**SOUTHERN INDIANA GAS AND ELECTRIC COMPANY**
**D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC.**
**(VECTREN SOUTH)**



**I.U.R.C. CAUSE NO. 44909**

# REBUTTAL TESTIMONY
# OF
# ROBERT C. SEARS
# VICE PRESIDENT, ENERGY SOLUTIONS & PLANNING

# ON

# SOLAR AND BATTERY ENERGY STORAGE PROJECTS

**SPONSORING PETITIONER'S EXHIBIT NO. 4,**

**REBUTTAL TESTIMONY OF ROBERT C. SEARS**

## I. INTRODUCTION

**Q. Please state your name and business address.**

A. My name is Robert C. Sears. My business address is One Vectren Square, Evansville, Indiana 47708.

**Q. What position do you hold with Petitioner Southern Indiana Gas and Electric Company d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren South" or the "Company")?**

A. I am Vice President of Energy Solutions and Planning for Vectren Utility Holdings, Inc. ("VUHI"), the immediate parent company of Vectren South. I hold the same position with two other utility subsidiaries of VUHI—Indiana Gas Company, Inc. d/b/a Vectren Energy Delivery of Indiana, Inc. ("Vectren North") and Vectren Energy Delivery of Ohio, Inc. ("VEDO").

**Q. Are you the Robert Sears who previously filed direct testimony in this Cause?**

A. Yes.

## II. PURPOSE

**Q. What is the purpose of your rebuttal testimony in this proceeding?**

A. To respond to the testimony of Edward T. Rutter, specifically his recommendation that costs associated with the battery energy storage system ("BESS") for the Urban Living Research Center ("ULRC") be disallowed.

**Q. Did you review the testimony of Edward T. Rutter filed on behalf of the Office of Utility Consumer Counselor ("OUCC") as Public's Exhibit #1 in this Cause?**

A. Yes.

**Q. Is it your understanding that the OUCC is recommending approval for all of Vectren South's other clean energy projects?**

A. Yes, the OUCC is recommending approval of the Highway 41 Facility project, the Evansville Urban Facility Project and the ULRC Project including the rooftop solar system and the shared BESS located in front of the meter but excluding the BESS located on the customer's side of the meter.

**Q. What rationale does the OUCC give for disallowing cost recovery of the BESS at the ULRC?**

A. The OUCC states that the "majority of the investments at the ULRC [redacted] is proposed to be treated as "behind the meter" benefitting the occupants of the planned new mixed-use development, not directly Vectren South's full customer base." (Public's Exhibit No. 1C, page 4, lines 10-13) The OUCC also states a concern that smaller sized BESS units located on the customer side of the ULRC meter will outweigh the cost of the twenty-five (25) smaller BESS units. (Public's Exhibit No. 1C, page 5, lines 12-15).

**Q. What does "behind the meter" mean?**

A. From my perspective "behind the meter" is a term to describe the location of equipment and not necessarily the ownership of the equipment. Generally, equipment is described as "in front of the meter" or "behind the meter". In front of the meter equipment typically means equipment that is owned and operated by the utility but behind the meter equipment can be equipment owned by the customer or in some cases by the utility.

**Q. Does Vectren South plan to own, operate and control all of the BESS at the ULRC?**

A. Yes. Vectren South will own, operate and control the BESS at the ULRC. The OUCC testimony stating the energy storage systems will be owned and controlled by the building owners or tenants who will directly benefit from their future use is not accurate. (Public Exhibit No. 1C, page 6, lines 1-3). The host customer will benefit from the back-up capabilities of the BESS. The purpose of the BESS at the ULRC is to understand and evaluate how energy storage benefits can be realized by Vectren South's grid and its customers, whether located in front of or behind the customer meter.

**Q. Does ownership and control of the BESS by Vectren South make sense?**

A. Yes. It makes sense technologically and will potentially save Vectren South customers money to have BESS distributed and operating in locations inside residential or

commercial buildings. The fact that the units would be owned by Vectren South and the controls of the BESS would be monitored and controlled by Vectren South with limited customer involvement makes it clear that this is not a traditional behind the meter customer product. Vectren South believes that the pilot will demonstrate that aggregating small behind the meter storage devices can provide the same services and benefits that utility-scale storage can provide.

