PUBLIC VERSION

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., FOR: (1) AUTHORITY TO CONSTRUCT, OWN AND OPERATE A SOLAR ENERGY PROJECT AND A FINDING THAT SUCH PROJECT CONSTITUTES A CLEAN ENERGY PROJECT PURSUANT TO IND. CODE CH. 8-1-8.8; (2) ISSUANCE OF A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF THE SOLAR ENERGY PROJECT PURSUANT TO IND. CODE CH. 8-1- 8.5; AND (3) AUTHORITY TO TIMELY RECOVER COSTS INCURRED DURING CONSTRUCTION AND OPERATION OF THE PROJECT IN ACCORDANCE WITH IND. CODE § 8-1-8.5-6.5 AND IND. CODE § 8-1- 8.8-11.	)	**CAUSE NO. 45086**

IURC
INTERVENOR'S Alliance Coal
EXHIBIT NO. 1
11-19-18 AT
DATE REPORTER

DIRECT TESTIMONY

OF

CHARLES S. GRIFFEY

ON BEHALF OF
ALLIANCE COAL LLC

September 4, 2018

PUBLIC VERSION

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DIRECT TESTIMONY OF CHARLES S. GRIFFEY

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A. My name is Charles S. Griffey, and I am a consultant providing services to the electric and natural gas industries. My address is 2918 Todville Road, Seabrook, Texas 77586.

Q. ON WHOSE BEHALF ARE YOU PROVIDING TESTIMONY?

A. I am testifying on behalf of Alliance Coal LLC ("Alliance"). Alliance is a diversified coal supplier and marketer operating eight underground mining complexes in five states including Indiana. Alliance operates a coal loading terminal on the Ohio River at Mt. Vernon, Indiana and owns several mining and coal transportation facilities in the service territory of Vectren. Three of Alliance's subsidiaries (Gibson County Coal, LLC, Matrix Design Group, LLC, and Mt. Vernon Transfer Terminal, LLC) are Vectren customers. Additionally, Alliance has served as a coal supplier to Vectren.

Q. PLEASE OUTLINE YOUR FORMAL EDUCATION AND CERTIFICATIONS.

A. I have a Master of Business and Public Management from the Jones Graduate School of Business at Rice University and a Bachelor of Science in Chemical Engineering from Rice University. I am a Chartered Financial Analyst and a Professional Engineer registered in the State of Texas.

Q. PLEASE STATE YOUR PROFESSIONAL EXPERIENCE.

A. I provide consulting services to the energy industry, including generators, retail electric providers, customers, and the Staff of the Public Utility Commission of Texas

("Commission"). Prior to becoming a consultant in 2009, I was employed by Reliant Energy, Inc. ("Reliant") as Senior Vice President of Regulatory Affairs and Market Design, reporting to the CEO. I was responsible for Reliant's nationwide efforts in the design of competitive markets, regulatory affairs, including interface with state commissions and Regional Transmission Organizations, and government affairs. Reliant owned generation in a number of states and had retail operations in Texas and the Mid-Atlantic region. At Reliant I served on the Strategic Planning Committee, the Retail Leadership Team, and the Wholesale Leadership Team.

I began working for Houston Lighting and Power ("HL&P")—the electric utility serving parts of Southeast Texas and the predecessor company to Reliant—in 1989, in Corporate Planning. There I dealt with generation planning and demand-side management, including analysis of power purchases and determination of marginal cost. Beginning in 1995, I was also responsible for the rate department, and I eventually became Vice President of Regulatory Planning, with responsibility for generation planning, financial planning, rates, and rate design and cost allocation. Subsequently, I helped lead the integrated utility's efforts in restructuring the ERCOT market and transitioning the company for competition by, integrating both wholesale and retail market design and operations; restructuring utility functions and affiliate issues; managing the corporate separation and spin-off of the unregulated business; and working on public policy.

Before working for Reliant, I worked for Austin Energy, for the Public Utility Commission of Texas, and for Bechtel Group, Inc. as an engineer on the Coolwater Coal Gasification Project.

Q. PLEASE EXPAND ON YOUR RESOURCE PLANNING EXPERIENCE WITH RESPECT TO RESOURCE PLANNING.

A. I have performed resource planning at the Public Utility Commission of Texas, at Houston Lighting & Power Company/Reliant Energy, and as a consultant. At HL&P I was directly responsible for all resource planning. I evaluated decisions to retire plants, reactivate plants, and add new power plants, as well as evaluated the economics of power purchases and demand–side management. I also worked with the Electric Power Research Institute to look at how to use options analysis in the evaluation of the decision to retire a unit, as well as general resource planning economic issues. While at Reliant Energy, I also participated in evaluations of power plant construction, mothballing, and retirements. As a consultant I have testified on the prudence of utility resource planning and evaluated utility resource planning with respect to the Turk coal plant located in Arkansas, the Kemper IGCC in Mississippi, combined cycle gas plants in Louisiana and Texas, and the Colorado Energy Plan. I have also evaluated the economics of cogeneration projects for industrial clients.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE ANY REGULATORY COMMISSIONS OR COURTS?

