1,992	2,058	2,181	2,403
Louisville Gas and Electric Company	1,280	1,354	1,457	1,592	1,646	1,768	1,887	1,998	2,114	2,248	2,553
Madison Gas and Electric Company	1,987	2,105	2,302	2,394	3,669	3,842	3,897	4,004	4,131	4,302	4,560
MidAmerican Energy Company	1,792	1,822	1,873	1,764	1,848	1,955	2,038	2,121	2,226	2,405	2,681
Monongahela Power Company	1,741	1,809	1,900	2,317	2,426	2,600	2,748	2,904	3,069	3,264	3,681
Northern Indiana Public Service Company	1,418	1,400	1,376	1,424	1,489	1,578	1,695	1,932	2,103	2,328	2,881
Northern States Power Company - WI	1,197	1,251	1,381	1,451	1,498	1,590	1,668	1,748	1,824	1,954	2,178
Southern Indiana Gas and Electric Company	2,029	2,065	2,145	2,245	2,281	2,345	2,410	2,495	2,750	3,061	3,528
Union Electric Company	1,999	2,056	2,093	2,171	2,216	2,288	2,332	2,451	2,516	2,583	2,750
Westar Energy (KPL)	1,583	1,634	1,692	1,754	1,816	1,994	2,225	2,511	2,659	2,851	3,464
Wisconsin Electric Power Company	1,932	1,975	2,034	2,113	2,197	2,297	2,418	2,541	2,684	2,829	3,156
Wisconsin Power and Light Company	2,326	2,507	2,627	2,704	2,823	2,949	3,041	3,201	3,453	3,645	4,075
Wisconsin Public Service Corporation	1,190	1,173	1,180	1,197	1,232	1,326	1,486	1,690	1,984	2,293	3,130
Peer Group Average	\$ 1,750	\$ 1,806	\$ 1,883	\$ 1,976	\$ 2,096	\$ 2,208	\$ 2,311	\$ 2,450	\$ 2,611	\$ 2,789	\$ 3,175

Net Distribution Plant per Customer 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	10	8	8	8	8	7	8	8	8	9	11
Appalachian Power Company	15	15	15	14	15	15	14	13	13	13	9
Duke Energy Kentucky, Inc.	7	7	7	6	6	6	5	5	5	7	6
Empire District Electric Company	23	22	22	21	20	20	20	20	20	19	17
Indiana Michigan Power Company	8	10	11	12	12	12	11	10	10	12	15
Indianapolis Power & Light Company	1	1	1	1	1	1	1	1	1	1	1
Interstate Power and Light Company	21	21	21	23	22	23	23	23	23	24	24
Kansas City Power & Light Company	20	20	19	18	18	18	19	18	18	17	16
Kansas Gas and Electric Company	11	9	9	10	9	9	10	11	11	11	14
KCP&L Greater Missouri Operations Company	16	16	17	15	16	16	17	16	14	14	10
Kentucky Power Company	24	24	23	24	23	22	22	22	21	21	21
Kentucky Utilities Company	5	6	6	7	7	8	6	6	4	3	3
Louisville Gas and Electric Company	4	4	5	5	5	5	7	7	7	4	4
Madison Gas and Electric Company	17	19	20	20	24	24	24	24	24	23	23
MidAmerican Energy Company	13	13	12	11	11	10	9	9	9	8	5
Monongahela Power Company	12	12	13	19	19	19	18	19	19	20	20
Northern Indiana Public Service Company	6	5	3	3	3	3	4	4	6	6	8
Northern States Power Company - WI	3	3	4	4	4	4	3	3	2	2	2
Southern Indiana Gas and Electric Company	19	18	18	17	17	17	15	14	17	18	19
Union Electric Company	18	17	16	16	14	13	13	12	12	10	7
Westar Energy (KPL)	9	11	10	9	10	11	12	15	15	16	18
Wisconsin Electric Power Company	14	14	14	13	13	14	16	17	16	15	13
Wisconsin Power and Light Company	22	23	24	22	21	21	21	21	22	22	22
Wisconsin Public Service Corporation	2	2	2	2	2	2	2	2	3	5	12

Net Distribution Plant per Customer 2009 – 2018



Source: Federal Energy Regulatory Commission, Form 1; S&P Global Market Intelligence; Company response to data request OUC 2.4, 2.5, and 2.6.

Net General Plant per MWh 2009 – 2018

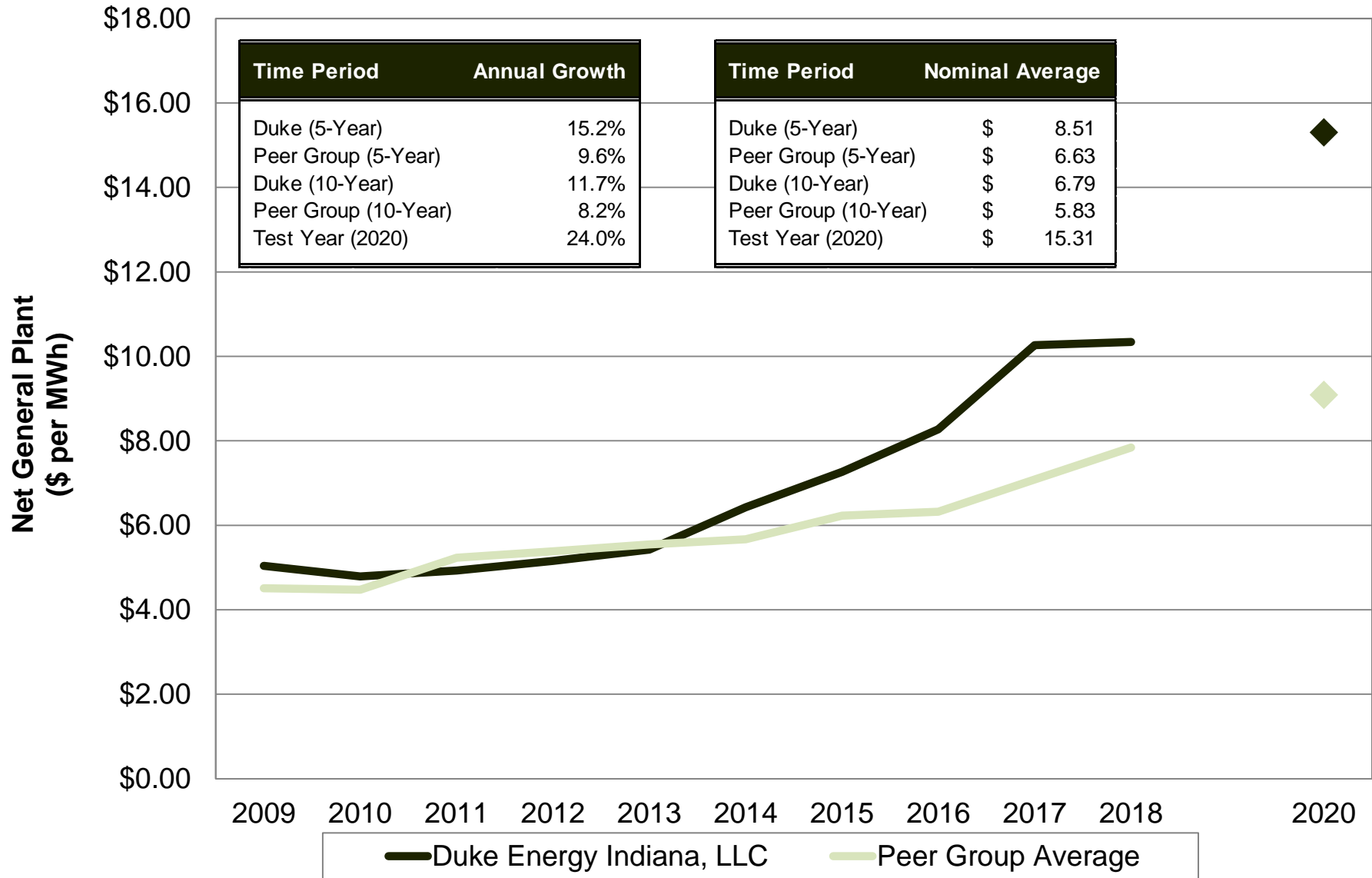
Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/MWh)										
Duke Energy Indiana, LLC	\$ 5.04	\$ 4.79	\$ 4.93	\$ 5.16	\$ 5.42	\$ 6.43	\$ 7.26	\$ 8.27	\$ 10.26	\$ 10.34	\$ 15.31
Appalachian Power Company	4.12	3.89	4.13	4.41	4.37	4.40	4.71	5.16	5.58	6.06	7.21
Duke Energy Kentucky, Inc.	0.45	0.71	1.22	1.13	1.11	1.15	1.20	1.63	1.77	1.95	2.63
Empire District Electric Company	3.52	2.65	4.80	6.71	6.82	7.63	8.41	8.92	8.69	7.54	7.50
Indiana Michigan Power Company	4.18	3.99	4.13	4.37	5.04	5.12	5.44	5.38	5.78	6.66	7.66
Indianapolis Power & Light Company	7.64	7.10	7.55	7.57	8.59	8.83	9.39	11.03	11.48	10.64	11.73
Interstate Power and Light Company	7.72	8.49	8.42	8.25	8.36	8.44	8.90	9.70	12.76	11.52	13.61
Kansas City Power & Light Company	3.84	4.50	16.02	16.18	16.86	16.92	19.86	20.82	21.76	22.95	27.03
Kansas Gas and Electric Company	4.53	4.01	3.99	4.22	4.52	4.56	4.74	5.28	7.54	8.78	12.83
KCP&L Greater Missouri Operations Company	12.62	13.78	14.06	11.47	11.58	12.24	12.72	12.60	13.03	12.06	11.97
Kentucky Power Company	3.79	3.60	3.74	4.09	4.35	4.52	4.85	5.12	5.10	5.66	6.38
Kentucky Utilities Company	3.26	3.45	4.34	4.49	4.54	5.23	6.19	6.49	6.59	7.16	8.49
Louisville Gas and Electric Company	0.25	0.31	0.41	0.43	0.54	0.74	0.87	0.99	1.00	0.97	1.12
Madison Gas and Electric Company	0.52	0.32	0.47	0.65	3.69	2.40	2.54	1.59	1.82	1.89	1.69
MidAmerican Energy Company	7.93	6.74	7.31	7.49	8.76	8.82	9.29	9.55	11.44	14.56	19.30
Monongahela Power Company	4.61	4.41	5.18	4.73	4.42	5.10	4.69	4.23	4.03	4.50	4.24
Northern Indiana Public Service Company	6.56	7.89	7.20	9.52	4.99	3.65	5.38	(0.38)	(0.04)	2.02	1.57
Northern States Power Company - WI	4.18	5.66	6.57	7.35	7.51	7.81	8.88	8.83	10.23	11.33	13.89
Southern Indiana Gas and Electric Company	1.85	1.93	2.00	2.13	2.08	2.11	2.25	2.50	3.17	4.55	7.17
Union Electric Company	8.00	7.57	8.22	8.58	8.37	8.92	9.90	11.85	12.48	12.92	15.81
Westar Energy (KPL)	9.45	8.87	9.10	9.34	10.01	10.32	10.60	11.12	12.21	12.73	14.21
Wisconsin Electric Power Company	0.74	(0.51)	(2.30)	(3.45)	(3.44)	(3.20)	(2.66)	(2.37)	(1.88)	4.59	(1.00)
Wisconsin Power and Light Company	3.07	2.82	3.09	3.63	3.88	3.91	4.07	4.26	7.23	7.91	11.96
Wisconsin Public Service Corporation	0.84	0.71	0.70	0.59	0.66	0.72	1.02	1.14	1.26	1.43	2.13
Peer Group Average	\$ 4.51	\$ 4.47	\$ 5.23	\$ 5.39	\$ 5.55	\$ 5.67	\$ 6.23	\$ 6.32	\$ 7.09	\$ 7.84	\$ 9.09

Net General Plant per MWh

2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	17	16	14	14	15	15	15	15	17	16	21
Appalachian Power Company	12	11	10	11	9	9	9	11	10	10	10
Duke Energy Kentucky, Inc.	2	4	5	5	4	4	4	6	5	4	6
Empire District Electric Company	9	7	13	15	16	16	16	17	15	13	11
Indiana Michigan Power Company	14	12	11	10	14	13	13	13	11	11	12
Indianapolis Power & Light Company	19	19	19	18	20	20	20	20	19	17	14
Interstate Power and Light Company	20	22	21	19	18	18	18	19	22	19	18
Kansas City Power & Light Company	11	15	24	24	24	24	24	24	24	24	24
Kansas Gas and Electric Company	15	13	9	9	11	11	10	12	14	15	17
KCP&L Greater Missouri Operations Company	24	24	23	23	23	23	23	23	23	20	16
Kentucky Power Company	10	10	8	8	8	10	11	10	9	9	8
Kentucky Utilities Company	8	9	12	12	12	14	14	14	12	12	13
Louisville Gas and Electric Company	1	2	2	2	2	3	2	3	3	1	2
Madison Gas and Electric Company	3	3	3	4	6	6	6	5	6	3	4
MidAmerican Energy Company	21	18	18	17	21	19	19	18	18	23	23
Monongahela Power Company	16	14	15	13	10	12	8	8	8	6	7
Northern Indiana Public Service Company	18	21	17	22	13	7	12	2	2	5	3
Northern States Power Company - WI	13	17	16	16	17	17	17	16	16	18	19
Southern Indiana Gas and Electric Company	6	6	6	6	5	5	5	7	7	7	9
Union Electric Company	22	20	20	20	19	21	21	22	21	22	22
Westar Energy (KPL)	23	23	22	21	22	22	22	21	20	21	20
Wisconsin Electric Power Company	4	1	1	1	1	1	1	1	1	8	1
Wisconsin Power and Light Company	7	8	7	7	7	8	7	9	13	14	15
Wisconsin Public Service Corporation	5	5	4	3	3	2	3	4	4	2	5

Net General Plant per MWh 2009 – 2018



Source: Federal Energy Regulatory Commission, Form 1; S&P Global Market Intelligence; Company response to data request OUC 2.4, 2.5, and 2.6.

