

FILED
April 4, 2024
INDIANA UTILITY
REGULATORY COMMISSION

**On Behalf of Petitioner,
DUKE ENERGY INDIANA, LLC**

**VERIFIED DIRECT TESTIMONY OF
PETER HOEFLICH**

Petitioner's Exhibit 18

April 4, 2024

DUKE ENERGY INDIANA 2024 BASE RATE CASE
DIRECT TESTIMONY OF PETER HOEFLICH

**DIRECT TESTIMONY OF PETER HOEFLICH
PRINCIPAL ENGINEER, GENERATION AND TRANSITION STRATEGY
ORGANIZATION DUKE ENERGY CAROLINAS, LLC
ON BEHALF OF DUKE ENERGY INDIANA, LLC
BEFORE THE INDIANA UTILITY REGULATORY COMMISSION**

I. INTRODUCTION

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Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Peter Hoeflich, and my business address is 525 South Tryon Street,
Charlotte, NC 28202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed as a Principal Engineer, Generation and Transition Strategy Organization,
Duke Energy Carolinas, LLC, an affiliate of Duke Energy Indiana, LLC (“Duke Energy
Indiana” or the “Company”) and a wholly owned subsidiary of Duke Energy Corporation
 (“Duke Energy”).

**Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND
BUSINESS EXPERIENCE.**

A. I earned a Bachelor of Science in Mechanical Engineering from Grove City College in
1981 and a Master of Business Administration from The Ohio State University in 1993. I
am a registered Professional Engineer in the states of North Carolina and Ohio. Prior to
joining Duke Energy Carolinas, LLC, I worked for over 20 years in the industrial, power,
and energy sectors, with a significant Combustion Turbine (“CT”) focus, as a project
engineer, operations manager, and project manager with both Cooper Energy Services
and United McGill Corporation. I joined Progress Energy in 2004 as a lead engineer. My
responsibilities included evaluating and testing new fuels and new and emerging

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1 generation technologies. In 2006, I was promoted to manager of Strategic Engineering. In
2 this role, I led a team of engineering professionals who developed generation
3 environmental compliance strategies, led successful coal generation fuel flexibility and
4 efficiency programs, and supported the Progress Energy generation fleet. Following the
5 Duke Progress merger, I was promoted to Manager of Analytical Engineering. In this
6 role, I led a team of engineers that provided generation technology inputs to Duke
7 Energy's system modeling groups and developed environmental compliance strategies. In
8 2014, I was promoted to the Director of Fuel Flexibility and Efficiency, where I led a
9 team that completed the coal fuel flexibility transition, developed numerous generation
10 efficiency improvement projects, and analyzed the impact of shale gas utilization to the
11 CT fleet. In 2016, I was promoted to Director of Analytical and Process Engineering,
12 where I was responsible for analytical and business support for the Regulated and
13 Renewable Energy generation fleet, as well as chemical engineering support. In 2021, I
14 was promoted to the position of Director of Generation Technology. In 2024, I became a
15 Principal Engineer in the Generation and Transition Strategy Organization.

16 **Q. PLEASE DESCRIBE YOUR DUTIES AND RESPONSIBILITIES AS PRINCIPAL**
17 **ENGINEER IN THE GENERATION AND TRANSITION STRATEGY**
18 **ORGANIZATION.**

19 A. My responsibilities include the identification and evaluation of zero and low carbon
20 generation and storage technologies, leading critical studies, pilots, and demonstrations of
21 emerging zero and low carbon technologies, including hydrogen, carbon capture, and
22 sequestration, and providing emerging technology system modeling inputs that facilitate

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1 future potential utilization of these technologies.

2 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

3 A. The purpose of my testimony is to discuss the U.S. Department of Energy's ("DOE") and
4 the DOE's Office of Clean Energy Demonstrations ("OCED") Carbon Capture Projects
5 Program as it relates to the Edwardsport Integrated Gasification Combined Cycle power
6 generation plant ("Edwardsport") located in Knox County, Indiana, and Duke Energy
7 Indiana's deferral request related to the same.

