

**BEFORE THE**  
**INDIANA UTILITY REGULATORY COMMISSION**

**VERIFIED PETITION OF DUKE ENERGY )  
INDIANA, LLC FOR; (1) APPROVAL OF )  
PETITIONER'S 6-YEAR PLAN FOR ELIGIBLE )  
TRANSMISSION, DISTRIBUTION AND STORAGE )  
SYSTEM IMPROVEMENTS, PURSUANT TO IND. )  
CODE § 8-1-39-10; (2) APPROVAL OF A )  
TRANSMISSION AND DISTRIBUTION )  
INFRASTRUCTURE IMPROVEMENT COST RATE )  
ADJUSTMENT AND DEFERRALS, PURSUANT TO )  
IND. CODE §§ 8-1-2-10, 8-1-2-12, 2-1-2-14, AND 8-1-39- )  
1 ET SEQ; AND (3) APPROVAL OF A TARGETED )  
ECONOMIC DEVELOPMENT PROJECT AND )  
RECOVERY OF COSTS ASSOCIATED WITH THE )  
PROJECT, PURSUANT TO IND. CODE §§ 8-1-39-10 )  
AND 8-1-39-11 )**

**CAUSE NO. 45647**

**INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR'S NOTICE  
OF FILING REVISED PUBLIC'S EXHIBIT NO. 1. PUBLIC REDACTED  
TESTIMONY OF OUCC WITNESS CASEY A. SHULL, Ph.D.**

**March 11, 2022**

The Indiana Office of Utility Consumer Counselor ("OUCC"), by counsel, notifies the Indiana Utility Regulatory Commission ("Commission") of filing a revised version of OUCC's Exhibit 1, the public, redacted version of witness Casey A. Shull, Ph.D.'s testimony, originally filed with the Commission on February 18, 2022. In support of this filing, the OUCC shows the following:

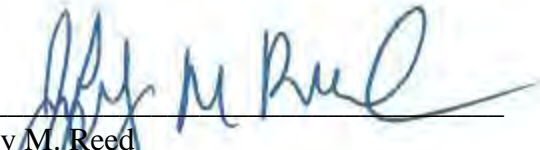
1. When the OUCC filed Dr. Shull's public testimony of 2/18/22, it contained multiple redactions of information the OUCC believed Duke Energy Indiana, LLC ("DEI") may consider confidential. On the same day, the OUCC provide DEI with a copy of Dr. Shull's confidential testimony.
2. DEI subsequently advised the OUCC that only one redaction in Dr. Shull's testimony

was required, but that DEI would need to seek Commission approval for a grant of confidentiality to cover Dr. Shull's confidential attachment CAS-C-3. The Commission subsequently granted DEI's request.

3. In the process of removing the redactions, the OUCC noticed several edits to Dr. Shull's testimony that should be made, including, among others, the omission of a cover sheet reflecting the OUCC's intent to file confidential exhibit CAS-C-3 on CD and testimonial references to that exhibit. The result of the redaction removal and these edits resulted in page number changes to Dr. Shull's testimony.
4. In the interest of providing the Commission and all parties with a single, self-contained document, the OUCC is filing the attached revised version of Public's Exhibit #1, Dr. Shull's public redacted testimony. This revised version replaces the 2/18/22 version in its entirety and will be the version offered at the evidentiary hearing.
5. The following is a list of all edits made to the 2/18/22 filed version and incorporated into the attached revised version (all page citations are to public, PDF version served on the parties 2/18/22):
  - 1) P3, line 7, deleted the phrase "Selected Tabs from"
  - 2) P3 line 8, change "V9" to "V10-Final".
  - 3) Page 3 line 9: changed "response to OUCC DR 5.5." to "DEI's Supplemental Response to OUCC DR1.1, Confidential Attachment 1.1-B."
  - 4) P3, line 18, changed "weather" to "whether"
  - 5) Page 4, lines 3-4, changed "The spreadsheet, on various tabs" to "The spreadsheet, on the tabs labeled "Blanks - Outage Data" and "Conductor - Outage Data"
  - 6) Page 4, line 5: changed "various" to "these"

- 7) Page 4, line 6-7: changed "The spreadsheet has" to "These tabs have"
- 8) Page 4, lines 6-11: All redactions removed, and deleted all "[<<CONFIDENTIAL" and "CONFIDENTIAL>>]".
- 9) Page 6, unnumbered line below line 20: deleted "<<CONFIDENTIAL". The redaction on line 19 remains.
- 10) Page 7, lines 1-7: Redactions removed, deleted "CONFIDENTIAL>>" which followed the redactions on an unnumbered line between lines 7 & 8.
- 11) Page 12, lines 14-22: Redactions removed, deleted "<<CONFIDENTIAL" from line 14 and deleted "CONFIDENTIAL>>" from line 22
- 12) Added cover page for Confidential Attachment CAS-3-C reflecting that exhibit as being filed with the IURC on CD due to size issues.