Net General Plant per Customer 2009 – 2018

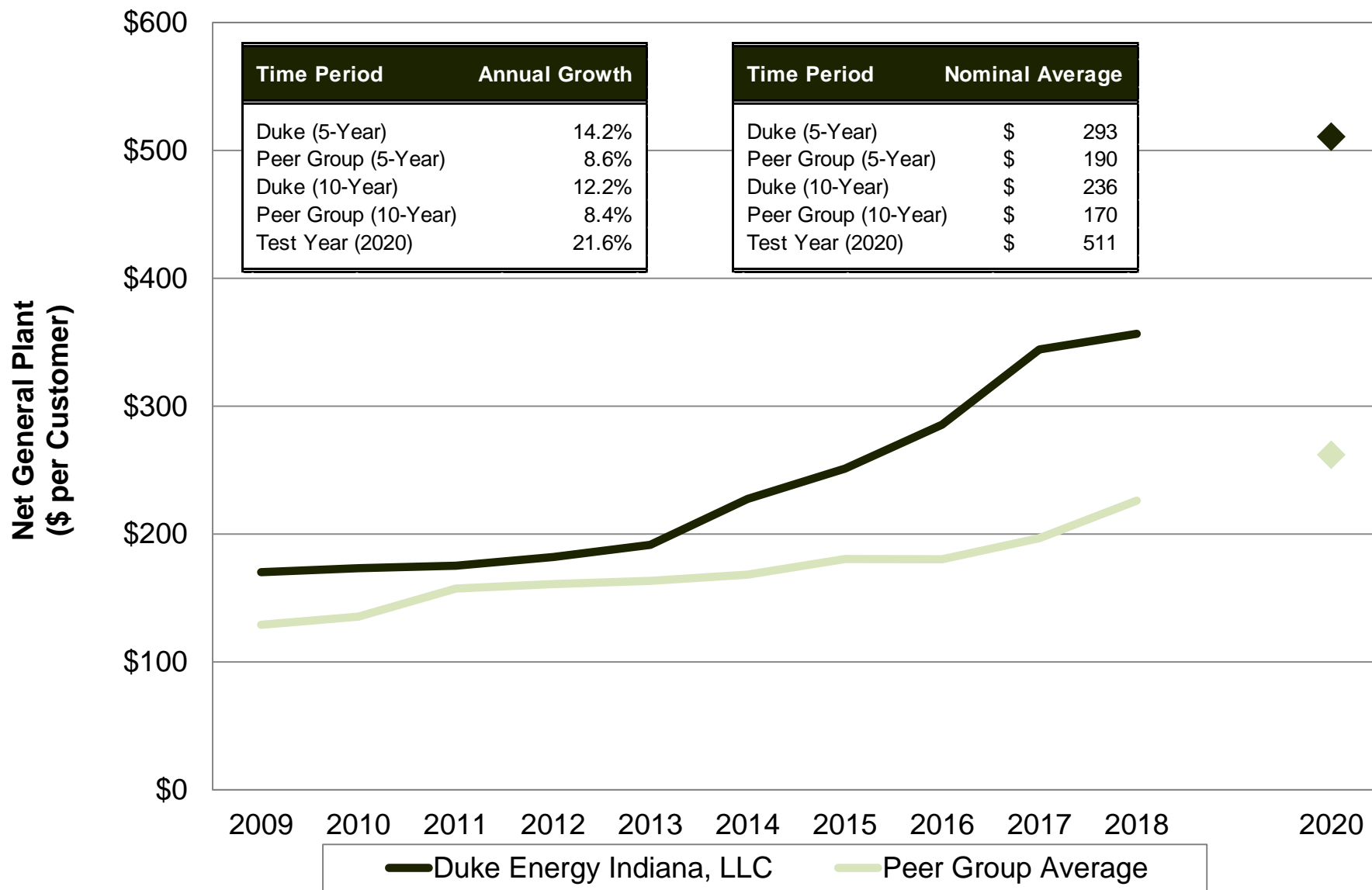
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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 170	\$ 173	\$ 175	\$ 182	\$ 192	\$ 227	\$ 251	\$ 286	\$ 344	\$ 357	\$ 511
Appalachian Power Company	131	129	131	137	136	139	143	153	161	183	213
Duke Energy Kentucky, Inc.	13	22	36	33	33	34	35	48	50	57	76
Empire District Electric Company	96	76	136	183	187	212	229	242	228	213	214
Indiana Michigan Power Company	127	128	132	138	158	161	167	168	175	207	237
Indianapolis Power & Light Company	230	222	229	225	254	259	267	310	309	296	317
Interstate Power and Light Company	218	246	245	241	244	247	258	289	375	345	415
Kansas City Power & Light Company	111	136	476	471	486	487	556	580	586	640	741
Kansas Gas and Electric Company	135	127	127	131	137	139	142	158	223	263	380
KCP&L Greater Missouri Operations Company	318	368	369	296	301	317	319	316	319	310	306
Kentucky Power Company	153	152	150	158	165	173	177	178	170	199	214
Kentucky Utilities Company	111	126	155	159	163	190	216	224	218	248	285
Louisville Gas and Electric Company	7	10	12	13	16	22	26	29	28	28	32
Madison Gas and Electric Company	12	8	11	15	86	55	57	35	39	40	35
MidAmerican Energy Company	221	201	219	224	266	270	285	301	365	484	677
Monongahela Power Company	121	122	142	128	123	150	138	126	120	141	137
Northern Indiana Public Service Company	215	280	265	349	183	139	193	(14)	(1)	70	53
Northern States Power Company - WI	101	137	168	189	195	208	232	228	267	305	377
Southern Indiana Gas and Electric Company	64	74	77	79	78	80	83	92	104	154	225
Union Electric Company	236	244	258	264	259	275	295	322	324	356	408
Westar Energy (KPL)	242	240	249	252	264	275	276	289	309	334	370
Wisconsin Electric Power Company	17	(12)	(56)	(83)	(79)	(69)	(60)	(55)	(42)	104	(26)
Wisconsin Power and Light Company	67	63	69	82	88	90	93	99	166	185	283
Wisconsin Public Service Corporation	20	18	17	15	16	18	25	28	31	36	54
Peer Group Average	\$ 129	\$ 135	\$ 157	\$ 161	\$ 163	\$ 168	\$ 180	\$ 180	\$ 197	\$ 226	\$ 262

Net General Plant per Customer 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	17	17	16	14	16	17	17	17	21	22	22
Appalachian Power Company	14	13	9	10	9	8	10	10	9	9	8
Duke Energy Kentucky, Inc.	3	5	5	5	4	4	4	6	6	4	6
Empire District Electric Company	8	8	11	15	15	16	15	16	15	13	9
Indiana Michigan Power Company	13	12	10	11	11	12	11	12	12	12	12
Indianapolis Power & Light Company	21	19	18	18	19	19	19	21	17	16	16
Interstate Power and Light Company	19	22	19	19	18	18	18	19	23	20	21
Kansas City Power & Light Company	10	14	24	24	24	24	24	24	24	24	24
Kansas Gas and Electric Company	15	11	8	9	10	10	9	11	14	15	19
KCP&L Greater Missouri Operations Company	24	24	23	22	23	23	23	22	19	18	15
Kentucky Power Company	16	16	13	12	13	13	12	13	11	11	10
Kentucky Utilities Company	11	10	14	13	12	14	14	14	13	14	14
Louisville Gas and Electric Company	1	3	3	2	2	3	3	4	3	1	2
Madison Gas and Electric Company	2	2	2	4	6	5	5	5	5	3	3
MidAmerican Energy Company	20	18	17	17	22	20	21	20	22	23	23
Monongahela Power Company	12	9	12	8	8	11	8	9	8	7	7
Northern Indiana Public Service Company	18	23	22	23	14	9	13	2	2	5	4
Northern States Power Company - WI	9	15	15	16	17	15	16	15	16	17	18
Southern Indiana Gas and Electric Company	6	7	7	6	5	6	6	7	7	8	11
Union Electric Company	22	21	21	21	20	22	22	23	20	21	20
Westar Energy (KPL)	23	20	20	20	21	21	20	18	18	19	17
Wisconsin Electric Power Company	4	1	1	1	1	1	1	1	1	6	1
Wisconsin Power and Light Company	7	6	6	7	7	7	7	8	10	10	13
Wisconsin Public Service Corporation	5	4	4	3	3	2	2	3	4	2	5

Net General Plant per Customer 2009 – 2018



Non-fuel Production O&M Expenses per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										(Estimated)
Duke Energy Indiana, LLC	\$ 7.55	\$ 8.37	\$ 8.45	\$ 7.25	\$ 8.51	\$ 10.51	\$ 12.33	\$ 11.94	\$ 11.29	\$ 10.64	\$ 12.83
Appalachian Power Company	6.64	9.61	6.93	6.23	6.51	8.41	7.91	7.80	7.75	7.84	7.57
Duke Energy Kentucky, Inc.	10.09	10.37	9.87	10.84	9.48	11.06	10.24	10.20	9.73	12.93	14.02
Empire District Electric Company	5.58	5.79	6.84	7.15	7.12	7.64	9.00	8.84	9.73	9.59	10.81
Indiana Michigan Power Company	21.57	21.41	21.01	20.29	20.58	22.25	21.91	20.15	20.20	20.90	20.26
Indianapolis Power & Light Company	8.79	9.71	10.21	8.70	9.76	9.52	11.38	10.99	11.00	12.59	14.62
Interstate Power and Light Company	4.46	4.87	6.51	4.00	4.01	4.46	4.63	4.30	4.51	4.49	4.50
Kansas City Power & Light Company	11.03	11.20	12.34	12.44	12.99	13.09	12.55	12.77	12.49	12.32	11.96
Kansas Gas and Electric Company	11.98	11.82	16.30	14.48	19.68	15.28	13.17	13.76	13.09	12.37	11.19
KCP&L Greater Missouri Operations Company	4.95	4.99	6.45	5.55	5.32	5.16	5.76	6.14	5.94	6.21	6.85
Kentucky Power Company	3.91	6.10	5.62	4.49	4.32	9.98	8.57	7.85	7.86	7.69	6.81
Kentucky Utilities Company	5.45	5.57	6.63	7.59	6.60	7.72	8.72	8.50	8.73	8.52	8.96
Louisville Gas and Electric Company	9.72	10.19	10.24	10.41	10.45	10.35	9.93	8.38	8.60	8.40	7.61
Madison Gas and Electric Company	6.75	7.00	6.96	7.39	7.79	7.70	7.73	7.86	7.40	7.23	7.01
MidAmerican Energy Company	10.43	10.05	9.66	10.53	10.91	11.06	11.03	9.78	11.33	11.40	11.57
Monongahela Power Company	4.46	4.06	5.81	5.97	6.42	8.11	8.15	9.14	8.98	8.35	8.48
Northern Indiana Public Service Company	9.58	9.99	9.62	10.68	9.85	10.04	11.07	12.63	14.02	11.03	11.58
Northern States Power Company - WI	3.14	3.49	3.32	2.98	3.26	3.24	3.04	2.94	3.02	3.03	2.92
Southern Indiana Gas and Electric Company	11.99	10.86	12.93	13.96	13.60	13.92	12.90	12.66	13.68	15.19	15.89
Union Electric Company	8.40	9.56	8.66	7.61	8.36	8.52	9.68	9.03	9.29	8.84	9.00
Westar Energy (KPL)	10.59	10.00	6.57	9.16	5.41	10.42	10.77	10.72	11.13	12.49	13.73
Wisconsin Electric Power Company	19.10	20.51	21.39	22.03	24.02	24.96	25.44	25.54	27.07	23.35	22.60
Wisconsin Power and Light Company	6.17	5.80	7.07	6.13	7.83	8.04	7.03	6.54	6.31	6.74	6.19
Wisconsin Public Service Corporation	7.55	6.55	6.51	6.63	8.56	9.87	8.68	7.09	7.30	6.46	5.35
Peer Group Average	\$ 8.80	\$ 9.11	\$ 9.45	\$ 9.36	\$ 9.69	\$ 10.47	\$ 10.40	\$ 10.16	\$ 10.40	\$ 10.35	\$ 10.41

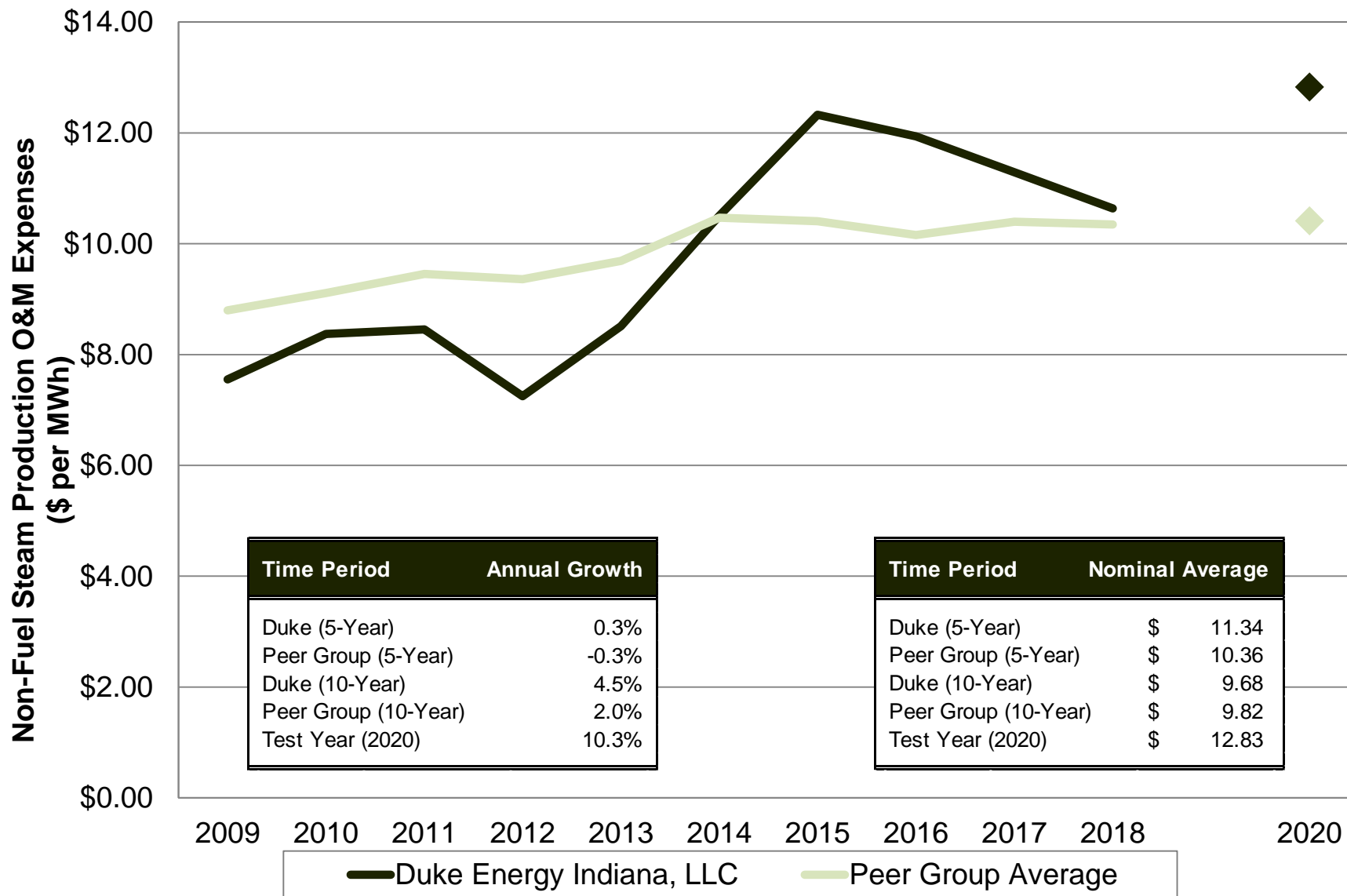
Note: Excludes all expenses in FERC accounts 501, 518, 536, 547, 555, and 557.
Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Non-fuel Production O&M Expenses per MWh 2009 – 2018