8 **Q. PLEASE PROVIDE AN OVERVIEW OF THE COMPANY'S PROPOSAL IN**
9 **THIS PROCEEDING.**

10 A. As discussed further herein, Duke Energy Indiana plans to engage in site assessment and
11 characterization for carbon capture and storage at Edwardsport, funded, in part, through
12 the DOE. As also discussed by Company witness Ms. Lilly, Duke Energy Indiana is
13 requesting approval from the Commission to defer the costs associated with the awarded
14 FEED (defined below) study at Edwardsport, to the extent not funded by DOE, in order
15 to be able to present those costs for inclusion in rates in a future base rate proceeding,
16 provided Duke Energy Indiana does not proceed with a related capital project for which
17 Commission approval would otherwise be required.

18 **Q. PLEASE DESCRIBE THE FEDERAL FUNDING OPPORTUNITY AND AWARD**
19 **PROCESS.**

20 A. As part of the Bipartisan Infrastructure Law, the DOE announced it will deploy
21 approximately \$12 billion in new carbon management funding. As part of the Carbon
22 Capture Demonstration Projects Program, the Office of Clean Energy Demonstrations

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1 (“OCED”), in collaboration with the Office of Fossil Energy and Carbon Management
2 (“FECM”) and National Energy Technology Laboratory (“NETL”), issued a funding
3 opportunity announcement (“FOA”), Number: DE-FOA-0002738, for Front-End
4 Engineering Design (“FEED”) studies for integrated carbon capture, transport, and
5 storage systems. The FEED studies are integrated in the sense that the FEED studies are
6 not focused on one aspect of the carbon capture, carbon dioxide (“CO₂”) transportation
7 and sequestration process, but the complete process of CO₂, including capture, any
8 necessary transportation of the captured CO₂, as well as the sequestration (storage) of the
9 captured CO₂. Federal cost sharing of up to 50% of the selected FEED studies will be
10 provided.

11 In late 2022, Duke Energy Indiana submitted a complete application in response
12 to the FOA. In the second quarter of 2023, Duke Energy Indiana was selected to enter
13 into negotiations with OCED. Those negotiations resulted in an award in the fourth
14 quarter of 2023.

15 **Q. PLEASE DESCRIBE DUKE ENERGY INDIANA’S AWARDED FEED STUDY.**

16 A. OCED awarded Duke Energy Indiana a cooperative agreement to conduct an integrated
17 FEED study for a carbon capture and storage project at Edwardsport. Duke Energy
18 Indiana’s awarded FEED study seeks to evaluate the feasibility of capturing and storing
19 CO₂ from the flue gases of the two heat recovery steam generators at Edwardsport. The
20 study will evaluate the use of Honeywell’s Advanced Solvent Carbon Capture process.
21 The project aims to capture, compress, and store locally approximately 3.6 million tons of
22 CO₂ per year, achieving a carbon capture efficiency of more than 95%. Through the

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1 awarded FEED study, OCED is working with Duke Energy Indiana to demonstrate Duke
2 Energy Indiana's carbon capture sequestration ("CCS") technology design. The current
3 estimated total cost of the awarded FEED study is \$17,163,453 with estimated
4 \$8,192,430 federal cost share. The awarded FEED study is scheduled to be complete by
5 the third quarter of 2026.

6 **Q. DOES THE COMPANY HAVE ANY PARTNERS IT IS WORKING WITH FOR**
7 **THE AWARDED FEED STUDY AND, IF SO, IN WHAT CAPACITY?**

8 A. Yes. The Company will be working with multiple team members. Team members
9 include: Honeywell UOP, who will provide the carbon capture technology, Dastur
10 Energy, who will assist with study project management and act as Duke Energy Indiana's
11 owner's engineer, Cozario, who will provide sub-surface expertise, modeling, and Class
12 VI permit application inputs, and Purdue University, who will support with engineering
13 modeling.