**Q. Does Vectren South own any other behind the meter equipment?**

A. Yes, Vectren South first introduced a Direct Load Control (DLC) program in 1992 that installed peak load management devices in tens of thousands of customer homes which were owned and operated by Vectren South but located on the customer side of the meter. This program continues today. The DLC program allows Vectren South to safely cycle customers' air conditioning units to reduce peak demand in times when wholesale market prices are high or system reliability is threatened. Ownership and operation of DLC equipment to help manage peak loads is not unique for investor owned utilities. The Vectren South ownership and control of the DLC system was a very successful business model for multi-family properties to offer peak load management programs to their residents.

**Q. How will Vectren South's customer base directly benefit from behind the meter BESS?**

A. Behind the meter BESS has the ability to provide the same benefits as BESS located in front of the meter when aggregated and controlled by the utility, including peak shaving, load shifting, frequency and voltage support and storage of renewables. Behind the meter adds the extra value of being close to the customer for back-up power when needed and offers these benefits distributed across the grid. The initial use cases of the BESS at the ULRC will focus on the benefits of peak load management, demand response, time shift of energy usage, renewable energy storage and resiliency. These use cases will be demonstrated and validated with the BESS located inside the ULRC to provide the same benefits as BESS in front of the meter. This is because electrons flow across a local distribution network freely following the path and from a physics and engineering standpoint the location of the BESS that are used to store these electrons does not impact benefits. It is important to understand the value of utility controlled and

dispatchable battery storage located behind the meter because it may offer greater value than more traditional behind the meter options such as electric water heater thermal storage or cycled air conditioning control.

Residential and commercial BESS offers many potential benefits to the grid and Vectren South customers. These combined benefits add greater value than a single use case for the BESS system. Onsite behind the meter BESS, for both residential and commercial facilities, can be used for specific applications including but not limited to:

- Back-up power, which enables electricity usage during a grid outage for the host customer;
- Load shifting, which offers the opportunity to lower the overall cost of energy to the Vectren South electric customer base by charging during low rate periods and discharging during more expensive rate periods;
- Peak shaving/demand management, which reduces peak demand;
- Self-storage of on-site solar power generation, which allows for storage of excess energy produced by onsite solar PV;
- Transmission and distribution grid investment deferral; and
- Voltage and frequency regulation of the utility grid system.

The locations of small BESS inside residential or commercial buildings can offer unique value by allowing for the systems to be integrated in locations that already have HVAC or other ambient temperature controls that reduce the need for costly thermal management systems integrated into BESS that are free standing located outside of buildings. Furthermore, there are several use cases such as demand response, frequency regulation, and time shift of energy usage that benefit the local distribution network that are more technically achievable located inside of residential or commercial buildings because the BESS is located closer to the load that is being augmented (i.e. the electrons stored are closer to the load that needs to be served). This can also have the grid related benefits of reducing investments in distribution lines, busing, and step up transformers.

Utility ownership of BESS both in front and behind the meter offers a versatile tool to help optimize the distribution system and take advantage of BESS's ability to perform

like generation, transmission and distribution, load or demand response depending on what is most valuable at the time.

**Q. How does the BESS at the ULRC differ from the BESS at the Highway 41 Facility?**

A. All of the BESS at the ULRC will be owned and controlled by Vectren South whether it is the shared BESS located on the utility side of the meter or the distributed BESS located on the customer side of the meter. The BESS at the ULRC will be owned and controlled in the same manner as the BESS at the Highway 41 Facility. As BESS continues to grow it is very important that Vectren South be able to understand how BESS systems on either side of the meter could be deployed by Vectren South to deliver benefits to the Vectren South electric grid as well as customers. The ULRC BESS systems will be controlled by Vectren South to support use cases that validate the system wide benefits of BESS for the local distribution network.

**Q. Are you aware of any other utilities that operate energy storage programs "behind the meter" that are allowed cost recovery of those programs?**

**A. Yes.** The energy storage industry is experiencing a period of tremendous growth globally and it has become clear that BESS of varying sizes will be required across a range of distributed locations in order to provide the greatest value to the grid. This includes large multi-megawatt BESS that would be connected at the high voltage transmission level as well as smaller BESS ranging from 5 kwh to 1 MW collected at the local distribution network level often distributed across a range of locations including behind the meter in residential or commercial buildings.