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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	12	11	13	10	13	17	19	18	17	14	18
Appalachian Power Company	9	13	10	7	7	9	6	6	7	8	8
Duke Energy Kentucky, Inc.	17	19	17	19	15	18	14	15	13	21	20
Empire District Electric Company	7	6	9	9	9	4	11	11	14	13	13
Indiana Michigan Power Company	24	24	23	23	23	23	23	23	23	23	23
Indianapolis Power & Light Company	14	14	18	14	16	11	18	17	15	20	21
Interstate Power and Light Company	4	3	5	2	2	2	2	2	2	2	2
Kansas City Power & Light Company	20	21	20	20	20	20	20	21	19	17	17
Kansas Gas and Electric Company	21	22	22	22	22	22	22	22	20	18	14
KCP&L Greater Missouri Operations Company	5	4	4	4	4	3	3	3	3	3	6
Kentucky Power Company	2	8	2	3	3	13	8	7	8	7	5
Kentucky Utilities Company	6	5	8	12	8	6	10	10	10	11	11
Louisville Gas and Electric Company	16	18	19	16	18	15	13	9	9	10	9
Madison Gas and Electric Company	10	10	11	11	10	5	5	8	6	6	7
MidAmerican Energy Company	18	17	16	17	19	19	16	14	18	16	15
Monongahela Power Company	3	2	3	5	6	8	7	13	11	9	10
Northern Indiana Public Service Company	15	15	15	18	17	14	17	19	22	15	16
Northern States Power Company - WI	1	1	1	1	1	1	1	1	1	1	1
Southern Indiana Gas and Electric Company	22	20	21	21	21	21	21	20	21	22	22
Union Electric Company	13	12	14	13	12	10	12	12	12	12	12
Westar Energy (KPL)	19	16	7	15	5	16	15	16	16	19	19
Wisconsin Electric Power Company	23	23	24	24	24	24	24	24	24	24	24
Wisconsin Power and Light Company	8	7	12	6	11	7	4	4	4	5	4
Wisconsin Public Service Corporation	11	9	6	8	14	12	9	5	5	4	3

Non-fuel Production O&M Expenses per MWh 2009 – 2018



Non-fuel Production O&M Expenses per Customer 2009 – 2018

Witness Dismukes
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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										(Estimated)
Duke Energy Indiana, LLC	\$ 255	\$ 303	\$ 300	\$ 256	\$ 301	\$ 372	\$ 426	\$ 412	\$ 379	\$ 367	\$ 428
Appalachian Power Company	210	320	221	193	204	265	239	232	224	237	224
Duke Energy Kentucky, Inc.	287	316	293	318	279	326	298	298	272	375	404
Empire District Electric Company	151	166	194	195	196	213	245	239	256	271	308
Indiana Michigan Power Company	654	688	672	640	644	698	672	630	612	649	627
Indianapolis Power & Light Company	265	303	310	259	289	279	323	309	296	350	395
Interstate Power and Light Company	126	141	190	117	117	130	134	128	132	135	137
Kansas City Power & Light Company	317	338	366	362	375	376	351	356	336	344	329
Kansas Gas and Electric Company	358	375	521	451	595	466	394	411	387	371	333
KCP&L Greater Missouri Operations Company	125	133	169	143	138	134	144	154	146	160	175
Kentucky Power Company	158	257	226	173	164	381	314	273	262	270	231
Kentucky Utilities Company	186	204	236	269	236	281	305	293	289	295	302
Louisville Gas and Electric Company	284	318	302	313	309	307	291	247	243	246	222
Madison Gas and Electric Company	154	166	165	174	180	176	172	174	157	154	145
MidAmerican Energy Company	291	300	289	315	331	338	338	309	361	379	402
Monongahela Power Company	117	112	159	162	179	238	240	271	267	262	275
Northern Indiana Public Service Company	314	354	355	391	361	382	397	457	501	383	384
Northern States Power Company - WI	76	85	85	77	85	86	79	76	79	82	79
Southern Indiana Gas and Electric Company	414	417	495	521	508	529	477	467	448	515	508
Union Electric Company	248	309	272	234	259	263	289	246	241	243	234
Westar Energy (KPL)	272	270	179	247	142	277	280	279	282	328	358
Wisconsin Electric Power Company	442	502	519	530	551	536	578	588	600	528	523
Wisconsin Power and Light Company	133	129	159	138	177	184	160	152	145	158	146
Wisconsin Public Service Corporation	180	162	161	163	209	240	210	175	178	161	134
Peer Group Average	\$ 251	\$ 277	\$ 284	\$ 278	\$ 284	\$ 309	\$ 301	\$ 294	\$ 292	\$ 300	\$ 299

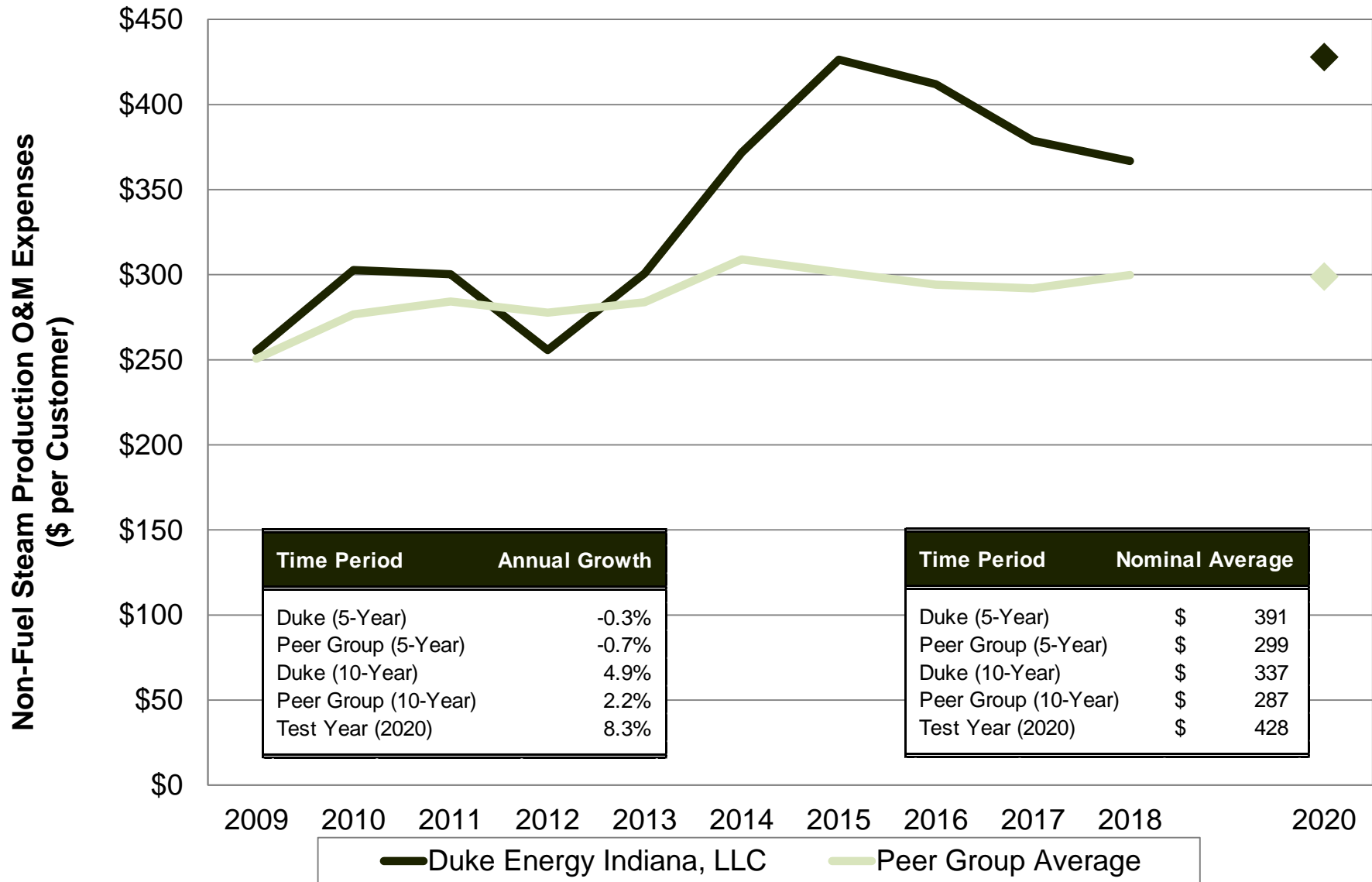
Note: Excludes all expenses in FERC accounts 501, 518, 536, 547, 555, and 557.
Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Non-fuel Production O&M Expenses per Customer 2009 – 2018

Witness Dismukes
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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	13	13	16	13	16	17	21	20	19	17	21
Appalachian Power Company	11	18	10	9	10	10	7	7	7	7	8
Duke Energy Kentucky, Inc.	17	16	15	18	14	15	13	15	13	19	20
Empire District Electric Company	6	8	9	10	9	6	9	8	10	12	13
Indiana Michigan Power Company	24	24	24	24	24	24	24	24	24	24	24
Indianapolis Power & Light Company	14	14	18	14	15	12	16	17	16	16	18
Interstate Power and Light Company	4	5	8	2	2	2	2	2	2	2	3
Kansas City Power & Light Company	20	19	20	19	20	18	18	18	17	15	14
Kansas Gas and Electric Company	21	21	23	21	23	21	19	19	20	18	15
KCP&L Greater Missouri Operations Company	3	4	6	4	3	3	3	4	4	5	6
Kentucky Power Company	8	10	11	7	5	19	15	12	11	11	9
Kentucky Utilities Company	10	9	12	15	12	13	14	14	15	13	12
Louisville Gas and Electric Company	16	17	17	16	17	14	12	10	9	9	7
Madison Gas and Electric Company	7	7	5	8	8	4	5	5	5	3	4
MidAmerican Energy Company	18	12	14	17	18	16	17	16	18	20	19
Monongahela Power Company	2	2	2	5	7	7	8	11	12	10	11
Northern Indiana Public Service Company	19	20	19	20	19	20	20	21	22	21	17
Northern States Power Company - WI	1	1	1	1	1	1	1	1	1	1	1
Southern Indiana Gas and Electric Company	22	22	21	22	21	22	22	22	21	22	22
Union Electric Company	12	15	13	11	13	9	11	9	8	8	10
Westar Energy (KPL)	15	11	7	12	4	11	10	13	14	14	16
Wisconsin Electric Power Company	23	23	22	23	22	23	23	23	23	23	23
Wisconsin Power and Light Company	5	3	3	3	6	5	4	3	3	4	5
Wisconsin Public Service Corporation	9	6	4	6	11	8	6	6	6	6	2