14 **II. PREVIOUS EDWARDSPORT CARBON RESEARCH**

15 **Q. PLEASE PROVIDE AN OVERVIEW OF ANY PRIOR CARBON CAPTURE AND**
16 **STORAGE STUDIES CONDUCTED AT EDWARDSPORT.**

17 A. Beginning in 2008, Duke Energy Indiana retained GE and Burns & McDonnell to
18 conduct a carbon capture FEED study at EdWARDSport. The CO₂ capture study consisted
19 of a CO₂ capture unit, a CO₂ compression unit, and a CO₂ dehydration unit, as well as
20 supporting balance of plant systems. For the purposes of this prior FEED study, the CO₂
21 capture unit was to be designed to capture a minimum of 15% carbon in the form of CO₂
22 for all design cases. The nominal rate of CO₂ capture predicted in the prior FEED study

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1 was 23% on the basis of carbon converted during the gasification of the coal feedstock.
2 Burns & McDonnell opined as to the existence of the technology and that the project
3 would use proven processes. The project was expected to require approximately thirty-
4 nine months to complete from the notice to proceed date. The capital cost for the carbon
5 capture project was estimated to be \$360 million.

6 In addition to the above-discussed prior FEED study, exploratory work was
7 conducted at Edwardsport to study subsurface data for carbon sequestration. At the time,
8 it was determined the site was unable to support carbon storage for the Edwardsport capture
9 project, demonstrating a need for further carbon storage work to locate another site for long
10 term storage of captured CO₂.

11 **Q. HOW DOES THE AWARDED FEED STUDY DIFFER FROM THE EARLIER**
12 **CARBON CAPTURE AND SEQUESTRATION STUDIES CONDUCTED AT**
13 **EDWARDSPORT AND WHAT ADVANCEMENTS HAVE OCCURRED SINCE**
14 **THE PRIOR STUDIES WERE PERFORMED?**

15 A. The current FEED study will differ significantly from the earlier Edwardsport carbon
16 capture and sequestration studies. The previous Edwardsport carbon capture study
17 focused on pre-combustion capture of CO₂. Meaning, the CO₂ would be captured from
18 the syngas prior to combustion in the power block. One of the drawbacks from pre-
19 combustion capture is that CO₂ will not be captured when the power block fires natural
20 gas. The current FEED study will focus on post-combustion capture of CO₂, whereby the
21 CO₂ would be captured following combustion in the power block, allowing CO₂ capture
22 whether the power block is firing syngas or natural gas.

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1 Another major difference is in carbon sequestration. Since completion of the
2 earlier storage study at Edwardsport, there have been significant advances in the state of
3 knowledge and understanding of the potential for permanent geologic storage of CO₂ in
4 the Potosi Dolomite unit. Historically, the Potosi Dolomite has not been the focus of
5 study for permanent CO₂ storage due to the presence of widely studied and regionally
6 pervasive sandstones that have traditionally been viewed as ideal CO₂ sequestration
7 targets. However, the prior storage study at Edwardsport found that the traditional
8 sandstone units at the Edwardsport site do not have the storage capacity or reservoir
9 quality needed to support a CO₂ storage project of the scale required to support
10 Edwardsport carbon capture. Further, since that time, studies confirming that the Potosi
11 Dolomite has potential for CO₂ sequestration have been published, and, most recently, the
12 U.S. Environmental Protection Agency (“EPA”) has approved the construction of CO₂
13 injection wells into the Potosi Dolomite unit to store CO₂ associated with the Wabash
14 Valley Resources’ project, also in Indiana. Additionally, a Duke Energy Indiana
15 commissioned sequestration characterization study, completed in 2022, showed
16 significant sequestration capacity locally at Edwardsport, eliminating the need for long
17 distance transport of CO₂ for sequestration.