A. Yes. I have testified before, the Federal Energy Regulatory Commission ("FERC"), and the state regulatory commissions of Colorado, Kansas, Louisiana, Maryland, Mississippi, Pennsylvania, and Texas. I have also testified or provided expert reports to state and federal courts and provided testimony before the Texas Legislature. As a consultant, I have testified on behalf of a ratepayer coalition, industrial customers, retail electric

providers, generators, and the Staff of the Texas Public Utility Commission. Exhibit CSG-1 lists the testimony I have presented and a summary of my work experience.

Q. WHAT IS THE SUBJECT OF YOUR TESTIMONY?

A. I address the request by Southern Indiana Gas and Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren South") for the Indiana Utility Regulatory Commission (the "Commission" or the "IURC") to grant it a Certificate of Public Convenience and Necessity ("CPCN") for its proposed 50 MW solar facility (the "Solar Project").

Q. DOES YOUR TESTIMONY CONTAIN CONFIDENTIAL INFORMATION?

A. My testimony contains information that Vectren South is claiming is confidential, including the overall cost of the Solar Project and the annual and levelized cost per kwh of the Solar Project. I have also made some calculations using those numbers which I am also marking as confidential. While I agree that competitively sensitive information such as the asset purchase agreement price and estimates for individual items in the project scope should be confidential, I find it peculiar that Vectren South is claiming that the overall cost and cost per kwh are confidential, as I do not believe any competitively sensitive information can be gleaned from those aggregate numbers. Customers should be entitled to know the aggregate cost and unit cost of the Solar Project, which they will be paying, and Vectren South should not be able to shield the size of the initial annual losses from customers.

II. REVIEW OF VECTREN SOUTH'S APPLICATION FOR A CPCN FOR THE SOLAR PROJECT

Q. PLEASE BRIEFLY DESCRIBE VECTREN SOUTH'S APPLICATION.

A. Vectren South proposes to build a 50 mw[1] solar project for $76.2 million.[2] Vectren South claims that the facility will provide power at a levelized cost of approximately $0.07 per kwh.[3] It also states:

> Vectren South believes that investing in solar energy resources is reasonable and appropriate at this time and will benefit Indiana and Vectren South's customers. The Solar Project serves to diversify the Company's generation portfolio, provides additional solar generation located in Indiana, encourages economic development and meets our customers' increasing desire to have renewable energy options available to serve their needs.[4]

Q. WHAT IS YOUR UNDERSTANDING OF THE STANDARD THAT A UTILITY POWER PLANT MUST MEET TO BE GRANTED A "CPCN" IN INDIANA?

A. My understanding[5] is that a utility must demonstrate that its proposed project will result in reliable, efficient, and economical electric service.[6] Making that demonstration requires an analysis of the need for a project and the economics of the project.

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[1] This is its nameplate capacity. As discussed below, the facility will rarely produce 50 mw, and on an effective capacity basis to meet peak load its size is closer to 25 mw. With an assumed 25% capacity factor its average capacity is only 12.5 mw.

[2] Attachment WDG-3 to the Direct Testimony of Mr. Wayne Games.

[3] Direct Testimony of Wayne Games at 7.

[4] Direct Testimony of Wayne Games at 21.

[5] I am not an attorney, and I am not offering a legal opinion. Rather I am providing my regulatory understanding of what a utility must demonstrate to be granted a CPCN.

[6] *See* generally Indiana Code C 8-1-8.5, and specifically. for example, *see* Indiana Code C 8-1-8.5-4 Consideration of petition:

Sec. 4. In acting upon any petition for the construction, purchase, or lease of any facility for the generation of electricity, the commission shall take into account:
(1) the applicant's current and potential arrangement with other electric utilities for:
(A) the interchange of power;
(B) the pooling of facilities;
(C) the purchase of power; and
(D) joint ownership of facilities; and

Q. DOES VECTREN SOUTH CLAIM THERE IS A CAPACITY NEED FOR THE PROJECT?

A. No. In fact, Vectren South projects that, based on assumptions in its Integrated Resource Plan ("IRP"), it will have "approximately 200 MW's [sic] of excess capacity in 2025 and approximately 100MW's [sic] of excess capacity in 2036."[7] The IRP shows that expected demand will not reach the level seen in 2016 until the year 2030.[8] Thus, absent generation retirements, there is no capacity need for the output of the Solar Project for the foreseeable future. Vectren South does not show any unit retirements until the year 2023,[9] and it proposes to replace those units with a combined cycle gas turbine ("CCGT").

Q. WHAT JUSTIFICATION DOES VECTREN SOUTH PROVIDE FOR PURSUING THE SOLAR PROJECT NOW?

A. As noted above, Vectren South's justification is that the Solar Project will

1. Diversify its generation portfolio consistent with its 2016 IRP;
2. Provide solar generation in Indiana;
3. Encourage economic development;
4. Meet customers' "increasing desire to have renewable energy options available to serve their needs."[10]

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(2) other methods for providing reliable, efficient, and economical electric service, including the refurbishment of existing facilities, conservation, load management, cogeneration and renewable energy sources

[7] Vectren South Response to OUCC 1.16.

[8] Vectren South 2016 Integrated Resource Plan at 105.

[9] Direct Testimony of Wayne Games at 16.