Non-fuel Production O&M Expenses per Customer 2009 – 2018



Transmission O&M Expenses per MWh 2009 – 2018

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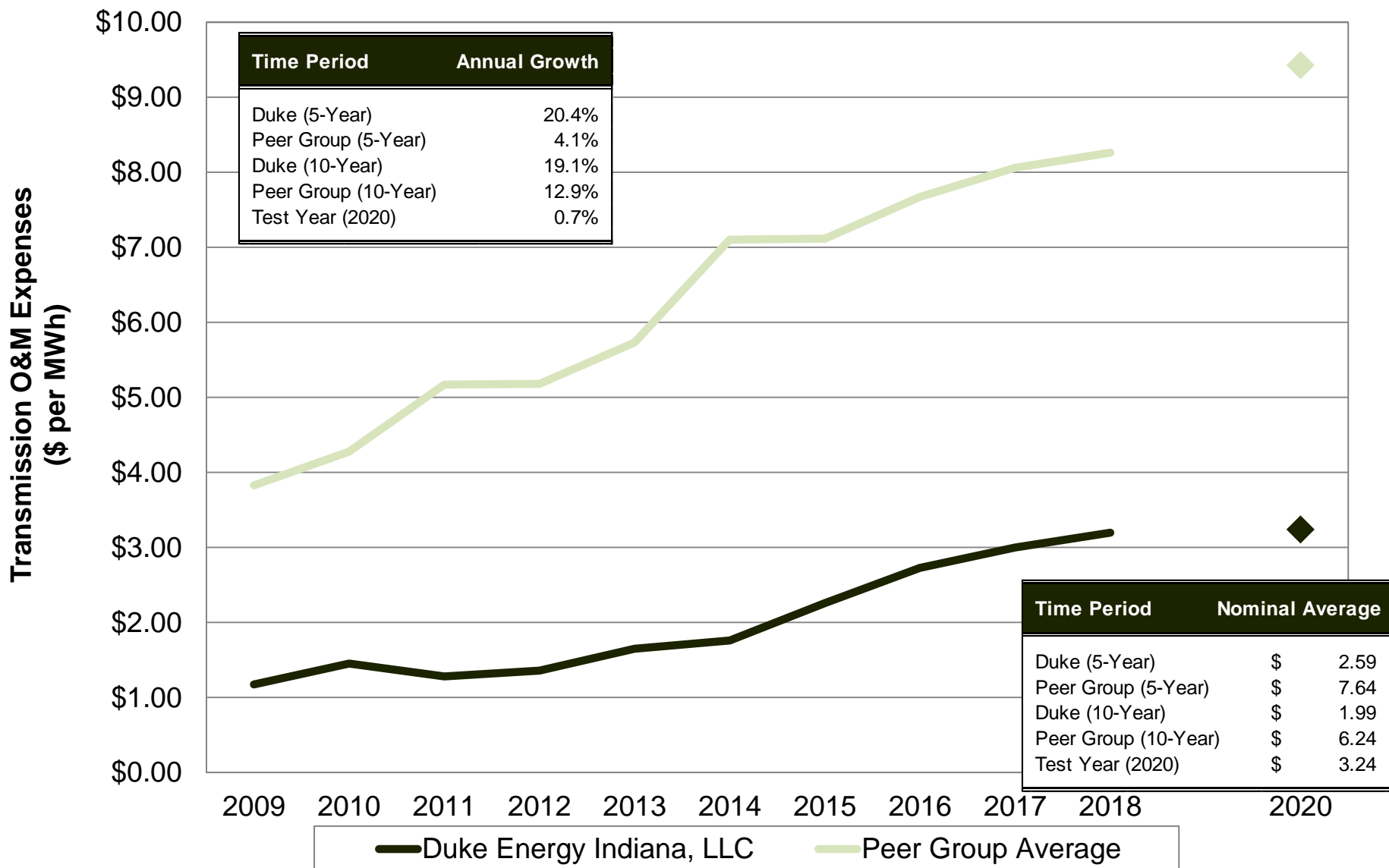
Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										(Estimated)
Duke Energy Indiana, LLC	\$ 1.18	\$ 1.45	\$ 1.28	\$ 1.36	\$ 1.65	\$ 1.76	\$ 2.26	\$ 2.73	\$ 3.00	\$ 3.20	\$ 3.24
Appalachian Power Company	(0.18)	1.09	1.49	2.16	2.56	4.69	4.98	7.62	8.41	7.51	9.76
Duke Energy Kentucky, Inc.	5.23	5.22	8.40	3.37	2.54	3.41	4.01	4.74	4.36	3.07	2.91
Empire District Electric Company	1.44	1.82	2.33	2.68	3.75	4.83	5.13	4.78	5.54	5.21	5.41
Indiana Michigan Power Company	(0.71)	0.46	1.85	2.17	3.00	4.52	4.84	5.34	7.85	6.50	7.93
Indianapolis Power & Light Company	0.77	0.77	0.81	0.75	0.84	0.83	0.75	2.05	3.05	3.40	8.66
Interstate Power and Light Company	9.03	11.91	14.48	15.49	19.71	21.09	22.22	24.90	21.77	24.20	25.99
Kansas City Power & Light Company	1.72	1.97	2.24	2.76	3.64	4.31	5.15	4.90	5.91	5.78	6.77
Kansas Gas and Electric Company	6.90	6.99	7.94	9.72	10.40	12.70	12.98	13.07	13.63	13.96	14.66
KCP&L Greater Missouri Operations Company	2.61	2.46	2.40	2.47	2.60	4.63	4.96	4.65	5.97	5.52	6.06
Kentucky Power Company	(0.12)	0.38	1.55	1.83	2.20	3.38	4.48	5.96	7.91	6.58	9.69
Kentucky Utilities Company	0.99	1.34	1.44	1.54	1.43	1.53	1.67	1.67	1.90	2.19	2.65
Louisville Gas and Electric Company	0.88	1.05	1.45	1.34	1.22	1.24	1.23	1.26	1.33	1.71	2.03
Madison Gas and Electric Company	7.78	8.92	8.66	8.88	9.96	10.04	11.04	10.95	12.84	11.98	13.13
MidAmerican Energy Company	2.59	2.63	1.62	1.92	2.16	2.33	2.51	2.80	3.15	2.90	3.26
Monongahela Power Company	1.73	1.72	11.15	8.99	9.69	21.41	12.27	9.25	7.53	11.38	8.71
Northern Indiana Public Service Company	1.17	1.14	1.19	1.33	1.75	1.79	2.16	2.63	2.77	2.75	3.48
Northern States Power Company - WI	6.88	7.64	7.79	8.19	7.17	8.70	6.94	10.03	11.90	10.62	11.80
Southern Indiana Gas and Electric Company	2.06	2.42	2.48	2.25	2.50	2.78	3.28	3.87	3.74	4.36	5.60
Union Electric Company	1.14	1.04	1.16	1.40	1.59	1.63	1.96	2.45	3.05	2.90	4.04
Westar Energy (KPL)	7.10	7.37	7.86	9.43	10.40	12.72	13.18	13.34	13.88	13.90	14.55
Wisconsin Electric Power Company	9.98	9.74	9.97	9.74	10.20	11.36	10.47	11.14	10.03	17.45	22.13
Wisconsin Power and Light Company	9.79	10.12	10.38	10.52	11.43	11.89	15.01	15.68	16.03	13.12	13.80
Wisconsin Public Service Corporation	9.26	10.17	10.28	10.25	11.09	11.59	12.49	13.39	12.90	13.02	13.83
Peer Group Average	\$ 3.83	\$ 4.28	\$ 5.17	\$ 5.18	\$ 5.73	\$ 7.10	\$ 7.12	\$ 7.67	\$ 8.06	\$ 8.26	\$ 9.43

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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	9	9	4	4	5	5	6	6	4	7	4
Appalachian Power Company	2	6	7	9	11	14	13	15	16	15	16
Duke Energy Kentucky, Inc.	16	16	18	15	10	10	9	10	9	6	3
Empire District Electric Company	10	11	12	13	15	15	14	11	10	10	8
Indiana Michigan Power Company	1	2	10	10	13	12	11	13	14	13	12
Indianapolis Power & Light Company	4	3	1	1	1	1	1	3	5	8	13
Interstate Power and Light Company	21	24	24	24	24	23	24	24	24	24	24
Kansas City Power & Light Company	11	12	11	14	14	11	15	12	11	12	11
Kansas Gas and Electric Company	18	17	17	20	20	21	21	20	21	22	22
KCP&L Greater Missouri Operations Company	15	14	13	12	12	13	12	9	12	11	10
Kentucky Power Company	3	1	8	7	8	9	10	14	15	14	15
Kentucky Utilities Company	6	8	5	6	3	3	3	2	2	2	2
Louisville Gas and Electric Company	5	5	6	3	2	2	2	1	1	1	1
Madison Gas and Electric Company	20	20	19	17	18	17	18	18	19	18	18
MidAmerican Energy Company	14	15	9	8	7	7	7	7	7	4	5
Monongahela Power Company	12	10	23	18	17	24	19	16	13	17	14
Northern Indiana Public Service Company	8	7	3	2	6	6	5	5	3	3	6
Northern States Power Company - WI	17	19	15	16	16	16	16	17	18	16	17
Southern Indiana Gas and Electric Company	13	13	14	11	9	8	8	8	8	9	9
Union Electric Company	7	4	2	5	4	4	4	4	6	5	7
Westar Energy (KPL)	19	18	16	19	21	22	22	21	22	21	21
Wisconsin Electric Power Company	24	21	20	21	19	18	17	19	17	23	23
Wisconsin Power and Light Company	23	22	22	23	23	20	23	23	23	20	19
Wisconsin Public Service Corporation	22	23	21	22	22	19	20	22	20	19	20

Transmission O&M Expenses per MWh 2009 – 2018



Transmission O&M Expenses per Customer 2009 – 2018

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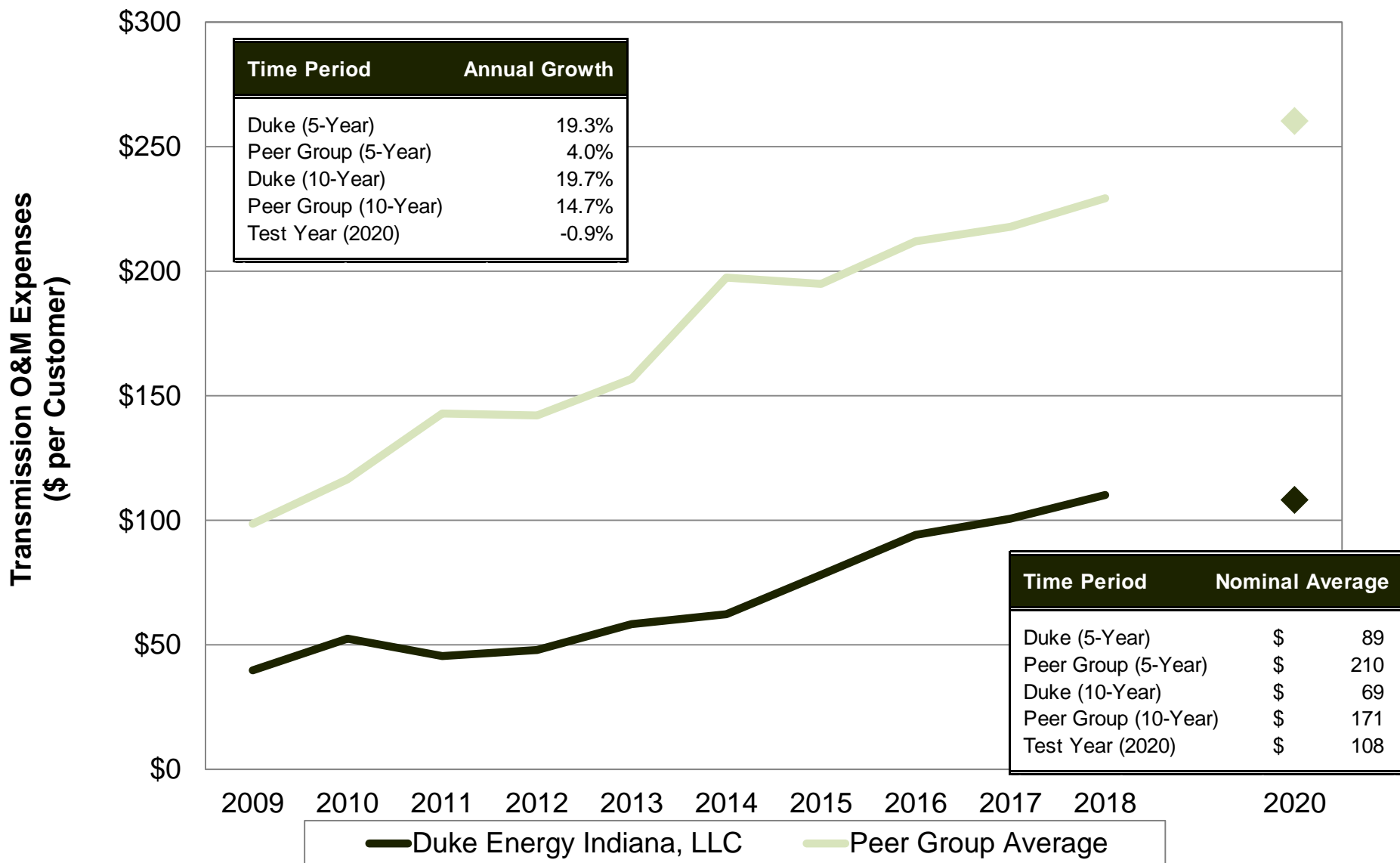
Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 40	\$ 52	\$ 46	\$ 48	\$ 58	\$ 62	\$ 78	\$ 94	\$ 101	\$ 110	\$ 108
Appalachian Power Company	(6)	36	47	67	80	148	150	227	243	227	288
Duke Energy Kentucky, Inc.	149	159	249	99	75	100	117	139	122	89	84
Empire District Electric Company	39	52	66	73	103	135	140	130	146	147	154
Indiana Michigan Power Company	(21)	15	59	69	94	142	148	167	238	202	245
Indianapolis Power & Light Company	23	24	25	22	25	24	21	57	82	94	231
Interstate Power and Light Company	255	346	422	452	576	616	645	743	640	726	791
Kansas City Power & Light Company	49	60	66	80	105	124	144	136	159	161	186
Kansas Gas and Electric Company	206	222	254	303	314	388	388	391	404	419	436
KCP&L Greater Missouri Operations Company	66	66	63	64	68	120	124	117	146	142	155
Kentucky Power Company	(5)	16	62	71	84	129	164	207	264	231	322
Kentucky Utilities Company	34	49	51	55	51	56	58	58	63	76	89
Louisville Gas and Electric Company	26	33	43	40	36	37	36	37	38	50	59
Madison Gas and Electric Company	178	211	206	209	231	229	246	242	273	255	270
MidAmerican Energy Company	72	79	49	57	66	71	77	88	100	96	114
Monongahela Power Company	45	48	305	244	271	630	362	275	224	357	280
Northern Indiana Public Service Company	38	40	44	49	64	68	78	95	99	95	115
Northern States Power Company - WI	166	185	200	211	186	231	181	260	311	286	320
Southern Indiana Gas and Electric Company	71	93	95	84	93	106	121	143	123	148	177
Union Electric Company	34	34	37	43	49	50	58	67	79	80	104
Westar Energy (KPL)	182	199	215	254	274	339	343	347	352	365	379
Wisconsin Electric Power Company	231	238	242	234	234	244	238	256	223	394	516
Wisconsin Power and Light Company	212	225	234	237	258	273	342	366	368	307	326
Wisconsin Public Service Corporation	221	251	255	253	271	281	303	331	314	324	349
Peer Group Average	\$ 99	\$ 116	\$ 143	\$ 142	\$ 157	\$ 197	\$ 195	\$ 212	\$ 218	\$ 229	\$ 260