Respectfully submitted,



---

Jeffrey M. Reed  
Attorney No. 11651-49  
Deputy Consumer Counselor

**CERTIFICATE OF SERVICE**

This is to certify that a copy of *OUCC REVISED Public's Exhibit No. 1, Public Redacted Testimony of OUCC Witness Casey A. Shull, Ph.D* has been served upon the following parties of record in the captioned proceeding by electronic serve on March 11, 2022.

**Duke, LLC**

Andrew J. Wells  
Elizabeth A. Heneghan  
**DUKE ENERGY BUSINESS SERVICES LLC**  
[andrew.wells@duke-energy.com](mailto:andrew.wells@duke-energy.com)  
[beth.heneghan@duke-energy.com](mailto:beth.heneghan@duke-energy.com)

**IG-Intervenor**

Todd A. Richardson  
Tabitha L. Balzer  
Aaron A. Schmoll  
**LEWIS & KAPPES, P.C.**  
[trichardson@lewis-kappes.com](mailto:trichardson@lewis-kappes.com)  
[tbalzer@lewis-kappes.com](mailto:tbalzer@lewis-kappes.com)  
[aschmoll@lewis-kappes.com](mailto:aschmoll@lewis-kappes.com)

**WVPA-Intervenor**

Randolph G. Holt  
Jeremy L. Fetty  
J. Michael Deweese  
**PARR RICHEY FRANDSEN PATTERSON  
KRUSE LLP**  
[r\\_holt@wvpa.com](mailto:r_holt@wvpa.com)  
[jfetty@parrlaw.com](mailto:jfetty@parrlaw.com)  
[jdeweese@parrlaw.com](mailto:jdeweese@parrlaw.com)

**Steel Dynamics-Intervenor**

Robert K. Johnson, Esq.  
[rjohnson@utilitylaw.us](mailto:rjohnson@utilitylaw.us)

**Nucor-Intervenor**

Anne E. Becker  
**LEWIS KAPPES, P.C.**  
[abecker@lewis-kappes.com](mailto:abecker@lewis-kappes.com)

**CAC-Intervenor**

Jennifer Washburn  
**CITIZENS ACTION COALITION**  
[jwashburn@citact.org](mailto:jwashburn@citact.org)

courtesy copy to:  
Reagan Kurtz  
[rkurtz@citact.org](mailto:rkurtz@citact.org)

**Hoosier Energy REC, Inc.-Intervenor**

Christopher M. Goffinet  
**HUBER GOFFINET & HAGEDORN**  
[cgoffinet@hepn.com](mailto:cgoffinet@hepn.com)

Mike Mooney  
**HOOSIER ENERGY REC, INC.**  
[mmooney@hepn.com](mailto:mmooney@hepn.com)

  
\_\_\_\_\_  
Jeffrey M. Reed  
Deputy Consumer Counselor

**INDIANA OFFICE OF UTILITY CONSUMER COUNSELOR**

PNC Center  
115 West Washington Street, Suite 1500 South  
Indianapolis, Indiana 46204  
317-233-3236 Jeff's Direct Line  
317-232-2494 Main Office  
317-232-5923 Facsimile  
[infomgt@oucc.IN.gov](mailto:infomgt@oucc.IN.gov)

**CONFIDENTIAL TESTIMONY OF OUCC WITNESS CASEY A. SHULL, PHD  
CAUSE NO. 45647  
DUKE ENERGY INDIANA**

**GRAY HIGHLIGHT INDICATES CONFIDENTIAL INFORMATION**

**I. INTRODUCTION**

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

2 A: My name is Dr. Casey Shull, and my business address is 115 W. Washington St.,  
3 Suite 1500 South, Indianapolis, Indiana 46204. I am a Senior Utility Analyst in the  
4 Electric Division for the Office of Utility Consumer Counselor ("OUCC"). My  
5 qualifications are attached to this testimony as Appendix A.

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

7 A: My testimony: 1) Discusses the flawed methodology and processes DEI and DEI's  
8 consultant, Black & Veatch ("B&V"), used to develop the Transmission,  
9 Distribution, and Storage System Improvement Charge Plan ("TDSIC Plan" or  
10 "Plan"); 2) Discusses DEI's failure to provide empirical evidence or support  
11 regarding the public convenience and necessity requiring the replacement or  
12 rehabilitation of certain proposed transmission and distribution lines, per Indiana  
13 Code 8-1-39-10(b)(2); 3) Discusses DEI's Distributed Energy Resource ("DER")  
14 projects, which DEI fails to demonstrate that the public convenience and necessity  
15 requires these upgrades to allow for future distributed generation or future renewable  
16 projects not yet identified by DEI; 4) Discusses how DEI's project costs do not  
17 provide the "best estimate of the cost" as required by Indiana Code 8-1-39 ("TDSIC  
18 Statute"); and 5) Discusses how DEI does not show eligible improvements estimates

1 it included in the Plan are justified by incremental benefits attributable to the Plan,  
2 as required by Ind. Code § 8-1-39-10(b)(3).

