

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

VERIFIED PETITION OF SOUTHERN INDIANA GAS)
AND ELECTRIC COMPANY d/b/a VECTREN ENERGY)
DELIVERY OF INDIANA, INC. ("VECTREN SOUTH"))
FOR (1) ISSUANCE OF A CERTIFICATE OF PUBLIC)
CONVENIENCE AND NECESSITY FOR THE)
CONSTRUCTION OF A COMBINED CYCLE GAS)
TURBINE GENERATION FACILITY ("CCGT"); (2))
APPROVAL OF ASSOCIATED RATEMAKING AND)
ACCOUNTING TREATMENT; (3) ISSUANCE OF A)
CERTIFICATE OF PUBLIC CONVENIENCE AND)
NECESSITY FOR COMPLIANCE PROJECTS TO MEET)
FEDERALLY MANDATED REQUIREMENTS ("CULLEY)
3 COMPLIANCE PROJECT"); (4) AUTHORITY TO)
TIMELY RECOVER 80% OF THE COSTS INCURRED)
DURING CONSTRUCTION AND OPERATION OF THE)
CULLEY 3 COMPLIANCE PROJECTS THROUGH)
VECTREN SOUTH'S ENVIRONMENTAL COST)
ADJUSTMENT MECHANISM; (5) AUTHORITY TO)
CREATE REGULATORY ASSETS TO RECORD (A) 20%)
OF THE REVENUE REQUIREMENT FOR COSTS,)
INCLUDING CAPITAL, OPERATING, MAINTENANCE,)
DEPRECIATION, TAX AND FINANCING COSTS ON THE)
CULLEY 3 COMPLIANCE PROJECT WITH CARRYING)
COSTS AND (B) POST-IN-SERVICE ALLOWANCE FOR)
FUNDS USED DURING CONSTRUCTION, BOTH DEBT)
AND EQUITY, AND DEFERRED DEPRECIATION)
ASSOCIATED WITH THE CCGT AND CULLEY 3)
COMPLIANCE PROJECT UNTIL SUCH COSTS ARE)
REFLECTED IN RETAIL ELECTRIC RATES; (6))
ONGOING REVIEW OF THE CCGT; (7) AUTHORITY TO)
IMPLEMENT A PERIODIC RATE ADJUSTMENT)
MECHANISM FOR RECOVERY OF COSTS DEFERRED)
IN ACCORDANCE WITH THE ORDER IN CAUSE NO.)
44446; AND (8) AUTHORITY TO ESTABLISH)
DEPRECIATION RATES FOR THE CCGT AND CULLEY)
3 COMPLIANCE PROJECT ALL UNDER IND. CODE §§ 8-)
1-2-6.7, 8-1-2-23, 8-1-8.4-1 *ET SEQ.*, 8-1-8.5-1 *ET SEQ.*, AND)
8-1-8.8 -1 *ET SEQ.*)

CAUSE NO. 45052

INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR

REDACTED TESTIMONY OF


PETER M. BOERGER PH.D – PUBLIC'S EXHIBIT NO. 3

AUGUST 10, 2018

Respectfully submitted,



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TESTIMONY OF OUCC WITNESS PETER M. BOERGER, PH.D.
CAUSE NO. 45052
SOUTHERN INDIANA GAS AND ELECTRIC COMPANY
D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC.

I. INTRODUCTION

1 **Q: Please state your name, business address, and employment capacity.**

2 A: My name is Peter M. Boerger, and my business address is 115 West Washington
3 St., Suite 1500 South, Indianapolis, Indiana 46204. I am employed by the Indiana
4 Office of Utility Consumer Counselor (“OUCC”) as a senior economist in the
5 Electric Division, with the official job title of Senior Utility Analyst. A summary
6 of my educational and professional background, as well as my duties and
7 responsibilities at the OUCC, can be found in Appendix A.

8 **Q: Please describe the examination and analysis you conducted in order to**
9 **prepare your testimony.**

10 A: I reviewed the petition, direct testimony and discovery responses presented by
11 Southern Indiana Gas and Electric Company d/b/a Vectren Energy Delivery of
12 Indiana, Inc. (“Vectren” or “Petitioner”) related to its proposal in this Cause. I also
13 visited A. B. Brown, and F. B. Culley coal facilities, attended the field hearing and
14 attended other meetings and teleconferences with the Petitioner.