[10] Direct Testimony of Wayne Games at 21.

Q. DO YOU BELIEVE THESE JUSTIFICATIONS PROVIDE A REASONABLE BASIS TO GRANT A CPCN FOR THE SOLAR PROJECT?

A. No. Nowhere does Vectren South provide data or analysis to show that the Solar Project will lead to the provision of reliable, efficient, and economical power for customers. The generation/fuel diversity claim is more of a slogan than a strategy, and it is inconsistent with Vectren South's larger proposal to build a combined cycle gas turbine. While it is a fact that the Solar Project would result in more solar generation in Indiana, there is no showing that such a result is beneficial, much less a stand-alone reason to justify the plant. Further, the claim that the Solar Project will encourage economic development is actually a related point to the claimed increasing customer desire for renewable options. It does not overall encourage economic development to raise electric prices to consumers, nor to harm most customers to benefit a few. Further, if certain large customers actually want more renewable power, there are ways to accomplish that without charging all customers for the Solar Project. For instance, Vectren South could offer a buy-through or tracking tariff to charge the customers who want to pay for the higher cost of the Solar Project without burdening remaining customers with the high cost Solar Project.

Q. IS THE SOLAR PROJECT COST EFFECTIVE AS PROPOSED?

A. No. Vectren South has not even attempted to show a cost/benefit analysis for building the Solar Project at this time. The Solar Project will cost customers millions of dollars annually with little hope that the Solar Project is cost justified. The first year cost for the Solar Project is $79.8/MWh,[11] while the volume-weighted real-time locational marginal price ("LMP") at its delivery point in 2017 for the hours that the Solar Project is

[11] Workpaper of Mr. Swiz entitled "Solar Case Exhibits – JCS Final" at tab "Levelized Cost," cell C10.

estimated to operate would have been only $31.3/MWh.[12] Based on a first year capacity factor of 25%,[13] the cost of the Solar Project is higher than its projected MISO wholesale revenue by over $5 million in the first year of projected operation.[14] I present sensitivity analyses based on possible evolutions of market prices over time in Section III of my testimony. The summary of those analyses is that the Solar Project does not breakeven on an annual basis for 15-25 years, and is a $11 million - $38 million loss for customers if it commences operation in 2020.[15]

Alternatively, if Vectren South believes that the Solar Project will only back-down coal output and not avoid energy purchases from MISO, as it assumed in its estimate of the CO2 reduction associated with the Solar Project,[16] then the Solar Project would be offsetting power with an incremental cost of $15-$20/MWh, instead of generation LMPs above $30/MWh, and the losses would be even worse.

Q. DOES VECTREN SOUTH'S FUEL DIVERSITY JUSTIFICATION FOR THE SOLAR PROJECT EVEN MAKE SENSE IN THE CONTEXT OF ITS OVERALL PLANS?

[12] Calculated using data from Vectren South Response to OUCC 1.15, and the National Renewable Energy Laboratory 2017 System Advisor Model's solar production profile for Evansville, Indiana using a First Solar PV facility. The 2017 System Advisor Model is available for download at https://sam.nrel.gov/.
[13] Vectren South Response to OUCC 1.6.
[14] While this estimate does not contain any capacity revenues, the 2017/2018 planning year capacity price in MISO was very small and would have added less than $15,000 to the Solar Project's annual revenue. 2018/2019 capacity prices would add less than $100,000, so the outcome of the analysis would remain unchanged.
[15] I calculated the NPV loss using Vectren South's approach of using its weighted average cost of capital as the discount rate, where its WACC is calculated using accumulated deferred income taxes to reduce the WACC rather than as a reduction to rate base. This will have the impact of lowering the WACC and the discount rate for new projects relative to what it should be. In addition, while it is a subject for a more extended discussion, the utility WACC is not the proper risk discounting approach for evaluating the benefits of new generation.
[16] Vectren South Response to OUCC 1.26. Note that since coal is not always on the margin in MISO the actual expected CO2 reduction will be about 1/3 less than Vectren South's estimate using 100% coal being displaced.

A. No. Vectren South's claim that the Solar Project is needed for fuel/generation diversity is more of a slogan than a strategy. Vectren South has not quantified when its generating fleet is sufficiently diverse, nor what amount ratepayers should pay additionally for more fuel diversity. If one cannot tell when fuel diversity is achieved or measure fuel diversity in a quantifiable way, what one is left with is not a strategy but a political slogan used to justify the inclusion of a very expensive plant in rate base, and a very expensive plant that cannot justify itself on only fuel savings at that.

Furthermore, the usual context for a claim of fuel/generation diversity is to avoid too much exposure to a volatile fuel source. Until recently, natural gas was generally considered to have the most volatile price, while coal prices have been less volatile. However, as I understand it, Vectren South is currently proposing to replace coal generation with a CCGT. This increases exposure to natural gas and increases the volatility of fuel costs. Adding a zero fuel cost source such as solar will increase base rates while decreasing fuel costs by a much smaller amount. Vectren needs to explain why customers are paying for a new CCGT and increased exposure to natural gas prices, and then also paying for a solar facility to decrease exposure to more volatile fuel prices.

