

STATE OF MICHIGAN  
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

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In the matter of the application of )  
**CONSUMERS ENERGY COMPANY** )  
for authority to increase its rates for ) Case No. U-21870  
the generation and distribution of )  
electricity and for other relief. )  
\_\_\_\_\_)

**QUALIFICATIONS AND DIRECT TESTIMONY OF**  
**ALLAN D. FREEMAN**  
**MICHIGAN PUBLIC SERVICE COMMISSION**

**September 30, 2025**

**QUALIFICATIONS OF ALLAN D. FREEMAN**  
**CASE NUMBER U-21870**  
**PART I**

1 Q. Please state your full name and business address for the record.

2 A. My name is Allan David Freeman, and my business address is 7109 W. Saginaw Hwy.,  
3 Lansing, MI 48917.

4 Q. By whom are you employed and in what capacity?

5 A. I am employed by the Michigan Public Service Commission (MPSC or Commission) as  
6 an Assistant to the Division Director in the Energy Resources Division.

7 Q. Please describe your educational background.

8 A. I hold three degrees. In 2000, I earned a Juris Doctor and a Masters of Public  
9 Administration, both from the University of Pittsburgh. I earned a Bachelor of Arts in  
10 International Relations from Michigan State University in 1996.

11 Q. What is your professional background?

12 A. In 2009, I began working for the MPSC in the Energy Markets section. My  
13 responsibilities included representing Michigan and advocating policy objectives during  
14 meetings of the Organization of MISO States (OMS) and the Organization of  
15 Pennsylvania-New Jersey-Maryland Interconnection (PJM) States, Inc. I coordinated  
16 regulatory oversight and policy formation among the states. Additionally, I collaborated  
17 to perform analysis and evaluation on the elements of existing and future market designs.  
18 I served as co-chair of OMS's Market and Tariff workgroup. I attended the Eastern  
19 Interconnection States' Planning Council, Federal Energy Regulatory Commission  
20 (FERC), Midcontinent Independent System Operator (MISO), and PJM Interconnection  
21 stakeholder work groups and committee meetings. Lastly, I drafted speeches for MPSC  
22 Commissioners (Commissioners).

**QUALIFICATIONS OF ALLAN D. FREEMAN**  
**CASE NUMBER U-21870**  
**PART I**

1           In 2015, I became an Executive Policy Advisor in the Research Section of the  
2 Strategic Operations Division. In this role, I advised the Commissioners on policy and  
3 technical matters pertaining to the Commission's regulatory and policy-making  
4 responsibilities across all regulated sectors. I assisted the Commissioners during  
5 deliberations on decisions in general rate cases, certificate of need proceedings, energy  
6 law implementation, and electricity and natural gas fuel cost cases. Additionally, I  
7 negotiated decisions on behalf of the Commissioners. I conducted research on emerging  
8 jurisdictional, structural, and technical issues in the utility industries. I represented the  
9 Commissioners in various capacities and functions involving industry and the public.

10           In 2020, I became the Assistant to the Division Director in the Energy  
11 Resources Division. This division is responsible for implementation of the State's Clean  
12 & Renewable Energy and Energy Waste Reduction Act, evaluating certificate of  
13 necessity and integrated resource plan filings, reviewing Smart Grid utility investments,  
14 administration of Michigan's gas and electric customer choice programs, and electric  
15 resource adequacy and modeling. I assist the Energy Resources Division Director in  
16 program planning, policy and procedures development, and research. I review testimony  
17 for contested case proceedings. I represent the Director in meetings, settlement  
18 conferences, and task forces. I serve as the MPSC Staff (Staff) lead for our internal  
19 electric vehicles team. Lastly, I co-chaired the Commission's Diversity, Equity, and  
20 Inclusion initiative.

21 Q. Have you received any work-related training since your employment with the MPSC?

22 A. Yes, I have attended several programs hosted by the Institute of Public Utilities (IPU) at  
23 Michigan State University: the Michigan Forum on Economics and Regulatory Policy,

**QUALIFICATIONS OF ALLAN D. FREEMAN**  
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**PART I**

1 the Annual Regulatory Studies Program, IPU's Grid and Rate Schools, the National  
2 Regulatory Research Institute, and several Advanced Regulatory Studies Program  
3 sessions.

4 Q. Have you previously filed testimony before the Commission?

5 A. Yes. I have filed testimony in the following cases: U-20836, DTE Electric's 2022 rate  
6 case; U-21224, Consumers Energy Electric's 2022 rate case; U-21279, DTE Electric's  
7 2023 rate case; U-21389, Consumers Energy Electric's 2023 rate case; U-21401, Indiana  
8 Michigan Power Company's 2023 rate case; U-21534, DTE Electric's 2024 rate case;  
9 Consumers Energy Electric's 2024 rate case U-21585; and DTE Electric's 2025 rate case,  
10 U-21860.

11 Q. Have you worked to analyze any cases filed before the Commission?

12 A. Yes, in my role as Executive Policy Advisor, I assisted in the deliberations on many  
13 different types of cases. I was intimately involved in both electric and gas rate cases,  
14 Certificate of Need proceedings, Integrated Resource Plan (IRP) cases, Securitization  
15 proceedings, reliability dockets, renewable energy cases, and the MI PowerGrid  
16 stakeholder initiatives.

**DIRECT TESTIMONY OF ALLAN D. FREEMAN**  
**CASE NUMBER U-21870**  
**PART II**

1 Q. What is the purpose of your testimony?

2 A. The purpose of my testimony is to present MPSC Staff's analysis of Consumers Energy  
3 Electric Company's (Consumers or the Company) electric vehicle (EV) rate case  
4 proposals.

5 Q. Are you sponsoring any exhibits?

6 A. No.

7 Q. What is the purpose of the Company's EV testimony?

8 A. Company witness Jeffrey Myrom outlines the Company's execution of its Transportation  
9 Electrification Plan (TEP) and proposes enhancements to improve the customer  
10 experience.

11 Q. What is the TEP's purpose?

12 A. The TEP focuses on the Company's long-term strategies to optimize EV charging load so  
13 that it benefits all customers. Additionally, the TEP identifies the investments, incentives,  
14 programs, and expenditures that are reasonably expected to increase transportation  
15 electrification in the Company's footprint.<sup>1</sup>

16 Q. Is the Company asking for any budgetary increases from prior MPSC approvals?

17 A. No, there are no increases to the TEP budget previously approved.<sup>2</sup>

18 Q. When will the Company file its next TEP?

19 A. In its January 24, 2025 Order in Case No. U-21492, the Commission approved updated  
20 TEP filing requirements. In addition, all Michigan investor-owned utilities are required to

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<sup>1</sup> Prefiled Direct Testimony and Exhibits of Company witness Myrom, p. 4.

<sup>2</sup> *Id.*, at, p. 12.

**DIRECT TESTIMONY OF ALLAN D. FREEMAN**  
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**PART II**

1 file TEPs every two years. This Order established a July 1, 2026 deadline for the  
2 Company's next TEP.

3 Q. Does Staff have any suggestions on what it would like to see in the Company's next TEP?

4 A. In addition to the updated filing requirements from Case No. U-21492, Staff would like to  
5 see an additional item discussed in the TEP. This trend reflects an emerging topic that is  
6 newly relevant to TEPs.

7 Q. What is the first topic?

8 A. On July 4, 2025, The One Big Beautiful Bill Act<sup>3</sup> (OBBBA) became federal law. This  
9 legislation included several changes to the energy tax credits introduced and expanded by  
10 the Inflation Reduction Act of 2022.<sup>4</sup> The OBBBA changed Internal Revenue Code §30D  
11 and §45W, the clean vehicle credits provisions. Their sunset date moved up from December  
12 31, 2032 to September 30, 2025. The elimination of these tax credits will impact EV  
13 adoption. After an initial spike of new EV registrations to take advantage of the credit  
14 before it terminates, it is unclear what will happen to EV adoption after the September 2025  
15 end date. Staff recommends that DTE consider these changes and discuss them fully in the  
16 Company's 2026 TEP.

17 Q. Does Staff have any opinions on the Company's forecast for EV adoption in its footprint?

18 A. As noted above, the recent OBBBA EV tax credits termination will impact EV adoption.  
19 Given this legislation is only approximately three months old, it is unclear the magnitude  
20 of this impact. In both its next TEP and rate case, Staff expects to see a thorough discussion  
21 of these developments and how EV adoption and load will be impacted.

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<sup>3</sup> <https://www.congress.gov/bill/119th-congress/house-bill/1/text>, July 2025.

<sup>4</sup> <https://www.congress.gov/bill/117th-congress/house-bill/5376/text>, August 2022.

**DIRECT TESTIMONY OF ALLAN D. FREEMAN**  
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**PART II**

1 Q. Is the Company proposing any TEP enhancements?

2 A. Yes, Consumers is proposing two enhancements.

3 Q. What is the first TEP enhancement?

4 A. The Company wants to use weatherized and EV-rated National Electric Manufacturers  
5 Association (“NEMA”) 14-50 outlets across all Level 2 rebate categories and NEMA 5-20  
6 outlets across all duration Level 1 rebate categories.<sup>5</sup>

7 Q. What is the Company’s rationale for this change?

8 A. Consumers states that the adoption of this recommendation will be “a useful option across  
9 the board to reduce infrastructure costs.”<sup>6</sup> The enhancement does this by simplifying  
10 installations and reducing costs for host sites.<sup>7</sup> These NEMA outlets employ standardized  
11 designs. Additionally, this recommendation would allow multifamily locations to utilize a  
12 bring-your-own-cord solution.<sup>8</sup>

13 Q. Does Staff support this enhancement?

14 A. Yes, Staff supports this enhancement for two reasons. First, reducing EV infrastructure  
15 costs is an excellent rationale. In addition, increased utilization of multifamily charger  
16 locations is a worthwhile goal.

17 Q. What is the second proposed enhancement?

18 A. The Company wants to continue its Direct Current Fast Charging (“DCFC”) rebates on a  
19 time-limited and selective basis.<sup>9</sup> Consumers is proposing four alterations to its existing  
20 program.

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<sup>5</sup> Prefiled Direct Testimony and Exhibits of Company witness Myrom, p. 12.

<sup>6</sup> *Id.*, at, p. 13.

<sup>7</sup> *Id.*, at, p. 12.

<sup>8</sup> *Id.*, at, p. 13.

<sup>9</sup> *Id.*

**DIRECT TESTIMONY OF ALLAN D. FREEMAN**  
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**PART II**

1 Q. What are the proposed changes?

2 A. First, the Company is proposing a DCFC rebate of up to \$50,000 per 150 kW port.<sup>10</sup> Next,  
3 Consumers wants to limit the DCFC rebates to communities that do not have at least four  
4 150 kW DCFC ports across two or more different host sites.<sup>11</sup> Third, the DCFC rebate  
5 application will only be available for two years after approval by the Commission. Lastly,  
6 the Company will look to select host sites that offer a quality customer experience.<sup>12</sup>

7 Q. Does Staff support the DCFC rebate enhancements?

8 A. Staff supports all these changes. It is consistent with Staff's prior positions that DCFC  
9 incentives should work to create a skeleton charger network and not become a permanent  
10 program. These enchantments are consistent with this approach. Additionally, these  
11 enchantments will steer DCFC rebates towards current charging deserts and avoid  
12 subsidizing in areas already with DCFC infrastructure.

13 Q. Please provide a summary of Staff recommendations in this testimony addressing the  
14 Company's EV Programs.

15 A. Staff's recommendations are as follows:

16 1. Staff supports both the Company's proposed TEP enhancements.

17 Q. Does this conclude your testimony?

18 A. Yes.

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<sup>10</sup> Prefiled Direct Testimony and Exhibits of Company witness Myrom, p. 13.

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*, at, p. 14.

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**QUALIFICATIONS AND DIRECT TESTIMONY OF**  
**MARCELINE A. CHAMPION**  
**MICHIGAN PUBLIC SERVICE COMMISSION**

**September 30, 2025**

**QUALIFICATIONS OF MARCELINE A. CHAMPION**

**CASE NUMBER U-21870**

**PART I**

1 Q. Please state your full name and business address for the record.

2 A. My name is Marceline A. Champion (she/her), and my business address is 7109 W.  
3 Saginaw Highway, Lansing, MI 48917.

4 Q. By whom are you employed and in what capacity?

5 A. I am employed in the Energy Resources Division of the Michigan Public Service  
6 Commission (MPSC or Commission). I am a Public Utilities Engineer in the Resource  
7 Optimization and Certification Section (ROC), which is responsible for assisting in the  
8 implementation of Public Acts 341 and 342 of 2016, as amended by Act 231 of 2023, and  
9 evaluating applications for transmission siting pursuant to Public Act 30 of 1995.

10 Q. What is your educational background?

11 A. I earned a Bachelor of Science in Biosystems Engineering, with a Concentration in  
12 Ecosystems Engineering, from the College of Engineering and a Minor in Environmental  
13 and Sustainability Studies from the College of Natural Science at Michigan State  
14 University (MSU) in 2019. In 2021, I attended several training seminars, including the  
15 Institute for Public Utilities' Power Grid School I and II, the Wisconsin Public Utility  
16 Institute's Regional Transmission Organization Fundamentals training course, and the  
17 National Association of Regulatory Utility Commissioners' (NARUC) Fundamentals of  
18 Resource Adequacy course. In 2023, I attended NARUC's How To Be An Effective  
19 Witness training.

20 Q. What are your professional experiences?

21 A. In 2016, I worked as a Student Assistant for Dr. Eric Hanson in MSU's Department of  
22 Horticulture. I maintained several hundred raspberry and blackberry plants for a research  
23 study of several emerging organic fertilizers and pesticides, built irrigation systems,

**QUALIFICATIONS OF MARCELINE A. CHAMPION**

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**PART I**

1 harvested and recorded yield data by section, and performed other tasks for the department.

2 In 2018, I began working for Enviroweather, a program within MSU, as a Student  
3 Technician. I installed, maintained, and programmed new weather stations across  
4 Michigan. I conducted several special projects during this time, including completing a  
5 feasibility study for a proposed microclimate research project, building a solar-battery  
6 powered smart irrigation system, and developing Excel tools for weather data analysis.

7 In 2020, I accepted a position as a Public Utilities Engineer in the ROC Section of  
8 the MPSC. I am responsible for evaluating regulated utilities' integrated resource plans  
9 (IRPs) and analyzing supply and demand side resource investment. I am involved in  
10 reviewing Requests For Proposals (RFP) and Voluntary Green Pricing (VGP) programs. I  
11 am responsible for the evaluation of Power Purchase Agreements, Build Transfer  
12 Agreements, and Engineering, Procurement, and Construction contracts fulfilling capacity  
13 and energy needs identified in approved IRP Proposed Courses of Action and to meet VGP  
14 subscriptions. I participated in several MI Power Grid workgroups, where I assisted with  
15 all aspects of the stakeholder process and report writing. I am responsible for updating the  
16 MPSC's annual regional fuel mix and emissions data page. In 2024, I co-authored the  
17 Upper Peninsula Energy Report, pursuant to Section 51(5) of Act 235.

18 Q. Have you previously filed testimony in a contested case before the Commission?

19 A. Yes. I have prepared and filed testimony in the following cases before the Commission:

- 20 • Case No. U-20793: DTE Energy's 2019 DR Reconciliation case;
- 21 • Case No. U-20836: DTE Energy's 2022 Electric Rate Case;
- 22 • Case No. U-21097: NSP's 2021 Electric Rate Case;
- 23 • Case No. U-21090: Consumers Energy Company's 2021 IRP;

**QUALIFICATIONS OF MARCELINE A. CHAMPION**

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**PART I**

- 1 • Case No. U-21224: Consumers Energy Company’s 2022 Electric Rate Case;
- 2 • Case No. U-21172: DTE Energy’s Voluntary Green Pricing Case;
- 3 • Case No. U-21374: Consumers Energy Company’s Voluntary Green Pricing Case;
- 4 • Case No. U-21375: DTE Energy’s Voluntary Green Pricing Case;
- 5 • Case No. U-21471: METC’s Act 30 Certificate of Public Need and Convenience Case;
- 6 and
- 7 • Case No. U-21809: Upper Peninsula Power Company’s 2025 IRP.