3 I recommend the Indiana Utility Regulatory Commission (“Commission”)  
4 deny DEI’s application. If the Commission approves any portion of DEI’s Plan, the  
5 OUCC recommends the Commission remove specific transmission projects, as  
6 noted below, and require a bi-annual Plan updates utilizing project management data  
7 related to DEI’s TDSIC Plan, including information in the Project Management  
8 Institute’s (“PMI”) Standard for Earned Value Management (“EVM”).<sup>1</sup>

9 **Q: Please describe the review and analysis you conducted to prepare your**  
10 **testimony.**

11 A: I reviewed the Verified Petition, Direct Testimony and Exhibits DEI submitted in  
12 this Cause. I drafted data requests (“DRs”) and reviewed DEI’s responses. I  
13 reviewed relevant Indiana Code sections, including Ind. Code ch. 8-1-39 *et seq.* I  
14 also had several meetings with DEI technical staff to discuss specific projects and  
15 data.

16 **Q: Are you sponsoring any attachments in this proceeding?**

---

<sup>1</sup> PMI’s EVM can be found at the following link: <https://www.pmi.org/pmbok-guide-standards/foundational/earned-value-management>

1 A: Yes, I am sponsoring the following attachments:

2 1. Attachment CAS-1: DEI's response to the OUCC's DR related to  
3 transmission outages causing more Customer Minutes of Interruption  
4 ("CMI") than distribution outages.

5 2. Attachment CAS-2: DEI's response to the OUCC's DR regarding outage  
6 information reported to the Energy Information Administration ("EIA").

7 3. CONFIDENTIAL Attachment CAS C-3: a Confidential Spreadsheet titled,  
8 "Deteriorated Conductor Calculations V10-Final," provided in DEI's  
9 Supplemental Response to OUCC DR 1.1, Confidential Attachment 1.1-B.

10 **Q: To the extent you do not address a specific item in your testimony, should it be**  
11 **construed to mean you agree with DEI's proposal?**

12 A: No. My silence regarding any topics, issues or items DEI proposes does not indicate  
13 my approval of those topics, issues, or items. Rather, the scope of my testimony is  
14 limited to the specific items addressed herein.

## II. B&V'S FLAWED METHODOLOGY

15 **Q: What are the OUCC's concerns with B&V's model and methodology?**

16 A: B&V's Copperleaf model is proprietary. No party, nor the Commission, has access  
17 to this model. No one can replicate any Copperleaf output. It is impossible to verify  
18 whether Copperleaf's modeling logic is reasonable, or the calculations are accurate.

19 B&V relied upon spreadsheets that are miscalculated. B&V relied upon  
20 various spreadsheet values from DEI as inputs into its proprietary modeling  
21 algorithms. The algorithms produce a series of outputs to categorize DEI projects  
22 into value measures used to optimize and select specific projects for inclusion in

1 DEI's TDSIC Plan. As shown on CONFIDENTIAL CAS-C-3, one variable DEI  
2 produced in the algorithm is Value of Lost Load ("VOLL").

3 Average number of outages is an input to VOLL. The spreadsheet on the tabs  
4 labeled "Blanks - Outage Data" and "Conductor - Outage Data", identifies number  
5 of outages by the years 2015 through 2019. Some of the number of outages on these  
6 tabs for specific line numbers indicate zero outages for each year. These tabs have a  
7 column calculating the average 5-year outage. Most line numbers containing a row  
8 of zero outages are averaged to a number greater than zero, which should be  
9 mathematically impossible. The resultant average is used by B&V as an input to  
10 Copperleaf, which produces the optimized Plan.

11 **Q: Did you discuss this discrepancy with DEI?**

12 A: Yes. I attended a tech-to-tech discussion on February 3, 2022, to clarify my findings.  
13 However, DEI could not explain the math discrepancy. This calls into question the  
14 validity of the VOLL values used to produce the Plan.

### **III. THE PLAN**

#### **A. RELIABILITY**

15 **Q: Briefly describe what DEI includes in the "Reliability" portion of its Plan?**

16 A: As a method to improve reliability, DEI proposes increasing redundancy through  
17 rehabilitation of electrical transmission, substations, and distribution facilities, in the  
18 system. This involves reconductoring and reconstructing transmission lines. The  
19 Plan proposes installing self-healing networks and eliminating radial or single 69kv



1 lines by installing a loop configuration. DEI proposes measuring reliability by  
2 reducing CMI and CI. However, DEI fails to provide empirical evidence or support  
3 explaining why the public convenience and necessity require the replacement or  
4 rehabilitation of these proposed redundancy projects. DEI's proposed level of  
5 additional redundancy is unnecessary and not supported by evidence.