15 **Q: What is the purpose of your testimony?**

16 A: I present my analysis of Vectren’s proposal and review of Vectren’s economic
17 modeling. My analysis shows that Vectren’s proposal did not adequately consider
18 viable options for serving its customers—including making use of existing
19 resources and adequately considering the addition of a smaller combined cycle gas

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1 turbine (“CCGT”) unit rather than the large unit being proposed. I also determine
2 that Vectren’s economic modeling of the proposed CCGT understated its capital
3 cost by \$200 million, an error that disadvantaged other options in the Petitioner’s
4 economic modeling. Given the significance of this case, the OUCC recommends
5 that Vectren reevaluate its future needs, including in its modeling the full cost of
6 resource alternatives, a smaller CCGT along with refueling of its Brown Unit(s),
7 and to more fully consider continued use of its existing assets. While that analysis
8 will take additional time, the OUCC’s engineering and environmental witnesses
9 (Mr. Anthony A. Alvarez and Ms. Lauren M. Aguilar) have determined that
10 reaching a decision at the end of the 2019 IRP process would allow sufficient time
11 to take action (based on the results of that more complete evaluation) without
12 affecting reliable service to Vectren’s customers.

13 **Q: Please summarize Vectren’s proposal in this case.**

14 A: Vectren’s petition outlines¹ eight specific requests, which I condense and
15 summarize as requesting a certificate of public convenience and necessity
16 (“CPCN”) under Ind. Code § 8-1-8.5-2 to spend \$781 million² for construction of
17 an 800 to 900 MW CCGT facility, as well as \$90 million for environmental
18 investments at the Petitioner’s Culley generation facility. Vectren’s stated need for
19 the CCGT is based on the proposal to retire or exit the use of 865 MW of current
20 generating capacity.

¹ Pages 2 and 3 of the Petition.

² See page 15 of the Direct Testimony of Wayne D. Games.

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1 **Q: How does Vectren support that proposal?**

2 A: The Petitioner presents 13 witnesses covering aspects of economic analysis,
3 engineering, environmental compliance and regulatory treatment.

4 **Q: Given the large size of the investment proposed by the Vectren, does it have a**
5 **margin of error in its decision?**

6 A: Unfortunately not. Vectren is already the highest cost electricity provider among
7 investor-owned utilities in Indiana. Vectren's customers cannot afford missteps
8 related to incorrect forecasts about the future or inappropriate technology choices.
9 Local businesses and the local economy cannot bear unnecessary rate increases
10 because, unlike Vectren, those businesses must compete in national and
11 international markets based in part on the cost of electricity.

12 **Q: What are some of the uncertainties facing electric utilities that could change**
13 **the attractiveness of Vectren's proposed investment?**

14 A: The current federal administration has already taken actions to ease regulations on
15 the use of coal and may take more in the future; a future federal administration
16 might swing the other way. Natural gas looks economic right now, and the market
17 consensus appears to be that gas prices will remain low for a long time. However,
18 it is possible that forecast could change due to regulations on fracking. While
19 electric vehicles currently represent a tiny share of electric load, some companies
20 are betting billions of dollars that electric propulsion will gain a large market share.
21 This could change significantly the types of electricity supply that may look
22 economic a decade from now, perhaps by raising the value of off-peak generation
23 (such as wind) and/or through making use of automobile batteries as part of a

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1 connected system of utility storage. Additionally, as much as coal was the
2 unquestioned choice for electric generation in Indiana a decade or two ago,
3 renewables are being viewed by Wall Street as more economically viable and
4 having lower risks as part of a generation portfolio. Conversely, if renewables are
5 implemented in larger quantities, control of renewables (which currently continue
6 to be intermittent in nature) on the grid could be difficult.

7 **Q: If the OUCC recognizes the uncertainties previously discussed, how can it**
8 **question a utility's proposal to serve its customers reliably and economically**
9 **in the face of such uncertainty?**

10 A: While the OUCC does not have any single path that it can propose, the agency
11 recognizes that some strategies for moving forward are more suited to future
12 uncertainty than others. A small, high cost electric utility like Vectren needs a
13 strategy that 1) makes use, to the greatest degree possible, of the assets that it
14 already owns and 2) provides it with flexibility to avoid an expensive 30-year
15 commitment and a related inability to take advantage of opportunities as an
16 uncertain future unfolds.