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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	10	11	5	4	5	5	7	6	7	8	5
Appalachian Power Company	2	6	6	9	10	15	14	15	16	14	16
Duke Energy Kentucky, Inc.	16	16	20	15	9	8	8	11	8	4	2
Empire District Electric Company	9	10	12	12	14	13	11	9	10	10	8
Indiana Michigan Power Company	1	1	9	10	13	14	13	13	15	13	13
Indianapolis Power & Light Company	4	3	1	1	1	1	1	2	4	5	12
Interstate Power and Light Company	24	24	24	24	24	23	24	24	24	24	24
Kansas City Power & Light Company	12	12	13	13	15	11	12	10	12	12	11
Kansas Gas and Electric Company	20	20	21	23	23	22	23	23	23	23	22
KCP&L Greater Missouri Operations Company	13	13	11	8	8	10	10	8	11	9	9
Kentucky Power Company	3	2	10	11	11	12	15	14	17	15	18
Kentucky Utilities Company	7	9	8	6	4	4	4	3	2	2	3
Louisville Gas and Electric Company	5	4	3	2	2	2	2	1	1	1	1
Madison Gas and Electric Company	18	19	16	16	17	16	18	16	18	16	14
MidAmerican Energy Company	15	14	7	7	7	7	5	5	6	7	6
Monongahela Power Company	11	8	23	20	21	24	22	19	14	20	15
Northern Indiana Public Service Company	8	7	4	5	6	6	6	7	5	6	7
Northern States Power Company - WI	17	17	15	17	16	17	16	18	19	17	17
Southern Indiana Gas and Electric Company	14	15	14	14	12	9	9	12	9	11	10
Union Electric Company	6	5	2	3	3	3	3	4	3	3	4
Westar Energy (KPL)	19	18	17	22	22	21	21	21	21	21	21
Wisconsin Electric Power Company	23	22	19	18	18	18	17	17	13	22	23
Wisconsin Power and Light Company	21	21	18	19	19	19	20	22	22	18	19
Wisconsin Public Service Corporation	22	23	22	21	20	20	19	20	20	19	20

Transmission O&M Expenses per Customer 2009 – 2018



Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Distribution O&M Expenses per MWh 2009 – 2018

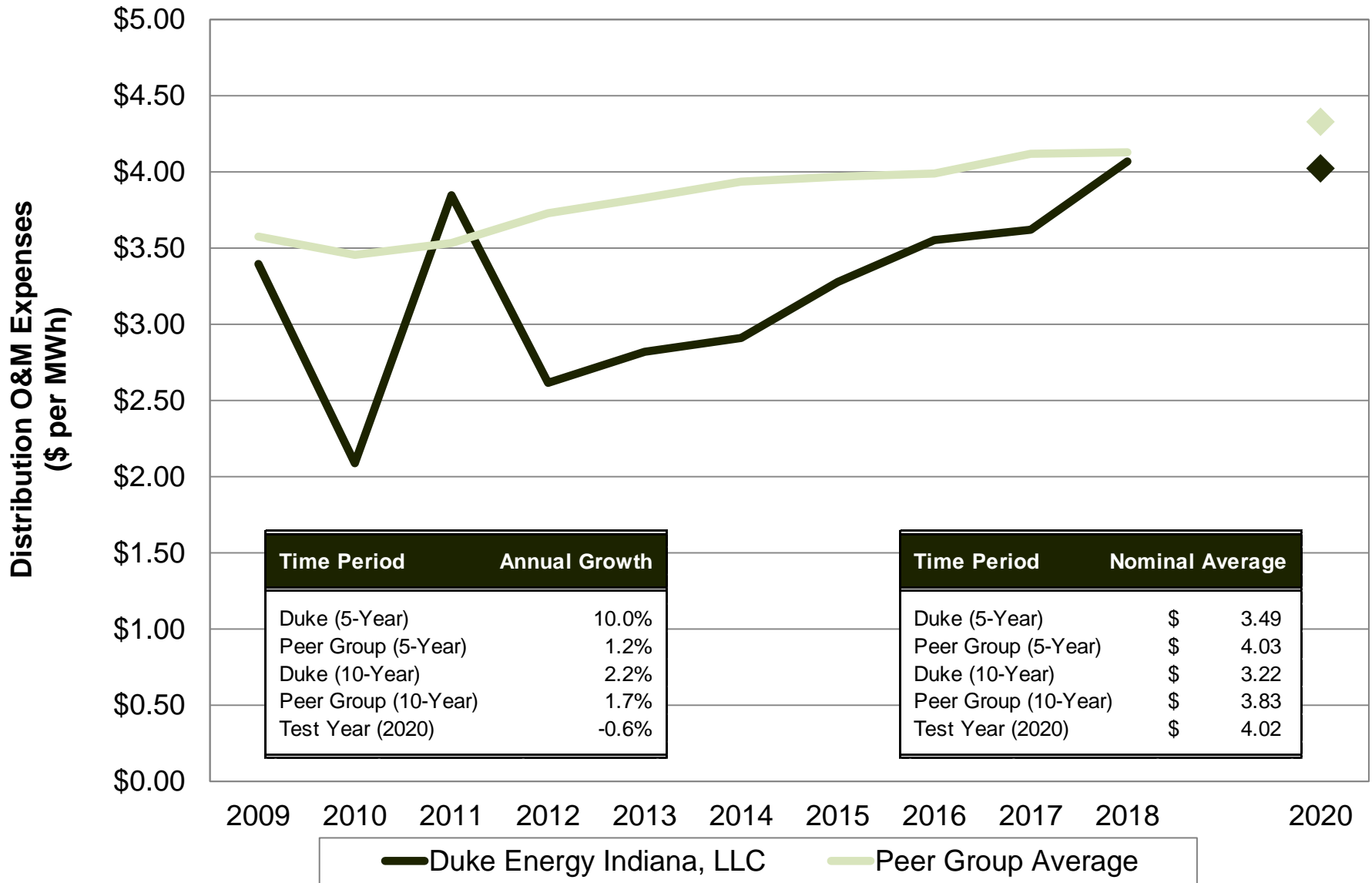
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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										(Estimated)
Duke Energy Indiana, LLC	\$ 3.40	\$ 2.09	\$ 3.85	\$ 2.62	\$ 2.82	\$ 2.91	\$ 3.28	\$ 3.55	\$ 3.62	\$ 4.07	\$ 4.02
Appalachian Power Company	5.15	3.43	2.96	3.88	5.62	4.11	4.83	5.58	5.37	7.01	9.50
Duke Energy Kentucky, Inc.	2.60	2.12	2.34	2.52	2.55	2.87	3.09	3.15	4.60	3.51	3.89
Empire District Electric Company	5.07	5.12	5.72	5.71	5.79	6.52	6.30	5.84	5.51	5.44	4.99
Indiana Michigan Power Company	3.79	3.81	2.70	2.94	3.03	3.51	3.15	3.68	3.75	4.40	4.96
Indianapolis Power & Light Company	2.52	2.44	2.49	2.73	2.63	2.70	2.87	3.00	3.27	3.16	3.43
Interstate Power and Light Company	1.55	1.69	1.59	1.78	2.09	2.16	2.29	2.05	2.39	2.30	2.37
Kansas City Power & Light Company	3.18	2.97	3.17	3.27	3.61	3.43	3.63	3.78	3.86	4.00	4.34
Kansas Gas and Electric Company	3.97	3.83	3.56	3.92	4.33	4.62	3.82	4.37	4.17	3.97	3.69
KCP&L Greater Missouri Operations Company	3.91	3.63	3.52	3.49	3.55	3.94	4.00	4.34	4.42	4.32	4.53
Kentucky Power Company	4.20	5.39	6.35	6.06	6.01	6.90	7.62	8.44	8.76	7.47	7.78
Kentucky Utilities Company	2.63	2.31	2.41	2.94	2.85	3.02	2.92	3.01	3.08	3.20	3.30
Louisville Gas and Electric Company	2.72	2.71	3.65	3.58	3.85	4.25	4.08	3.88	3.92	4.47	4.58
Madison Gas and Electric Company	3.57	3.84	4.03	4.10	4.45	4.27	4.30	4.40	4.41	4.46	4.55
MidAmerican Energy Company	4.37	4.73	4.55	4.48	4.10	4.05	3.59	3.31	3.61	3.11	2.76
Monongahela Power Company	4.67	3.14	2.95	5.46	3.17	5.33	5.86	5.64	5.67	5.37	5.39
Northern Indiana Public Service Company	2.36	2.58	2.61	2.85	2.87	2.49	2.50	2.61	2.97	3.39	4.00
Northern States Power Company - WI	3.08	3.37	3.74	3.44	3.92	3.68	3.75	3.78	3.90	4.30	4.67
Southern Indiana Gas and Electric Company	3.25	2.79	2.90	2.90	2.77	2.84	2.83	2.80	3.37	3.45	3.81
Union Electric Company	5.45	4.72	5.24	4.59	4.51	4.35	4.17	4.16	4.43	4.65	4.82
Westar Energy (KPL)	4.95	4.88	4.86	5.15	6.02	4.94	5.07	4.60	4.43	4.51	4.32
Wisconsin Electric Power Company	3.17	3.28	3.46	3.37	3.58	3.30	3.12	3.53	3.15	3.10	3.01
Wisconsin Power and Light Company	1.97	2.54	2.33	2.55	2.50	2.48	2.71	2.43	2.64	2.66	2.76
Wisconsin Public Service Corporation	4.11	4.16	4.14	4.05	4.27	4.77	4.80	3.36	3.04	2.68	2.09
Peer Group Average	\$ 3.58	\$ 3.46	\$ 3.53	\$ 3.73	\$ 3.83	\$ 3.94	\$ 3.97	\$ 3.99	\$ 4.12	\$ 4.13	\$ 4.33

Distribution O&M Expenses per MWh 2009 – 2018

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	12	2	17	4	6	7	10	11	10	13	12
Appalachian Power Company	23	14	10	15	21	15	20	21	21	23	24
Duke Energy Kentucky, Inc.	5	3	3	2	3	6	7	7	20	10	10
Empire District Electric Company	22	23	23	23	22	23	23	23	22	22	21
Indiana Michigan Power Company	14	16	7	8	9	11	9	12	11	16	20
Indianapolis Power & Light Company	4	5	5	5	4	4	5	5	7	6	7
Interstate Power and Light Company	1	1	1	1	1	1	1	1	1	1	2
Kansas City Power & Light Company	10	10	11	10	13	10	12	14	12	12	14
Kansas Gas and Electric Company	16	17	14	16	18	19	14	18	15	11	8
KCP&L Greater Missouri Operations Company	15	15	13	13	11	13	15	17	17	15	15
Kentucky Power Company	18	24	24	24	23	24	24	24	24	24	23
Kentucky Utilities Company	6	4	4	9	7	8	6	6	5	7	6
Louisville Gas and Electric Company	7	8	15	14	14	16	16	15	14	18	17
Madison Gas and Electric Company	13	18	18	18	19	17	18	19	16	17	16
MidAmerican Energy Company	19	21	20	19	16	14	11	8	9	5	3
Monongahela Power Company	20	11	9	22	10	22	22	22	23	21	22
Northern Indiana Public Service Company	3	7	6	6	8	3	2	3	3	8	11
Northern States Power Company - WI	8	13	16	12	15	12	13	13	13	14	18
Southern Indiana Gas and Electric Company	11	9	8	7	5	5	4	4	8	9	9
Union Electric Company	24	20	22	20	20	18	17	16	19	20	19
Westar Energy (KPL)	21	22	21	21	24	21	21	20	18	19	13
Wisconsin Electric Power Company	9	12	12	11	12	9	8	10	6	4	5
Wisconsin Power and Light Company	2	6	2	3	2	2	3	2	2	2	4
Wisconsin Public Service Corporation	17	19	19	17	17	20	19	9	4	3	1

Distribution O&M Expenses per MWh 2009 – 2018



Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Distribution O&M Expenses per Customer 2009 – 2018

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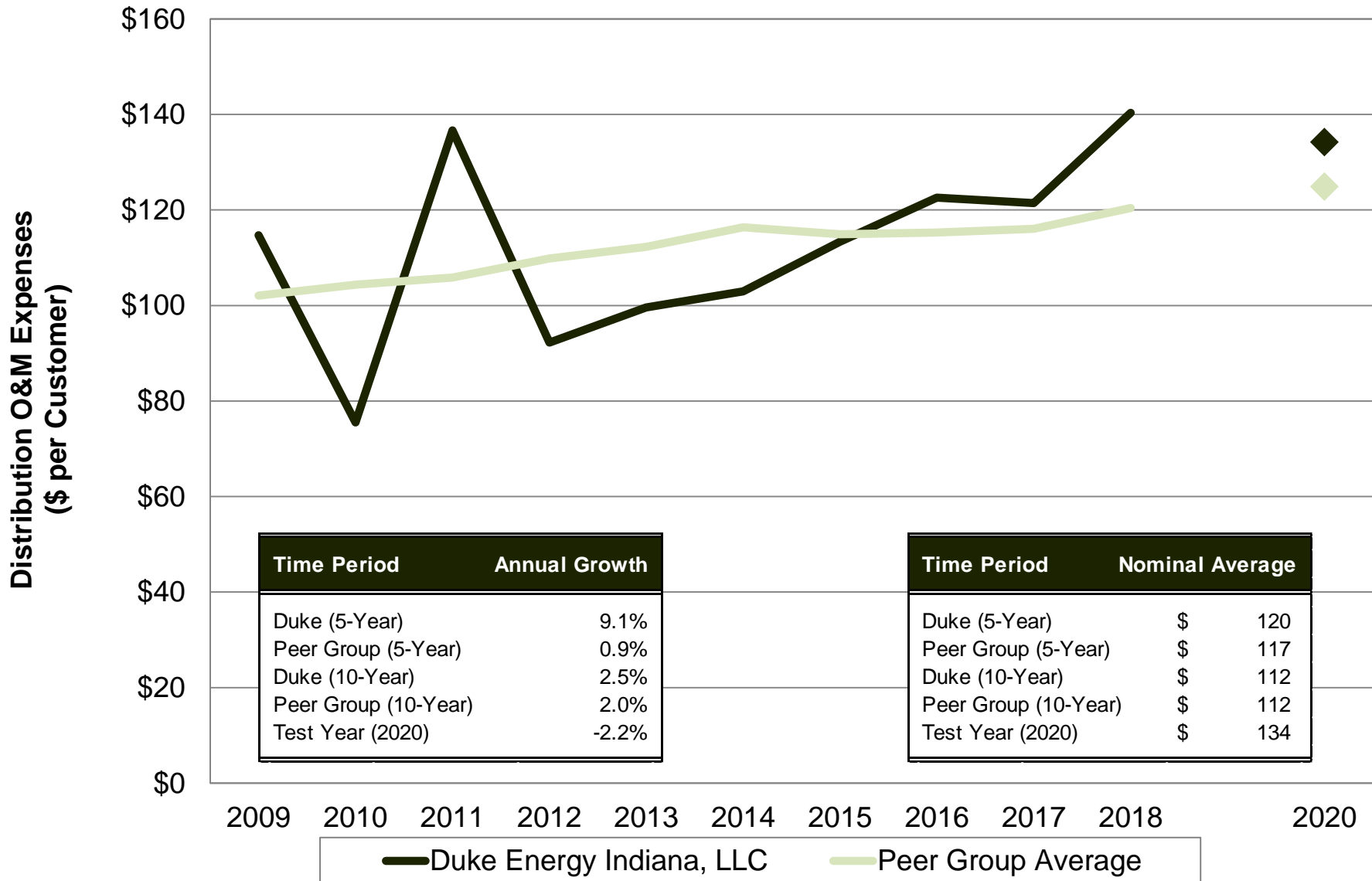
Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 115	\$ 76	\$ 137	\$ 92	\$ 100	\$ 103	\$ 113	\$ 123	\$ 121	\$ 140	\$ 134
Appalachian Power Company	163	114	94	121	176	129	146	166	155	212	280
Duke Energy Kentucky, Inc.	74	65	69	74	75	85	90	92	129	102	112
Empire District Electric Company	138	147	162	156	159	182	171	158	145	154	142
Indiana Michigan Power Company	115	122	86	93	95	110	97	115	114	137	153
Indianapolis Power & Light Company	76	76	76	81	78	79	82	84	88	88	93
Interstate Power and Light Company	44	49	46	52	61	63	66	61	70	69	72
Kansas City Power & Light Company	92	90	94	95	104	99	102	105	104	112	119
Kansas Gas and Electric Company	119	121	114	122	131	141	114	131	123	119	110
KCP&L Greater Missouri Operations Company	99	97	92	90	92	102	100	109	108	111	116
Kentucky Power Company	170	227	256	234	228	263	279	293	292	262	262
Kentucky Utilities Company	90	84	86	104	102	110	102	104	102	111	111
Louisville Gas and Electric Company	79	85	108	108	114	126	120	115	111	131	133
Madison Gas and Electric Company	82	91	96	96	103	97	96	97	94	95	94
MidAmerican Energy Company	122	141	136	134	125	124	110	104	115	104	95
Monongahela Power Company	122	87	81	148	88	157	173	168	169	169	175
Northern Indiana Public Service Company	77	91	96	104	105	95	90	94	106	118	132
Northern States Power Company - WI	74	82	96	88	102	98	98	98	102	116	127
Southern Indiana Gas and Electric Company	112	107	111	108	104	108	105	103	111	117	122
Union Electric Company	161	152	165	141	140	134	124	113	115	128	125
Westar Energy (KPL)	127	132	133	139	159	132	132	120	112	118	113
Wisconsin Electric Power Company	73	80	84	81	82	71	71	81	70	70	70
Wisconsin Power and Light Company	43	56	52	57	57	57	62	57	61	62	65
Wisconsin Public Service Corporation	98	103	102	100	104	116	116	83	74	67	52
Peer Group Average	\$ 102	\$ 104	\$ 106	\$ 110	\$ 112	\$ 116	\$ 115	\$ 115	\$ 116	\$ 120	\$ 125