6 **Q: What is redundancy?**

7 A: Redundancy is the ability for a system to have alternate methods of delivering a  
8 specific service to its customers during adverse conditions.

9 **Q: Does DEI claim the additional redundancy is necessary to improve reliability?**

10 A: Yes. However, DEI also claims that failure of a single Bulk Electric System ("BES")  
11 element will not cause a customer outage. DEI witness Martin Dickey made the  
12 following statements regarding the BES:

13 The BES is highly redundant by design, [...] failure of a single BES  
14 element will not cause a direct outage to our customers but removes  
15 a level of redundancy for the entire BES.<sup>2</sup>

16 Mr. Dickey referenced the 2016 loss of redundancy as an example, stating "loss of  
17 redundancy occurred most recently in 2016, where thirty-three (33) 345kV  
18 aluminum lattice H-frame structures cascaded due to high straight-line winds."<sup>3</sup> The  
19 failure of the structures did not cause a loss of electrical service to customers. It  
20 removed one level of DEI's redundancy.<sup>4</sup>

21 **Q. Are DEI's additional redundancy projects necessary?**

---


<sup>2</sup> Petitioner's Exhibit 3, Direct Testimony of Martin Dickey, p.10.

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

1 A. No. As noted above, Mr. Dickey indicates DEI's system is highly redundant and  
2 DEI's system is already highly reliable. DEI has not shown any historical data or  
3 other support that it needs this added layer of redundancy. DEI's 2020 System  
4 Average Interruption Frequency Index ("SAIFI") was 1.25. According to DEI  
5 witness Stan C. Pinegar, the Plan will improve SAIFI by 17%, reducing SAIFI to  
6 1.038 ( $1.25 - [1.25 * 0.17] = 1.038$ ).<sup>5</sup> Said another way, for \$800 million, the  
7 average customer will continue to experience one outage lasting more than five  
8 minutes per year. Furthermore, DEI measuring its alleged improvement in  
9 transmission outages in System Average Interruption Duration Index ("SAIDI") and  
10 SAIFI is inappropriate, as SAIDI and SAIFI measures improvement in distribution.

11 **Q: Has the OUCC identified any specific projects included in DEI's TDSIC Plan**  
12 **it recommends removing?**

13 A: Yes. While the OUCC recommends denying the entirety of DEI's TDSIC Plan,<sup>6</sup> if  
14 the Commission approves any portion of the Plan, the OUCC recommends removing  
15 the following transmission projects totaling approximately [<<<CONFIDENTIAL  
16  CONFIDENTIAL>>>], as shown on Confidential Exhibit 3 attached  
17 to this testimony:

- 18 • 6936
- 19 • 6920
- 20 • 69154
- 21 • 6975
- 22 • 69139
- 23 • 6933
- 24 • 6935

---

<sup>5</sup> As shown in Petitioner's Exhibit 1, Pinegar testimony, p. 11.

<sup>6</sup> Excluding the amounts for Targeted Economic Development Projects, as discussed in Cause No. 45647-S1.

1 **Q: Why does the OUCC recommend removing these projects?**

2 A: DEI failed to provide empirical evidence or support regarding the public  
3 convenience and necessity requiring the replacement or rehabilitation of these  
4 transmission lines to improve reliability. There are no capacity changes or other  
5 upgrades to qualify these projects as a system modernization. DEI failed to show  
6 these lines have deteriorated and require replacement. Further, DEI provides no  
7 evidence that these specific projects result in CI or CMI reduction or improved  
8 reliability. There is no justification for including these projects at their projected  
9 cost.

**B. HARDENING AND RESILIENCY**

10 **Q: Do the OUCC's arguments regarding redundancy relate to DEI's claim for**  
11 **"hardening and resiliency"?**

12 A: Yes. As described above, Mr. Dickey explains that the transmission network is  
13 already highly redundant. DEI's transmission and distribution networks are already  
14 highly reliable. According to Mr. Pinegar, customers will still experience, on  
15 average, one five-minute or longer outage per year after the Plan is complete, which  
16 is roughly the same outage frequency as it is now. The proposed Plan would  
17 anticipate a 0.21 decrease in SAIFI. The \$800 million cost for  
18 redundancy/hardening/resiliency projects is not justified by the incremental benefit  
19 those projects might provide, as required by the TDSIC Statute.