17 **Q: Aren't large combined cycle gas plants, such as the one proposed by Vectren**
18 **in this proceeding, the "go-to" solution for electric utilities shutting down coal**
19 **facilities right now?**

20 A: Generally, but most electric utilities are not as small as Vectren and most utilities
21 in Indiana do not have electric rates as high as Vectren's.³ While a small utility
22 might have a higher cost of service than a larger utility due to lesser economies of

³ Vectren has the highest residential electric rates in the IURC's 2018 Residential Bill Survey, available on the IURC web site.

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1 scale, such an explanation does not change the reality of the burden that those rates
2 place on local residents and the local economy. A large gas-fired plant might make
3 sense for large electric utilities; however, it is more prudent for small, higher-cost
4 utilities like Vectren to take a more incremental path to the future than a larger
5 utility might take.

6 **Q: What do you mean by an “incremental path”?**

7 **A:** Small steps, such as taking advantage of existing assets where possible, can allow
8 the utility to evaluate the future as it unfolds rather than betting on the future.
9 Incrementalism can allow a gradually rising cost burden on customers, rather than
10 large cost increases resulting from excess capacity or from an inability to take
11 advantage of new generation and storage technologies as they become more cost
12 effective.

13 **Q: Does Vectren’s modeling show that it will have a very high reserve margin**
14 **after the proposed CCGT is built?**

15 **A:** Yes. The Strategist output report modeling the Petitioner’s preferred path forward
16 shows a ████████% reserve margin in 2024.⁴ Compared to MISO’s current ICAP⁵
17 reserve margin of 17.1%, Vectren’s expected level is high. Further evidence of
18 excess capacity in 2024 is in Vectren’s modeling, which shows that its economic

⁴ Calculated as a ████████ MW reserve above its expected ████████ MW peak load, found in the Strategist report “Preferred-7F5F-GAF SYSTEM – CONFIDENTIAL.REP” which was created by the Petitioner as part of its updated 2017 modeling. The “Preferred-7FDF” model run is the Petitioner’s preferred solution coming out of its updated 2017 modeling, as stated in response to ICC DR 3-10.

⁵ “ICAP” is MISO’s designation for “installed capacity,” which can be contrasted with “UCAP” which means “unforced capacity,” reflecting installed capacity less forced outage rates. Vectren’s modeling uses installed capacity, so MISO’s ICAP requirements are relevant rather than its UCAP requirements.

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1 energy sales in 2024 (sales that are sold into MISO's market beyond what is needed
2 to serve retail customers) to be ██████ GWh. This represents over ██████ (%) of its
3 expected sales to its retail customers of ██████ GWh.

II. VIABLE OPTIONS NOT ADEQUATELY CONSIDERED OR EVALUATED

4 **Q: What assets does Vectren currently have that might allow it to take an**
5 **incremental approach versus committing to a large 30 year generation**
6 **investment?**

7 A: The assets Vectren should have fully evaluated to allow it to take smaller steps are
8 essentially⁶ all of the units Vectren proposes to shut down—AB Brown Units 1 and
9 2 (total of 490 MW), FB Culley Unit 2 (90 MW), Warrick Unit 4 (150 MW) and
10 Broadway 2 (65 MW)—totaling 795 MW,⁷ which almost equals the size of the
11 CCGT Vectren proposes to build. Each of these existing units is much smaller than
12 the proposed CCGT and thus represents an important option to evaluate as part of
13 a strategy of taking smaller steps.

14 **Q: Vectren must have reasons for committing to shutting down these units and**
15 **replacing them with new capacity. What is your response?**

16 A: None of these units “needs” to be committed for shutdown at this time. While they
17 all have issues, as identified by Vectren, they are all candidates for continued use

⁶ I will not address the 50 MW Broadway Unit 1, which was shut down in 2018 and according to the Petitioner experienced serious technical problems, or the two Northeast Units, totaling 20 MW, which were installed in the early 1960s. See attachment PMB-1 for a discovery response that discusses Vectren's reasoning behind its plan to retire gas units.

⁷ I am using the “Net Installed MW Capacity” as shown in the testimony of Vectren witness Wayne D. Games.

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1 in some capacity as part of a strategic path of minimizing cost and risk for Vectren's
2 customers.