Q. DIDN'T VECTREN SOUTH QUANTIFY THE NEED FOR GENERATION DIVERSITY AND FLEXIBILITY IN ITS 2016 IRP?

A. No. Vectren South did not quantify the need for generation diversity. In fact, Vectren South included generation diversity as an *objective* of its IRP[17] rather than as a *metric* to measure whether the IRP objectives (e.g., maintain reliability, minimize costs, mitigate risks, etc) have been met. Vectren South did use a metric of net present value revenue

[17] Vectren South 2016 IRP at 50-51has "Include a balanced mix of energy resources" as an onbjective.

requirements compared to the standard deviation of the NPV of revenue requirements to measure the risk of each portfolio. However, this metric does not quantify the value of flexibility in determining the value of generation diversity. In other words, it is a single period evaluation that doesn't capture the option value of not having to act today. Further, Vectren South made no attempt to specify the acceptable or reasonable level of risk that should be taken on behalf of customers, without which the concept of risk and return is not meaningful for making actual decisions. Finally, even if a generic renewable project might conceptually reduce risk without reducing expected return in illustrative IRP modeling, there is no showing that this specific Solar Project does not reduce expected return over time. In fact, as I discuss in my testimony, it is very likely to lead to a loss to customers relative to waiting to build the project.

Q. IN ITS IRP VECTREN SOUTH CLAIMS THAT GENERATION DIVERSITY ALLOWS IT THE FLEXIBILITY TO ADAPT TO UNEXPECTED CHANGES THAT WOULD STRAND ITS GAS ASSETS.[18] DO YOU AGREE THAT THE SOLAR PROJECT IS A REASONABLE WAY TO ADDRESS THAT RISK?

A. No. Vectren South does not promote flexibility by committing to a Solar Facility that is uneconomic today. Under Vectren South's theory consumers have to carry large amounts of excess capacity *at all times* to "hedge" against regulatory/political risk. But this theory would only be true if, among other things, (1) the alternate generating capacity has a long lead time, and (2) the alternate generation capacity is not expected to become less expensive over time. Solar technology does not have a long lead time to construct, and many market observers expect solar technology to improve through time and become

[18] Vectren South 2016 IRP at 239-240.

cheaper on a per watt basis, not more expensive. Vectren South does not appear to have considered these issues in this case, and has certainly not quantified the value of the purported hedge. Without some quantitative measure for reasonable fuel or generation diversity, there is no basis to justify customers paying $70-$80/MWh for the output of a solar facility when current fuel costs and power prices are a fraction of that and the same technology can be built in the future at the same or lower cost. In short, Vectren South currently has a free option to delay the expense of building solar while awaiting any indication that political/regulatory risk could strand its gas assets. By committing to the Solar Project now and eliminating that free option, Vectren South is losing flexibility to react to changing circumstances, not gaining flexibility, and is incurring costs today that do not have to be incurred. This is a present value loss to customers.

Q. GIVEN THAT, WHY DO YOU THINK A UTILITY WOULD PURSUE SUCH A PLAN?

A. Regulated utilities typically make a return only from building infrastructure such as generation, not from fuel or other expenses. Utility allowed rates of return in general, and Vectren South's allowed rate of return on equity of 10.4% in particular, are currently in excess of their cost of capital, so investments are quite attractive today. Further, as noted by Vectren South witness Mr. Swiz, Indiana provides "financial incentives including the timely recovery of costs and expenses incurred during the construction and operation of clean energy projects."[19] Such financial incentives make the Solar Project even more attractive to the utility, but they are paid for by customers. Thus, Vectren has

[19] Direct Testimony of Mr. J. Cas Swiz at 4.

strong financial incentives to favor turning fuels costs into rate base recovery, even if the net effect is a loss to customers.

Q. IS THE SITING OF A SOLAR FACILITY IN INDIANA A REASON FOR CUSTOMERS TO PAY MORE?

A. No. From a relative solar resource efficiency perspective, Indiana is not a good location, and the relatively low capacity factor of the Solar Project bears that out.[20] Ultimately, a new resource has to provide economical, efficient, and reliable power. While locating the solar facility in Indiana at the proposed location may lessen the risk of congestion while also having lower interconnection cost, nature's limitations on solar radiation cause the facility to have a relatively low capacity factor and thus a much higher cost per kwh. The Solar Facility simply does not provide competitively priced power at this time, and an Indiana location is not a stand-alone reason to build an unneeded and uneconomic resource.

Q. WHAT ABOUT ECONOMIC DEVELOPMENT AND THE ALLEGED DESIRE OF MORE CUSTOMERS TO WANT RENEWABLE OPTIONS?

A. First, one of the best ways to have economic development is to have economical and reliable electric supply. Projects that undercut that tend to harm economic development. It is an economic fallacy to focus on the benefits to a small group while ignoring the harm to the groups. Second, to the extent that certain customers want to pay higher costs for renewable resources, they should certainly be able to do that. But that is not Vectren

[20] National Renewable Energy Labs maps for solar resources found at https://www.nrel.gov/gis/solar.html.

South's proposal. Rather, Vectren South wants all customers to pay for the high cost Solar Project, not just the certain customers who allegedly want to claim they are purchasing more renewable resources.