**DIRECT TESTIMONY OF MARCELINE A. CHAMPION**

**CASE NUMBER U-21870**

**PART II**

1 Q. What is the purpose of your testimony?

2 A. I will be presenting MPSC Staff's (Staff) review and recommendations regarding  
3 Consumers Energy Company's (Consumers or the Company) two proposed energy storage  
4 projects, Weadock BESS (Weadock) and Iosco BESS (Iosco), and their accompanying  
5 contracts.

6 Q. Are you sponsoring any exhibits?

7 A. Yes. I am sponsoring the following exhibits:

8 • Exhibit S-11.0: Discovery response to Staff on the projected life of the Weadock and  
9 Iosco projects

10 • Confidential Exhibit S-11.1: Discovery response to Staff on the Levelized Cost of  
11 Storage for the Weadock and Iosco projects

12 Q. Were these exhibits prepared by you or under your supervision?

13 A. Yes.

14 Q. Please describe the Weadock BESS project.

15 A. Weadock BESS is a Company-owned, 45 megawatt (MW) 4-hour lithium-ion battery  
16 energy storage project to be located at the Weadock Substation in Bay County, with an  
17 expected commercial operations date (COD) of December 21, 2026.<sup>1</sup> It has a 20-year  
18 design life.<sup>2</sup> The total projected cost is \$67.45 million.<sup>3</sup> The Levelized Cost of Storage  
19 (LCOS) is [REDACTED].<sup>4</sup>

20 Q. Please describe the Iosco BESS project.

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<sup>1</sup> Prefiled Direct Testimony of Company witness Thomas Clark, p. 7.

<sup>2</sup> Staff Exhibit S-11.0, p. 1.

<sup>3</sup> Prefiled Direct Testimony of Company witness Clark, p. 9.

<sup>4</sup> Confidential Staff Exhibit S-11.1, p. 1.

**DIRECT TESTIMONY OF MARCELINE A. CHAMPION**

**CASE NUMBER U-21870**

**PART II**

1 A. Iosco BESS is a Company-owned, 30 MW 4-hour lithium-ion battery energy storage  
2 project to be located at the Iosco Substation in Iosco County, with an expected COD of  
3 December 21, 2026.<sup>5</sup> It has a 20-year design life.<sup>6</sup> The total projected cost is \$49.9 million.<sup>7</sup>  
4 The LCOS is [REDACTED]<sup>8</sup>

5 Q. What can the LCOS of these two projects be compared to?

6 A. The Company has several previously approved storage projects, but these projects are all  
7 significantly larger than the two projects presented in this case. The Company's 2021 IRP  
8 included a modeled energy storage proxy resource, which is far closer in size to the two  
9 projects. This option also presents a problem in that it is 4 years out of date and does not  
10 represent an actual project.

11 Q. How do the Weadock and Iosco projects compare to the Company's previous projects and  
12 its 2021 IRP proxy?

13 A. The previous projects and IRP proxy LCOS values come in at around \$145/MWh, roughly  
14 [REDACTED] than the two proposed projects.

15 Q. Is there an external source for comparison of the LCOS values?

16 A. Yes. Lazard Inc., a financial advisory and asset management firm, conducts an annual  
17 analysis of energy generating technologies, the Levelized Cost of Energy+ Report. Its most  
18 recent version was published on June 16, 2025. Included in this report is an analysis of  
19 LCOS for energy storage resources.

20 Q. Does this report contain a category of energy storage comparable to the two proposed  
21 projects?

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<sup>5</sup> Prefiled Direct Testimony of Company witness Clark, pp. 9-10.

<sup>6</sup> Staff Exhibit S-11.0, p. 1.

<sup>7</sup> Prefiled Direct Testimony of Company witness Clark, p. 11.

<sup>8</sup> Confidential Staff Exhibit S-11.1, p. 2.

**DIRECT TESTIMONY OF MARCELINE A. CHAMPION**

**CASE NUMBER U-21870**

**PART II**

1 A. Yes. The closest category to the two proposed projects is the Utility-Scale Standalone (100  
2 MW, 4-Hour) category. This category's LCOS ranges from \$115/MWh to \$254/MWh.<sup>9</sup>

3 Q. How do Weadock and Iosco compare to the Utility-Scale Standalone (100 MW, 4-Hour)  
4 category?

5 A. Both Weadock and Iosco fall within that range of LCOS values.

6 Q. Do these projects align with the Company's most recently approved Integrated Resource  
7 Plan (IRP) in Case No. U-21090?

8 A. Yes. In the June 23, 2022, settlement agreement, the Company agreed to the addition of 75  
9 MW of energy storage resources between 2024 and 2027. These projects combined will  
10 provide 75 MW of 4-Hr storage within that time period.

11 Q. Has Staff reviewed the contracts for Weadock and Iosco?

12 A. Yes. Staff reviewed the contracts for the two storage projects on July 30, 2025.

13 Q. What is Staff's recommendation to the Commission?

14 A. Staff recommends the Commission approve these contracts. They are consistent with the  
15 Company's approved IRP settlement agreement and the cost is within the expected range.

16 Q. Does this conclude your testimony?

17 A. Yes.

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<sup>9</sup> [Levelized Cost of Energy+ Report](#), p. 19.

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**QUALIFICATIONS AND DIRECT TESTIMONY OF**  
**PAUL R. AUSUM**  
**MICHIGAN PUBLIC SERVICE COMMISSION**

**September 30, 2025**

**QUALIFICATIONS OF PAUL R. AUSUM**

**CASE NUMBER U-21870**

**PART I**

1 Q. Please state your name and business address.

2 A. My name is Paul R. Ausum, and my business address is 7109 W. Saginaw  
3 Highway, Lansing, Michigan 48917.

4 Q. By whom are you employed and in what capacity?

5 A. I am employed as an Economic Analyst in the Resource Adequacy & Forecasting Section  
6 of the Energy Resources Division of the Michigan Public Service Commission (MPSC or  
7 Commission).

8 Q. What are your responsibilities in your current position?

9 A. I am responsible for the analysis of energy sales (deliveries, load) and peak demand  
10 forecasts in cases that come before the Commission, including rate cases and integrated  
11 resource plans (IRPs). This analysis leads to MPSC Staff (Staff) positions and  
12 recommendations.

13 Q. Please outline your educational background and work history at the Commission.

14 A. I graduated with a Bachelor of Science degree in Economics from Oakland University in  
15 December 2018. From November 2019 to August 2022, I worked as an Economic  
16 Analyst in the Act 304 & Sales Forecasting Section<sup>1</sup> of the Energy Operations Division  
17 of the Commission. In this role, I conducted analysis of Gas Cost Recovery (GCR) and  
18 Power Supply Cost Recovery (PSCR) cases and provided analysis and input that  
19 supported Staff positions in rate cases. In August of 2022, I assumed my current  
20 position. I have attended various courses on regulated utility companies, including the  
21 Accounting and Ratemaking course presented by Michigan State University's Institute of  
22 Public Utilities (IPU) in February 2021, as well as IPU's Fundamentals course in the

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<sup>1</sup> In 2022, this section was renamed as the Energy Cost Recovery & Generation Operations Section.

**QUALIFICATIONS OF PAUL R. AUSUM**  
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**PART I**

1 theory, principles, and practice of economic regulation of utility companies in August  
2 2021. In June 2023, I attended IPU's Power Grid School on the Engineering and  
3 Economics of the Supply Chain for Power, and, in May 2024, I attended a course on the  
4 Fundamentals of Long-Term Load Forecasting held by Electric Utility Consultants  
5 Incorporated (EUCI).

6 Q. Have you previously provided testimony before the Commission?

7 A. Yes. I have provided testimony in the following cases:

<u>Case Number</u>	<u>Company</u>	<u>Type of Case</u>
U-20541	Consumers Energy-Gas	GCR Plan
U-20542	Consumers Energy-Gas	GCR Reconciliation
U-20642	DTE Gas	Rate Case
U-20650	Consumers Energy-Gas	Rate Case
U-20816	DTE Gas	GCR Plan
U-20817	DTE Gas	GCR Reconciliation
U-20822	SEMCO Energy	GCR Plan
U-20823	SEMCO Energy	GCR Reconciliation
U-20836	DTE Electric	Rate Case
U-20940	DTE Gas	Rate Case
U-21046	Alpena Power Company	PSCR Plan
U-21064	DTE Gas	GCR Plan
U-21070	SEMCO Energy	GCR Plan
U-21148	Consumers Energy-Gas	Rate Case
U-21193	DTE Electric	Integrated Resource Plan

**QUALIFICATIONS OF PAUL R. AUSUM**

**CASE NUMBER U-21870**

**PART I**

	<u>Case Number</u>	<u>Company</u>	<u>Type of Case</u>
1			
2	U-21255	Alpena Power Company	PSCR Plan
3	U-21297	DTE Electric	Rate Case
4	U-21308	Consumers Energy-Gas	Rate Case
5	U-21461	Indiana Michigan Power	Rate Case
6	U-21540	Michigan Gas Utilities Corp.	Rate Case
7	U-21585	Consumers Energy-Electric	Rate Case
8	U-21806	Consumers Energy-Gas	Rate Case
9	U-21860	DTE Electric	Rate Case

**DIRECT TESTIMONY OF PAUL R. AUSUM**  
**CASE NUMBER U-21870**  
**PART II**

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

2 A. My testimony will present Staff’s analysis of the May 2026 – April 2027 Test Year forecast  
3 sponsored by Consumers Energy Company (Consumers or the Company) witness Eugène  
4 M.J.A. Breuring in Exhibits A-5 and A-15. My analysis includes review of the number of  
5 customers, energy sales to those customers, and system peak demand used to design  
6 proposed rates.

7 Q. Are you sponsoring any exhibits?

8 A. Yes. I am sponsoring 13 exhibits:

9	<u>Exhibit</u>	<u>Description</u>
10	S-15.0	Staff’s Recommended Adjustment to Test Year Commercial Deliveries
11	S-15.1	Part III Filing Attachment 027
12	S-15.2	Company Residential and Commercial MWh Forecast Equations
13	S-15.3	Part III Filing Attachment 016
14	S-15.4	Comparison of MetrixND Model Test Year Forecasts and Part III
15		Attachment 016 Test Year Forecasts
16	S-15.5	Discovery Response U21870-ST-CE-0085
17	S-15.6	Discovery Response U21870-ST-CE-0086
18	S-15.7	Model Coefficients and July 2024 – March 2025 Out of Sample Test on
19		Individual Company Commercial Forecasting Models
20	S-15.8	Discovery Response U21870-ST-CE-0084
21	S-15.9	Staff Model Coefficients
22	S-15.10	Comparison of Company and Staff Model Statistics
23	S-15.11	Out-of-Sample Comparison of Company and Staff Models
24	S-15.12	Discovery Response U21870-ST-CE-0087

**DIRECT TESTIMONY OF PAUL R. AUSUM**

**CASE NUMBER U-21870**

**PART II**

**ADJUSTMENTS TO TEST YEAR BILLING DETERMINANTS**

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Q. What recommendations do you have for the Commission regarding Consumers' test year electric deliveries forecast in this case?

A. I recommend that the Company's forecast of deliveries to commercial customers be increased by 204,656 megawatt hours (MWh) for customers receiving bundled service and 16,308 MWh for customers receiving choice (retail open access (ROA)) service. My adjustment affects cycle-billed sales and is presented in Staff Exhibit S-15.0, column (f), lines 32 and 41. Within my Staff Exhibit S-15.0, the recommended adjustment is presented alongside and in the same format as Company witness Breuring's Exhibit A-15, Schedule E3.

Q. Do you have any recommendations for the Commission regarding Consumers' test year customer count forecast in this case?

A. I am not recommending that the Commission alter the Company's forecast of customers it expects to serve in the test year.

Q. Do you have any recommendations for the Commission regarding the Company's test year peak demand forecast?

A. I am not recommending that the forecast of peak demand be adjusted at this time.

Q. Why are you recommending adjustments to the test year deliveries forecast?

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1 A. The adjustments are the result of alterations made to the econometric regression models  
2 the Company uses to forecast electricity demand<sup>2</sup> for the major customer classes it serves.<sup>3</sup>  
3 The Company's sales, peak demand, and customer models in their native .NDM<sup>4</sup> format  
4 were requested by Staff via audit request and are included as workpapers to my testimony  
5 and exhibits.<sup>5</sup> Staff analyzed the Company's forecasting models in their original format,  
6 and, using the Company's own criteria for model evaluation, was able to improve upon the  
7 model outputs to create a more accurate forecast of MWh deliveries.

8 **BRIEF DESCRIPTION OF SELECT COMPANY MWh MODELS AND STAFF**  
9 **MODIFICATIONS TO THEM**

10 **RESIDENTIAL MODEL**

11 Q. Please describe the components of the Company's residential deliveries forecasting models  
12 in their native format.

13 A. Company witness Breuring provides an overview of the forecasting process in his direct  
14 testimony, but the ability to analyze the sales and customers in their native formats yields  
15 some additional insight. Regarding the residential forecast, the Company's MWh  
16 deliveries model is composed of two separate use-per-customer regression models  
17 constructed with monthly measured energy efficiency savings from the Company's energy

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<sup>2</sup> Here, the term demand is used to refer to the amount of electrical energy delivered to the meters of the Company's customers. Peak demand, on the other hand, is a function of the highest average amount of energy recorded on the Company's system over a given period. Energy (MWh) is measured over a timespan (e.g. a month, season, year) in intervals (e.g. 15 minutes). The measured interval energy values are divided by the interval (15 minutes = 0.25 hours), giving units of power in megawatts (MW). The highest of these MW values in the timespan of interest (month, season, year) is that period's peak demand.

<sup>3</sup> Company witness Breuring describes the general methodology, process, evaluation criteria, variable selection, and data sources that undergird the Company's demand and customer forecasting philosophy on page 4, lines 5 through page 9, line 17 of his direct testimony in this case.

<sup>4</sup> .NDM is the suffix for an Itron, Inc. MetrixND file. MetrixND is the statistical modeling software used by the Company and many other electric and natural gas utilities to analyze and forecast energy demand and customer counts. To view the forecast models in their native format, a license to install MetrixND is needed.

<sup>5</sup> I have included as a workpaper a copy of the forecasting models with Staff's alterations.

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1 efficiency team added back in.<sup>6</sup> The use-per-customer with efficiency savings added is  
2 modeled as a function of weather (in the form of heating and cooling degree days), binary  
3 variables, billing days, a variable that tracks the closure of the economy due to COVID-19  
4 and its eventual reopening, and several binary variables that explain large variations in  
5 individual months that do not occur elsewhere in the time series. One model captures the  
6 effect of prior usage with an autoregressive term, and the other model uses recorded usage  
7 from the prior twelve months to similarly capture the effect of prior usage on current usage.  
8 The predicted values from these use-per-customer models are weighted and then added  
9 together before being multiplied by the residential customer forecast and combined with  
10 the external forecasts for electric vehicles (EVs) and distributed generation (DG). After  
11 adding in the expected load from EVs and the expected reductions in sales due to increasing  
12 levels of distributed generation, the Company sponsored energy efficiency savings are  
13 subtracted from the model. Staff Exhibit S-15.1 shows the explanatory variables that go  
14 into the Company's models, as well as the statistics that demonstrate the performance of  
15 models over the January 2014 – June 2024 sample of observations that was used estimate  
16 the model equations. Staff Exhibit S-15.2 shows how they combine to form the residential  
17 forecast.

18 Q. Does Staff take issue with the Company's residential forecasting models and their outputs?

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<sup>6</sup> The Company files energy waste reduction (EWR) plans that set goals for annual reductions in deliveries. The projected reductions in sales must be attributable to Company actions (explicitly defined in the EWR plan) that incentivize the efficient use of electricity within the Company's service territory. At a portfolio (aggregate) level, the Company's plan **must** decrease customer consumption of electricity. Plans are reconciled and the achieved level of sales reductions are verified by Staff. In adding the historic efficiency savings to recorded sales, the modeler seeks to isolate the effect of Company sponsored reductions in usage from the other factors that influenced usage in the past and will continue to influence usage into the future.

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1 A. Not at this time. Staff did inquire as to the rationale behind the weights applied to each  
2 model, included as Staff Exhibit S-15.5. As the Company indicates, the model with less  
3 weight (ResDelCycUse\_XEE2) was created to give “weight to the previous twelve months,  
4 where the original model (ResDelCycUse\_XEE) uses the full history with the regression  
5 modeling.” However, both models used the same number of observations to train the  
6 model, so it appears that both models use the “full” history of data, unless the Company is  
7 referring to something else. Aside from the choice of different binary variables, a key  
8 difference between the two models is a “ResUseCalibration” variable in the model with  
9 more weight. This variable is not explained in Company witness Breuring’s testimony.