3 **Q: Please give an overview of the potential for continued use of these facilities.**

4 A: While the technical details are addressed further in the testimony of OUCC
5 witnesses Ms. Aguilar and Mr. Alvarez, I will give a snapshot for each of these
6 units:

7 **AB Brown Units 1 and 2:** The Petitioner states that the flue gas desulfurization
8 ("FGD") equipment on these units will need to be replaced if they are used beyond
9 2023, at a capital cost of approximately \$350 million for both units. That cost
10 represents a large incentive to stop burning coal in these units. However, as further
11 explained in the testimony of Ms. Aguilar, Vectren only evaluated the most
12 expensive option for replacing the scrubbers. While extending the life of small coal
13 plants is not common in the industry right now, other than operation of their current
14 FGDs these units operate quite well and are sized appropriately for a small utility
15 like Vectren. See, Testimony of Mr. Alvarez.

16 An even more attractive option for extending the lives of these plants does
17 not require the replacement of their FGDs, but instead refueling them to burn
18 natural gas. Mr. Alvarez explains that refueling is a viable option for these units at
19 a small fraction of the capital cost of a new CCGT. That option does not preclude
20 the building of a CCGT on that site in the future as more facts become known about
21 Vectren's load and more information about other technologies becomes available.

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1 I will provide more information later in my testimony showing why this option is
2 attractive and why Vectren's modeling did not select it.

3 **FB Culley Unit 2:** Culley Unit 2 is a very small coal-burning unit. Vectren's
4 proposal to continue burning coal at Culley Unit 3 makes the incremental cost of
5 burning coal at Unit 2 lower than it otherwise would be, as discussed in the
6 testimony of Ms. Aguilar.

7 **Warrick Unit 4:** Vectren has proposed to give up its share of the output of Warrick
8 Unit 4 at the end of 2023, due to uncertainty surrounding co-owner Alcoa's ongoing
9 use of the facility.⁸ As such, Vectren chose to not include the possibility of its use
10 beyond 2023 and it was not even offered for selection in the Petitioner's Strategist
11 modeling beyond that year.⁹ Ms. Aguilar evaluates the contract between Vectren
12 and Alcoa and determines that there is nothing in the contract precluding the
13 Petitioner's ongoing reliance on that facility. By not performing a rigorous
14 evaluation of the facility's continued use, Vectren is unnecessarily precluding the
15 valuable asset's potential use at a cost to its customers.

16 **Broadway Avenue Unit 2:** This is the newest of the gas units that Vectren witness
17 Mr. Wayne D. Games identifies in his testimony as "Units to be Retired or
18 Exiting."¹⁰ The OUCC asked Vectren for engineering studies showing the need to

⁸ See page 23 of Mr. Games' testimony.

⁹ See for example the Strategist "Tunnel Report" in the non-confidential file "Preferred-7F5F-PRV TUNNEL.REP" which was provided was one of Mr. Lind's workpapers, which shows that Warrick 4 is forced in the modeling to be shut down in 2024.

¹⁰ Pages 13 and 14 of Mr. Games' testimony.

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1 retire this unit.¹¹ Petitioner did not produce any such evaluations, and instead stated
2 that the need was based on the judgment of its staff. This unit is 65 MW of capacity
3 that is largely depreciated and slated for shutdown in 2024 without detailed
4 documentation supporting its need to be retired. Mr. Alvarez evaluates the need to
5 retire this unit from an engineering perspective and finds that its operating
6 characteristics do not show why it cannot continue to be used.

7 **Q: What initial conclusions spring from that overview?**

8 A: Vectren has not submitted evidence justifying its conclusion that these existing
9 assets lack viability as part of a lower-risk, lower cost strategy. Thus, Vectren has
10 not provided reasonable support to justify retiring or exiting the use of these
11 facilities.

12 **Q: Beyond the inadequate evaluation of options related to keeping Vectren's**
13 **current generation fleet operational, are there other options with a lower**
14 **capital commitment that were not adequately evaluated?**

15 A: Yes. As part of Vectren's last IRP, a much smaller 440 MW CCGT option was
16 presented and was enabled for selection in some of the Petitioner's Strategist
17 modeling runs. While this smaller unit was not selected on a standalone basis in
18 Vectren's modeling runs for this case, it was also not allowed by Vectren to be
19 selected in combination with a gas refueling of one or both Brown units.¹² In

¹¹ See response to OUCR DR 8.11, attached as Attachment PMB-1.

¹² See response to OUCR DR 4.4, attached as Attachment PMB-2. The OUCR received a discovery response to OUCR DR 17.3 on August 6, 2018 in which Vectren indicated a commitment to evaluate the cost of a combination of refueling one or more units at Brown with gas with a CCGT unit smaller than the one proposed in this proceeding. The response indicated that this modeling was underway as of the date of that response and that completion is anticipated within fifteen days.