Q. IS THERE A WAY TO PROVIDE CERTAIN CUSTOMERS ACCESS TO MORE RENEWABLES WITHOUT BURDENING OTHER CUSTOMERS WITH UNWANTED HIGHER COST?

A. Yes. There are a variety of ways to accomplish that. For instance, Vectren South could offer a buy-through type tariff to assign the cost of the Solar Project directly to those customers desiring more renewables. Alternatively, Vectren South could track the excess solar costs above market revenues and charge the volunteering customers ratably for the excess costs.

Q. IF VECTREN SOUTH DID OFFER SUCH A TARIFF, WHAT WOULD HAPPEN IF IT WAS UNABLE TO RECOVER ITS COSTS DUE TO UNDERSUBSCRIPTION FOR THE FULL OUTPUT OF THE SOLAR PROJECT?

A. That would be one indicator that the alleged desire of certain customers for higher cost renewable energy was speculative on the part of Vectren South. To avoid that outcome, Vectren South could stage the construction of the Solar Project to match the subscriptions from the customers choosing that tariff. Alternatively, Vectren South could seek to defer the costs for future recovery under that tariff pending greater penetration of customers interested in directly purchasing renewables. What should not happen, however, is for

Vectren South to be able to charge all customers for a project that is self-evidently not cost-competitive and not needed to meet demand.

Q. PLEASE ADDRESS VECTREN SOUTH'S CLAIM THAT THE SOLAR PROJECT IS CONSISTENT WITH ITS IRP.

A. IRPs are not recipes that are to be followed without consideration of the facts as they now exist. Instead, a utility should perform substantial and timely analysis to justify the generation for which is requesting a CPCN. As Vectren South itself noted:

> Vectren South acknowledges the reasonableness of the ICC's main point that it makes sense to perform, updated modeling in conjunction with seeking approval of new generation. Such modeling would continue to evaluate a low regulatory scheme (with no carbon restrictions) that was considered as part of a scenario analysis in the 2016 IRP. This update would supplement but not replace the significant analysis conducted to create the IRP.[21]

Q. HAS VECTREN SOUTH PERFORMED SUCH MODELING IN THIS CASE?

A. No.

Q. ARE IRPs APPROVED BY THE COMMISSION WITHOUT COMMENT?

A. No. It is my understanding that utility IRPs in Indiana are not approved by the Commission, but rather are subject to comment by various parties, including the Director of Research, Policy and Planning of the IURC (the "Director"). In the Director's comments on the Vectren South IRP, it was noted that "[a]n appropriate planning aspiration is to maintain flexibility while also waiting as long as reasonably possible to commit to a resource. This flexibility allows initial resource analysis to be reversed if

[21] Vectren South's Response to Stakeholder Comments on Its 2016 IRP at 3.

there is new information that makes the initial selection less desirable compared to other options."[22]

Q. HAS VECTREN SOUTH WAITED AS LONG AS REASONABLY POSSIBLE TO COMMIT TO THE SOLAR RESOURCE?

A. No. There is no need for capacity on the system, and no compelling reason to commit to excess capacity today. Vectren South claims that it would not be able to access the 30% ITC for the Solar Project if it waited. However, this is akin to buying clothing that you do not need for many years because it is on sale today, and the sale might not be offered in the future. Vectren South has made no showing solar costs will not decline in the future sufficient to offset the planned reduction in ITCs. Nor has it shown any regulatory or political reason to justify the need to act today to purchase a "hedge" for its existing coal generation or its proposed CCGT.

Q. IS VECTREN SOUTH'S CLAIM THAT THE SOLAR PROJECT NEEDS TO BE BUILT NOW TO QUALIFY FOR A 30% ITC EVEN ACCUARRATE?

A. No. To qualify for the 30% ITC, the project must commence construction in 2019 and be in service by the end of 2023. The Internal Revenue Service has recently issued regulations defining commencement of construction, and there are alternate methods to show that construction was commenced.[23] For instance, a project can be determined to have commenced construction based on spending as little as 5% of project costs in 2019,

[22] Final Director's Report for the 2016 Integrated Resource Plans, November 2, 2017, at 49.
[23] https://www.seia.org/initiatives/commence-construction-guidance.

and possibly less if based on physical work of a "significant" nature.[24] In short, the hurdle is not great, and the project does not need to be in service by the end of 2019 or in 2020. Moreover, projects that commence construction by as late as December 31, 2021 can receive a 22% ITC.

Q. VECTREN STATES IT WAS CONCERNED THAT IMPENDING TARIFFS ON ONE TYPE OF SOLAR MODULE WOULD INCREASE COSTS FOR FUTURE SOLAR PROJECTS.[25] DO YOU AGREE THAT THE IMPOSITION OF TARIFFS IMPOSED AT THE FEDERAL LEVEL ON POLYCRYSTALLINE MODULES PORTEND SIGNIFICANT INCREASES IN THE COST OF SOLAR THROUGH TIME?