10 Q. Are there any other adjustments made to the residential forecast?

11 A. Yes. Everything I’ve described up to this point happens within MetrixND. The forecast  
12 is then altered before being included in the Exhibits and Filing Attachments that make up  
13 the Company’s rate case application. Staff Exhibit S-15.4 shows the Company’s  
14 MetrixND forecast for each month of the May 2026 – April 2027 test year, the monthly  
15 forecast for the same period that was included with the Part III Attachment 016.<sup>7</sup> For most  
16 months, there exists a difference in the MWh forecast that is not explained by Company  
17 witness Breuring in testimony. In future rate cases, the Company should explain how it  
18 derived the adjustments to the MetrixND forecasts and why they are necessary.

19 Q. Do you have any recommendations to the Commission regarding the residential deliveries  
20 forecast?

21 A. In future cases, the Company should provide an explanation as to how this  
22 “ResUseCalibration” variable is derived. The Company should also give more explanation

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<sup>7</sup> Part III Attachment 016 is included as Staff Exhibit S-15.3.

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1 as to why two models are needed to predict residential deliveries. The Company should  
2 also provide an explanation as to why the forecasts in MetrixND differ so largely from  
3 what is contained in the Part III Attachment 016, aside from the cycle to calendar billed  
4 conversion.

**COMMERCIAL MODEL**

5  
6 Q. Please describe the components of the Company's commercial deliveries forecasting  
7 models in their native format.

8 A. Similar to the residential modeling process, the Company takes out energy efficiency  
9 before utilizing two separate models, which are then weighted and combined with an  
10 external EV forecast. Aside from the various explanatory variables in each model, a key  
11 difference in the two models is the fact that one is a model of use-per-customer, while the  
12 other is a model of total commercial deliveries. Staff Exhibit S-15.2 shows that the use-  
13 per-customer model is weighted less heavily than the total commercial deliveries model.<sup>8</sup>  
14 Just like the residential models, Staff inquired as to the reasoning underlying the weights  
15 given to each model, and the Company's response is presented as Staff Exhibit S-15.6.  
16 The Company provided much less explanation than the residential forecast as to weightings  
17 used in the commercial models, only providing that the weighting scheme "provides weight  
18 to each model to increase flexibility in modeling."

19 Q. Does Staff agree that the combination of the weighted models produces a more accurate  
20 forecast than the predictions yielded by the output of each model separately?

21 A. No. Staff Exhibit S-15.7 contains an examination of the model statistics and an out-of-  
22 sample test of accuracy for each commercial deliveries model. The Exhibit shows that the

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<sup>8</sup> ComDelCycUse\_XEE is given a weight of 0.4 and ComDelCyc\_XEE is given a weight of 0.6.

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1 commercial use-per-customer model is better able to explain variations in customer usage  
2 (as measured by adjusted R<sup>2</sup>) and is less prone to error (as measured by Mean Absolute  
3 Percentage Error). This demonstrates that the use-per-customer model has more  
4 explanatory power than the total deliveries model. For further evidence that the use-per-  
5 customer model is a better predictor of future deliveries, Staff compared the predictions  
6 made by each model on out-of-sample data from July 2024 – March 2025. Staff Exhibit  
7 S-15.7 also shows that the predictions yielded by the Company’s use-per-customer model  
8 fell closer to both actual and weather normal cycle billed deliveries in the test set. In future  
9 rate case filings, the Company should explain why it requires two models to forecast  
10 commercial load, especially when it appears that one model (use-per-customer) does a  
11 much better job of predicting commercial customer usage.

12 Q. How is choice load considered in the commercial forecasting models?

13 A. The delivery model outputs are inclusive of both bundled *and* choice load. The historical  
14 ratio of choice deliveries to total deliveries is recorded as a percentage and is then modeled  
15 with binary variables corresponding with each month of the year as explanatory variables.  
16 The percentages resulting from this model are applied to each month of the commercial  
17 deliveries model to represent expected ROA load in each month. Once expected energy  
18 efficiency savings are added back into the model, the Company calculates the forecasted  
19 growth in commercial load relative to 2023 and applies this same growth rate to choice  
20 load throughout the forecast horizon.

21 Q. Does the Company calculate a historical percentage and forecasted growth rate for the  
22 number of commercial choice customers it expects to serve?

23 A. No.

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1 Q. Please describe how the Company forecasted commercial customer count.

2 A. The Company's regression model uses population, a lagged dependent variable, and an  
3 autoregressive variable to forecast commercial customer count. When looking at the data  
4 that was inputted into the model, Staff noticed that the historical customer count only  
5 included the number of bundled commercial customers and did not include choice  
6 customers. This differs from the commercial delivery models that input a combination of  
7 bundled and choice customers. Staff queried the Company as to why choice customers are  
8 not included in any of the MetrixND historical data and forecasts used in this case. The  
9 Company's response is included as Staff Exhibit S-15.8. Due to their relatively static  
10 nature, the number of choice customers the Company expects to serve in the test year was  
11 not modeled explicitly in the commercial customer regression model. Instead, the  
12 Company used the most recent monthly choice customer count figure<sup>9</sup> and then held the  
13 number of choice customers fixed at this amount in the test year. Staff was unable to find  
14 the choice commercial count added anywhere into MetrixND and the commercial delivery  
15 forecast.

16 Q. Does Staff take issue with the way that commercial customer count is included in the  
17 Company's commercial deliveries model?

18 A. While Staff does not take issue with the Company's method of forecasting commercial  
19 customer count, the omission of choice customers becomes problematic when the  
20 Company forecasts deliveries with a use-per-customer model. If use-per-customer is  
21 calculated and then modeled in MetrixND with choice load included, but the forecast of

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<sup>9</sup> In this case, the last historical observation used to train the regression model (i.e., estimate the model coefficients) was June 2024, so choice customers over the forecast horizon are assumed to remain static at 844.

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1 commercial customers does not include choice customers, the resulting MWh forecast has  
2 the potential to be understated.<sup>10</sup> Staff’s recommended adjustment adds the expected  
3 number of choice customers (844 per month) back into commercial customer counts before  
4 multiplying forecasted use-per-customer, which provides a better estimate of commercial  
5 MWh load in the test year.

6 Q. What other modifications did Staff make to the Company’s commercial models?

7 A. Staff’s recommended commercial models focus solely on use-per-customer multiplied by  
8 the number of customers. The ability to measure usage separate from the number of  
9 customers is useful for a class of over 200,000 customers. Staff began by adding together  
10 historical bundled and choice load, *as well as* historical bundled and choice customer  
11 counts, which were sourced from previous Company rate case filing attachments and  
12 annual P-521 reports to the Commission. The combined load was divided by the combined  
13 customer count figures dating back to January 2014, the first period in the Company’s  
14 training set. The resulting commercial kWh usage per customer became the dependent  
15 variable in Staff’s forecast models. Staff’s recommended model uses the same degree day,  
16 commercial use calibration,<sup>11</sup> cycle billing days, and COVID-19 variables included in the  
17 Company’s model, but omits unnecessary binary variables and substitutes non-  
18 manufacturing employment from the Company’s list of economic indicators as an  
19 explanatory economic variable, instead of the Company’s service employment variable.  
20 Both variables are measures of employment in the state and come from the same source of

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<sup>10</sup> In a use-per-customer model, total MWh are calculated as the product of kWh usage per customer and the number of customers served in a given month. The value in modeling usage separate from customer count is the ability to measure whether change in total load is due to changes in average individual customer consumption, or changes in the total number of customers served.

<sup>11</sup> Similar to the residential model, no explanation is provided as to how this variable is derived. In future cases, explanation should be given as to the source and reasoning for this variable’s inclusion in the model.

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1 economic data included within the Company's MetrixND model file, but non-  
2 manufacturing employment is a slightly broader measure of economic activity that still  
3 corresponds with the Company's definition of commercial usage in its rate book.<sup>12</sup> The  
4 only other key difference in Staff's recommended model is the inclusion of an intercept  
5 term within the regression equation. Unless a complete set of seasonal binary variables are  
6 used,<sup>13</sup> the inclusion of an intercept term is an accepted practice in regression modeling.  
7 Staff's model coefficients and associated statistics are presented in Staff Exhibit S-15.9,  
8 and a comparison of the model with the Company's use-per-customer and aggregate load  
9 models is presented in Staff Exhibit S-15.10. Staff's model has both a higher adjusted R<sup>2</sup>  
10 statistic, meaning that more of the variation in commercial use-per-customer is explained  
11 by Staff's choice of explanatory variables, and Staff's model has lower average in-sample  
12 mean absolute percentage error (MAPE), meaning that the fitted values in Staff's model  
13 fall closer to actuals than the Company's. By the Company's stated criteria, Staff's model  
14 is the more reasonable choice for forecasting commercial deliveries in the test year.

15 Q. Did Staff conduct any out-of-sample testing to further validate the choice of its model?

16 A. Yes. The Company included historical deliveries and customers from January 2020  
17 through March of 2025 with Part III Attachment 014 in this case. Because the period used  
18 for estimating the regression models ends with June 2024, the period of July 2024 – March  
19 2025 is a prime test set to analyze the predictive power of each model. Staff Exhibit S-

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<sup>12</sup> Page A-26.00 of the Company's rate book defines Commercial Usage as "Usage for applications, other than residential, associated with businesses and other establishments which qualify for a **nonmanufacturing industry code** under the most current edition of the Standard Industrial Classification Manual. In addition to the usual retail and service businesses included are communication, transportation, utility, recreation, education, religious, social, and governmental businesses or institutions. It also includes usage for business offices and common use facilities associated with centrally metered complexes (apartments, condominiums, and trailer parks)."

<sup>13</sup> For example, 12 binary variables corresponding to each month, or 4 binary variables corresponding to each quarter.

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**PART II**

1 15.11 contains a comparison of the Company's and Staff's MetrixND model predictions  
2 for the out-of-sample test period, alongside actual sales and weather normal actual sales  
3 over the same period. Staff's model had a lower out-of-sample MAPE on both actual and,  
4 more importantly, weather normal data, further validating the usage of Staff's model.

5 Q. Were there any additional adjustments performed on Staff's commercial deliveries model?

6 A. Yes. Staff noted a discrepancy in the forecasted sales in the Company's MetrixND files  
7 and what was included in the Part III Attachment 016, which contains monthly class level  
8 and rate category sales from January 2025 – December 2029. For each month of the test  
9 year, there exists a difference in the MetrixND and Attachment 016 forecasts. When asked  
10 about this, the Company states “[t]he final cycle-billed deliveries are adjusted for unbilled  
11 sales (when looking at calendar deliveries in Part III), as well as adjustments to overall  
12 model outputs when looking at overall monthly, quarterly, and annual reasonableness.”<sup>14</sup>  
13 The conversion from cycle to calendar deliveries is understood by Staff, but is not germane  
14 to the question, as attachment 016 included cycle deliveries alongside calendar deliveries  
15 in this case. Because cycle deliveries are used as forecasted billing determinants, they are  
16 what Staff used to compare its model with the Company's. With nothing else to explain  
17 how the Company arrived at the forecast contained in Attachment 016, and in order to  
18 achieve a comparable test year forecast, Staff computed the difference between the  
19 Company's MetrixND forecast and the commercial deliveries forecast in Attachment 016  
20 for each month of the test year, and then applied that same difference to Staff's MetrixND  
21 commercial deliveries forecast. In future rate case applications, the Company should

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<sup>14</sup> Discovery response included as Staff Exhibit S-15.12.

**DIRECT TESTIMONY OF PAUL R. AUSUM**  
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**PART II**

1 explain why the predicted values from the models in MetrixND are adjusted so heavily  
2 before they appear in the Part III Attachment 016.

3 Q. How did Staff allocate its recommended commercial deliveries amongst bundled and  
4 choice customers?

5 A. Staff computed the percentage of choice deliveries as a component of total commercial  
6 deliveries for each month of the test year in the same manner as the Company, by  
7 calculating the growth in total commercial deliveries resulting from the Staff's model  
8 relative to 2023 and applying that forecasted growth rate to choice load. Bundled deliveries  
9 are calculated as the difference between total commercial deliveries and choice deliveries.

10 Q. How did Staff allocate the incremental class level forecast amongst the rate schedules in  
11 the test year?

12 A. Staff allocated the additional class level sales and customers in its model amongst the rate  
13 schedules according to the Company's 2024 P-521 Annual Report.

**SUMMARY**

14  
15 Q. Please summarize your recommendations to the Commission in this case.

16 A. I am recommending that the forecast of cycle-billed commercial deliveries, as presented  
17 by the Company in Part III Attachment 016, be increased by 204,656 MWh for bundled  
18 customers and 16,308 MWh for choice customers.

19 Q. Please summarize any additional recommendations that you have for the Company in  
20 future rate case filings.

21 A. I recommend that the Company provide more detail as to the origin of the calibration  
22 variables in the residential, commercial, and industrial deliveries models. The Company

**DIRECT TESTIMONY OF PAUL R. AUSUM**

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**PART II**

1 | should also explain why the MetrixND model outputs are adjusted before they appear in

2 | the Part III Attachment 016.

3 | Q. Does this conclude your testimony at this time?

4 | A. Yes, it does.

STATE OF MICHIGAN  
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

\* \* \* \* \*

In the matter of the application of )  
**CONSUMERS ENERGY COMPANY** )  
for authority to increase its rates for ) Case No. U-21870  
the generation and distribution of )  
electricity and for other relief. )  
\_\_\_\_\_)

**QUALIFICATIONS AND DIRECT TESTIMONY OF**  
**ANNA N. N. SCHILLER**  
**MICHIGAN PUBLIC SERVICE COMMISSION**

**September 30, 2025**

**QUALIFICATIONS OF ANNA N. N. SCHILLER**  
**CASE NUMBER U-21870**  
**PART I**

1 Q. Please state your full name and business address for the record.

2 A. My name is Anna N. N. Schiller. My business address is the Michigan Public Service  
3 Commission's work site at 7109 West Saginaw Highway, Lansing, Michigan 48917.

4 Q. By whom are you employed and in what capacity?

5 A. I am employed by the Michigan Public Service Commission (MPSC or Commission) in  
6 the Energy Resources Division. I am a Public Utilities Engineer Specialist in the  
7 Distribution Planning Section.

8 Q. Please describe your educational background.

9 A. I earned a Bachelor of Science in Biosystems Engineering from Michigan State  
10 University (MSU) in 2018. I successfully completed the Fundamentals of Engineering  
11 examination in May of 2018. Since joining the Commission, I have attended various  
12 training programs sponsored by Electric Utility Consultants, Inc. (EUCI); the  
13 Organization of Midcontinent Independent System Operator (MISO) States; and the  
14 MSU Institute of Public Utilities.

15 In April 2023, I completed courses by EUCI in overhead and underground  
16 distribution systems, substation design, electric distribution system planning and safety,  
17 and performance-based regulation. I have completed additional EUCI course material  
18 since then, including a course on Distribution Pole Safety in August 2024, and a course  
19 on Energy Burden and Affordability in July 2025. I also completed NARUC-NASEO  
20 training on Integrated Distribution Planning in March 2025 and on Comprehensive  
21 Electric Planning in April 2025. I am a member of the ongoing Regulatory Collaborative  
22 effort hosted by the Rocky Mountain Institute (RMI), which reviews novel ideas and

**QUALIFICATIONS OF ANNA N. N. SCHILLER**  
**CASE NUMBER U-21870**  
**PART I**

1 tackles emerging issues through a cohort of public utility commission members across  
2 many member states.

3 Q. Please describe your professional work experience.

4 A. In January of 2015, I began working as an Engineering Assistant under the Infrastructure  
5 Planning and Facilities Power and Water department at MSU. As an Engineering  
6 Assistant, I worked both part- and full-time to assist in the oversight analysis of both  
7 power and water engineering at the T.B. Simon Power Plant.