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1 addition to eliminating or delaying a large incremental capital investment, selection
2 of such a smaller unit would pose less market risk in the event of a unit outage than
3 reliance on the much larger unit Vectren is proposing. Vectren should have allowed
4 this lower cost combination of resources to be modeled in its economic evaluation,
5 and the failure to analyze this option is a serious flaw in Vectren's modeling.

6 **Q: Are you suggesting there is reason to question the need for Vectren to commit**
7 **to its proposed \$781 million CCGT project?**

8 A: Yes. Vectren has landed on a solution requiring a huge capital commitment
9 without providing sufficient evidence regarding its evaluation of options that would
10 allow a more incremental approach to replacing its facilities, and thus would have
11 reduced its risk and kept its options open as the future unfolds.

12 **Q: But a CCGT is much more efficient than making use of Vectren's current**
13 **equipment, is it not?**

14 A: Yes, its efficiency is higher (its heat rate is lower) than Vectren's existing
15 generating units, and more efficient generation is preferable to less efficient, other
16 things equal. But that benefit must be balanced against the commitment of capital
17 needed to build that more efficient unit and the related costs and risks of making
18 that commitment now, compared to waiting and seeing how the future unfolds. It
19 is currently unnecessary for ratepayers to be burdened with those costs and risks.

20 **Q: How are those fuel-related benefits evaluated against the greater costs and**
21 **size-related risks of building a large CCGT unit?**

22 A: That balancing should be evaluated in the economic modeling performed by
23 Vectren. The primary model used in evaluating Petitioner's resource options is

1 called "Strategist," which calculates the present value of portfolios under various
2 scenarios.

III. SPECIFIC ISSUES WITH VECTREN'S ECONOMIC MODELING

3 **Q: Are there issues with the economic modeling that was performed by Vectren?**

4 **A:** Yes. There are a number of issues that affect the modeling results. I will address
5 those issues organized by the investment options I have already discussed.

6 **Continuing to burn coal at AB Brown Units:** One issue, as mentioned earlier,
7 is that lower cost Flue-gas Desulfurization ("FGD") replacement options were not
8 considered. Because such lower cost FGD options were available, but Vectren
9 chose not to study them in detail, they could not be included in its modeling. That
10 decision to restrict options made the continued use of Brown coal units look less
11 attractive in the modeling than if those options had been included. All feasible
12 options should be fully evaluated when making the kind of major investment
13 contemplated in this case.

14 **Continuing to burn coal at Culley Unit 2:** Mr. Games¹³ identifies primarily
15 economic reasons for shutting down this coal-fired unit and does not identify any
16 engineering reasons why this unit cannot be used reliably so long as ongoing
17 investments are made, as they would need to be made with any coal-burning unit
18 over time. Furthermore, Ms. Aguilar's analysis finds that there is no environmental

¹³ See page 21 of his testimony.

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1 regulation issue standing in the way of keeping this facility as a resource. While
2 small, Culley Unit 2 has the economic advantage of sharing some environmental
3 controls with Culley Unit 3. Thus, while I did not identify specific problems with
4 Vectren's economic analysis of continuing to burn coal at Culley Unit 2, it seems
5 reasonable not to foreclose the possibility of continued use of Culley 2, in
6 conjunction with continued use of Culley 3, as part of a strategic review of creating
7 an incremental path forward for the Petitioner.

8 **Converting AB Brown 1 and 2 to Gas:** In spite of the fact that Vectren had an
9 analysis performed, which identified that refueling AB Brown Units 1 and 2 was a
10 technically viable option at a very low capital cost, the Strategist model was not
11 allowed by Vectren to select gas conversion of Brown Units 1 and 2 in any of
12 Petitioner's model runs.¹⁴ The low capital cost option of repowering Brown Units
13 1 and/or 2 can be viewed as the equivalent to buying an option on the future. The
14 gas line needed for the refueled units could be used to support a CCGT facility later,
15 as Vectren's future load and the economics of generation technologies materializes.

16 **Warrick Unit 4:** As discussed earlier, Petitioner chose to not model costs needed
17 to keep this unit operating beyond 2023. As described by Ms. Aguilar, this unit
18 already has in place some modern environmental controls, and thus it is appropriate
19 to model and understand the attractiveness of its continued use, given nothing in

¹⁴ See response to OUCC DR 8.9(b), attached as Attachment PMB-3. Only Culley Units were allowed to be selected in the modeling.