Distribution O&M Expenses per Customer 2009 – 2018

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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	15	4	21	8	9	11	15	19	18	20	19
Appalachian Power Company	23	17	10	17	23	18	21	22	22	23	24
Duke Energy Kentucky, Inc.	4	3	3	3	3	5	6	6	20	7	10
Empire District Electric Company	21	22	22	23	22	23	22	21	21	21	20
Indiana Michigan Power Company	16	19	8	9	8	14	8	17	15	19	21
Indianapolis Power & Light Company	6	5	4	5	4	4	4	5	5	5	5
Interstate Power and Light Company	2	1	1	1	2	2	2	2	3	3	4
Kansas City Power & Light Company	11	11	11	10	14	9	11	13	9	11	13
Kansas Gas and Electric Company	17	18	18	18	19	21	16	20	19	16	8
KCP&L Greater Missouri Operations Company	13	14	9	7	7	10	10	14	11	10	12
Kentucky Power Company	24	24	24	24	24	24	24	24	24	24	23
Kentucky Utilities Company	10	8	7	13	11	13	12	11	8	9	9
Louisville Gas and Electric Company	8	9	16	15	17	17	18	16	13	18	18
Madison Gas and Electric Company	9	12	12	11	12	7	7	8	6	6	6
MidAmerican Energy Company	18	21	20	19	18	16	14	12	17	8	7
Monongahela Power Company	19	10	5	22	6	22	23	23	23	22	22
Northern Indiana Public Service Company	7	13	14	14	16	6	5	7	10	14	17
Northern States Power Company - WI	5	7	13	6	10	8	9	9	7	12	16
Southern Indiana Gas and Electric Company	14	16	17	16	13	12	13	10	12	13	14
Union Electric Company	22	23	23	21	20	20	19	15	16	17	15
Westar Energy (KPL)	20	20	19	20	21	19	20	18	14	15	11
Wisconsin Electric Power Company	3	6	6	4	5	3	3	3	2	4	3
Wisconsin Power and Light Company	1	2	2	2	1	1	1	1	1	1	2
Wisconsin Public Service Corporation	12	15	15	12	15	15	17	4	4	2	1

Distribution O&M Expenses per Customer 2009 – 2018



Administrative & General O&M Expenses per MWh 2009 – 2018

Witness Dismukes
Cause No. 45253
Schedule DED-15
Page 1 of 6

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										(Estimated)
Duke Energy Indiana, LLC	\$ 8.06	\$ 8.19	\$ 7.22	\$ 7.90	\$ 7.07	\$ 5.51	\$ 5.79	\$ 5.43	\$ 5.10	\$ 5.17	\$ 4.57
Appalachian Power Company	4.19	4.18	3.88	3.88	3.49	3.68	3.62	3.67	3.67	3.49	3.40
Duke Energy Kentucky, Inc.	6.36	7.04	5.75	7.06	5.86	4.58	5.14	4.73	4.93	4.90	5.07
Empire District Electric Company	6.26	6.77	7.84	9.20	9.67	9.72	10.03	10.63	11.77	11.09	11.88
Indiana Michigan Power Company	7.44	7.81	6.93	6.93	6.31	6.87	6.41	6.23	6.00	5.15	4.50
Indianapolis Power & Light Company	7.98	7.17	7.66	8.89	9.96	9.00	9.27	9.77	9.87	10.38	11.18
Interstate Power and Light Company	5.45	5.89	5.63	5.67	5.99	6.33	6.95	7.91	8.17	7.82	8.75
Kansas City Power & Light Company	9.68	9.88	11.42	10.27	10.49	10.85	10.94	11.35	10.78	10.61	10.49
Kansas Gas and Electric Company	9.83	9.86	10.27	11.18	10.74	10.12	11.02	10.56	10.24	11.59	12.42
KCP&L Greater Missouri Operations Company	8.51	7.42	8.60	9.32	9.11	9.10	10.00	10.14	10.72	11.21	12.50
Kentucky Power Company	3.40	3.28	2.92	2.99	3.03	3.34	3.64	3.70	4.45	3.72	3.93
Kentucky Utilities Company	4.73	4.87	5.40	5.21	5.91	5.23	6.34	5.83	6.01	5.76	6.06
Louisville Gas and Electric Company	6.72	6.43	7.16	6.71	7.41	6.96	7.16	6.72	6.64	6.36	6.09
Madison Gas and Electric Company	9.84	11.29	11.24	12.66	11.67	9.96	10.44	10.38	10.43	10.04	10.08
MidAmerican Energy Company	4.32	3.81	3.65	3.55	3.45	3.20	2.95	2.66	2.42	1.91	1.53
Monongahela Power Company	7.64	7.42	9.52	8.59		9.04	4.35	3.90	7.61	6.38	5.44
Northern Indiana Public Service Company	10.95	8.89	9.55	10.59	10.92	11.58	12.77	13.14	13.26	11.31	11.18
Northern States Power Company - WI	4.81	6.01	5.80	5.78	6.34	6.19	6.76	6.23	6.55	6.36	6.45
Southern Indiana Gas and Electric Company	7.55	6.86	6.77	6.88	7.25	7.13	6.73	7.09	9.03	8.05	8.57
Union Electric Company	7.14	6.26	7.35	6.45	6.80	7.53	7.38	7.66	7.41	6.97	6.72
Westar Energy (KPL)	8.72	9.34	9.34	9.85	9.95	10.79	11.65	10.93	10.43	11.86	12.45
Wisconsin Electric Power Company	6.74	8.55	8.08	8.50	7.51	6.82	5.61	5.11	5.24	5.62	5.13
Wisconsin Power and Light Company	6.43	6.90	6.87	7.04	7.84	7.70	8.08	8.17	8.16	8.12	8.35
Wisconsin Public Service Corporation	9.74	8.70	8.16	8.41	8.58	6.87	7.49	10.40	7.13	5.90	5.49
Peer Group Average	\$ 7.15	\$ 7.16	\$ 7.38	\$ 7.64	\$ 7.65	\$ 7.50	\$ 7.60	\$ 7.69	\$ 7.87	\$ 7.59	\$ 7.72

Note: Analysis of Monongahela Power Company for 2013 was not included due to data irregularities.

Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

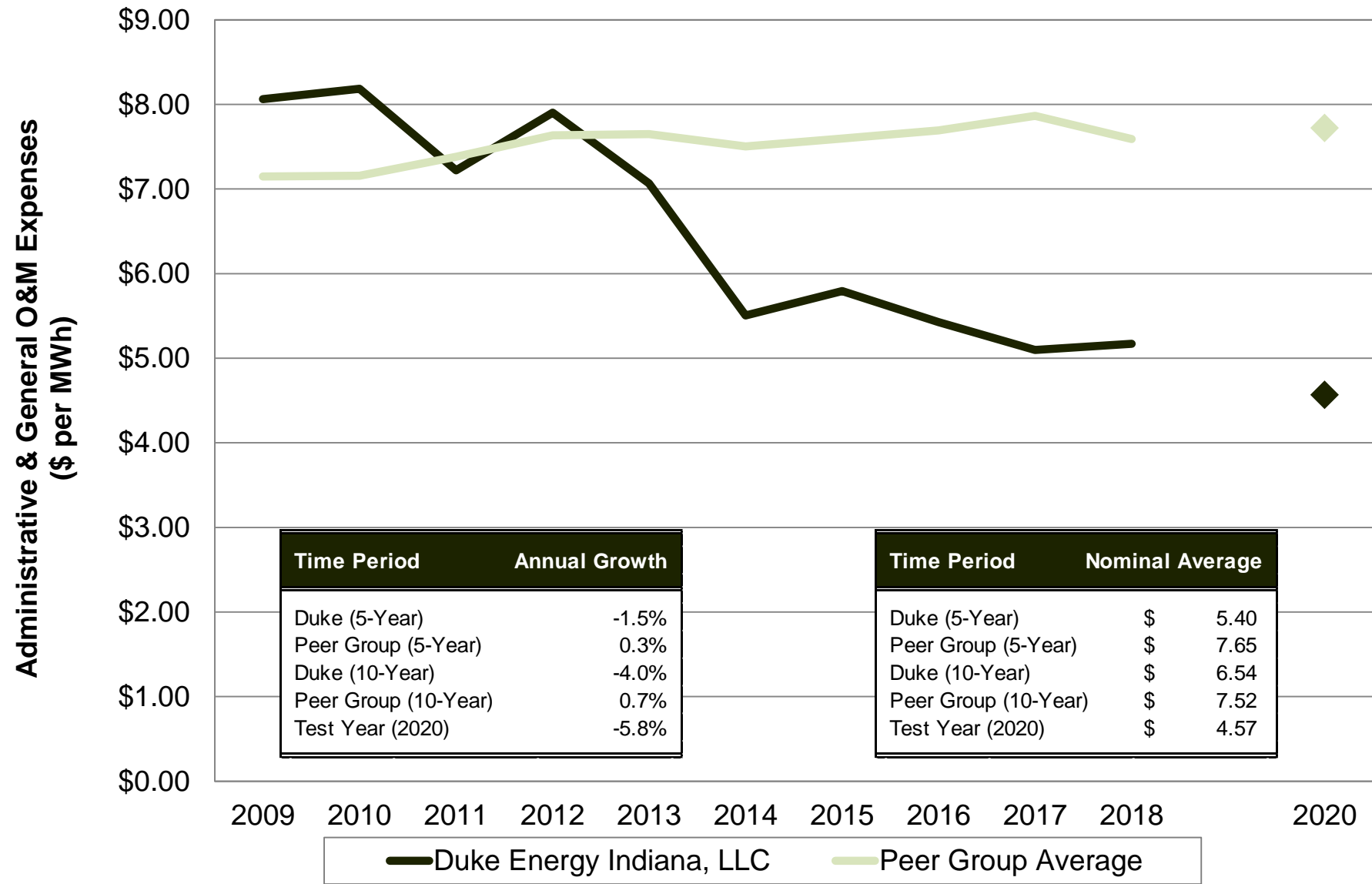
Administrative & General O&M Expenses per MWh 2009 – 2018

Witness Dismukes
Cause No. 45253
Schedule DED-15
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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/MWh)										
Duke Energy Indiana, LLC	17	17	12	13	10	6	7	7	5	6	5
Appalachian Power Company	2	3	3	3	3	3	2	2	2	2	2
Duke Energy Kentucky, Inc.	8	12	6	12	4	4	5	5	4	4	6
Empire District Electric Company	7	9	15	18	17	19	19	21	23	20	21
Indiana Michigan Power Company	13	16	10	10	7	11	9	10	7	5	4
Indianapolis Power & Light Company	16	13	14	17	19	16	17	16	17	18	19
Interstate Power and Light Company	6	5	5	5	6	8	12	14	15	14	16
Kansas City Power & Light Company	20	23	24	21	20	23	21	23	22	19	18
Kansas Gas and Electric Company	22	22	22	23	21	21	22	20	18	23	22
KCP&L Greater Missouri Operations Company	18	14	18	19	16	18	18	17	21	21	24
Kentucky Power Company	1	1	1	1	1	2	3	3	3	3	3
Kentucky Utilities Company	4	4	4	4	5	5	8	8	8	8	10
Louisville Gas and Electric Company	10	8	11	8	12	12	13	11	10	11	11
Madison Gas and Electric Company	23	24	23	24	23	20	20	18	19	17	17
MidAmerican Energy Company	3	2	2	2	2	1	1	1	1	1	1
Monongahela Power Company	15	15	20	16		17	4	4	13	12	8
Northern Indiana Public Service Company	24	20	21	22	22	24	24	24	24	22	20
Northern States Power Company - WI	5	6	7	6	8	7	11	9	9	10	12
Southern Indiana Gas and Electric Company	14	10	8	9	11	13	10	12	16	15	15
Union Electric Company	12	7	13	7	9	14	14	13	12	13	13
Westar Energy (KPL)	19	21	19	20	18	22	23	22	20	24	23
Wisconsin Electric Power Company	11	18	16	15	13	9	6	6	6	7	7
Wisconsin Power and Light Company	9	11	9	11	14	15	16	15	14	16	14
Wisconsin Public Service Corporation	21	19	17	14	15	10	15	19	11	9	9