**C. DISTRIBUTED ENERGY RESOURCES**

20 **Q: Will adding electrical system devices in DEI's TDSIC Plan provide the**  
21 **capability and/or market for future DER installations? Please explain.**

1 A: Not necessarily. First, DEI has not demonstrated customer demand for DER exists.  
2 Second, any new system improvement would need to be completed according to  
3 customers' DER specifications. It would be prudent to wait until a customer has a  
4 specific project need, and DEI can build its system specific to meet its customers'  
5 DER needs. DEI's request amounts to, speculation that, perhaps, sometime in the  
6 future, such upgrades will help make an easier build for distributed or renewable  
7 generation.

#### IV. COSTS

8 **Q. Does DEI comply with the TDSIC Statute as it relates to a finding of the "best**  
9 **estimate of the cost"**<sup>7</sup>?

10 A: No. The prices of copper, aluminum, and steel have risen dramatically in the past  
11 two years since DEI first began pricing these projects. As such, DEI's Plan estimates  
12 are understated and, therefore, DEI's incremental benefit calculation is almost  
13 certainly overstated.

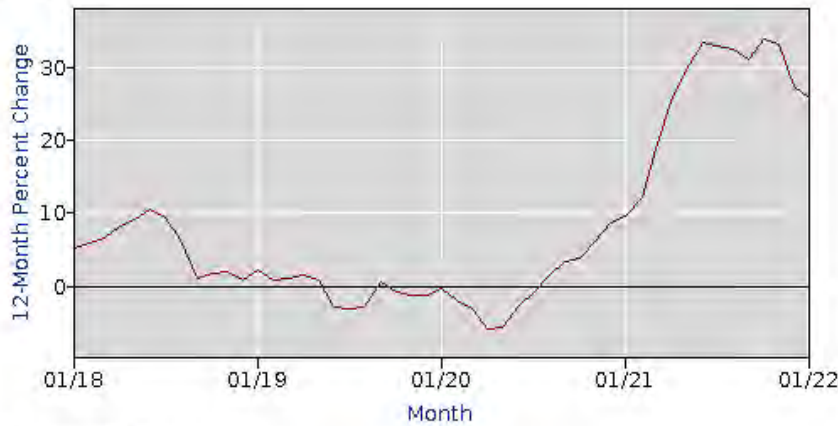
14 The graphs below taken from the U.S. Department of Labor and Statistics,  
15 show commodity fluctuation and percent change from 2018-2021.

---

<sup>7</sup> Ind. 8-1-39-10(b)(1).

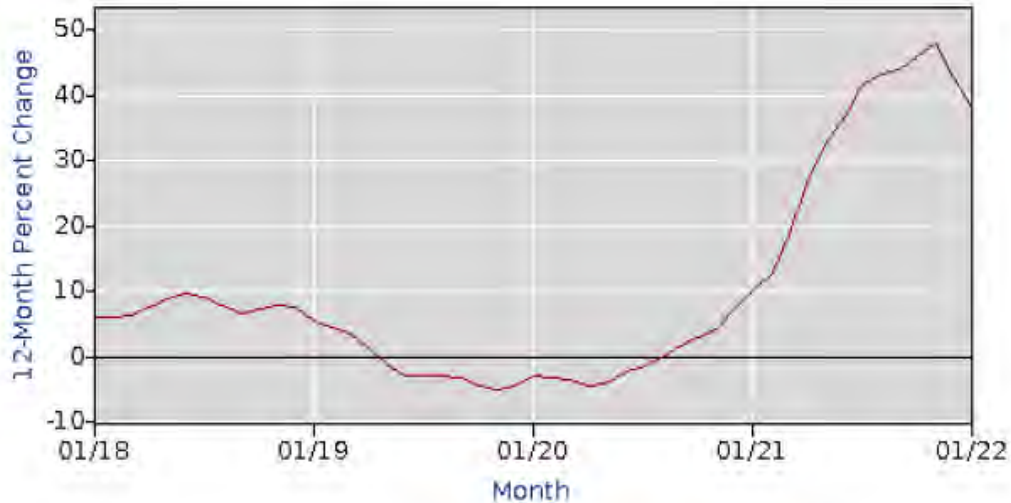
**12-Month Percent Change**

**Series Id:** WPU1026  
Not Seasonally Adjusted  
**Series Title:** PPI Commodity data for Metals and metal products-Nonferrous wire and cable, not seasonally adjusted  
**Group:** Metals and metal products  
**Item:** Nonferrous wire and cable  
**Base Date:** 198200



**12-Month Percent Change**

**Series Id:** WPU10  
Not Seasonally Adjusted  
**Series Title:** PPI Commodity data for Metals and metal products, not seasonally adjusted  
**Group:** Metals and metal products  
**Item:** Metals and metal products  
**Base Date:** 198200



Retrieved from: U.S. Bureau of Labor Statistics, February 2022: <https://data.bls.gov/pdq/SurveyOutputServlet>

1 Q. Why are you concerned with the price of aluminum, copper, and steel?

1    **A.**    Nearly every project in DEI's Plan relies on these base materials. Specifically, all  
2           transmission projects in Table 2-1,<sup>8</sup> and all distribution projects on Table 2-2<sup>9</sup> rely  
3           on these materials.