1 the Vectren/Alcoa contract precludes Petitioner's ongoing usage. Vectren should
2 have identified and included in the economic modeling the costs of this facility's
3 continued use. That absence is a serious deficiency.

4 **Broadway Avenue Unit 2:** Vectren's modeling has this unit being retired in 2024.
5 As discussed above and by Mr. Alvarez, there was insufficient evidence supporting
6 the need to retire this facility and thus Vectren should have included Broadway
7 Avenue Unit 2 in its economic modeling beyond the year 2024. If it were included,
8 the modeling results of Petitioner's proposed CCGT addition would have been less
9 economically attractive.

10 **Smaller 440 MW CCGT:** This option was modeled, but not allowed¹⁵ by Vectren
11 to be selected in combination with the refueling of Brown Units 1 and/or 2. This
12 combination as an option would likely make Petitioner's proposed CCGT facility's
13 less attractive, especially if it properly evaluated the risks involved in having such
14 a large unit in the generation fleet of a small utility.

¹⁵ A resource option can be verified as being "not allowed" in a Strategist model run by looking in the "input summary" report of a portfolio/scenario run and looking at the year chosen as "first year available." As an example, in the run evaluating Vectren's preferred portfolio (the set of model run reports designated as "Preferred-7F5F"), the "first year available" for the four gas conversion options at the four Brown and Culley units are shown as ██████████, which makes them unavailable to be selected in that run.

1 **Q: Do you have concerns about Vectren's economic modeling in addition to how**
2 **it modeled its proposed CCGT alternatives?**

3 A: Yes. In reviewing the input and output reports of Petitioner's Strategist modeling,
4 I discovered that the representation of the CCGT's capital cost significantly
5 understated the actual capital cost of that option.

IV. THE MISSING \$200 MILLION IN MODELING OF THE CCGT COST

6 **Q: Does the capital cost for Vectren's proposed CCGT match what Mr. Games**
7 **identified as the project's capital cost?**

8 A: No. Vectren's proposed CCGT capital costs in its modeling is about \$200 million
9 less than the \$781 million that Mr. Games' testimony presents as the project's
10 capital cost, as identified in detail below.

11 **Q: What effect does that discrepancy have on the economic modeling results**
12 **Vectren used to justify the CCGT?**

13 A: Vectren's exclusion of approximately \$200 million in its net present value ("NPV")
14 analysis makes the proposed CCGT option look more attractive than it should,
15 when compared to other alternatives. The \$200 million discrepancy could unfairly
16 influence the Commission's decision regarding Vectren's CPCN request.

17 **Q: How did you discover this discrepancy?**

18 A: I calculated¹⁶ the present value of the "levelized fixed cost" shown in the
19 confidential "Proview Input Summary"¹⁷ Strategist report for the CCGT option
20 Vectren determined to be its final choice in its 2017 updated modeling.¹⁸ That

¹⁶ My calculations are shown in Attachment PMB-4.

¹⁷ Proview is a component of the Strategist model.

¹⁸ Found in the report filed with Vectren's testimony as "Preferred-7F5F-PRV INPUT SUMMARY -- CONFIDENTIAL.REP".

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1 calculation was based on Petitioner's investment being made in 2024—using
2 equipment costs that would be inflated by an assumed 1.6% per year from 2017
3 levels. When I adjust the 2024 value found in the Strategist report using Petitioner's
4 assumed 1.6% inflation rate, I determined that the 2024 capital cost value in the
5 preferred 2017 model run¹⁹ reflects a 2017 capital cost very close to the “B&V EPC
6 Estimate” of \$582 million shown on page 15 of Mr. Games' testimony. That \$582
7 million cost assumed in Petitioner's 2017 updated modeling for its preferred result
8 is about \$200 million less than the \$781 million estimate that Mr. Games presents
9 as the “Total Vectren Estimate.”

10 **Q: Did you ask the Petitioner about this discrepancy?**

11 **A:** Yes. I participated in a phone call with Vectren's witness Mr. Matthew Lind who
12 supports the Petitioner's Strategist modeling. He did not have an explanation when
13 we spoke that could account for this discrepancy, although as I understood his
14 response to my calculation description, he indicated that my calculations should
15 result in the \$781 million figure for results stated in 2017 dollars. He later provided
16 a response to me via email that also did not resolve the discrepancy.²⁰ The
17 calculations I show in Attachment PMB-4 identify clearly that Petitioner's 2017

¹⁹ The run designated by Vectren as “Preferred-7F5F,” as noted earlier.