A. No. The market price for solar is dependent on a variety of factors, including technological advancement, and not just tariffs on one component of the project. For instance, Public Service of Colorado recently undertook a bid process for solar, wind, and natural gas projects. The initial bids were submitted prior to the imposition of the polycrystalline solar tariffs, but also prior to the Tax Cut and Jobs Act. Public Service subsequently went out for a bid refresh after the level of the tariffs was set and after passage of the corporate tax reduction. It reported that "58% of the bids affirmed no change in pricing, 16% increased pricing, and 26% decreased pricing."[26] The median bid price for solar proposals went up less than 5%, from $29.5/MWh to $30.96/MWh.[27] As

[24] *Id.*
[25] Direct Testimony of Wayne Games at 7-8.
[26] Public Service of Colorado 2017 All-Source Solicitation 120-Day Report at 81.
[27] Public Service of Colorado 2017 All-Source Solicitation 30 Day Report Update Attachment A. dated March 1, 2018 and original Public Service Of Colorado All-Source Solicitation 30 Day Report dated January 2, 2018: https://www.dora.state.co.us/pls/efi/EFI_SEARCH_UI.SEARCH?p_session_id=&p_results=Documents&p_proceeding_number=16A-

might be expected in the light of there being 152 solar bids, the proposed winning bids are below the midpoints.

Q. HAS ANY UTILTY OPINED ON THE FUTURE COST OF SOLAR FACILITIES?

A. Yes, during its July 26, 2018, second quarter earnings call, the CEO of XCEL Energy made the following statement in response to a question asking whether XCEL would lock in solar projects now to capture the ITC:

> Solar, of course, has a capacity element to it. And I believe solar is going to continue to fall in price and very quickly offset the fall off of the ITC. So I'm more inclined to match our solar resources with our capacity needs. And as you know, our capacity needs tend to be more in the mid-2020s and beyond. So we're doing some solar, but as you know, we made an alternative recommendation in our preferred portfolio in Colorado, which should just go a little bit lighter on solar and some of the storage elements. Because we think the technology is going to continue to improve, and we'll have other opportunities to lock in great prices.[28]

Q. WHAT SHOULD VECTREN SOUTH DO IF IT SHARED XCEL ENERGY'S BELIEF IN FUTURE SOLAR PRICING TRENDS AND THE IURC DIRECTOR'S ASPIRATION FOR FLEXIBILITY?

A. Vectren South should delay building a solar facility until it has a need, in anticipation of falling solar costs, and pending future increases in the price of alternative power supply and/or changes to the political/regulatory environment. To do otherwise unnecessarily limits flexibility and forces customers to pay higher rates.

0396E&p_document_type=Choose%20One&p_docket_status=Choose%20One&p_decision_type=Choose%20One&p_decision_author=Choose%20One&p_auto_search=Y.

[28] https://finance.yahoo.com/news/edited-transcript-xel-earnings-conference-012902100.html

III. THE COST AND MARKET RISK OF THE SOLAR PROJECT

Q. IS THE 50 MW NAMEPLATE CAPACITY OF THE SOLAR PROJECT THE CORRECT WAY TO THINK ABOUT ITS CAPABILITY TO SERVE LOAD RELATVE TO OTHER TYPES OF GENERATION?

A. No. The solar project cannot reliably provide capacity near its nameplate amount.

Q. HOW DOES THE MIDWEST INDEPENDENT SYSTEM OPERATOR MEASURE THE EFFECTIVE CAPACITY OF GENERATING UNITS?

A. It uses a calculation called unforced capacity ("UCAP") to measure the effective capability of generation to meet demand. In simple terms UCAP is the generation that for planning purposes can be used to meet expected peak load.

Q. IN TERMS OF EFFECTIVE CAPACITY, WHAT IS THE COST PER KW OF THE SOLAR PROJECT?

A. A new solar project is granted UCAP of 50% of its nameplate capacity by MISO.[29, 30] Under that approach, the effective capacity for the Solar Project is 25 MW and the cost per effective unit of capacity is $3,047/kw.[31] However, Vectren South forecasts a 0.5% [32]annual decline in the efficiency of the proposed Solar Project, so the lifetime average will be only 93% of the first year value. That would make the cost per unit of effective capacity $3,274/kw.

[29] Vectren South Response to OUCC 2.1.
[30] Using NREL data for an Evansville, Indiana location yields an expected UCAP for hours 15-17 in June-August of slightly more than 27 MW, so the 50% assumption used in the MISO Protocols is very close to what may actually occur in year 1. Using NREL data for an Evansville, Indiana location yields an expected UCAP for hours 15-17 in June-August of slightly more than 27 MW, so the 50% assumption used in the MISO Protocols is very close to what may actually occur in year 1.
[31] $**76.2 million** divided by 25 MW.
[32] Workpaper of Mr. Swiz entitled "Solar Case Exhibits – JCS Final" at tab "Levelized Cost," cell B63.

Q. WHAT IS THE IMPORTANCE OF COST PER EFFECTIVE KW OF CAPACITY?

A. It is an indicator of the relative difficulty of a generating project paying for itself. High cost capacity, even if it has zero fuel cost, will not be economic absent high market prices for power over the life of the proposed facility. In my experience, power plants whose cost are as high as that of the Solar Project are unlikely to ever be economic relative to lower capital cost alternatives, because the energy savings provided by such high cost facilities will be inadequate to cover the capital costs.