8 In June 2018, I accepted a position as a Public Utilities Engineer in the  
9 Resource Adequacy and Retail Choice Section of the MPSC, which has since become the  
10 Resource Adequacy and Forecasting Section. In May 2023, I accepted a position as a  
11 Public Utilities Engineer in the Distribution Planning Section of the MPSC. At the  
12 Commission, I am part of the group responsible for assessing the reasonableness and  
13 feasibility of utility distribution planning efforts.

14 Q. Have you previously participated in cases before the MPSC?

15 A. Yes. I have testified in the following cases:

<u>Case No.</u>	<u>Description</u>
U-20350	UPPCO Integrated Resource Plan 2019
U-20471	DTE Electric Integrated Resource Plan 2019
U-20591	Indiana Michigan Integrated Resource Plan 2019
U-21090	Consumers Energy Integrated Resource Plan 2020
U-21183	Indiana Michigan Integrated Resource Plan 2022
U-21193	DTE Electric Integrated Resource Plan 2022
U-21389	Consumers Energy Rate Case 2023

**QUALIFICATIONS OF ANNA N. N. SCHILLER**

**CASE NUMBER U-21870**

**PART I**

1 I have also recently participated in the following recent cases, including the assistance of  
2 other witnesses and the preparation of MPSC Staff filings:

3	<u>Case No.</u>	<u>Description</u>
4	U-20147	Michigan Distribution Planning
5	U-21251	MI Power Grid Distribution System Data Access
6	U-21305	Third Party Utility Audit with the Liberty Consulting Group
7	U-21860	DTE Electric Rate Case 2025

**DIRECT TESTIMONY OF ANNA N. N. SCHILLER**  
**CASE NUMBER U-21870**  
**PART II**

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

2 A. I am providing testimony regarding distribution planning topics related to the Consumers  
3 Energy (Consumers or the Company) rate case testimony; specifically, the Company's  
4 Demand Failures program and synchronicity with existing MPSC Docket Nos. U-20147  
5 and U-21305. I also discuss integration between the Company's rate cases and the  
6 Company's Electric Distribution Infrastructure Investment Plans (EDIIP).

7 My testimony is divided into topic sections as follows:

8 **Inspections within the Demand Failures Program**

9 **Distribution System Plan Alignment**

10 **Coordination with MPSC Case No. U-21305**

11 Q. Are you sponsoring any exhibits?

12 A. Yes, I am sponsoring the following exhibit(s):

13 S-19.0: Company Discovery

14 S-19.1: SAIDI Trendline Datasheet

15 Q. Were these exhibits made by you or under your direction?

16 A. Yes.

17 **Inspections within the Demand Failures Program**

18 Q. Please describe the LVD Lines Demand Failures subprogram.

19 A. Company witness Jennifer M. Partlan presents the LVD Lines Demand Failures as a  
20 subprogram under the unplanned distribution capital investment, part of the Demand  
21 Failures program. This subprogram "includes capital expenditures incurred during  
22 customer interruption restoration, or during the repair or replacement of LVD equipment

**DIRECT TESTIMONY OF ANNA N. N. SCHILLER**  
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1 due to unanticipated failure.”<sup>1</sup> It does not include projects planned in advance and is meant  
2 for quick response(s) to system interruptions. The subprogram is split into the investment  
3 categories of Service Restoration Orders and Security Assessment Inspection Orders. The  
4 LVD Lines Demand Failures capital subprogram is provided in Company Exhibit No. A-  
5 113 (MPK-3), including assessment and inspection costs under the Security Assessment  
6 Inspection Order investment category.

7 Q. Please explain Staff’s review of these assessment and inspection costs.

8 A. Staff’s review of this subprogram recognizes that a portion of the assessment and  
9 inspection costs within the LVD Lines Demand Failures subprogram are capitalized.<sup>2</sup>  
10 These LVD line inspections occur over the entire LVD system annually.<sup>3</sup> Company  
11 responses to Staff discovery requests in the examination of this program, compiled in Staff  
12 Exhibit No. S-19.0, provide additional detail. The Company estimates a cost of \$1.2  
13 million for both internal and contracted labor related to the inspections.<sup>4</sup> Response ST-CE-  
14 0304 confirms that these security assessments are the same as visual line inspections.  
15 Further, the Company’s response ST-CE-0306 demonstrates the Company’s view that the  
16 inspections are included as components of engineering and supervision of the construction  
17 work, referring to the Electric Plant Instructions, Section 3, subsection 11 of the FERC  
18 Uniform System of Accounts (USOA), adopted in MPSC Docket No. U-14811. The  
19 Company explains that the inspection activity is classified under the USOA as  
20 “Engineering and supervision” which “includes the pay and expenses of engineers,

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<sup>1</sup> Prefiled Direct Testimony of Company witness Partlan, MPSC Case No. U-21870, p. 17.

<sup>2</sup> *Id.*, at, p. 19.

<sup>3</sup> *Id.*, at, p. 20.

<sup>4</sup> Staff Exhibit No. S-19.0, ST-CE-0306, p. 4.

**DIRECT TESTIMONY OF ANNA N. N. SCHILLER**  
**CASE NUMBER U-21870**  
**PART II**

1 surveyors, draftsmen, inspectors, superintendents and their assistants applicable to the  
2 construction work.”<sup>5</sup>

3 Q. Does Staff believe these costs are correctly categorized?

4 A. No. Staff is not convinced that the inspections are interpreted correctly in subsection 11.  
5 The work is better classified under the Operating Expense Instructions, Section 2. Section  
6 2 expenses of the USOA includes “[i]nspecting, testing, and reporting on condition of plant  
7 specifically to determine the need for repairs, replacements, rearrangements, and changes  
8 and inspecting and testing the adequacy of repairs which have been made.” In addition, the  
9 Company itself cites a 2015 EPRI report in the explanation of this subprogram within  
10 Company witness Partlan’s testimony for which those practices are listed as systems  
11 maintenance.<sup>6</sup> It is important for utilities to classify expenses correctly.

12 Q. Does Staff agree the overhead line inspections are necessary?

13 A. Yes. As presented, Staff supports the maintenance of the overhead system. The  
14 classification of these costs is the concern.

15 Q. Is Staff recommending a capital disallowance and operations and maintenance (O&M)  
16 credit based on its findings?

17 A. No. Instead, Staff recommends the Commission direct the Company to: 1) provide a  
18 thorough breakdown of inspection costs applied across all capital programs/subprograms,  
19 2) support why these costs are appropriately classified as capital instead of O&M with  
20 reference(s) to accounting guidance, and 3) amend the classification of these expenditures  
21 in the Company’s next rate case, where necessary, based on the analysis. The Company

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<sup>5</sup> Staff Exhibit No. S-19.0, ST-CE-0306, p. 5.

<sup>6</sup> Prefiled Direct Testimony of Company witness Partlan, MPSC Case No. U-21870, p. 19.

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1 should explain why section 2 under the Operating Expense Instructions of USOA is not  
2 appropriate and why section 3 under the Electric Plant Instructions of USOA is appropriate  
3 under recommendation #2 above. Staff witness Ally Durfee further discusses Staff's  
4 review of the Demand Failures programs and the proposed disallowances therein.

5 **Distribution System Plan Alignment**

6 Q. Please briefly describe the Company's distribution system planning efforts.

7 A. In 2023, the Company filed a Distribution System Plan (DSP) to MPSC Docket No. U-  
8 20147 as ordered previously by the Commission<sup>7</sup> and containing items agreed to in the  
9 settlement of MPSC Case No. U-21224.<sup>8</sup> The Company has previously filed such plans as  
10 directed in 2018<sup>9</sup> and 2021<sup>10</sup> and has been ordered to provide its next DSP in 2026.<sup>11</sup> The  
11 Company has historically referred to these plans as Electric Distribution Infrastructure  
12 Investment Plans (EDIIP) or as the Reliability Roadmap. During this period, the  
13 Commission continued to seek transparent and distinct details into the long-term planning  
14 efforts of the distribution system outside of the annual rate case proceedings. In mid-2025,  
15 the MPSC issued guidelines for future DSPs after receiving feedback and comments from  
16 participating utilities, including Consumers Energy.<sup>12</sup>

17 The Company's 2023 DSP was reviewed by Staff and interested parties, who  
18 submitted comments on the contents and planning process.<sup>13</sup> The Commission issued an  
19 order on September 26, 2024 which, among other topics, found that the Company's 2023

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<sup>7</sup> [September 8, 2021 Commission Order](#) in MPSC Case No. U-20147.

<sup>8</sup> [January 19, 2023 Commission Order](#) in MPSC Case No. U-21224.

<sup>9</sup> [Consumers Energy EDIIP](#) in Case No. U-20147. April 13, 2018.

<sup>10</sup> [Consumers Energy's Final EDIIP 2021-2025](#) in Case No. U-20147. June 30, 2021.

<sup>11</sup> [July 10, 2025 Commission Order](#) in MPSC Case No. U-20147, p. 33.

<sup>12</sup> *Id.*, Exhibit A.

<sup>13</sup> [MPSC Staff Comments on Consumers Energy Company's EDIIP](#) in MPSC Case No. U-20147. February 16, 2024.

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1 DSP “complied with the September 8 order and the additional directives from the  
2 settlement agreement in Case No. U-21224”, while also noting that “Consumers’ spending  
3 demonstrates a large increase in capital expenditures and that this spending continues to  
4 increase each year.”<sup>14</sup>

5 Q. How has the Company presented its distribution system planning in this case?

6 A. The Company filed an amended version of the 2023 DSP as Exhibit No. A-129 (MPK-19)  
7 in this case in its entirety.

8 Q. What changes has the Company made to its DSP in Exhibit No. A-129 (MPK-19)  
9 compared to the 2023 DSP filed in U-20147?

10 A. Per Company witness Michael P. Kelly;<sup>15</sup>

11 *“[T]he Company has made minor amendments to the 2023 Reliability*  
12 *Roadmap. These amendments primarily concern updating information to*  
13 *reflect another year of actual historical reliability data, and to extend*  
14 *projected investments by another year into the future. Some content has also*  
15 *been revised to reflect issues highlighted by intervenors in Case No. U-*  
16 *21585, or raised by intervenors in other regulatory areas, particularly in*  
17 *the Company’s third-party distribution system audit conducted in Case No.*  
18 *U-21305.”*

19 Staff notes that the Company included, within Company witness Kelly’s testimony,  
20 sections of discussion that was filed previously with the 2023 DSP in MPSC Case No. U-  
21 20147, ostensibly to explain the purpose and findings of the prior 2023 DSP.

22 Q. What filing guidance was provided to the Company regarding amendments to DSPs?

23 A. On July 10<sup>th</sup>, 2025, the Commission issued an order approving Staff’s proposed guidance  
24 with modifications for future distribution plans, notably after this case was filed. The

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<sup>14</sup> [September 26, 2024 Commission Order](#) in MPSC Case No. U-20147, p. 142.

<sup>15</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, p. 17.

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1 Company was a participating party in the engagement efforts held by Staff to develop those  
2 guidelines and filed comments on the docket.

3 Q. How does the guidance differ from the Company’s distribution planning efforts in this  
4 case?

5 A. The guidelines, attached as Exhibit A to that order, informs the Company in Section VI (a)  
6 and (b) that it may submit a revised DSP within a rate proceeding under two circumstances  
7 - 1) significant misalignments between spend categories/allocations following changes in  
8 investment strategy or 2) differences between the DSP and the rate case that the utility  
9 judges to be significant. As seen in Company witness Kelly’s discussion cited above, this  
10 is not the situation in the refiled DSP as these are “minor amendments.” While Staff  
11 believes the Company was following the best guidance it had at the time for documenting  
12 changes in its DSP investment strategy, it should also be noted that the refiled document  
13 does not align with the intent of the guidelines and Commission order. The Commission  
14 provided additional context in its order by defining “significant” under Section VI as  
15 “including areas within a utility’s DSP where strategies have changed, where spending  
16 levels and/or timing for investments have materially changed, and/or where whole new  
17 investment categories are included and discussed” and “foresees as being a rarity as  
18 opposed to the normal course.”<sup>16</sup> Further, the Commission warns against misuse of the  
19 supplemental rate case filing by stating it should “not be used as an avenue for utilities to  
20 introduce new or unvetted investment strategies to achieve a desired outcome or spend  
21 approval in the short-term through the present rate case.” Small considerations, such as the  
22 incorporation of previously discussed intervenor feedback and the addition of another

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<sup>16</sup> July 10, 2025 Order in MPSC Case No. U-20147, pp. 20-21.

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1 historical year to projections, are not considered as “significant” justification to refile. The  
2 Company is due to file its next DSP in 2027.

3 Q. Are there other changes between the 2023 DSP and this case that Staff wishes to address?

4 A. Yes. Staff notes that, within the Company’s exhibits and proceedings in this case, many  
5 projects, programs, and subprograms have changed names and contents. These changes  
6 were not always documented and made Staff’s comparison between the two documents  
7 difficult. In addition, because of the changes documented by Company witness Kelly,  
8 many capital costs have changed between the 2023 DSP and the current case. While Staff  
9 does not oppose the content of these changes necessarily and acknowledges that all plans  
10 and forecasts are subject to change, the recategorization of these changes between the 2023  
11 DSP and the current rate case makes these investments very difficult to track between plans  
12 and rate cases.

13 Q. Please provide examples of this misalignment between the DSP and the rate case.

14 A. As an example, the automatic transfer recloser (ATR) loop program between the  
15 Company’s 2023 DSP (and, as such, its revised DSP exhibit in this case) and the rate case.  
16 ATR devices, put simply, help automate load transfer of customers in an outage situation;  
17 Consumers has been deploying these devices in loop schemes to both avoid customer  
18 outages and improve distribution system automation. In the revised DSP of this case, the  
19 ATR loops are included as a resiliency investment under the “Resilience” category.<sup>17</sup> In  
20 the rate case, however, the ATR loops are a part of the LVD Lines Reliability subprogram  
21 under the “Reliability” category.<sup>18</sup> Associated expenses are listed as the “Automation –

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<sup>17</sup> Prefiled Exhibits of Company witness Kelly, MPSC Case No. U-21870, Exhibit A-129 (MPK-19), p. 81.

<sup>18</sup> Prefiled Direct Testimony of Company witness Partlan, MPSC Case No. U-21870, p. 44.

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1 ATR Loops” category in the Bridge Period LVD Project List.<sup>19</sup> Providing additional  
2 confusion, Company witness Scott A. McPhail discusses ATR deployment as part of  
3 several projects in the Grid Automation category, such as the Peer-to-Peer project<sup>20</sup> and  
4 the FLISR project.<sup>21</sup> The Grid Automation category, which the Company previously called  
5 Grid Modernization, handles much of the Company’s automation initiatives and is separate  
6 from its LVD Lines Reliability subprogram. The Company does not clearly delineate  
7 between these various uses of ATR automation in the rate case and the DSP.

8 As a second example, between Case No. U-21585 and U-21870, the “HVD Lines  
9 and Substation Rehabilitation” sub-program became the new “Transformer Bank  
10 Replacements and Substation Rebuilds” sub-program or was merged into the existing  
11 “HVD Lines Reliability” subprogram. Company witness Megan L. Hayward provides  
12 some breakdown between the historical spending category and the new category in her  
13 Figures 12, 34, and 35, and a paragraph documenting the change in her testimony.<sup>22</sup> Two  
14 of the previous categories under that sub-program were moved and merged into other  
15 programs under the “HVD Lines Reliability” subprogram, while one was simply moved.  
16 Another category was discontinued (“Miscellaneous Other Requirements”) and the final  
17 subdivided and separated into three other categories under “Transformer Bank  
18 Replacements and Substation Rebuilds”. While an explanation was provided by Company  
19 witness Hayward from Case No. U-21585 and Case No. U-21870 to track where those  
20 expense changes, no walkthrough or explanation was attempted by the Company to walk

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<sup>19</sup> Prefiled Exhibits of Company witness Partlan, MPSC Case No. U-21870, Exhibit A-166 (JMP-1), p. 14.

<sup>20</sup> Prefiled Direct Testimony of Company witness McPhail, MPSC Case No. U-21870, p. 33.

<sup>21</sup> *Id.*, at, pp. 67-69.

<sup>22</sup> Prefiled Direct Testimony of Company witness Hayward, MPSC Case No. U-21870, p. 31.

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1 those same expense category changes between Case No. U-21870 and the DSP the  
2 Company filed in Case No. U-20147 in 2023.