4    **Q:**    **Do you agree with the cost-benefit assessment provided in the Plan?**

5    **A:**    No. The projected costs do not take into consideration the unstable aluminum,  
6           copper, and steel commodity prices. Also, as discussed in detail, B&V's Copperleaf  
7           model has unknown algorithms; therefore, no party, nor the Commission can  
8           replicate B&V's outputs. Additionally, the VOLL configurations are not  
9           mathematically feasible. All these concerns undermine the confidence of the cost-  
10          benefit assessment provided in the Plan.

11   **Q:**    **Based on your assessment, do you have concerns regarding affordability?**

12   **A:**    Yes. State policy is to protect the affordability of utility services.<sup>10</sup> Mr. Lantrip  
13          discusses affordability concerns in greater detail. The DEI Plan proposes nearly \$2  
14          billion in 1) redundant infrastructure that does not decrease CI and CMI and is not  
15          for purposes of safety, reliability or modernization; and 2) unnecessary DER  
16          projects. There are no identified customers seeking DER connectivity, which falls  
17          outside the scope of modernization. Given these projects are unnecessary and are  
18          outside the scope of the TDSIC statute, these projects would not meet the obligation  
19          of "affordability."

---

<sup>8</sup> Petitioner's Exhibit 4A, p.2-3.

<sup>9</sup> Petitioner's Exhibit 4A, p.2-5.

<sup>10</sup> Ind. Code §8-1-2-0.5.

## **V. PROJECT MANAGEMENT**

1 **Q: Are there project management tools available to monitor the status of a**  
2 **project?**

3 A: Yes. Project Management Institute (“PMI”) has developed a standard, EVM, which  
4 divulges Cost Performance Index (“CPI”) and Schedule Performance Index (“SPI”),  
5 as defined, and detailed within the PMI standard for EVM. EVM is a system of tools  
6 designed to measure the progress and performance of a project. CPI and SPI, both  
7 tools within EVM, will provide the OUCC with the ability to monitor DEI’s TDSIC  
8 Plan progress.

9 **Q: Has the OUCC discussed with DEI how it would like to receive project updates**  
10 **if DEI’s Plan is approved?**

11 A: Yes. DEI is active within PMI community via DEI employees who are certified  
12 Project Management Professionals. I discussed DEI’s PMI activities in a video  
13 conference on February 3, 2022. DEI verified corporate acceptance and utilization  
14 of PMI EVM practices. DEI produces elements from PMI such as the Standard for  
15 EVM, CPI and SPI. These indices indicate DEI’s ability to complete defined projects  
16 and programs within their estimates. The DEI indices will provide the OUCC with  
17 an industry-accepted method, as a bi-annual report, allowing the OUCC to monitor  
18 the progress of DEI’s Plan.

## **VI. RECOMMENDATIONS**

19 **Q: What are your recommendations regarding DEI’s proposed TDSIC Plan?**

1 A: I recommend the Commission:

2 1. Deny DEI's Plan, as DEI has not provided all data it used to develop the Plan,  
3 and relies on flawed data and methodologies, and, therefore, cannot be replicated  
4 to determine an accurate cost-benefit analysis.

5 2. Deny DEI's Plan, as it relates to DER Projects, as DEI has failed to demonstrate  
6 the public convenience and necessity requires these upgrades to allow for future  
7 distributed generation or future renewable projects not yet identified by DEI.

8 3. Deny DEI's proposed TDSIC Plan because DEI's estimates fail the statutory  
9 requirement of "best estimate of the cost" as DEI's estimates do not accurately  
10 reflect the rising commodity prices.

11 4. If the IURC approves the Plan, it should remove 19 transmission line projects  
12 contained within the identified transmission project numbers below identified as  
13 being conducted for redundancy, as well as all DER-related projects.

- 14 • 6936
- 15 • 6920
- 16 • 69154
- 17 • 6975
- 18 • 69139
- 19 • 6933
- 20 • 6935

21  
22 5. If the IURC approves any portion of TDSIC Plan, require DEI to provide  
23 biannual reports containing PMI EVM metrics.

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

25 A: Yes, it does.



**APPENDIX A**

1 **Q: Please describe your educational background and experience.**

2 A: I received a B.S in Mechanical Engineering Technology, M.S. in Industrial  
3 Technology, and a PhD in Technology Leadership and Innovation (TLI) with a  
4 cognate in Systems and Analytics from Purdue University. In addition, I received an  
5 MBA with a concentration in Finance from Anderson University and hold a Project  
6 Management Professional (PMP) designation.