²⁰ In his subsequent email Mr. Lind represented that the \$████ million 2024 capital cost value in that I calculated from discounting the CCGT's “levelized fixed cost” in the “Preferred-7F5F” model run, which is the discrepancy that I noted in my conversation with Mr. Lind (see the intermediate result in Attachment PMB-4), arises from a combination of a Black and Veatch cost estimate that is an estimated \$20 million lower than in Mr. Games' testimony and secondly from showing other “Owners Costs” represented in Mr. Games' testimony as being not applicable. These changes presented in the email from Mr. Lind represent differences from the filed testimony in this proceeding. Additionally, the calculations that I present in Attachment PMB-4 are a straightforward, clear explanation that makes sense without resort to changes in representation made in Vectren testimony.

1 modeling assumes a capital cost for its proposed CCGT project that is \$200 million
2 less than the figure presented by Mr. Games.

3 **Q: If Mr. Lind's explanation for the discrepancy does not address your concerns,**
4 **is there an explanation that would appear to fit with the facts?**

5 A: Yes. My expectation, based simply on the numbers involved, is that the modeling
6 was conducted using the Black and Veatch estimates and did not include the
7 additional \$200 million of costs included in Mr. Games' "Total Vectren Estimate,"
8 with those additional costs identified on page 28 of his testimony as "Owner's
9 Costs."²¹

10 **Q: Will customers actually pay that \$200 million in addition to the Black and**
11 **Veatch estimate?**

12 A: Yes. According to Mr. Games' testimony, identified above, customers will pay not
13 only the \$582 million Black and Veatch estimate, but also the additional \$200
14 million in owner's costs. Thus for purposes of appropriately comparing other
15 options, the Petitioner must also account for this \$200 million cost, but that cost is
16 not represented in the modeling.

17 **Q: Are you saying that Petitioner's calculated NPV of each model run that include**
18 **the proposed CCGT are \$200 million lower than what they should be?**

19 A: Yes, and the NPV of the various portfolios is the basis upon which the economic
20 attractiveness of selecting the CCGT is grounded. This NPV understatement

²¹ "Owner's costs" are Vectren's costs related to building the facility, including allowance for funds used during construction ("AFUDC"), contingency, study costs, etc.

1 inappropriately advantages selection of the CCGT by \$200 million compared to
2 portfolios that do not include the CCGT.

3 **Q: Is it possible that a similar category of “Owner’s Costs” could be missing from**
4 **capital costs for other resources modeled by Vectren, making the \$200 million**
5 **discrepancy less significant to the final result?**

6 A: It is possible, but there is no support for that view in Vectren’s testimony.
7 Significantly, the lack of modeling of these additional costs would inappropriately
8 advantage the proposed CCGT compared to keeping the Petitioner’s currently
9 owned assets in operation, since those facilities already include such additional
10 “owners” costs in their existing “plant in service” and “rate base” balances in the
11 Petitioner’s books and records.

12 As an additional check, I reviewed the capital cost values for the 50 MW
13 solar facility that was modeled as a resource in Vectren’s Strategist modeling. The
14 reason I can check whether similar “Owner’s Costs” were included in the solar
15 project modeling is because Vectren has a pending CPCN case where it is
16 requesting authority for that 50 MW facility.²² Using Vectren’s 2017 updated
17 modeling,²³ I found that this solar resource was modeled with a capital cost very
18 close to the total cost Petitioner is projecting for that project in its concurrent case,²⁴

²² Cause No. 45086.

²³ It is interesting to note that Vectren’s 2017 updated modeling shows 2019 solar capital costs about [REDACTED] lower than the capital costs for solar modeled in its 2016 IRP just a year earlier.

²⁴ Mr. Games presented a confidential attachment to his testimony in that proceeding presenting a total cost of the project of \$ [REDACTED] compared to a modeled capital cost for such a project of \$ [REDACTED] million for a solar project built in 2019 (calculations are presented in Attachment PMB-5).

██████████ Indicates Confidential Information

1 contrary to the hypothesis²⁵ that all of the Petitioner's modeled investment options
2 did not have these additional "Owners" costs in its modeling. And because
3 "Owners" costs were included in the Petitioner's modeling of the 50 MW solar
4 facility but not in the modeling of the CCGT, I can conclude that the solar
5 investment options were inappropriately disadvantaged in Vectren's modeling.
6 While I do not have data to make a similar determination for other modeled
7 resources, the evidence that I do have for both currently owned and for solar
8 indicate that the \$200 million CCGT capital cost discrepancy is a serious problem
9 in Vectren's modeling.