3 These are meant as illustrative examples of the drastic changes between the 2023  
4 DSP and the current rate case, and do not encompass every expense or category the Staff  
5 has had difficulty tracking between the documents.

6 Q. Has the Commission previously provided guidance on this topic?

7 A. Yes. In the Company’s previous rate case, MPSC Docket No. U-21585, the Commission  
8 notes several times in its March 21, 2025 Order that “reategorizing or shifting of  
9 expenditures from one subprogram to another may lend confusion to the process of  
10 identifying historical costs and benefits as well as justifying projected expenditures”<sup>23</sup> and  
11 that “simply relabeling or reategorizing capital expenditures from one program or tracking  
12 method to another does not provide sufficient evidence to demonstrate the reasonableness  
13 and prudence of costs nor the benefits of program expenditures.”<sup>24</sup> The order asks the  
14 Company to be clear and do its due diligence to avoid any confusion when discussing  
15 historical and planned investments. Given that DSPs discuss planned investments, there is  
16 no exception for alignment between the DSP and rate case categories. Staff notes the  
17 Commission disallowed several expenses on such reasoning in that case, and stated that:

18 *“...the Commission expects to see additional detail in future electric rate*  
19 *cases regarding line items that have been reategorized, the past spending*  
20 *levels for those line items, how historical spending for any relabeled line*  
21 *items compares to proposed expenditures, and clarity on how these*  
22 *investments deliver value for the company’s customers.”<sup>25</sup>*

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<sup>23</sup> March 21, 2025 Order in U-21585, p. 102.

<sup>24</sup> *Id.*, at, p. 62.

<sup>25</sup> *Id.*, at, p. 63.

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1 Further, the Commission’s July 10, 2025 order in U-20147 when describing alignment  
2 between the DSP and rate case states:

3 *“DSPs are meant to be fully vetted, executable plans that flow directly into*  
4 *a utility’s rate case request... and alignment between the two filings is*  
5 *necessary for the Commission’s accurate evaluation.”<sup>26</sup>*

6 and:

7 *“DSP spending classifications (such as programs, subprograms,*  
8 *categories) shall be aligned with such classifications within the utility’s rate*  
9 *case, with variations explained in detail.”<sup>27</sup>*

10 Q. Is the Staff recommending any disallowances in this case due to misalignment between the  
11 DSP and rate case?

12 A. No. The current filing guidelines were approved by the Commission after the Company  
13 submitted this rate case. Should the Commission accept Staff’s recommendation, only  
14 future rate case costs would be impacted.

15 Q. What does Staff recommend in regard to future case alignment with DSPs?

16 A. Distribution system planning efforts and rate case proceedings are inherently linked, as  
17 both the Commission and the Company have acknowledged in the past. Therefore,  
18 reasonable and prudent costs should be categorized and similarly trackable between any  
19 DSP submitted by the Company and any rate case which uses such DSP to justify cost  
20 recovery. Staff recommends the Commission recognize such and consider that any costs  
21 in future cases that are unable to be reconciled or tracked between the planning efforts and  
22 the rate case be disallowed.

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<sup>26</sup> July 10, 2025 Order in MPSC Case No. U-20147, p. 21.

<sup>27</sup> *Id.*, Exhibit A, p. 3.

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1           In addition, Staff recommends the Commission direct the Company to reevaluate  
2           its supplemental rate case filings for future rate cases to align with the July 10, 2025 order  
3           in U-20147.

4           **Coordination with MPSC Case No. U-21305**

5           Q.     What conclusions from the Consumers Liberty Consulting Group (Liberty) Audit were  
6           adopted by the Commission in its June 12, 2025 Order in MPSC Case No. U-21305 related  
7           to future System Average Interruption Duration Index (SAIDI) performance?

8           A.     The Chapter II, Recommendation 1 of the Consumers Liberty Audit Report, states the  
9           Company should “[r]estate EDIIP reliability and safety program, measure, and activity  
10          scopes to optimize scope and expenditures assuming an extended period to reach second  
11          quarter SAIDI performance.” which leads to Conclusion 1 in that same report that “[t]he  
12          goal of reaching essentially the median industry level for SAIDI performance is very  
13          aggressive, given the massive efforts and large expenditure increases needed to meet it;  
14          meeting it does not appear highly likely and efforts to pursue it may lead to more costly  
15          programs, initiatives, and activities.”<sup>28</sup> In that case, the Company commits to an analysis  
16          of slower investment paces in this current case. The Commission ordered that it will  
17          “continue to evaluate the company’s plans going forward, including the evaluation of an  
18          extended timeframe from seven to ten years coupled with evidence supporting the  
19          appropriate mix of projected capital and O&M spending to meet the goal in a cost-effective  
20          manner.”<sup>29</sup> Staff notes that the cited order was issued three months after this current case  
21          was filed and thus refers to the Company’s next rate case.

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<sup>28</sup> Final Report Utility Distribution Audit of Consumers Energy Part Two, Case No. U-21305, September 23, 2024, pp. 58-59.

<sup>29</sup> June 12, 2025 Order in U-21305, p. 18.

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1 Q. Please summarize the arguments on SAIDI performance related to the discussions within  
2 MPSC Case No. U-21305.

3 A. The Company, as in its 2023 DSP plan submitted to MPSC Case No. U-20147, projects a  
4 five-year “glidepath” of desired SAIDI performance based on its projections. It also  
5 presents, per the U-21305 order state above, alternative seven-year and ten-year  
6 “glidepath” projections.<sup>30</sup>

7           Additionally, as discussed by many parties including the Company in MPSC  
8 Docket No. U-21305, Consumers contests the statement from the Liberty audit that it has  
9 not meaningfully improved its reliability over the past decade. This is acknowledged and  
10 then further argued by the Company in Company witness Kelly’s testimony.<sup>31</sup> The  
11 Company also provides Figure 6 to illustrate its improvement in SAIDI performance since  
12 2014,<sup>32</sup> which I have copied here for simplicity.

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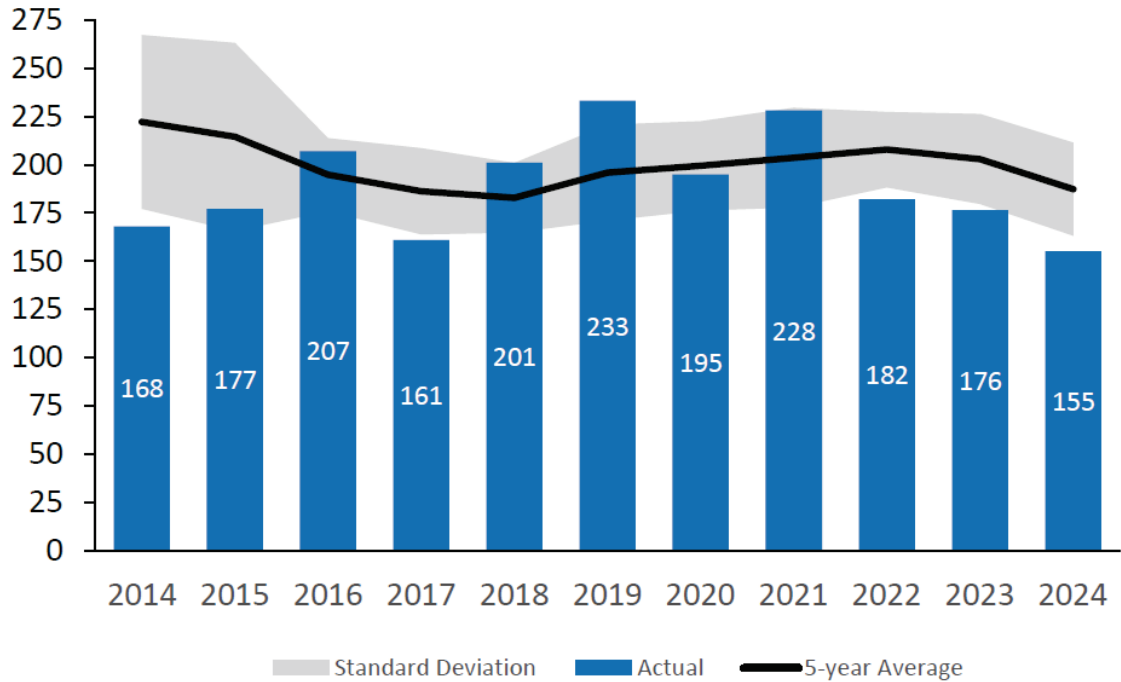
<sup>30</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, Figure 19, p. 40.

<sup>31</sup> *Id.*, at, pp. 24-25.

<sup>32</sup> *Id.*, at, p. 26.

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**FIGURE 6**  
*SAIDI PERFORMANCE COMPARED TO STANDARD DEVIATION (2014-2024)*



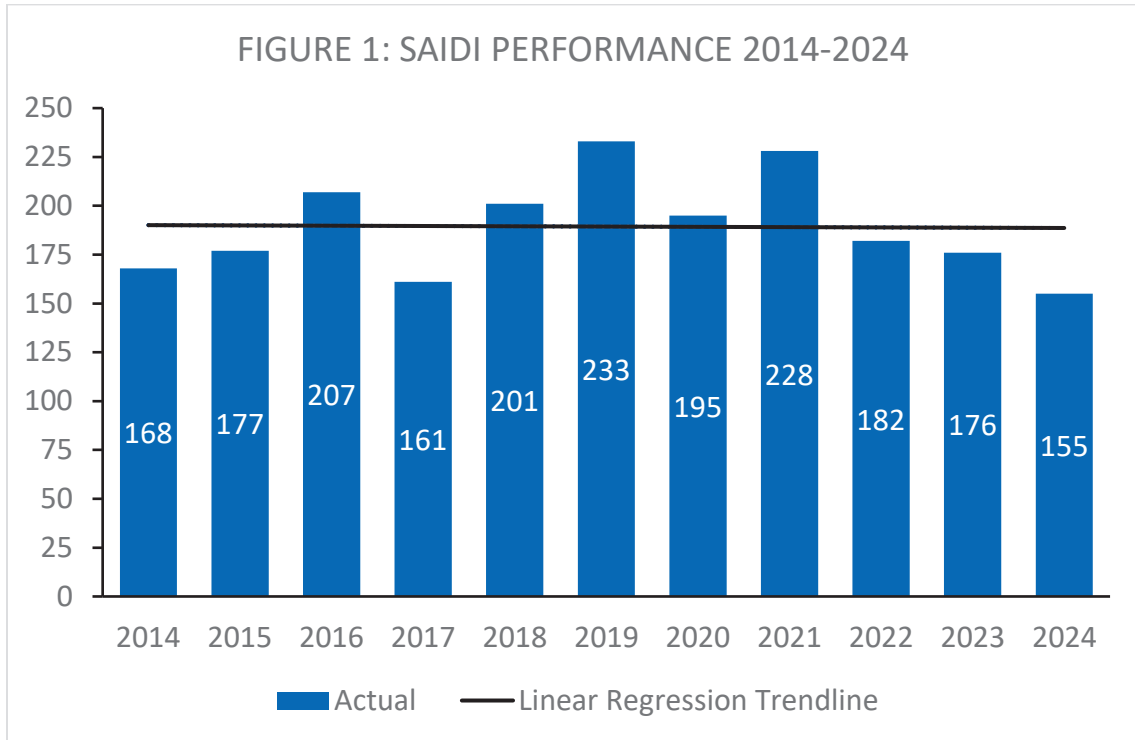
1           The Company then argues that its SAIDI has improved in the three most recent  
2           years. It also argues that a five-year average is most appropriate, as it would “limit annual  
3           variability.”<sup>33</sup>

4           Q.    What concerns does Staff have with the Company’s Figure 6?

5           A.    The graph is misleading. The Company uses a rolling five-year average to create the  
6           illusion of a declining trendline over the entire period shown in Figure 6. Using a rolling  
7           average line can obscure other trends and as such, the line lags the current data. Staff used  
8           the same data as the Company presented in Figure 6 and ran a typical linear regression  
9           trendline to better demonstrate the movement of SAIDI performance in the past decade,  
10          using the entirety of the data instead of a five-year average. This is presented as Figure 1.

<sup>33</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, Figure 19, p. 25.

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1            The incredibly slight slope of the trendline is not statistically significant, as  
2 demonstrated in the further data analysis in Staff Exhibit S-19.1. In using the full decade  
3 of data presented in the Company’s Figure 6, there is a marked lack of reliability  
4 improvement. In the MPSC Case No. U-21305 proceedings, other intervenors and Liberty  
5 itself argue that the past decade of additional data contains important context. The  
6 additional half-decade of data also meets the Company’s desire to limit annual variability,  
7 one of the main reasons it consistently argues for a five-year average usage. Staff opines  
8 that the ten-year range, therefore, provides an even more stable figure when considering  
9 annual variability when presented with this data.

10 Q.        Are there considerations as to why the Company would assert that a five-year data range  
11 is most appropriate?

12 A.        Yes. Within the aforementioned discussions in Docket No. U-20147 around appropriate  
13 distribution guidelines, Staff advocated previously for five years of historical data. The

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1 Company also may have internal standards for five years of data. Considering the results  
2 of the Liberty audit discussions and the data analysis presented above, the Staff postulates  
3 that perhaps additional data would be more appropriate context.

4 In addition, Staff postulates that the few worst years of SAIDI performance between  
5 2019 and 2021 make the recent five-year trends appear as if the Company is consistently  
6 improving SAIDI performance over the long-term. When additional historical data is  
7 considered, as in Staff’s Figure 1 and argued in the Liberty audit, the downward trend is  
8 mitigated. While 2024 may be the best year in SAIDI performance so far, the second-best  
9 year is 2017, while the third best is 2014, both of which are not included in the five-year  
10 average the Company examines. The Company confirmed through discovery that the  
11 model it is using to project potential SAIDI improvements only considers the prior five  
12 years of historical data, and not the larger decade trend presented by Liberty.<sup>34</sup>

13 Q. How does the Company project SAIDI improvements?

14 A. The Company uses an internal model “to project improvements to SAIDI reliabilities  
15 versus historical trendlines between SAIDI and spend in areas such as line clearing, capital  
16 investments in key areas, and certain CAIDI improvements.”<sup>35</sup> It is through this model that  
17 the Company created its five-year, seven-year, and ten-year improvement projections.

18 Q. Do the seven-year and ten-year projected “glidepaths” meet the requirements set by the  
19 Commission Order in Case No. U-21305?

20 A. No, for several reasons. First, the Company did not meaningfully examine an extended  
21 period to reach second quartile SAIDI performance. It appears the Company simply ran

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<sup>34</sup> Staff Exhibit No. S-19.0, ST-CE-0589, p. 8.

<sup>35</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, p. 28.

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1 its model for longer periods. In discovery, when questioned how the “glidepath”  
2 corresponds to actual improvement, the Company responds that they cannot produce error  
3 margins with confidence due to a limited sample size.<sup>36</sup> It also states within testimony that  
4 its 2024 performance was accurate to the model, while confirming it was outside of a  
5 standard deviation in the model. It also admits to a large variance in the 2021 data.<sup>37</sup> In  
6 another discovery, the Company states that accuracy of the model is limited due to “the  
7 unknown impacts on the system of day-to-day weather that would not occur for more than  
8 five years from today.”<sup>38</sup> The Company’s model, historically, has been unable to predict  
9 two of the previous four years (for better or for worse reliability) and cannot guarantee  
10 accuracy nor quantify the error of the model.

11 The Company’s modeling approach is in good faith; however, the approach above  
12 does not appear to properly fit the data. The model is too nascent to rely on, as discussed  
13 obliquely by the Company above. In addition, while the model does project a future SAIDI  
14 improvement, the model is based on historical performance of SAIDI coupled with  
15 expenses used to reach that level of performance. As demonstrated above in Figure 1, the  
16 SAIDI performance of the Company has not meaningfully changed in the past decade.  
17 SAIDI performance is also highly dependent on weather. Michigan weather is expected to  
18 become more severe over the coming years,<sup>39</sup> which five years of historical data will not  
19 meaningfully capture in a historical-looking model. Improvements the Company has seen  
20 in SAIDI with one investment in the model may not arrive in different weather or may be  
21 amplified in a storm year. The Company has included projections of this increasing

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<sup>36</sup> Staff Exhibit No. S-19.0, ST-CE-0197, p. 3.

<sup>37</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, p. 29.

<sup>38</sup> Staff Exhibit No. S-19.0, AG-CE-0423, p. 6.