Note: Analysis of Monongahela Power Company for 2013 was not included due to data irregularities.
Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Administrative & General O&M Expenses per MWh 2009 – 2018



Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Administrative & General O&M Expenses per Customer 2009 – 2018

Witness Dismukes
Cause No. 45253
Schedule DED-15
Page 4 of 6

Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020 (Estimated)
	(\$/Customer)										
Duke Energy Indiana, LLC	\$ 272	\$ 296	\$ 257	\$ 279	\$ 250	\$ 195	\$ 200	\$ 187	\$ 171	\$ 178	\$ 152
Appalachian Power Company	133	139	123	120	109	116	109	109	106	106	101
Duke Energy Kentucky, Inc.	181	214	171	207	172	135	150	138	138	142	146
Empire District Electric Company	170	194	222	251	266	271	273	288	309	314	338
Indiana Michigan Power Company	225	251	222	219	197	215	197	195	182	160	139
Indianapolis Power & Light Company	240	224	233	264	295	264	263	275	266	289	302
Interstate Power and Light Company	154	171	164	165	175	185	202	236	240	235	266
Kansas City Power & Light Company	278	299	339	299	303	312	306	316	290	296	288
Kansas Gas and Electric Company	294	313	328	348	325	309	329	316	303	347	369
KCP&L Greater Missouri Operations Company	215	198	225	240	237	236	250	254	263	288	319
Kentucky Power Company	137	138	118	115	115	127	133	129	148	131	132
Kentucky Utilities Company	161	179	192	184	212	190	222	201	199	199	204
Louisville Gas and Electric Company	196	201	212	202	219	207	210	199	187	186	177
Madison Gas and Electric Company	225	267	267	298	270	227	233	230	222	214	208
MidAmerican Energy Company	120	114	109	106	105	98	91	84	77	64	52
Monongahela Power Company	200	206	260	233		266	128	116	227	200	175
Northern Indiana Public Service Company	359	315	352	388	400	441	459	476	474	393	372
Northern States Power Company - WI	116	146	149	149	164	164	176	161	171	171	175
Southern Indiana Gas and Electric Company	261	264	259	257	271	271	249	262	296	273	274
Union Electric Company	211	202	231	198	210	232	220	208	193	192	175
Westar Energy (KPL)	224	252	255	265	262	287	303	284	264	311	325
Wisconsin Electric Power Company	156	209	196	205	172	147	127	118	116	127	119
Wisconsin Power and Light Company	139	153	155	159	177	176	184	191	188	190	197
Wisconsin Public Service Corporation	232	215	202	207	209	167	181	257	174	147	138
Peer Group Average	\$ 201	\$ 211	\$ 217	\$ 221	\$ 221	\$ 219	\$ 217	\$ 219	\$ 219	\$ 216	\$ 217

Note: Analysis of Monongahela Power Company for 2013 was not included due to data irregularities.
Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

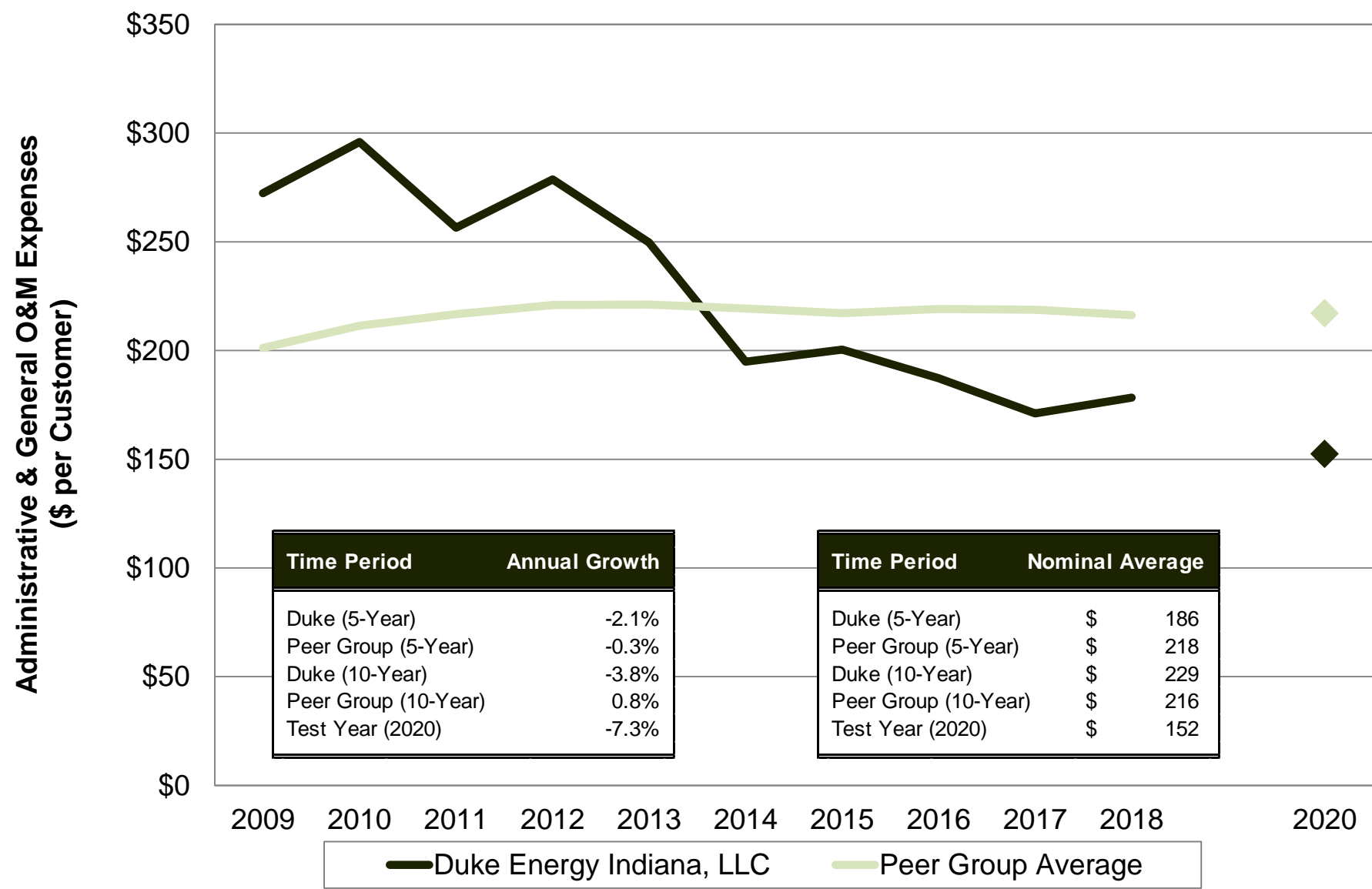
Administrative & General O&M Expenses per Customer 2009 – 2018

Witness Dismukes
Cause No. 45253
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Company	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
	(\$/Customer)										
Duke Energy Indiana, LLC	21	21	18	20	15	11	11	8	7	9	8
Appalachian Power Company	3	3	3	3	2	2	2	2	2	2	2
Duke Energy Kentucky, Inc.	10	14	7	11	6	4	6	6	4	5	7
Empire District Electric Company	9	8	13	16	17	19	20	21	23	22	22
Indiana Michigan Power Company	17	17	12	13	9	13	10	10	9	7	6
Indianapolis Power & Light Company	19	16	16	18	20	17	19	19	19	19	19
Interstate Power and Light Company	6	6	6	6	7	9	12	15	16	16	16
Kansas City Power & Light Company	22	22	23	22	21	23	22	23	20	20	18
Kansas Gas and Electric Company	23	23	22	23	22	22	23	22	22	23	23
KCP&L Greater Missouri Operations Company	14	9	14	15	14	16	18	16	17	18	20
Kentucky Power Company	4	2	2	2	3	3	5	5	5	4	4
Kentucky Utilities Company	8	7	8	7	12	10	15	12	13	13	14
Louisville Gas and Electric Company	11	10	11	9	13	12	13	11	10	10	12
Madison Gas and Electric Company	16	20	21	21	18	14	16	14	14	15	15
MidAmerican Energy Company	2	1	1	1	1	1	1	1	1	1	1
Monongahela Power Company	12	12	20	14		18	4	3	15	14	11
Northern Indiana Public Service Company	24	24	24	24	23	24	24	24	24	24	24
Northern States Power Company - WI	1	4	4	4	4	6	7	7	6	8	9
Southern Indiana Gas and Electric Company	20	19	19	17	19	20	17	18	21	17	17
Union Electric Company	13	11	15	8	11	15	14	13	12	12	10
Westar Energy (KPL)	15	18	17	19	16	21	21	20	18	21	21
Wisconsin Electric Power Company	7	13	9	10	5	5	3	4	3	3	3
Wisconsin Power and Light Company	5	5	5	5	8	8	9	9	11	11	13
Wisconsin Public Service Corporation	18	15	10	12	10	7	8	17	8	6	5

Note: Analysis of Monongahela Power Company for 2013 was not included due to data irregularities.
Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Administrative & General O&M Expenses per Customer 2009 – 2018



Source: S&P Global Market Intelligence; Company response to data request OUCC 2.4 and 2.7.

Schedule DED-16
Duke Energy Indiana's Responses to Discovery Requests

This schedule presents a compilation of Duke Energy Indiana's documents and responses to discovery requests cited in the direct testimony of David E. Dismukes, Ph.D.

OUCC 1.14.....	2
OUCC 1.22.....	4
Attachment OUCC 1.22-A	6
OUCC 1.27.....	8
OUCC 1.31.....	10
OUCC 1.36.....	12
OUCC 1.37.....	15
OUCC 1.38.....	17
OUCC 1.42.....	20
OUCC 36.4.....	23
OUCC 1.28.....	25
CONFIDENTIAL ATTACHMENT OUCC 1.28-A	27

OUCC 1.14

OUC
IURC Cause No. 45253
Data Request Set No. 1
Received: July 30, 2019

OUC 1.14

Request:

Please describe in detail any ratepayer protection mechanisms (e.g. limit/cap on amount recovered, limit to recovery if earning return, rider term/expiration, etc.) that Duke Energy Indiana has included in its decoupling proposal.

Response:

As explained in the direct testimony of Dr. Hansen (page 20), Duke Energy Indiana proposed a decoupling mechanism that is initially limited to five years with an evaluation of the program prior to the expiration and recommendation as to whether the program should be maintained, expanded, or discontinued in a separate proceeding. At the end of the five years, the decoupling mechanism expires unless the Commission approves its continued use. The impact of the decoupling proposal on revenues is subject to the earnings test pursuant to Ind. Code §8-1-2-42, wherein Duke Energy Indiana cannot exceed its authorized return in excess of that authorized by the Commission.

Witnesses: Maria Diaz / Dan Hansen

OUCC 1.22

sOUCC
IURC Cause No. 45253
Data Request Set No. 1
Received: July 30, 2019

OUCC 1.22

Request:

Please provide on an annual basis, for the last ten years, any other revenue collected from customers through an adjustment or rider mechanism. Provide this comparison by type of rider/adjustment, and describe each mechanism. Please provide the requested documents in electronic form with all spreadsheet links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Objection:

Duke Energy Indiana objects to this data request on the basis that it is vague, ambiguous. The term “adjustment” is not defined or reasonably limited in scope.

Response:

Subject to and without waiving or limiting its objections, and in the spirit of cooperation, Duke Energy Indiana responds as follows:

Please see Attachment OUCC 1.22-A for 2009-2018 rider revenue.

Please also see Petitioner’s Exhibit 2, Direct Testimony of Brian P. Davey, Table 1 starting on page 3 for a description of all riders along with the Company witness who provided proposed rate making information.

Witness: Brian P. Davey

Attachment OUCC 1.22-A

DUKE ENERGY INDIANA, LLC

RETAIL BILLED REVENUE
(DOLLARS IN THOUSANDS)

Line No.	Year/Month	Fuel Clause Adjustment	IGCC Adjustment	Environmental Compliance Investment Adjustment	Property Tax Component	SO2, NOX And HG Emission Allowance Adjustment	T&D Infrastructure Improvement Cost Rate Adjustment	Demand Side Management Adjustment	Energy Efficiency Revenue Adjustment	Tax and Merger Credits Adjustment	MISO Adjustment	Summer Reliability Adjustment	Clean Coal Operating Cost Revenue Adjustment	Environmental Compliance Cost Adjustment	Federally Mandated Cost Rate Adjustment	Renewable Energy Project Revenue Adjustment	Line No.
		(Rider 60)	(Rider 61)	(Rider 62)	(Rider 62)	(Rider 63)	(Rider 65)	(Rider 66)	(Rider 66A)	(Rider 67)	(Rider 68)	(Rider 70)	(Rider 71)	(Rider 71)	Rider 72	Rider 73	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	
1	2009	309,406	26,885	104,017	2,010	6,281	-	3,875	-	(10,930)	17,773	4,008	106,298	-	-	-	1
2	2010	270,373	77,134	106,301	(2,608)	27,176	-	(5,753)	-	(12,545)	22,906	7,065	113,683	-	-	-	2
3	2011	386,235	106,458	105,087	(3,360)	10,632	-	17,869	-	(11,407)	16,830	8,828	100,723	-	-	-	3
4	2012	452,261	104,478	95,415	(1,166)	4,131	-	4,777	31,832	(10,969)	25,318	9,653	106,762	-	-	-	4
5	2013	494,021	227,440	86,416	(106)	6,110	-	(7,543)	67,395	(12,013)	26,636	11,868	115,426	(1,372)	-	-	5
6	2014	611,337	300,833	85,597	-	5,834	-	(85)	57,681	(12,166)	33,872	14,368	117,081	-	-	-	6
7	2015	405,272	295,269	87,125	-	2,590	-	-	23,046	(11,181)	38,569	13,762	108,754	-	-	-	7
8	2016	282,242	315,687	91,023	-	(757)	-	-	47,130	(11,166)	50,252	15,962	156,225	-	1,593	-	8
9	2017	327,701	347,739	83,503	-	(1,563)	19,761	-	51,463	(11,333)	52,648	17,777	162,642	-	2,570	1,718	9
10	2018	347,602	365,715	82,590	-	(384)	40,286	-	70,404	(15,010)	64,552	16,441	169,807	-	2,885	7,568	10
11	Total	3,886,450	2,167,638	927,074	(5,230)	60,050	60,047	13,140	348,951	(118,720)	349,356	119,732	1,257,401	(1,372)	7,048	9,286	11

OUCC 1.27

Request:

Please refer to page 5, lines 1-4, of Mr. Hansen's direct testimony, where he states "Duke Energy Indiana's proposed pilot rates include dynamic rates, which change with system conditions (as forecast on a day-ahead basis) and a demand-based rate. As customers respond to these rates, the resulting change in utility revenue is likely to be larger than the change in its short-term costs." Please provide all studies and analyses conducted by or on the behalf of the Company, which evaluated the change in revenue that will result from the Company's proposed dynamic or peak pricing pilot programs. Please provide all workpapers and source documents in electronic form. Please provide the requested documents in electronic form with all spreadsheet links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Objection:

Duke Energy Indiana objects to this request to the extent it seeks a calculation or analysis that has not already been performed and that Duke Energy Indiana objects to performing.