Q. HAS VECTREN SOUTH PRESENTED ANY ANALYSES TO SHOW THAT BUILDING SUCH AN EXPENISVE SOLAR PROJECT TODAY IS BENEFICIAL TO CUSTOMERS IN THIS CPCN?

A. No.

Q. WHAT MARKET PRICE SENSITIVITY ANALYSES HAVE YOU EVALUATED TO DETERMINE WHETHER IT MIGHT MAKE SENSE TO CUSTOMERS UNDER A COST/BENEFIT APROACH?

A. I have looked at the cost/benefit of having the Solar Project in-service 2020 under three price forecasts to make a reasonable attempt to bracket the likely outcomes. The first is simply inflating current LMPs for inflation at 2.5% nominal, the second increases LMPs using 2.5% real escalation plus 2.5% inflation, and the third uses Vectren South's system marginal energy cost from its 2016 IRP[33] plus the average capacity price for UCAP in MISO over the last six years starting in the next planning cycle auction and escalated for

[33] 2016 Vectren South IRP at 261.

inflation. Since the Vectren South IRP system marginal cost actually has rapidly escalating costs for CO2 built into its forecast beginning in 2024, this price forecast is close to the 2.5% real escalation case for about the first twenty years of the forecast period.

Q. WHAT ARE THE RESULTS OF YOUR SENSITIVITY ANALYSES?

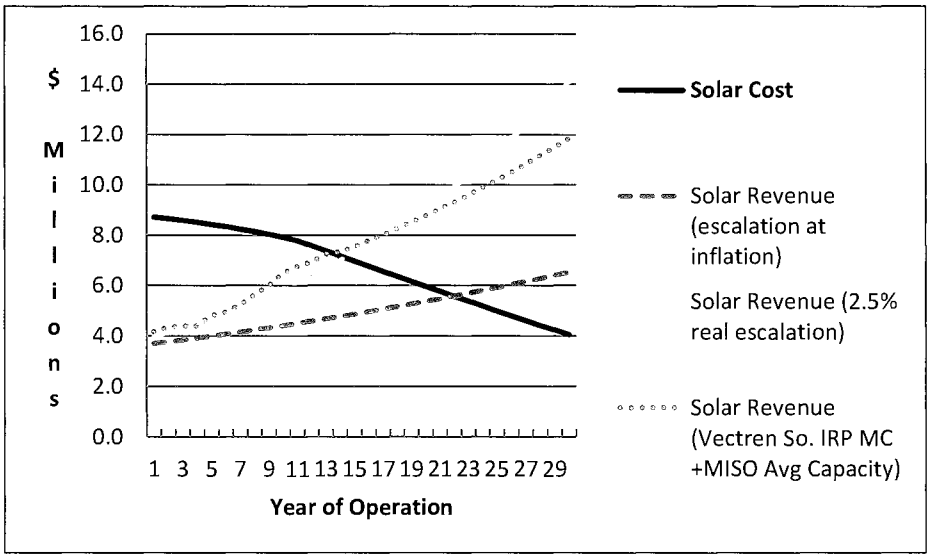
A. If market prices were assumed to increase at inflation (2.5% in Vectren South's workpapers),[34] the Solar Project would not have revenues above cost until year 23 (2042) of its life, and the net present value loss to customers would be approximately $38 million; even with market prices escalating at 5% annually for thirty years (2.5% real cost escalation for thirty years is a very unrealistic assumption), revenues do not go above costs for over 15 years (2034), and the NPV loss is approximately $11 million. The case using Vectren South's IRP system marginal cost from the 2016 IRP, escalating costs for CO2 beginning in 2024, and MISO average capacity revenues, shows a breakeven on an annual basis in year 14 (2033), and the NPV loss is also $11 million.

Q. WHAT ARE THE ANNUAL MARKET REVENUES AND SOLAR PROJECT COSTS UNDER THE ASSUMPTIONS YOU DISCUSSED ABOVE?

A. Please see Figure 1 below:

Figure 1
Annual Solar Project Costs and Revenues Under Alternate Price Projections
(Confidential Solar Cost)

[34] Workpaper of Mr. Swiz entitled "Solar Case Exhibits – JCS Final" at tab "Levelized Cost," cell C36.



As discussed in the previous answer, the annual revenue does not exceed the annual cost for 14-23 years, depending on the assumptions made about future wholesale prices. But it is telling that the losses incurred up to those points (the difference between the cost line and the revenue lines) are greater on a present value basis than the benefits that are projected to accrue after the breakeven dates. Furthermore, it can be seen that delaying the start of the solar cost line by delaying the project can more than proportionately shrink the losses if, in fact, wholesale power prices begin to increase sharply. This visually demonstrates the loss that Vectren South would impose on customers from prematurely building the Solar Project.

Q. IS IT LIKELY THAT MISO PRICES WILL BE HIGH IN THE SHORT-TERM AND CONTINUE TO BE HIGH?

A. No. Wholesale market prices (LMPs) in the MISO have been below approximately $30/MWh for the last several years. The price paid for installed capacity is also quite low, only $1.50/MW-Day during the 2017/2018 planning year and $10/MW-Day in the

2018/2019 planning period.[35] These combined market prices are below the cost of new entry according to the MISO Market Monitor.[36] Given that Vectren South has no need for capacity and has sufficient generation already to hedge its retail load from wholesale market price volatility,[37] the reality is that Solar Project will be receiving market revenues for its energy and capacity. Therefore, from the economic perspective of Vectren South's customers, the Solar Project's cost/benefit is driven by the market revenues received, and the Solar Project is best thought of as a merchant generating unit for that reason.