<sup>39</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, p. 19.

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1 severity in other parts of its scenario analysis. The model, however, does not appear to be  
2 weather normalized, though, as stated above, the heavy reliance of SAIDI on the weather  
3 would make such normalization difficult. Basing all potential SAIDI investments on five  
4 years of historical data, which does not capture the trends shown in Figure 1, creates a  
5 flawed model and approach.

6 Second, there was no attempt by the Company to show how this extended period  
7 could contribute to cost effectiveness, affordability, or decreased rate impacts. It states in  
8 discovery that “[s]uch quantitative analysis was not part of the recommendation by the  
9 Liberty Consulting Group”<sup>40</sup> which, while true, ignores the Commission’s statement in its  
10 order regarding approaching SAIDI with a “cost effective manner.” The Commission  
11 continues to examine all possibilities to address affordability and rate impact in Michigan,  
12 and Staff would be interested to see how an extended SAIDI timeline could contribute to  
13 those goals. The Company states in discovery that “[t]he alternative glidepaths may result  
14 in *cheaper* outcomes for customers *today*, but that does not mean that these outcomes are  
15 the most cost effective for customers in the longer term [emphasis original]”<sup>41</sup> yet has  
16 provided no data or analysis to whether a quicker, five year “glidepath” *would* be the most  
17 cost effective for customers in the long run. As stated above, the Company cannot  
18 guarantee accuracy of its SAIDI model, nor model error on it, nor even reliably predict  
19 what a year’s reliability will be with it. The question of cost effectiveness has not been  
20 appropriately addressed by the Company in these extended “glidepaths” in this case.

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<sup>40</sup> Staff Exhibit No. S-19.0, ST-CE-0506, p. 7.

<sup>41</sup> *Id.*

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1 Q. What reasons does the Company give for its continued commitment to the five-year  
2 “glidepath”?

3 A. The Company states that other strategies would include “unacceptable outcomes”,  
4 including a reduction or elimination of ATR loops, zonal health investments, and the  
5 Company’s diverse portfolio of reliability investments.<sup>42</sup> Company witness Kelly also  
6 states that “[t]he Company must be allowed to invest at a level that will allow the Company  
7 to avoid financial penalties established by the Commission.”<sup>43</sup>

8 Q. Does Staff agree with these statements?

9 A. Not necessarily. The Commission has adopted certain Liberty recommendations in MPSC  
10 Docket No. U-21305, which highlight areas where the Company may slow its investments,  
11 but has not ordered such directly. Rather, the Commission asks the Company to analyze  
12 and share the tradeoffs with other potential capital and O&M program spending and  
13 support why its decisions are reasonable. If certain programs are unacceptable to cut for  
14 the Company, then it should explain why it will not cut them. The Company, as outlined  
15 above, has not meaningfully demonstrated in this case what programs could be reduced,  
16 rearranged, extended, or cut. Staff acknowledges that a slower investment pace may  
17 require potential program cuts in certain areas, but the Company cannot make an internal  
18 management decision on said cuts and then accuse the Commission of forcing it to remove  
19 programs.

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<sup>42</sup> Staff Exhibit S-19.0, ST-CE-0196, pp. 1-2.

<sup>43</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, p. 45.

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1 Staff also takes issue with the Company’s insistence that the Commission must allow  
2 recovery of investments to avoid penalties the Commission itself has set. The Company  
3 presumes much by this statement.

4 Q. To what financial penalty is the Company referring to?

5 A. The Commission is in the process of establishing performance-based ratemaking  
6 procedures in MPSC Case Nos. U-21400 and U-21911. These include financial incentives  
7 and disincentives based on the Company’s reliability performance, including SAIDI  
8 performance. The Company asserts that, out of the three “glidepaths” it examined, only  
9 the five-year “glidepath” would be able to gain one of the proposed draft incentives by  
10 2030.<sup>44</sup> Staff notes that no “glidepath” shown on the Company’s projections would result  
11 in a financial penalty.

12 Q. Is the Commission required to allow the Company to “invest at a level that will allow the  
13 Company to avoid financial penalties established by the Commission,” or, as may be the  
14 case, allow the Company to earn a financial incentive established by the Commission?

15 A. No. The Commission’s duty is “to serve the public by ensuring safe, reliable, and  
16 accessible energy and telecommunications services at reasonable rates.”<sup>45</sup> Removal of  
17 financial penalties or the acquisition of incentives may be a priority of Consumers, but that  
18 does not mean that recovery of related costs is inherently reasonable.

19 Q. What does Staff recommend regarding the Company’s SAIDI projections?

20 A. Staff would ask that the Commission and the Company give more thought to these potential  
21 extended timelines for SAIDI improvements in the Company’s next rate case, as it

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<sup>44</sup> Prefiled Direct Testimony of Company witness Kelly, MPSC Case No. U-21870, Figure 20, p. 44.

<sup>45</sup> State of Michigan, Michigan Public Service Commission, “[About the MPSC: Mission Statement](#)”, retrieved September 23, 2025.

**DIRECT TESTIMONY OF ANNA N. N. SCHILLER**  
**CASE NUMBER U-21870**  
**PART II**

1 committed to in the U-21305 Order. It would recommend the Commission closely  
2 scrutinize the models the Company will use to project such investments and compare it to  
3 the Company's history appropriately. To that end, the Commission should not allow any  
4 spend in future rate cases that is based solely on avoiding financial penalties set by the  
5 Commission; while the rapid investment in SAIDI could potentially provide reliability  
6 benefits to customers, the Company has yet to prove it is reasonable from a cost-effective  
7 standpoint.

8 In addition, the Staff recommends the Commission look into extending the  
9 historical data requirements currently presented in the guidelines from the July 10<sup>th</sup> order  
10 in U-20147. The Company and Liberty demonstrate here that more data and a longer  
11 historical look could be beneficial to projections of future improvements in that context as  
12 well. The current guidelines list a five-year historical data review, as available: Staff would  
13 recommend this be extended to ten years, as available, should the Commission chose to  
14 revise the guidelines.

15 Q. Does Staff have further discussion regarding the outcomes of recent orders in MPSC  
16 Docket U-21305?

17 A. Yes. Staff witness Jessica Duell discusses other influences MPSC Docket U-21305 has  
18 had on this rate case, including the Company's commitment to expedited tree trimming  
19 cycles.

20 **Recommendations**

21 Q. Please summarize your recommendations below.

22 A. Staff recommends the Commission:

**DIRECT TESTIMONY OF ANNA N. N. SCHILLER**  
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**PART II**

- 1       1. Request the Company to provide a thorough breakdown of the inspection associated  
2           costs applied across all capital programs/subprograms, support why the costs are  
3           appropriately classified as capital instead of O&M with reference(s) to accounting  
4           guidance, and amend the classification of these expenditures in the Company's next  
5           rate case, where necessary, based on the analysis. In addition, the Commission should  
6           require the Company to explain why section 2 under the Operating Expense of USOA  
7           is not appropriate for the inspection-related costs of the LVD Lines Demand Failures  
8           subprogram and why section 3 under the Electric Plant of USOA is appropriate.
- 9       2. Require costs to be categorized and similarly trackable between any submitted DSP  
10           and any rate case which uses such DSP to justify cost recovery to prove prudence and  
11           reasonableness of such costs.
- 12       3. Require a comprehensible walkthrough of any expense programs, subprograms, and/or  
13           categories that have varied between the prior submitted DSP and the ongoing rate  
14           proceedings as an exhibit within that rate proceeding.
- 15       4. Consider revising the DSP guidelines presented in the July 10<sup>th</sup> order in Case No. U-  
16           20147 to include, where applicable, ten-years of historical reliability data, as available.
- 17       5. Require a method other than the SAIDI performance model used in this case to examine  
18           fully potential extended timelines for SAIDI improvements in the Company's next rate  
19           case to be considered reasonable in reference to the June 12, 2025 order in Case No.  
20           U-21305.
- 21       6. Require the Company to assess the cost effectiveness, affordability, and potential rate  
22           impact of any SAIDI performance forecast related to the U-21305 order.

**DIRECT TESTIMONY OF ANNA N. N. SCHILLER**

**CASE NUMBER U-21870**

**PART II**

1 | 7. Establish that any expenses in future rate cases based solely on avoiding financial

2 | penalties or gaining a financial incentive set by the Commission as imprudent.

3 | Q. Does this conclude your testimony?

4 | A. Yes, it does.

STATE OF MICHIGAN  
BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

\* \* \* \* \*

In the matter of the application of )  
**CONSUMERS ENERGY COMPANY** )  
for authority to increase its rates for ) Case No. U-21870  
the generation and distribution of )  
electricity and for other relief. )  
\_\_\_\_\_ )

**EXHIBITS OF**  
**ENERGY RESOURCES DIVISION**  
**MICHIGAN PUBLIC SERVICE COMMISSION**

**September 30, 2025**

U21870-ST-CE-0055

Page 1 of 1

**Question:**

5. Please provide the projected life of the Weadock and Iosco BESS projects.

**Response:**

Weadock BESS and Iosco BESS both have a 20-year Design Life.

**Witness:** THOMAS P CLARK

**Date:** July 21, 2025

**EXHIBIT S-11.1**  
**IS CONFIDENTIAL AND BEING**  
**FILED UNDER SEAL WITH THE**  
**MPSC**

Schedule E-3

**MICHIGAN PUBLIC SERVICE COMMISSION**  
Consumers Energy Company  
Electric Deliveries & Customer Counts by Rate Category  
(Annual Deliveries in MWh)

Case No.: U-21870  
Exhibit No.: A-15 (EMB-4)  
Schedule: E-3  
Page: 1 of 1  
Witness: EMBreuring  
Date: June 2025

Line No.	Description	(a)	(b)	(c)	(d)	(e)	(f)
		2024		Test Year		Staff Adjustment Test Year	
		Avg. No. of Customers	Annual Deliveries	Avg. No. of Customers	Annual Deliveries	Avg. No. of Customers	Annual Deliveries
<b>Bundled Residential Service</b>							
1	Standard Service RS	10,787	103,833	10,973	108,263	10,973	108,263
2	Peak Pwr Savers / Dynamic Pricing	-	-	-	-	-	-
3	Time-of-Day RT	-	-	-	-	-	-
4	Electric Vehicles REV-1	-	-	-	-	-	-
5	Electric Vehicles REV-2	-	-	-	-	-	-
6	Nighttime Savers (RPM)	8,452	97,258	16,879	168,382	16,879	168,382
7	Summer On-Peak (RSP)	1,614,371	12,042,417	1,628,594	12,230,766	1,628,594	12,230,766
8	Smart Hours (RSH)	24,233	180,314	24,351	177,999	24,351	177,999
9	<b>Total Bundled Residential</b>	<b>1,657,843</b>	<b>12,423,822</b>	<b>1,680,798</b>	<b>12,685,409</b>	<b>1,680,798</b>	<b>12,685,409</b>
<b>Bundled Secondary Service</b>							
10	Secondary Energy-only GS	204,356	4,087,646	204,973	4,043,300	204,973	4,114,903
11	Secondary Demand GSD	19,910	2,947,769	20,152	2,927,804	20,152	2,979,410
12	Secondary GSTU	2,004	91,360	1,891	83,093	1,891	84,695
13	<b>Total Bundled Secondary</b>	<b>226,270</b>	<b>7,126,774</b>	<b>227,015</b>	<b>7,054,196</b>	<b>227,015</b>	<b>7,179,008</b>
<b>Bundled Primary Service</b>							
14	Primary Energy-only GP	1,362	670,575	1,360	659,010	1,360	666,952
15	Primary Demand GPD	1,030	7,735,609	855	4,994,897	855	5,035,360
16	Primary Time-of-Use GPTU	1,433	3,954,047	1,517	4,243,508	1,517	4,273,401
17	General Service Primary (EIP)	18	408,336	17	392,565	17	392,565
18	Special Contract (Rate_LED)	-	-	-	-	-	-
19	<b>Total Bundled Primary</b>	<b>3,843</b>	<b>12,768,568</b>	<b>3,748</b>	<b>10,289,980</b>	<b>3,748</b>	<b>10,368,279</b>
<b>Bundled Street Lighting Service</b>							
20	Unmetered Lighting GUL	3,863	56,621	-	-	-	-
21	Metered Lighting GML	387	4,399	399	10,777	399	10,776
22	Unmetered GU	460	94,740	465	97,806	465	99,352
23	Unmetered Lighting GU-LED	841	21,964	-	-	-	-
24	Universal Unmetered Lighting UUL	-	-	4,696	54,640	4,696	54,640
25	<b>Total Bundled Street Lighting</b>	<b>5,551</b>	<b>177,724</b>	<b>5,560</b>	<b>163,223</b>	<b>5,560</b>	<b>164,769</b>
<b>Bundled Self-generation Service</b>							
26	Self-generation GSG-1	-	-	-	-	-	-
27	Self-generation GSG-2	23	177,359	14	173,301	14	173,301
28	<b>Total Bundled Self-generation</b>	<b>23</b>	<b>177,359</b>	<b>14</b>	<b>173,301</b>	<b>14</b>	<b>173,301</b>
<b>Bundled Other Service</b>							
29	Wholesale	1	260,664	-	-	-	-
30	Grand Rapids	1	14,220	-	-	-	-
31	<b>Total Bundled Other</b>	<b>2</b>	<b>274,884</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
32	Cycle Billed Bundled Service	1,893,532	32,949,131	1,917,136	30,366,110	1,917,136	30,570,765
33	Unbilled	-	248,222	-	-	-	-
34	<b>Calendar Bundled Service</b>	<b>1,893,532</b>	<b>33,197,353</b>	<b>1,917,136</b>	<b>30,366,110</b>	<b>1,917,136</b>	<b>30,570,765</b>
<b>ROA Secondary Service</b>							
35	Secondary Energy-only GS	80	18,520	85	18,386	85	18,702
36	Secondary Demand GSD	464	178,044	472	171,253	472	174,288
37	<b>Total ROA Secondary</b>	<b>544</b>	<b>196,564</b>	<b>556</b>	<b>189,639</b>	<b>556</b>	<b>192,989</b>
<b>ROA Primary Service</b>							
38	Primary Energy-only GP	59	72,767	60	71,144	60	72,068
39	Primary Demand GPD	358	3,328,394	356	3,291,840	356	3,303,873
40	<b>Total ROA Primary</b>	<b>417</b>	<b>3,401,161</b>	<b>417</b>	<b>3,362,984</b>	<b>417</b>	<b>3,375,942</b>
41	Cycle Billed ROA Service	961	3,597,725	973	3,552,623	973	3,568,931
42	Unbilled ROA	-	(15,136)	-	-	-	-
43	<b>Calendar ROA Service</b>	<b>961</b>	<b>3,582,589</b>	<b>973</b>	<b>3,552,623</b>	<b>973</b>	<b>3,568,931</b>
44	<b>Cycle Billed Total Deliveries</b>	<b>1,894,493</b>	<b>36,546,856</b>	<b>1,918,109</b>	<b>33,918,733</b>	<b>1,918,109</b>	<b>34,139,696</b>
45	<b>Unbilled</b>	<b>-</b>	<b>233,086</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
46	<b>Calendar Total Deliveries</b>	<b>1,894,493</b>	<b>36,779,942</b>	<b>1,918,109</b>	<b>33,918,733</b>	<b>1,918,109</b>	<b>34,139,696</b>