7 I was employed with Indianapolis Power & Light Company in various capacities in  
8 Distribution Engineering, Transmission Engineering, Civil/Mechanical  
9 Engineering, and Power Plant Engineering for 28 years. I left IPL in 2000 and spent  
10 approximately four years managing the design and construction of wireless and fiber  
11 optic facilities throughout the United States. I returned to IPL in 2004 as a Senior  
12 Engineer and moved into various engineering and management capacities. After  
13 concluding employment with Indianapolis Power & Light Company in 2018, I was  
14 employed with Verizon Wireless as a project/construction manager to create project  
15 and construction management schedules for the deployment of 5G technologies.  
16 Also, I was self-employed as a consultant to small electric utility engineering  
17 companies where I developed the format and structure for new distribution and  
18 transmission engineering departments. In addition, I developed various micro-grid  
19 engineering designs and proposals for various local and state entities. I provided  
20 engineering designs and proposals for Grid-Forming technologies to the Department

1 of Defense (DOE), high energy/high-impact energy engineering designs and  
2 proposals for Advanced Research Projects Agency-Energy (ARPA-E).

3 I have been employed with the OUCC since October 2021.

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

5 A: No.

OUCC  
IURC Cause No. 45647  
Data Request Set No. 1  
Received: December 17, 2021

OUCC 1.6

**Request:**

Petitioner's Exhibit 4, the Direct Testimony of Mr. James Shields, at page 14 Mr. Shields discusses the evaluation of Transmission and Distribution projects and says, "Distribution systems are typically radial, segmented, and have more frequent outages that impact fewer customers than transmission systems."

Please provide all data and materials Mr. Shields considered in reaching his conclusion distribution systems "have more frequent outages that impact fewer customers than transmission systems."

**Response:**

This sentence is based on the understanding of how distribution and transmission systems are designed to operate. As indicated in the following sentence, after the quoted sentence, transmission systems are designed to be "redundant". Transmission systems are also typically networked. The combination of being networked and redundant allows for continuation of service for single and in some cases multiple faults on the transmission system. When faults occur on the transmission system the faulted section is de-energized and isolated through relay protection schemes and continuity of service is maintained through remaining energized redundant network.

In contrast, distribution systems are designed to operate in a radial manner. When operated radially, faults on the distribution system cause outages. Outages occur because the faulted section is de-energized and isolated, however, there is no networked distribution circuits available to maintain continuity of service. Furthermore, distribution system delivery energy to customer locations where electric service is needed. This requires placing electric distribution facilities in areas with trees, animals and vehicle traffic that cause frequent outages.

**Witness:** James W. Shields

OUCC  
IURC Cause No. 45647  
Data Request Set No. 5  
Received: February 3, 2022

OUCC 5.1

**Request:**

Please provide pole inspection data collected and provided by DEI pole inspection contractor for all wood poles contained within the following project #'s

Project #TIN 1710  
Project #TIN 1711  
Project #TIN 1712  
Project #TIN 1785  
Project #M 170131  
Project #M 180007  
Project #M 180094  
Project #M 180276  
Project #M180281  
Project #M200312  
Project #M210398.

**Objection:**

Duke Energy Indiana objects to this request as vague, ambiguous, overly broad and unduly burdensome as it is not limited to a reasonable and relevant scope or time period.

**Response:**

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

The following three projects are not Transmission line rebuilds, and therefore it is not applicable to summarize pole inspection data for these projects:

- Project #M180276     Huntington
- Project #M180281     Middlefork
- Project #M210398     Akron

See Confidential Attachment OUCC 5.1-A for the inspection records for the remaining projects listed above. The inspection data has been filtered to only include information related to the poles within the spans that are going to be replaced during the execution of the rebuild projects, not the entire length of transmission line.

**Witness: Martin Dickey**

OUCC  
IURC Cause No. 45647  
Data Request Set No. 5  
Received: February 3, 2022

OUCC 5.2

**Request:**

For each of the 11 projects listed in Request No. 1 above, please identify all transmission line outages affecting at least 5000 customers for a duration exceeding 5 minutes, for the period 2012 - 2021 (ten years). Please provide this data for each individual transmission line included within each of the 11 projects.

**Objection:**

Duke Energy Indiana objects to this request as vague, ambiguous, overly broad and unduly burdensome. Duke Energy Indiana objects to the request to provide information for the past ten years as overly broad and unduly burdensome and has provided the information for the years it has available (2015-2021).