Q. WHAT IS THE IMPORT OF CONSIDERING THE SOLAR PROJECT AS A MERCHANT GENERATOR?

A. The cost of capital for merchant generation is higher than that of utilities. The economic loss I discussed earlier in my testimony was based on Vectren South's approach of using the utility cost of capital as the discount rate. Since the Solar Project is unlikely to provide incremental benefits for 15-25 years, any benefits that occur in out years will be discounted more heavily using a higher cost of capital, making it even less likely that higher prices that might eventually occur in MISO will bail customers out from the $3,274/kw cost they would incur for the Solar Project.

Q. WOULD ANY MERCHANT GENERATOR BUILD THE SOLAR FACILITY BASED ON WHOLESALE REVENUES IN INDIANA TODAY?

[35] 2017 MISO State of the Market Report at iv. https://www.potomaceconomics.com/wp-content/uploads/2018/07/2017-MISO-SOM_Report_6-26_Final.pdf.
[36] 2017 MISO State of the Market Report at 13.
[37] While in any given month Vectren South may generate less than 100% of the energy needed to meet its native load, this is because market prices are less than the bid cost of its generation.

A. No. Wholesale prices and price expectations do not support building a solar facility in the Indiana portion of MISO today, even with the 30% ITC. Such facilities require some form of subsidy from customers. Vectren South has provided no reason why its customers will benefit from or should be forced to subsidize the investment in the Solar Project.

Q. WHAT WOULD A MERCHANT GENERATOR LOOKING AT WHETHER TO BUILD THE SOLAR PROJECT DO IN THESE CIRCUMSTANCES?

A. The investor would delay building the project pending expected increases in wholesale market prices and potentially decreasing costs for solar projects from technological advances. Since customers are effectively in the same position as a merchant generator with respect to this project, it is better for customers to not commit to the Solar Project at this time.

Q. WOULD A DELAY IN THE DECISION TO BUILD THE SOLAR PROJECT HARM VECTREN SOUTH'S CUSTOMERS?

A. No. It is unlikely that any other entity will pursue the Solar Project in the foreseeable future if Vectren South does not build it today. It is safe to say that the project will not be built on a competitive basis today. If Vectren South were concerned about another utility acquiring the site, it could always acquire the development rights, which are but a small fraction ($[redacted])[38] of the overall cost of the project. This is a far better approach than committing to customers to spend $76.2 million for a project that is very unlikely to breakeven until 15-25 years from now.

[38] Attachment WDG-3 to the Direct Testimony of Mr. Games.

Q. WHAT WOULD BE THE IMPACT TO CUSTOMERS AND THE UTILITY OF BUYING ONLY THE DEVELOPMENT RIGHTS?

A. Customers would only have to carry the cost of a small amount of Plant Held for Future Use until such a time as the Solar Project actually makes sense to build. The utility would forego the financial advantages associated with earning a 10.4% ROE on the much larger amount of utility plant in service, but it should not be allowed to put plant in rate base that cannot meet the requirements of a CPCN. The utility should not be disadvantaged in any way by paying the smaller amount to secure the property for future use.

Q. ARE THERE ANY OBSTACKES TO YOUR SUGGESTION?

A. Not that I am aware of at this time. The Asset Purchase Agreement might have to be reworked to an extent because, among other things, [redacted].[39] Also, I have not reviewed the underlying land leases, so it may be that the lease terms may need to be extended and possibly additional lease payments made. None of these issues are insurmountable.

IV. CONCLUSION

Q. WHAT IS YOUR RECOMMENDATION?

A. The project is extraordinarily costly on the basis of its effective capacity, and it is unlikely to provide annual energy savings sufficient to offset its annual fixed cost for 15-

[39] Section 2.4 of the Asset Purchase Agreement provided in Vectren South's Response to OUCC 4.3.

25 years. The net result will be a present value loss to customers. There are no compelling justifications to build the Solar Project as a hedge at this time either. Vectren South has no need for capacity today, and it limits its flexibility by building the project today. Thus, committing customers to paying for the Solar Project today, while it may be beneficial to Vectren South's investors, is not a prudent decision from the customers' perspective.

Nor does the speculative claim of economic development justify the project. Renewable power can be provided to customers who desire it in ways that do not harm the vast majority of other customers. If Vectren South has certain customers who prefer to purchase renewable energy, Vectren South should pursue tariff alternatives that allow customers to do that on a pay-as-you go basis.

Finally, Vectren South has presented no analyses purporting to show the benefit of the Solar Project for customers, despite agreeing that such analyses are required in a CPCN proceeding for a new generating unit. In summary, Vectren South has not met its requirement to show that the Solar Project is necessary or that it will provide reliable, efficient, and economical power to customers. Therefore, I recommend that the Commission deny the requested CPCN for the Solar Project.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.