<u>Model Statistics</u>		<u>Model Statistics</u>		<u>Model Statistics</u>	
Iterations	11	Iterations	11	Iterations	11
Adjusted Observations	125	Adjusted Observations	125	Adjusted Observations	125
Deg. of Freedom for Error	113	Deg. of Freedom for Error	113	Deg. of Freedom for Error	113
R-Squared	0.96	R-Squared	0.96	R-Squared	0.96
Adjusted R-Squared	0.96	Adjusted R-Squared	0.96	Adjusted R-Squared	0.96
AIC	6.1	AIC	6.1	AIC	6.1
BIC	6.4	BIC	6.4	BIC	6.4
F-Statistic	#NA	F-Statistic	#NA	F-Statistic	#NA
Prob (F-Statistic)	#NA	Prob (F-Statistic)	#NA	Prob (F-Statistic)	#NA
Log-Likelihood	(546)	Log-Likelihood	(546)	Log-Likelihood	(546)
Model Sum of Squares	1,184,629	Model Sum of Squares	1,184,629	Model Sum of Squares	1,184,629
Sum of Squared Errors	45,477	Sum of Squared Errors	45,477	Sum of Squared Errors	45,477
Mean Squared Error	402	Mean Squared Error	402	Mean Squared Error	402
Std. Error of Regression	20	Std. Error of Regression	20	Std. Error of Regression	20
Mean Abs. Dev. (MAD)	14	Mean Abs. Dev. (MAD)	14	Mean Abs. Dev. (MAD)	14
Mean Abs. % Err. (MAPE)	0.02	Mean Abs. % Err. (MAPE)	0.02	Mean Abs. % Err. (MAPE)	0.02
Durbin-Watson Statistic	2.01	Durbin-Watson Statistic	2.01	Durbin-Watson Statistic	2.01
Durbin-H Statistic	#NA	Durbin-H Statistic	#NA	Durbin-H Statistic	#NA
Ljung-Box Statistic	24	Ljung-Box Statistic	24	Ljung-Box Statistic	24
Prob (Ljung-Box)	0	Prob (Ljung-Box)	0	Prob (Ljung-Box)	0
Skewness	(0.14)	Skewness	(0.14)	Skewness	(0.14)
Kurtosis	3.51	Kurtosis	3.51	Kurtosis	3.51
Jarque-Bera	1.79	Jarque-Bera	1.79	Jarque-Bera	1.79
Prob (Jarque-Bera)	0.41	Prob (Jarque-Bera)	0.41	Prob (Jarque-Bera)	0.41
<u>Variable</u>	<u>Coefficient</u>	<u>StdErr</u>	<u>T-Stat</u>	<u>P-Value</u>	<u>Coefficient</u>
Variables.ResUseCalibration	0.780	0.1	7.4	0.00%	ResDelCycUse_XEE2.LagDep(12)
Variables.CycBillDays	15.924	0.2	72.8	0.00%	Variables.dCycCDD60
Degree_Days.CycHDD60_15	0.256	0.0	29.0	0.00%	Variables.dCycHDD60
Degree_Days.CycCDD60_15	0.985	0.0	43.3	0.00%	Variables.dCycBillDays
External_Adjustments.COVID19	77.666	14.8	5.3	0.00%	Variables.dCDD70SAT
Variables.Jun2003	-	0.0	0.0	100.00%	External_Adjustments.COVID19
Variables.Sep2009	-	0.0	0.0	100.00%	Variables.Sep2002
Variables.Jul2008	-	0.0	0.0	100.00%	Variables.Sep2009
Variables.Jul2017	(64.373)	18.7	-3.5	0.08%	Variables.Feb2016
Variables.Jan2019	48.383	18.9	2.6	1.18%	Variables.Jul2017





t-Stat	P-Value
9.9	0.00%
4.5	0.00%
66.4	0.00%
-3	0
7	0
8.93	0.00%
8.885	0.00%
10.24	0.00%
8.762	0.00%
-7.536	0.00%
-1.583	11.56%
-4.292	0.00%
-3.767	0.03%

## MetrixND MWh Forecasting Model Equations

### Residential

$R_{Residential} = \text{ResDelCst.Filled}$   
 $\text{ResDelCyc\_XEE} = (\text{ResDelCycUse\_XEE.Predicted} * .9 + \text{ResDelCycUse\_XEE2.Predicted} * .1) * \text{Forecast.ResCst} / 1000 + \text{fillmissing}(\text{External\_Adjustments.PHEV\_RES}, 0) + \text{fillmissing}(\text{External\_Adjustments.DG}, 0)$   
 $\text{ResDelCyc} = \text{Forecast.ResDelCyc\_XEE} + \text{fillmissing}(\text{Energy\_Efficiency.RESDELICYCEESVG}, 0)$

### Commercial

$C_{Commercial} = \text{ComDelCst.Filled}$   
 $\text{ComCst} = \text{ComDelCst.Filled}$   
 $\text{ComDelCyc\_XEE} = (\text{ComDelCycUse\_XEE.Filled} * \text{Forecast.ComCst} / 1000) * .4 + \text{ComDelCyc\_XEE.Filled} * .6 + \text{fillmissing}(\text{External\_Adjustments.PHEV\_COM}, 0)$   
 $\text{ComROACyc\_XEE} = \text{round}(\text{Forecast.ComDelCyc\_XEE} * \text{ComPctROA.Filled}, 0)$   
 $\text{ComEndCyc\_XEE} = \text{Forecast.ComDelCyc\_XEE} - \text{Forecast.ComROACyc\_XEE}$   
 $\text{ComDelCyc} = \text{Forecast.ComDelCyc\_XEE} + \text{fillmissing}(\text{Energy\_Efficiency.COMBNDICYCEESVG}, 0) + \text{fillmissing}(\text{Energy\_Efficiency.STILTICYCEESVG}, 0) + \text{fillmissing}(\text{Energy\_Efficiency.INTIDELICYCEESVG}, 0)$   
 $\text{ComDel\_GrowthRates} = \text{Forecast.ComDelCyc} / \text{value}(\text{Deliveries.COMDELICYC}, 2023, \text{month}) - 1$   
 $\text{ComROACyc} = \text{round}(\text{value}(\text{Deliveries.COMROACYC}, 2023, \text{month}) * (1 + \text{Forecast.ComDel\_GrowthRates}), 0)$   
 $\text{ComEndCyc} = \text{Forecast.ComDelCyc} - \text{Forecast.ComROACyc}$

877,414	728,063	2,466	7,643	-	2,500,470	71,412	207,507	278,919	2,779,389
960,130	754,435	2,535	10,090	-	2,612,123	75,191	230,095	305,286	2,917,409
1,033,582	747,829	2,157	5,102	-	2,854,528	80,667	241,593	322,260	3,176,788
1,125,905	730,957	2,769	8,702	-	3,223,958	84,954	237,750	322,704	3,546,662
1,035,781	802,420	2,771	8,500	-	3,096,322	85,465	249,586	335,051	3,431,373
959,380	767,633	2,382	9,187	-	2,672,441	78,857	227,047	305,904	2,978,345
938,552	829,772	2,645	10,697	-	2,628,649	77,293	226,739	304,032	2,932,681
862,819	838,011	2,307	11,794	-	2,635,110	72,908	227,201	300,109	2,935,219
951,410	800,360	2,352	12,442	-	2,899,659	72,276	215,976	288,252	3,187,911
1,109,292	799,214	2,521	13,010	-	3,104,564	73,295	221,804	295,099	3,399,663
867,988	859,856	2,973	10,330	-	2,799,639	67,265	195,830	263,095	3,062,734
909,868	899,386	2,396	8,575	-	2,841,753	71,471	210,407	281,878	3,123,631
911,334	848,742	2,420	7,564	-	2,633,878	70,976	210,147	281,123	2,915,001
948,935	891,000	2,511	9,986	-	2,729,143	75,298	225,085	300,383	3,029,526
1,032,985	860,836	2,228	5,045	-	2,976,423	79,064	234,121	313,185	3,289,608
955,467	859,064	2,886	8,610	-	3,249,417	83,209	229,795	313,004	3,562,421
1,096,497	891,115	2,695	8,410	-	3,203,408	83,725	241,240	324,965	3,528,373
947,653	876,206	2,419	9,094	-	2,756,088	77,174	220,643	297,817	3,053,905
966,307	922,770	2,654	10,588	-	2,760,730	75,866	219,751	295,617	3,056,347
906,782	913,690	2,352	11,671	-	2,706,268	71,562	245,779	317,341	3,023,609
887,673	878,959	2,414	12,316	-	2,990,966	72,112	211,478	283,590	3,274,556
1,132,331	888,732	2,472	12,879	-	3,227,704	72,986	216,575	289,561	3,517,265
839,587	909,591	2,985	10,226	-	2,840,971	67,284	191,844	259,128	3,100,099
890,190	1,001,599	2,357	8,489	-	2,927,047	71,274	205,635	276,909	3,203,956
949,415	923,076	2,392	7,487	-	2,746,705	70,972	205,030	276,002	3,022,707
924,846	1,026,668	2,473	9,883	-	2,842,685	75,116	221,910	297,026	3,139,711
1,029,802	1,009,453	2,250	4,989	-	3,124,219	79,264	231,570	310,834	3,435,053
965,031	1,008,989	2,865	8,518	-	3,411,289	83,454	227,497	310,951	3,722,240
1,078,334	1,032,597	2,717	8,320	-	3,352,051	84,020	238,917	322,937	3,674,988
958,596	1,001,007	2,417	8,999	-	2,906,186	77,563	218,057	295,620	3,201,806
922,466	1,047,946	2,636	10,480	-	2,866,161	76,232	217,551	293,783	3,159,944
898,816	1,036,811	2,363	11,551	-	2,821,379	71,881	243,380	315,261	3,136,640
914,958	998,791	2,398	12,193	-	3,162,078	71,783	206,781	278,564	3,440,642
1,096,079	989,185	2,581	12,750	-	3,317,055	72,741	212,138	284,879	3,601,934
843,193	983,130	3,117	10,122	-	2,932,627	66,974	187,595	254,569	3,187,196
892,104	1,064,784	2,347	8,403	-	3,010,453	71,058	201,386	272,444	3,282,897
949,663	950,779	2,427	7,409	-	2,813,577	70,715	201,234	271,949	3,085,526
892,923	1,063,669	2,514	9,782	-	2,877,622	74,838	217,196	292,034	3,169,656
1,059,084	1,023,941	2,279	4,934	-	3,134,455	78,790	226,614	305,404	3,439,859
1,002,798	1,055,383	2,783	8,429	-	3,518,943	82,961	222,644	305,605	3,824,548
1,107,473	1,039,298	2,743	8,232	-	3,406,731	83,569	233,978	317,547	3,724,278
927,311	1,024,337	2,417	8,906	-	2,947,759	77,231	213,599	290,830	3,238,589
929,842	1,074,645	2,638	10,373	-	2,894,640	75,954	213,249	289,203	3,183,843
892,817	1,063,943	2,363	11,432	-	2,851,651	71,586	239,163	310,749	3,162,400
891,221	1,039,718	2,305	12,193	-	3,149,291	71,783	206,781	278,564	3,427,855
1,097,887	1,061,447	2,525	12,750	-	3,407,194	73,764	210,493	284,257	3,691,451
822,024	1,072,365	3,005	10,122	-	2,998,810	67,486	186,911	254,397	3,253,207
880,379	1,173,288	2,322	8,403	-	3,115,859	71,626	200,626	272,252	3,388,111
961,021	1,062,107	2,418	7,409	-	2,966,988	71,307	200,523	271,830	3,238,818
891,348	1,192,584	2,491	9,782	-	3,028,060	75,399	216,654	292,053	3,320,113
1,025,416	1,166,159	2,338	4,934	-	3,266,568	79,343	226,113	305,456	3,572,024
1,024,745	1,180,915	2,751	8,429	-	3,688,294	83,555	222,154	305,709	3,994,003
1,102,901	1,170,966	2,744	8,232	-	3,555,298	84,219	233,442	317,661	3,872,959
930,042	1,166,951	2,392	8,906	-	3,140,312	77,941	213,036	290,977	3,431,289

228,822	1,113	865	5,110	-	1,901,260	844	129	973	1,902,233
228,848	1,111	865	5,110	-	1,900,578	844	129	973	1,901,551
228,874	1,111	865	5,110	-	1,904,141	844	129	973	1,905,114
228,900	1,113	865	5,110	-	1,906,620	844	129	973	1,907,593
228,925	1,113	865	5,110	-	1,904,791	844	129	973	1,905,764
228,951	1,113	865	5,110	-	1,908,273	844	129	973	1,909,246
228,976	1,115	865	5,110	-	1,908,792	844	129	973	1,909,765
229,001	1,115	865	5,110	-	1,904,576	844	129	973	1,905,549
229,026	1,115	865	5,110	-	1,905,748	844	129	973	1,906,721
229,051	1,117	865	5,110	-	1,909,923	844	129	973	1,910,896
229,075	1,117	865	5,110	-	1,910,545	844	129	973	1,911,518
229,100	1,117	865	5,110	-	1,912,646	844	129	973	1,913,619
229,124	1,117	865	5,110	-	1,911,518	844	129	973	1,912,491
229,147	1,117	865	5,110	-	1,910,815	844	129	973	1,911,788
229,171	1,117	865	5,110	-	1,914,258	844	129	973	1,915,231
229,194	1,117	865	5,110	-	1,916,631	844	129	973	1,917,604
229,217	1,117	865	5,110	-	1,914,781	844	129	973	1,915,754
229,240	1,117	865	5,110	-	1,918,133	844	129	973	1,919,106
229,262	1,117	865	5,110	-	1,918,579	844	129	973	1,919,552
229,285	1,117	865	5,110	-	1,914,393	844	129	973	1,915,366
229,307	1,117	865	5,110	-	1,915,492	844	129	973	1,916,465
229,328	1,117	865	5,110	-	1,919,540	844	129	973	1,920,513
229,350	1,117	865	5,110	-	1,920,120	844	129	973	1,921,093
229,371	1,117	865	5,110	-	1,922,158	844	129	973	1,923,131
229,392	1,117	865	5,110	-	1,921,042	844	129	973	1,922,015
229,412	1,117	865	5,110	-	1,920,347	844	129	973	1,921,320
229,433	1,117	865	5,110	-	1,923,721	844	129	973	1,924,694
229,453	1,117	865	5,110	-	1,926,051	844	129	973	1,927,024
229,473	1,117	865	5,110	-	1,924,245	844	129	973	1,925,218
229,492	1,117	865	5,110	-	1,927,538	844	129	973	1,928,511
229,512	1,117	865	5,110	-	1,927,983	844	129	973	1,928,956
229,531	1,117	865	5,110	-	1,923,887	844	129	973	1,924,860
229,549	1,117	865	5,110	-	1,924,966	844	129	973	1,925,939
229,568	1,117	865	5,110	-	1,928,930	844	129	973	1,929,903
229,586	1,117	865	5,110	-	1,929,489	844	129	973	1,930,462
229,604	1,117	865	5,110	-	1,931,471	844	129	973	1,932,444
229,622	1,117	865	5,110	-	1,930,354	844	129	973	1,931,327
229,640	1,117	865	5,110	-	1,929,644	844	129	973	1,930,617
229,657	1,117	865	5,110	-	1,932,911	844	129	973	1,933,884
229,674	1,117	865	5,110	-	1,935,148	844	129	973	1,936,121
229,691	1,117	865	5,110	-	1,933,323	844	129	973	1,934,296
229,708	1,117	865	5,110	-	1,936,484	844	129	973	1,937,457
229,724	1,117	865	5,110	-	1,936,846	844	129	973	1,937,819
229,740	1,117	865	5,110	-	1,932,749	844	129	973	1,933,722
229,756	1,119	865	5,110	-	1,933,714	844	129	973	1,934,687
229,771	1,119	865	5,110	-	1,937,492	844	129	973	1,938,465
229,787	1,119	865	5,110	-	1,937,923	844	129	973	1,938,896
229,802	1,119	865	5,110	-	1,939,738	844	129	973	1,940,711
229,816	1,119	865	5,110	-	1,938,508	844	129	973	1,939,481
229,831	1,119	865	5,110	-	1,937,667	844	129	973	1,938,640
229,845	1,119	865	5,110	-	1,940,718	844	129	973	1,941,691
229,859	1,119	865	5,110	-	1,942,752	844	129	973	1,943,725
229,873	1,119	865	5,110	-	1,940,801	844	129	973	1,941,774
229,886	1,119	865	5,110	-	1,943,731	844	129	973	1,944,704