**Response:**

Subject to and without waiving or limiting its objections, Duke Energy Indiana responds as follows: Projects M180276 Huntington and M180281 Middlefork have been excluded from this response as these projects are not transmission line rebuild projects. See Confidential Attachment OUCC 5.2-A for the outages associated with the transmission line rebuild projects listed in OUCC 5.1. The data provided is for the transmission line overall, not the specific line segment within the rebuild. Reliability data is not collected below the resolution of the transmission line overall.

**Witness: Martin Dickey**

OUCC  
IURC Cause No. 45647  
Data Request Set No. 5  
Received: February 3, 2022

OUCC 5.3

**Request:**

For each of the 11 projects listed in Request No. 1 above, please identify all distribution circuit / distribution system outages affecting at least 5000 customers for a duration exceeding 5 minutes, for the period 2012 - 2021 (ten years). Please provide this data for each individual distribution circuit or system included within each of the 11 projects.

**Objection:**

Duke Energy Indiana objects to this request as vague, ambiguous, overly broad and unduly burdensome. Duke Energy Indiana objects to the request to provide information for the past ten years as overly broad and unduly burdensome and has provided the information for the years it has available (2015-2021).

**Response:**

Subject to and without waiving or limiting its objections, Duke Energy Indiana responds as follows: Excluding Projects M180276 Huntington and M180281 Middlefork, as these projects are not transmission line rebuild projects, there are no individual distribution circuits that incurred outages affecting greater than 5,000 customers, for a duration exceeding 5 minutes for the transmission line rebuild projects listed in OUCC 5.1.

**Witness:** Martin Dickey

OUCC  
IURC Cause No. 45647  
Data Request Set No. 5  
Received: February 3, 2022

OUCC 5.4

**Request:**

For each of the 11 projects listed in Request No. 1 above, please identify all substation outages affecting at least 5000 customers for a duration exceeding 5 minutes, for the period 2012 - 2021 (ten years) Please provide this data for each individual substation included within each of the 11 projects.

**Objection:**

Duke Energy Indiana objects to this request as vague, ambiguous, overly broad and unduly burdensome. Duke Energy Indiana objects to the request to provide information for the past ten years as overly broad and unduly burdensome and has provided the information for the years it has available (2015-2021).

**Response:**

Subject to and without waiving or limiting its objections, Duke Energy Indiana responds as follows: Excluding Projects M180276 Huntington and M180281 Middlefork, as these projects are not transmission line rebuild projects, there are no individual substations that incurred outages affecting greater than 5,000 customers, for a duration exceeding 5 minutes for the transmission line rebuild projects listed in OUCC 5.1.

**Witness:** Martin Dickey

OUCC  
IURC Cause No. 45647  
Data Request Set No. 5  
Received: February 3, 2022

OUCC 5.5

**Request:**

For each of the 11 projects listed in Request No. 1 above, please provide a copy of all transmission, distribution and substation outage reports submitted to the Federal Energy Information Administration (“EIA.gov”) for the period 2012 - 2021 (ten years). Please provide this data for each individual transmission line, distribution line and substation included within each of the 11 projects.

**Objection:**

Duke Energy Indiana objects to this request as vague, ambiguous, overly broad and unduly burdensome. Duke Energy Indiana objects to the request to provide information for the past ten years as overly broad and unduly burdensome as the Federal Energy Information Administration only began collecting reliability data in 2013 and any reporting for 2021 has not been submitted. In addition, Duke Energy Indiana objects to the request to the extent it seeks a compilation that has not already been performed and that Duke Energy Indiana objects to performing.

**Response:**

Subject to and without waiving or limiting its objections, Duke Energy Indiana responds that outages are not submitted to the Federal Energy Information Administration (“EIA.gov”) at the individual transmission line level as requested.



OUCC  
IURC Cause No. 45647  
Data Request Set No. 5  
Received: February 3, 2022

OUCC 5.6

**Request:**

For each of the 11 projects listed in Request No. 1 above, please provide a copy of all transmission, distribution and substation outage reports submitted to the Indiana Utility Regulatory Commission for the period 2012 - 2021 (ten years). Please provide this data for each individual transmission line, distribution line and substation included within each of the 11 projects.

**Objection:**

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

**Response:**

Subject to and without waiving or limiting its objections, Duke Energy Indiana responds as follows: Outages are not submitted to the IURC at the individual transmission line level. See Duke Energy Indiana's response to OUCC 6.3(f) for Duke Energy Indiana's Electric Reliability Reports submitted to the IURC for the 2011-2020 reporting period.

**OUCC Attachment CAS-3-C**

**DEI Supplemental Response to OUCC DR1.1; CONFIDENTIAL Attachment OUCC 1.1-B**

**“Confidential Deteriorated Conductor Calculations V10-Final”**

**CONFIDENTIAL Excel spreadsheet not reproduced here. The CONFIDENTIAL document has been filed with the IURC on CD due to size issues.**