Response:

Subject to and without waiving or limiting its objections, and in the spirit of cooperation, Duke Energy Indiana responds as follows:

The Company has not conducted, nor had conducted on its behalf, any studies to evaluate the change in revenue that will result from the pilot programs. A primary focus of the pilots is to understand customer engagement and price response, from which those results can be extrapolated to the broader customer population.

Witness: Jeffrey R. Bailey

OUCC 1.31

Request:

Please refer to pages 10-11, of Mr. Hansen's direct testimony, where he discusses the Sale Reconciliation Component ("SRC") of the other Indiana utilities' Energy Efficiency Rider ("EE Rider").

- a. Please explain in detail how the SRC is different than the Company's ability to recover lost revenue associated with energy efficiency efforts under its current Energy Efficiency Revenue Adjustment rider ("EERA Rider").
- b. Please explain why the Company did not implement the same SRC as its peer utilities as part of its EERA Rider?
- c. Please explain why the Company is not offering a cap on the amount allowed to be recovered in its proposed RDM similar to the 4 percent cap under the SRC?

Response:

- a. The Company's EERA Rider contains a lost revenue adjustment mechanism ("LRAM") while the SRC is a revenue per customer decoupling mechanism (like the RDM). The difference between these two mechanisms is described on page 6 line 4 through page 7 line 3 of Daniel Hansen's direct testimony. In addition, three of the four SRC mechanisms cap annual deferrals at four percent (Indiana Natural Gas is the exception), though amounts in excess of the cap are carried forward for future recovery.
- b. Ind. Code 8-1-8.5-10 explicitly provides that if a Utility EE Plan is found to be reasonable, then it is entitled to reasonable lost revenues. Prior to the enactment of SEA 412, which codified Ind. Code 8-1-8.5-10, the Commission rules provided for lost revenues for Company-sponsored EE.
- c. The Company expects that the RDM will lead to rate increases and decreases from year-to-year and prefers a symmetric approach to the resulting RDM credits and surcharges. Note that the Company is not proposing to cap the amount by which the RDM can refund revenue to customers.

Witness: Dan Hansen

OUCC 1.36

Request:

Please provide the Company's electric revenue margin and the total lost sales margin due to energy efficiency for each year for the period 2009-2018 and as projected for each year 2019-2024. Please provide any workpapers in electronic spreadsheet form, with all links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Objection:

Duke Energy Indiana objects to this request to the extent it seeks a calculation or analysis that has not already been performed and that Duke Energy Indiana objects to performing.

Duke Energy Indiana further objects to this data request on the basis that it is vague, ambiguous, and not reasonably calculated to lead to the discovery of admissible evidence. The terms "electric revenue margin," and "electric revenue margin" are not defined.

Response:

Subject to and without waiving or limiting its objections, and in the spirit of cooperation, Duke Energy Indiana responds as follows:

Assuming electric revenue margin is defined as revenues less fuel, emission allowances and purchased power, please see Attachment OUC 1.36-A for actual electric revenue margin for 2009 – 2018 and projected for 2019 – 2023. The Company has not yet included 2024 in the Company's 5-year plan forecasts.

Duke Energy Indiana began lost revenue recovery on its Company-sponsored energy efficiency program in 2012. Since that time, the lost revenue recovery the Company has received via its EE Rider has served to offset base rate revenue recovery lost due to the reduction in sales from the Company-sponsored energy efficiency programs. Therefore, the impact of lost sales from the Company's energy efficiency programs on the Company's revenue margin for 2012 through 2018 is zero. It is also forecasted to continue to be zero, assuming continued approval of reasonable lost revenues in future EE plan filings. The Company has not calculated the negative revenue impact of Company-sponsored energy efficiency programs offered in 2009 through 2011.

Please see Attachment OUC 1.36-B for the amount of lost revenues earned for Company-sponsored energy efficiency programs for programs offered during 2009 through 2018 and projected to be earned in 2019. The Company's current three-year plan ends in 2019. The 2020

– 2023 plan to be presented for Commission approval in a filing this fall has not yet been finalized and the fixed costs to be approved in this base rate proceeding and the timing of base rate implementation will impact lost revenue amounts for 2020 forward, so projected amounts have not been included past 2019.

Witness: Diana L. Douglas

OUCC 1.37

OUC
IURC Cause No. 45253
Data Request Set No. 1
Received: July 30, 2019

OUC 1.37

Request:

Please provide the year end rate base, separately, for electric distribution and energy efficiency programs for each year 2009-2018 and as projected for each year 2019-2024. Please provide any workpapers in electronic spreadsheet form, with all links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Objection:

Duke Energy Indiana objects to this request as the term “any” is vague, ambiguous, overly broad and unduly burdensome. Additionally, Duke Energy Indiana objects to this request to the extent it seeks a calculation or compilation that has not already been performed and that Duke Energy Indiana objects to performing.

Response:

Subject to and without waiving or limiting its objections, and in the spirit of cooperation, Duke Energy Indiana responds as follows:

Duke Energy Indiana has not had and is not forecasting to have any energy efficiency programs that were or are forecasted to be included in rate base from 2009 – 2023, so the amount for each year would be zero. Please see Attachment OUC 1.37-A for the total company amounts of electric distribution rate base for 2009 – 2018 and forecasted for 2019 – 2023 that were or are projected to be in rate base in either base rates or the Company’s TDSIC Rider. The Company has not yet included 2024 in its 5-year forecasting process.

Witnesses: Diana Douglas / Chris Jacobi

OUCC 1.38

Request:

For the purpose of this request, please refer to the Company's electric operations and energy efficiency efforts over the last 10 years.

- a. Please provide the annual achieved rate of return ("ROR") and return on equity ("ROE") that the Company has earned on its energy efficiency programs for each of the last 10 years.
- b. Please provide the impact that the Company's energy efficiency programs have had on its overall achieved ROE over the last 10 years.
- c. Please provide any workpapers in electronic spreadsheet form, with all links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Objection:

Duke Energy Indiana objects to this request to the extent it seeks a calculation or analysis that has not already been performed and that Duke Energy Indiana objects to performing. Duke Energy Indiana also objects to this request to the extent it purports to require Duke Energy Indiana to supply information in a format other than the format in which Duke Energy Indiana keeps such information. Finally, Duke Energy Indiana objects to this data request on the basis that it is vague, ambiguous, and not reasonably calculated to lead to the discovery of admissible evidence. The terms "annual achieved rate of return," and "return on equity . . . earned on its energy efficiency programs" are not defined or reasonably limited in scope.

Response:

Subject to and without waiving or limiting its objections, and in the spirit of cooperation, Duke Energy Indiana responds as follows:

- a. See objection.
- b. Please see Attachment OUC 1.38-A for the amount of shareholder incentives earned for Company-sponsored energy efficiency programs for programs offered during 2009 through 2018 and projected to be earned in 2019. The Company's current three-year plan ends in 2019. The 2020 – 2023 plan to be presented for Commission approval in a filing

this fall has not yet been finalized, so projected amounts have not been included past 2019. The shareholder incentives times one minus the Company's statutory composite state and federal income tax rate for each year would produce the contribution to the earnings used in calculating the Company's overall achieved ROE from energy efficiency programs.

- c. See response to b.

Witness: Diana L. Douglas

OUCC 1.42

Request:

Please refer to page 38, lines 15-19, of Ms. Diaz's direct testimony, where she states "Each month, for each of the applicable rate classes (RS and CS), the Company would calculate the actual fixed costs recovered that month. The fixed costs recovered would be compared to the monthly portion of fixed costs allowed for recovery from this base rate case proceeding, as adjusted for the actual number of customer bills."

- a. Please explain in detail and provide all alternatives that the Company considered its proposed RDM in order to recover fixed costs such as an increase in the customer charges or the addition of a facilities charge?
- b. For the alternatives identified in (a), please explain for each alternative why it was not a viable option for the Company to recovery its fixed costs.
- c. Please explain in detail and provide the proportion of fixed costs that the Company is proposing to recover in its connection charge and the fixed costs that will be recovered through the energy kWh charge?
- d. Please provide any workpapers in electronic spreadsheet form, with all links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Objection:

Duke Energy Indiana objects to this request as the term "any" is vague, ambiguous, overly broad and unduly burdensome. Additionally, Duke Energy Indiana objects to this request to the extent it seeks a calculation or compilation that has not already been performed and that Duke Energy Indiana objects to performing.

Response:

Subject to and without waiving or limiting its objections, Duke Energy Indiana responds as follows:

- a. The Company did not analyze other alternatives because the Company desired a broader mechanism that did not materially impact individual customers.

- b. N/A
- c. The proportion of fixed costs recovered through the energy charge for residential service is 89.6%. Please see Attachment OUCC 1.42-A for details.
- d. See part c.

Witness: Jeff Bailey

OUCC 36.4

Request:

On page 25 lines 1-4, of his testimony, Mr. Bailey states “While we are initially employing pilots to gain experience in customer usage and adoption characteristics, our work has shown that the potential for revenue erosion is significant when pilots become fully available to the general populous of customers, potentially running into the tens of millions.”

- a. Please provide all studies and analyses undertaken by or on the behalf of the Company that show employing pilots will lead to significant revenue erosion.
- b. Please provide all studies and analyses undertaken by of on the behalf of the Company that show pilot programs will result in revenue erosion into the “tens of millions.”
- c. Please provide all studies and analyses undertaken by or on the behalf of the Company, which estimate the impact (revenue losses and revenue gains) that the Company’s proposed dynamic pricing pilot programs will have on the Residential and Commercial rate class revenues over the next five years absent the adoption of a decoupling mechanism. Please provide the information separately by rate class and by year.
- d. Provide all workpapers and source documents used in connection with this response. Please provide the requested documents in electronic form with all spreadsheet links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Response:

- a. The question misconstrues the testimony. The impact of the pilots on revenue will not likely be significant. The issue is when pilots become fully available to the general populous of customers.
- b. Please see Response to CAC 12.10.
- c. No such studies have been performed, although as pilot programs revenue erosion is not expected to be significant.
- d. See responses to items a, b, and c.

Witness: Jeffrey R. Bailey

OUCC 1.28

Request:

Please refer to page 5, line 14, of Mr. Hansen's direct testimony where he states, "This program would result in a reduction in billed sales in the range of 1 to 2 percent." Please provide all studies and analyses conducted by or on the behalf of the Company which show that the Company's TDSIC plan will reduce billed sales by 1 to 2 percent. Please provide all workpapers and source documents in electronic form. Please provide the requested documents in electronic form with all spreadsheet links and formulas intact, source data used, and explain all assumptions and calculations used. To the extent the data requested is not available in the form requested, please provide the information in the form that most closely matches what has been requested.

Response:

Duke Energy Indiana would operate Integrated Volt Var Control (IVVC) in the form of Conservation Voltage Reduction (CVR), which supports voltage reduction. CVR functionality would enable the voltage to be lowered an average of approximately 2% at the distribution substation on enabled circuits, while maintaining voltage within regulatory limits for all customers. $\text{CVR factor} = \% \text{ Load Reduction} / \% \text{ Voltage Reduction}$. Assuming an average CVR factor of 0.7, this 2% voltage reduction is estimated to result in a 1.4% reduction in demand load on these circuits. Duke Energy has successfully implemented an IVVC solution at Duke Energy Ohio with similar results, which are expected to be achieved in Duke Energy Indiana.

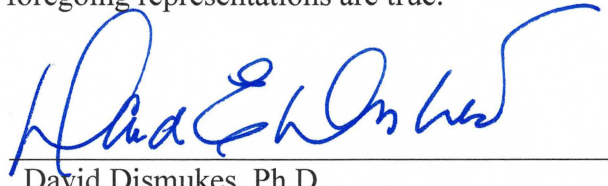
An industry standard dispatch model is used to determine the most efficient and cost-effective combination of generation assets to meet the system demand load. The system is then evaluated with and without IVVC load reductions using the above-mentioned assumptions to estimate the net benefits. See Confidential Attachment OUC 1.28-A, which is a copy of Mr. Howard Fowler's Confidential Workpaper 3-WHF filed in Cause 44720, for the benefits calculations. See also Confidential Attachment OUC 1.28-B, which provides data supporting the 1.4% reduction in demand load on IVVC enabled circuits.

Witnesses: Daniel G. Hansen / Cicely M. Hart

CONFIDENTIAL ATTACHMENT OUCC 1.28-A

AFFIRMATION

I affirm, under the penalties for perjury, that the foregoing representations are true.



David Dismukes, Ph.D.

Consulting Economist

Acadian Consulting Group

Consultant for the Indiana Office of Utility
Consumer Counselor

Cause No. 45253

Duke Energy Indiana, LLC

October 30, 2019

Date

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the foregoing was served by electronic mail this 30th day of October to the following:

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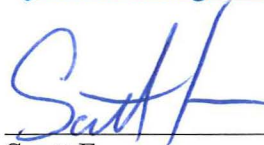
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