18 **Q. HOW WILL THE INFORMATION GATHERED DURING THE PREVIOUS**
19 **STUDIES AT EDWARDSPORT BE USED TO INFORM THE AWARDED FEED**
20 **STUDY?**

21 A. It is anticipated that the previous carbon capture studies completed at Edwardsport will
22 be beneficial to the current FEED study, most notably the exploratory storage study

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1 performed in 2008. The data obtained from that study will be instrumental in any future
2 evaluation of sequestration potential, as it provides invaluable site-specific geologic
3 information critical to any evaluation of a local CO₂ sequestration project. Though the
4 awarded FEED study is focused on post combustion CO₂ capture, which will allow
5 carbon capture while firing syngas as well as natural gas, a hybrid pre- and post-
6 combustion capture scenario will be evaluated, likely leveraging the earlier
7 precombustion capture study.

III. CURRENT DOE WORK FOR CCS AT EDWARDSPORT

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9 **Q. WHY DID DUKE ENERGY INDIANA SELECT EDWARDSPORT FOR THE**
10 **AWARDED FEED STUDY?**

11 A. Duke Energy Indiana applied to the subject FOA topic area, feeds for integrated ccs
12 systems at coal electric generation-only facilities. The technical requirements for the host
13 site included that the site be coal electric generation-only, 50+% grid electricity output,
14 commercial operation through at least 2035, and the ability to evaluate for project
15 benefits and disbenefits/harms in affected communities. Edwardsport satisfied the FOA
16 technical requirements. In addition, the previous completed Edwardsport sequestration
17 studies and data were able to be leveraged to characterize sequestration potential with
18 current and update sequestration knowledge and modeling that have advanced
19 significantly since the earlier studies were completed.

20 **Q. WHAT IS THE EDWARDSPORT SPECIFIC CARBON CAPTURE AND**
21 **STORAGE SCOPE OF WORK?**

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1 A. The awarded FEED study will evaluate the use of Honeywell's Advanced Solvent Carbon
2 Capture process, which has a Technology Readiness Level of 7. The project aims to
3 capture, compress, and store onsite 3.6 million tons of CO₂ per year, achieving a carbon
4 capture efficiency of more than 95%.

5 Major study tasks include Project Management and Planning, Community
6 Benefits Plan, Initial Engineering Design Package, Environmental Information Volume
7 ("EIV"), Carbon Capture FEED Study, Storage Field Development Plan, Final
8 Engineering Design Package, Cost Assessment, Underground Injection Control ("UIC")
9 Class VI Permit to Construct, Environment Health and Safety ("EH&S") Risk
10 Assessment, Life Cycle Analysis ("LCA").

11 **Q. WILL THERE BE ANY CONSTRUCTION OR WELL DRILLING AT**
12 **EDWARDSPORT DURING THIS STUDY?**

13 A. Currently, no construction nor any well drilling is anticipated as part of the awarded
14 FEED study.

15 **Q. WHAT IS THE EXPECTED DURATION OF THE AWARDED FEED STUDY?**

16 A. Duke Energy Indiana was awarded the cooperative agreement in October 2023, and the
17 awarded FEED study is scheduled to be complete by the third quarter of 2026. The
18 awarded FEED study is broken down into two phases, or budget periods, with the first
19 phase focused on verification and baselining. This phase is scheduled to be complete by
20 June 2024. The second phase is expected to begin in 2024 and to be completed in 2026.

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1 **Q. WILL THE COMPANY ENGAGE CONSULTANTS TO ASSIST IN ITS**
2 **CARBON CAPTURE AND STORAGE PROJECT?**

3 A. Yes, in addition to Duke Energy resources, engineering, sub-surface, and community
4 benefit contractors will be utilized for the study.