V. CONCLUSIONS AND RECOMMENDATIONS

10 **Q: What do you conclude from the OUCC's investigation into this matter?**

11 **A:** I conclude that viable options for serving Vectren's customers reliably and
12 economically were not adequately considered. I conclude further that the capital
13 cost of Vectren's proposed CCGT was significantly underrepresented in the
14 economic modeling used to justify that investment, resulting in an inappropriate
15 evaluation in comparison to other options available to the Petitioner. As such, it
16 cannot be reasonably determined whether Vectren's proposal meets the "public
17 convenience and necessity" standard of I.C. ch. 8-1-8.5. Vectren has not met its

²⁵ That "hypothesis" being that all of the resource options modeled by Vectren have the "owner's costs" removed from the modeled capital cost of those resources.

1 burden of proof in evaluating against that standard, and thus Vectren's request in
2 this case should be denied.

3 **Q: What do you recommend?**

4 A: Given the magnitude of the proposed investments and significance of the decisions
5 in this case, the OUCC recommends that Vectren's future capacity needs be
6 reevaluated. One avenue for that reevaluation would be the Petitioner's next IRP
7 process, scheduled for 2019. OUCC engineering and environmental witnesses have
8 determined that reaching a decision at the end of that 2019 IRP process would allow
9 sufficient time to take action on the results of that more complete evaluation and
10 still meet the needs of Vectren's customers in a reliable manner.

11 **Q: Does this conclude your testimony?**

12 A: Yes.

APPENDIX A - QUALIFICATIONS OF PETER M. BOERGER, PH.D.

1 **Q: Please summarize your professional background and experience.**

2 A: My undergraduate education consisted of a Bachelor of Science degree in
3 Mechanical Engineering from the University of Wisconsin-Madison and a
4 Bachelor of Arts degree in Physics from Carthage College, through its 3-2
5 engineering program. The extra year of liberal arts study during my undergraduate
6 career allowed me to take significant coursework in business and economics,
7 including courses in microeconomics, macroeconomics and accounting. After
8 working as an engineer at a manufacturing company, my graduate training began
9 at Purdue University (West Layette campus) in a program of Technology and
10 Public Policy, resulting in a Master of Science in Public Policy and Public
11 Administration. My training there included courses in microeconomic theory, cost-
12 benefit analysis, operations research (cost minimization algorithms as might be
13 used in utility economic optimization programs), and policy analysis. I came to
14 Indianapolis and worked doing research and analysis at Legislative Services
15 Agency and later at the Indiana Economic Development Council. Following those
16 stints, I began working on my Ph.D. at Purdue University (West Lafayette campus)
17 in Engineering Economics through Purdue's School of Industrial Engineering. That
18 program required taking Ph.D.-level microeconomics classes, as well as additional
19 work in operations research. During my time there I taught a 300-level engineering
20 economy class for three semesters. While finishing my doctoral thesis I worked in
21 policy research for the Indiana Environmental Institute in Indianapolis and then,

1 after obtaining my doctorate, went to work at the Indiana Office of Utility
2 Consumer Counselor, starting as an economist in the Economics and Finance
3 Division. During my 8 years there, I rose to Assistant Director of the Electric
4 Division and then Director of that Division. In 2005 I left the Agency to pursue
5 other interests, largely outside of utility regulation, and then returned in November
6 of 2015 to work in my current position as a senior economist in the Electric
7 Division, with the formal title of Senior Utility Analyst.

8 **Q: Please describe your duties and responsibilities at the OUCC.**

9 A: I review petitions submitted to the Commission for their economic justification and
10 perform other duties as assigned by the Agency.

11 **Q: Have you previously testified before the Commission?**

12 A: Yes, I have testified before the Commission in a number of significant cases during
13 the 1997 to 2005 time frame. I also recently submitted testimony in a number of
14 proceedings since my return to the agency.

AFFIRMATION

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



Peter M. Boerger
Senior Utility Analyst
Indiana Office of Utility Consumer Counselor

August 10, 2018

Date

Cause No. 45052
Vectren South Electric

CERTIFICATE OF SERVICE

This is to certify that a copy of the ***OUCC REDACTED TESTIMONY OF PETER M. BOERGER*** has been served upon the following parties of record in the captioned proceeding by electronic service on August 10, 2018.

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