**Q. Please provide examples of utility companies with "behind the meter" energy storage programs that are rate based.**

A. There are other utilities installing BESS behind the meter on residential and commercial customer facilities to pilot, demonstrate, or deploy BESS to understand and quantify the benefits to the utility grid and the utility's customer base. Some examples include:

- Xcel Energy in Colorado is installing six in-home battery storage systems and six larger utility scale battery storage systems to learn how energy storage can help manage the impact of photovoltaic solar on distribution line feeders. A key objective of the pilot program is to increase the ability to allow more solar energy on the distribution grid by storing excess solar energy during the day and discharging during times of peak energy use. Xcel energy also wants to learn how battery storage can help manage grid issues such as voltage regulation and peak demand. The Xcel project is particularly focused on learning how batteries can help regulate voltage, reduce peak demand, reduce energy costs, store excess solar power during the day and discharge stored solar during peak times. The residential battery systems will be used in similar ways to manage the grid as the larger utility scale batteries. The Colorado PUC authorized deferred accounting of the capitalized expenditures associated with the storage projects such that Xcel could seek recovery in a future rate proceeding.

- Green Mountain Power in Vermont offers customers the option to pay $15 per month for a residential behind the meter BESS system to provide back-up power service to the customer. The larger portion of the BESS system costs is rate based due to the benefits of the BESS to the Green Mountain power electric system and their customer base.
- Southern California Edison (SCE), the regulated utility subsidiary of Edison International, partnered with Tesla to provide Powerwall BESS units to a small number of residential customers for use with solar PV systems. The demonstration project includes demand response projects with customers. The demonstration project in partnership with the Solar City and others will install rooftop solar PV, batteries, controllable thermostats, and smart inverters on 50 homes in the Southern California Edison territory. The team will demonstrate how smart energy homes, combining numerous distributed technologies, can be deployed and aggregated to advance the evolution of the electrical grid. The project intends to aggregate the portfolio of the 50 homes to provide distribution grid support as well as the wholesale market. This project was funded by a $2M grant from the California Energy Commission (CEC) and $2M contributed by Solar City.

**Q. Have there been any changes with the BESS plan at the ULRC since you filed your direct testimony?**

A. Yes.

**Q. Please describe these changes.**

A. Vectren South has continued to work with Energy Systems Network (ESN) on the design of the BESS components of the ULRC. Vectren South participated in a design session regarding the uses and applications of the BESS as well as a discussion of an overall plan for implementation of the BESS at the ULRC. ESN engaged partners at the Battery Innovation Center ("BIC") to assist in this design session and implementation discussion. The workshop covered applications of BESS as well as an overview of procurement, implementation and operation of BESS. Based upon the discussion in the workshop, ESN and BIC suggested the use of 20 residential battery storage systems within the individual apartment units to support and validate the use cases discussed at the workshop. Vectren South initially proposed 25 units at an approximate cost of [redacted] in my Direct Testimony. Vectren South proposes to revise the number of residential battery storage systems to 20 at an approximate cost of [redacted]. Vectren South plans to have an equal number of residential battery storage systems from two vendors to be determined as part of the selection process being coordinated with ESN.

**Q. Could Vectren South utilize a different business model in the future related to BESS?**

A. Yes. Based upon the research and analysis of the BESS at the ULRC, Vectren South may determine that a larger offering of BESS to residential customers could include a utility ownership model with some monthly fee from the customer related to the value of the back-up service to the host customer, but could also develop a "bring your own battery" program that allows the utility to draw on energy stored in the behind-the-meter batteries at peak demand periods. This type of a program would also likely include some form of compensation to the customer for the use of their battery to benefit the grid. The ULRC program allows us to identify and analyze the value of various use cases of BESS

but also work with customers to determine the business model and potential program design that best offers value to host customers as well as all Vectren South customers.

**Q. Is now the time to limit ownership and control of BESS to customers only?**

A. No. Now is not the time to define a new technology like BESS that can provide multiple value streams to both individual customers and the broader grid network as one and the same. The very purpose of the proposed Vectren South pilot is to validate the use of BESS to benefit the grid. To the extent some secondary benefits are provided to individual consumers, this outcome will assist to justify broader deployment of such systems across the Vectren South grid.

## III. CONCLUSION

**Q. Does this conclude your rebuttal testimony in this proceeding?**

A. Yes, it does.

## VERIFICATION

I, Robert C. Sears, Vice President of Energy Solutions and Planning for Vectren Utility Holdings, Inc., under penalty of perjury, affirm that the foregoing representations are true and correct to the best of my knowledge, information and belief.

SOUTHERN INDIANA GAS AND ELECTRIC COMPANY D/B/A VECTREN ENERGY DELIVERY OF INDIANA, INC.

By: _____

Robert C. Sears
Vice President, Energy Solutions & Planning

Dated: May 26, 2017