5 **Q. WILL THE COMPANY BE PERFORMING ANY COMMUNITY OUTREACH**
6 **TO INFORM THE PUBLIC ON THIS PROJECT? IF SO, WHAT IS PLANNED?**

7 A. Yes, a key deliverable for this project includes a Community Benefits Plan (“CBP”),
8 informed and developed in consultation with the project community. Designed in
9 conjunction with the awarded FEED study, the CBP will promote equity and inclusion
10 through detailed plans to: a) engage with a wide range of local stakeholders – such as
11 labor unions, local governments, and community-based organizations that support or
12 work with disadvantaged communities – throughout the project’s conception; b) advance
13 Diversity, Equity, Inclusion, and Accessibility (“DEIA”), as well as engagement, job and
14 job quality impacts, and Justice40. The Justice40 initiative is a government effort to
15 deliver at least 40% of the overall benefits from certain federal investments to
16 disadvantaged communities.

17 **Q. WHAT WILL THE COMPANY DO WITH THE RESULTS OF THE AWARDED**
18 **FEED STUDY, AND HOW WILL IT SUPPORT THE CUSTOMERS OF DUKE**
19 **ENERGY INDIANA?**

20 A. The results of the awarded FEED study will provide cost estimates, risk assessments, and
21 community impact/benefit analysis that can be used to determine if the project should
22 advance to the next phases of project execution.

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1 **Q. IS DUKE ENERGY INDIANA REQUESTING APPROVAL FOR STUDY PLANS**
2 **AND COST RECOVERY FOR CARBON CAPTURE AND STORAGE IN THIS**
3 **PROCEEDING?**

4 A. Yes, the Company is requesting approval to defer its portion of the costs the awarded
5 FEED Study until the next base rate case as part of this proceeding and, if the Company
6 ultimately seeks approval of a project as a result of the awarded FEED study, the
7 Company would seek approval of such costs at that time.

8 **Q. WHAT ARE THE BENEFITS ASSOCIATED WITH THE AWARDED FEED**
9 **STUDY?**

10 A. The awarded FEED study will provide design and engineering basis, risk assessments,
11 cost estimates, and other deliverables that will support further evaluation of a potential
12 carbon capture and sequestration project at Edwardsport. The awarded FEED study
13 results can also be utilized to evaluate potential CCS projects at other Indiana generation
14 sites. Because the capture study is post-combustion, the results will be particularly useful
15 at any potential future natural gas combined cycle generating plants.

16 Additionally, under the EPA's proposed rule under Section 111 of the Clean Air
17 Act, CCS is a component of the Best System of Emission Reduction ("BSER") for new
18 base load stationary combustion turbine electric generating units and existing coal-fired
19 steam generating units that intend to operate after 2040, as well as large and frequently

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1 operated existing stationary combustion turbine electric generating units.¹ Given the
2 principal role of CCS technologies in the proposed rule, it is prudent and reasonable that
3 the company study CCS.

4 **Q. WHAT PORTION OF THE STUDY IS ANTICIPATED TO BE FEDERALLY**
5 **FUNDED?**

6 A. The current estimated total cost of the awarded FEED study is \$17,163,453, with an
7 estimated \$8,192,430 federal cost share.

8 **Q. IS THERE THE POTENTIAL FOR ADDITIONAL FEDERAL FUNDING IF A**
9 **PROJECT INFORMED BY THE AWARDED FEED STUDY SHOULD MOVE**
10 **FORWARD?**

11 A. Yes, additional federal cost share is potentially available. The DOE/OCED has identified
12 funding potential for future phases of carbon capture and sequestration projects, including
13 project development, permitting, financing, installation, integration, construction, and
14 startup, and sustained operations. In addition, the Inflation Reduction Act provides
15 increased CO₂ sequestration tax credits.

16 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

17 A. Yes.

¹ In a February 29, 2024 written statement, EPA Administrator Michael Regan stated that the EPA's proposed rule will focus on existing coal and new gas-fired power plants, indicating the EPA intends to drop requirements covering existing natural gas-fired power plants in its final Section 111 rule regulating power sector greenhouse gas.

VERIFICATION

I hereby verify under the penalties of perjury that the foregoing representations are true to the best of my knowledge, information and belief.

Signed: 
Peter Hoeflich

Dated: April 4, 2024