5	679,077	2,930	1,975	0	89,089	1,374	89,089	1,783,682	313,757	1,534
5	673,132	2,494	999	0	95,577	1,499	95,577	1,872,812	331,202	1,668
9	656,763	3,201	1,703	0	100,657	1,691	100,657	1,843,021	331,659	1,859
5	720,972	3,203	1,663	0	101,262	1,626	101,262	1,934,776	344,348	1,801
0	689,716	2,754	1,798	0	93,432	1,400	93,432	1,760,056	314,393	1,560
9	744,210	3,058	2,093	0	91,579	1,377	91,579	1,757,669	312,469	1,536
3	751,600	2,667	2,308	0	86,384	1,384	86,384	1,761,245	308,437	1,540
4	717,831	2,719	2,435	0	85,635	1,522	85,635	1,674,234	296,251	1,672
9	715,520	2,914	2,546	0	86,843	1,625	86,843	1,719,409	303,288	1,779
9	769,811	3,438	2,022	0	79,698	1,465	79,698	1,518,062	270,396	1,602
1	805,201	2,770	1,678	0	84,681	1,486	84,681	1,631,065	289,700	1,632
7	759,861	2,797	1,480	0	84,095	1,378	84,095	1,629,048	288,924	1,524
1	797,694	2,903	1,954	0	89,216	1,428	89,216	1,744,844	308,718	1,585
7	770,688	2,576	987	0	93,678	1,555	93,678	1,814,889	321,876	1,718
9	769,102	3,336	1,685	0	98,589	1,695	98,589	1,781,354	321,690	1,858
4	797,796	3,116	1,646	0	99,200	1,673	99,200	1,870,078	333,983	1,842
4	784,449	2,796	1,780	0	91,438	1,437	91,438	1,710,412	306,081	1,591
5	826,137	3,069	2,072	0	89,888	1,439	89,888	1,703,498	303,820	1,592
5	818,008	2,719	2,284	0	84,790	1,414	84,790	1,905,260	326,147	1,579
1	786,913	2,791	2,410	0	85,441	1,561	85,441	1,639,366	291,459	1,709
3	795,663	2,858	2,520	0	86,477	1,681	86,477	1,678,875	297,596	1,831
1	814,338	3,451	2,001	0	79,720	1,480	79,720	1,487,163	266,319	1,614
1	896,711	2,725	1,661	0	84,447	1,523	84,447	1,594,073	284,593	1,666
9	826,411	2,765	1,465	0	84,090	1,430	84,090	1,589,381	283,661	1,573
1	919,154	2,859	1,934	0	89,000	1,480	89,000	1,720,232	305,268	1,634
3	903,743	2,601	976	0	93,915	1,624	93,915	1,795,114	319,459	1,785
5	903,327	3,312	1,667	0	98,880	1,771	98,880	1,763,540	319,580	1,932
9	924,462	3,141	1,628	0	99,550	1,742	99,550	1,852,070	331,898	1,909
7	896,180	2,794	1,761	0	91,899	1,508	91,899	1,690,366	303,823	1,660
9	938,204	3,048	2,051	0	90,322	1,487	90,322	1,686,444	301,935	1,638
5	928,236	2,732	2,261	0	85,168	1,466	85,168	1,886,663	324,009	1,630
5	894,197	2,772	2,386	0	85,051	1,643	85,051	1,602,955	286,294	1,786
5	885,597	2,983	2,495	0	86,186	1,720	86,186	1,644,479	292,784	1,866
3	880,176	3,603	1,981	0	79,353	1,520	79,353	1,454,225	261,633	1,651
5	953,279	2,713	1,644	0	84,191	1,559	84,191	1,561,135	280,004	1,699
5	851,212	2,806	1,450	0	83,785	1,458	83,785	1,559,955	279,495	1,598
3	952,281	2,907	1,914	0	88,671	1,491	88,671	1,683,689	300,138	1,642
2	916,713	2,634	966	0	93,353	1,622	93,353	1,756,695	313,879	1,779
5	944,862	3,218	1,650	0	98,295	1,818	98,295	1,725,920	314,085	1,975
2	930,462	3,171	1,611	0	99,015	1,762	99,015	1,813,784	326,359	1,925
7	917,067	2,795	1,743	0	91,506	1,522	91,506	1,655,808	298,900	1,672
3	962,107	3,049	2,030	0	89,993	1,495	89,993	1,653,095	297,228	1,643
5	952,526	2,731	2,237	0	84,818	1,475	84,818	1,853,973	319,372	1,635
9	929,174	2,664	2,386	0	85,051	1,629	85,051	1,602,955	286,294	1,772
3	948,593	2,919	2,495	0	87,398	1,759	87,398	1,631,727	292,145	1,904
7	958,350	3,474	1,981	0	79,960	1,547	79,960	1,448,923	261,456	1,678
1	1,048,543	2,684	1,644	0	84,864	1,606	84,864	1,555,244	279,807	1,746
2	949,183	2,795	1,450	0	84,487	1,531	84,487	1,554,443	279,373	1,670
3	1,065,787	2,879	1,914	0	89,335	1,563	89,335	1,679,488	300,157	1,713
1	1,042,172	2,703	966	0	94,009	1,683	94,009	1,752,812	313,932	1,840
3	1,055,359	3,181	1,650	0	98,999	1,898	98,999	1,722,121	314,192	2,055
3	1,046,467	3,172	1,611	0	99,785	1,832	99,785	1,809,629	326,476	1,995
5	1,042,879	2,766	1,743	0	92,347	1,616	92,347	1,651,443	299,051	1,764
5	1,094,309	3,014	2,030	0	90,865	1,550	90,865	1,649,049	297,448	1,698

735,435	2,443	8,662	-	2,546,675	71,220	209,445	280,665	2,827,340
721,170	2,404	7,643	-	2,490,893	71,412	207,507	278,919	2,769,812
748,240	2,316	10,090	-	2,729,120	75,191	230,095	305,286	3,034,406
762,690	2,768	5,102	-	3,196,231	80,667	241,593	322,260	3,518,491
801,753	2,786	8,702	-	3,171,455	84,954	237,750	322,704	3,494,159
809,783	2,629	8,500	-	2,973,823	85,465	249,586	335,051	3,308,874
764,900	2,526	9,187	-	2,630,434	78,857	227,047	305,904	2,936,338
817,767	2,398	10,697	-	2,641,459	77,293	226,739	304,032	2,945,491
797,461	2,385	11,794	-	2,787,026	72,908	227,201	300,109	3,087,135
814,193	2,555	12,442	-	3,064,050	72,276	215,976	288,252	3,352,302
878,891	2,822	13,010	-	2,963,852	73,295	221,804	295,099	3,258,951
846,121	2,576	10,330	-	2,851,585	67,265	195,830	263,095	3,114,680
866,030	2,443	8,575	-	2,710,331	71,471	210,407	281,878	2,992,209
851,157	2,404	7,564	-	2,631,952	70,976	210,147	281,123	2,913,075
870,643	2,316	9,986	-	2,854,151	75,298	225,085	300,383	3,154,534
874,036	2,768	5,045	-	3,191,632	79,064	234,121	313,185	3,504,817
898,024	2,786	8,610	-	3,266,055	83,209	229,795	313,004	3,579,059
913,590	2,629	8,410	-	3,037,483	83,725	241,240	324,965	3,362,448
872,139	2,526	9,094	-	2,729,651	77,174	220,643	297,817	3,027,468
906,643	2,398	10,588	-	2,707,370	75,866	219,751	295,617	3,002,987
870,798	2,385	11,671	-	2,836,924	71,562	245,779	317,341	3,154,265
893,558	2,555	12,316	-	3,184,069	72,112	211,478	283,590	3,467,659
932,782	2,822	12,879	-	3,006,729	72,986	216,575	289,561	3,296,290
932,634	2,576	10,226	-	2,946,161	67,284	191,844	259,128	3,205,289
945,061	2,443	8,489	-	2,826,198	71,274	205,635	276,909	3,103,107
963,128	2,404	7,487	-	2,759,201	70,972	205,030	276,002	3,035,203
1,007,643	2,316	9,883	-	3,004,837	75,116	221,910	297,026	3,301,863
1,018,845	2,768	4,989	-	3,358,175	79,264	231,570	310,834	3,669,009
1,043,011	2,786	8,518	-	3,413,937	83,454	227,497	310,951	3,724,888
1,051,195	2,629	8,320	-	3,186,775	84,020	238,917	322,937	3,509,712
999,788	2,526	8,999	-	2,844,785	77,563	218,057	295,620	3,140,405
1,036,862	2,398	10,480	-	2,825,283	76,232	217,551	293,783	3,119,066
995,001	2,385	11,551	-	3,009,721	71,881	243,380	315,261	3,324,982
999,440	2,555	12,193	-	3,252,169	71,783	206,781	278,564	3,530,733
1,007,621	2,822	12,750	-	3,002,560	72,741	212,138	284,879	3,287,439
1,006,491	2,576	10,122	-	3,008,748	66,974	187,595	254,569	3,263,317
990,505	2,443	8,403	-	2,874,580	71,058	201,386	272,444	3,147,024
1,000,456	2,404	7,409	-	2,777,722	70,715	201,234	271,949	3,049,671
1,028,948	2,316	9,782	-	2,999,838	74,838	217,196	292,034	3,291,872
1,057,779	2,768	4,934	-	3,469,387	78,790	226,614	305,404	3,774,791
1,057,717	2,786	8,429	-	3,471,923	82,961	222,644	305,605	3,777,528
1,070,271	2,629	8,232	-	3,233,429	83,569	233,978	317,547	3,550,976
1,022,938	2,526	8,906	-	2,877,195	77,231	213,599	290,830	3,168,025
1,063,856	2,398	10,373	-	2,857,844	75,954	213,249	289,203	3,147,047
1,015,033	2,385	11,432	-	3,047,762	71,586	239,163	310,749	3,358,511
1,057,725	2,555	12,193	-	3,363,829	72,286	205,986	278,272	3,642,101
1,109,708	2,822	12,750	-	3,141,556	73,261	211,288	284,549	3,426,105
1,101,474	2,576	10,122	-	3,140,272	67,486	186,911	254,397	3,394,669
1,102,441	2,443	8,403	-	3,030,437	71,626	200,626	272,252	3,302,689
1,124,411	2,404	7,409	-	2,934,903	71,307	200,523	271,830	3,206,733
1,162,055	2,316	9,782	-	3,128,339	75,399	216,654	292,053	3,420,392
1,181,027	2,768	4,934	-	3,643,910	79,343	226,113	305,456	3,949,366
1,183,906	2,786	8,429	-	3,624,347	83,555	222,154	305,709	3,930,056
1,215,918	2,629	8,232	-	3,429,336	84,219	233,442	317,661	3,746,997

1,113	865	5,110	-	1,901,260	844	129	973	1,902,233
1,111	865	5,110	-	1,900,578	844	129	973	1,901,551
1,111	865	5,110	-	1,904,141	844	129	973	1,905,114
1,113	865	5,110	-	1,906,620	844	129	973	1,907,593
1,113	865	5,110	-	1,904,791	844	129	973	1,905,764
1,115	865	5,110	-	1,908,273	844	129	973	1,909,246
1,115	865	5,110	-	1,908,792	844	129	973	1,909,765
1,115	865	5,110	-	1,904,576	844	129	973	1,905,549
1,115	865	5,110	-	1,905,748	844	129	973	1,906,721
1,117	865	5,110	-	1,909,923	844	129	973	1,910,896
1,117	865	5,110	-	1,910,545	844	129	973	1,911,518
1,117	865	5,110	-	1,912,646	844	129	973	1,913,619
1,117	865	5,110	-	1,911,518	844	129	973	1,912,491
1,117	865	5,110	-	1,910,815	844	129	973	1,911,788
1,117	865	5,110	-	1,914,258	844	129	973	1,915,231
1,117	865	5,110	-	1,916,631	844	129	973	1,917,604
1,117	865	5,110	-	1,914,781	844	129	973	1,915,754
1,117	865	5,110	-	1,918,133	844	129	973	1,919,106
1,117	865	5,110	-	1,918,579	844	129	973	1,919,552
1,117	865	5,110	-	1,914,393	844	129	973	1,915,366
1,117	865	5,110	-	1,915,492	844	129	973	1,916,465
1,117	865	5,110	-	1,919,540	844	129	973	1,920,513
1,117	865	5,110	-	1,920,120	844	129	973	1,921,093
1,117	865	5,110	-	1,922,158	844	129	973	1,923,131
1,117	865	5,110	-	1,921,042	844	129	973	1,922,015
1,117	865	5,110	-	1,920,347	844	129	973	1,921,320
1,117	865	5,110	-	1,923,721	844	129	973	1,924,694
1,117	865	5,110	-	1,926,051	844	129	973	1,927,024
1,117	865	5,110	-	1,924,245	844	129	973	1,925,218
1,117	865	5,110	-	1,927,538	844	129	973	1,928,511
1,117	865	5,110	-	1,927,983	844	129	973	1,928,956
1,117	865	5,110	-	1,923,887	844	129	973	1,924,860
1,117	865	5,110	-	1,924,966	844	129	973	1,925,939
1,117	865	5,110	-	1,928,930	844	129	973	1,929,903
1,117	865	5,110	-	1,929,489	844	129	973	1,930,462
1,117	865	5,110	-	1,931,471	844	129	973	1,932,444
1,117	865	5,110	-	1,930,354	844	129	973	1,931,327
1,117	865	5,110	-	1,929,644	844	129	973	1,930,617
1,117	865	5,110	-	1,932,911	844	129	973	1,933,884
1,117	865	5,110	-	1,935,148	844	129	973	1,936,121
1,117	865	5,110	-	1,933,323	844	129	973	1,934,296
1,117	865	5,110	-	1,936,484	844	129	973	1,937,457
1,117	865	5,110	-	1,936,846	844	129	973	1,937,819
1,117	865	5,110	-	1,932,749	844	129	973	1,933,722
1,119	865	5,110	-	1,933,714	844	129	973	1,934,687
1,119	865	5,110	-	1,937,492	844	129	973	1,938,465
1,119	865	5,110	-	1,937,923	844	129	973	1,938,896
1,119	865	5,110	-	1,939,738	844	129	973	1,940,711
1,119	865	5,110	-	1,938,508	844	129	973	1,939,481
1,119	865	5,110	-	1,937,667	844	129	973	1,938,640
1,119	865	5,110	-	1,940,718	844	129	973	1,941,691
1,119	865	5,110	-	1,942,752	844	129	973	1,943,725
1,119	865	5,110	-	1,940,801	844	129	973	1,941,774
1,119	865	5,110	-	1,943,731	844	129	973	1,944,704

649,135	2,779	1,496	0	1,311	84,611	1,608,583	286,659	1,457
673,501	2,677	1,975	0	1,433	89,089	1,783,682	313,757	1,593
685,274	3,200	999	0	1,676	95,577	1,872,812	331,202	1,844
720,373	3,221	1,703	0	1,665	100,657	1,843,021	331,659	1,833
727,588	3,039	1,663	0	1,558	101,262	1,934,776	344,348	1,733
686,027	2,920	1,798	0	1,378	93,432	1,760,056	314,393	1,538
733,443	2,772	2,093	0	1,387	91,579	1,757,669	312,469	1,546
715,231	2,757	2,308	0	1,462	86,384	1,761,245	308,437	1,619
728,930	2,954	2,435	0	1,604	85,635	1,674,234	296,251	1,754
786,852	3,262	2,546	0	1,551	86,843	1,719,409	303,288	1,705
757,515	2,978	2,022	0	1,491	79,698	1,518,062	270,396	1,628
775,339	2,824	1,678	0	1,418	84,681	1,631,065	289,700	1,565
762,023	2,779	1,480	0	1,377	84,095	1,629,048	288,924	1,524
779,468	2,677	1,954	0	1,491	89,216	1,744,844	308,718	1,647
782,506	3,200	987	0	1,665	93,678	1,814,889	321,876	1,828
803,982	3,221	1,685	0	1,706	98,589	1,781,354	321,690	1,868
817,918	3,039	1,646	0	1,584	99,200	1,870,078	333,983	1,752
780,808	2,920	1,780	0	1,423	91,438	1,710,412	306,081	1,577
811,698	2,772	2,072	0	1,414	89,888	1,703,498	303,820	1,568
779,607	2,757	2,284	0	1,481	84,790	1,905,260	326,147	1,646
799,984	2,954	2,410	0	1,659	85,441	1,639,366	291,459	1,806
835,100	3,262	2,520	0	1,566	86,477	1,678,875	297,596	1,716
834,968	2,978	2,001	0	1,533	79,720	1,487,163	266,319	1,667
846,093	2,824	1,661	0	1,471	84,447	1,594,073	284,593	1,615
862,268	2,779	1,465	0	1,437	84,090	1,589,381	283,661	1,580
902,122	2,677	1,934	0	1,562	89,000	1,720,232	305,268	1,716
912,151	3,200	976	0	1,744	93,915	1,795,114	319,459	1,904
933,786	3,221	1,667	0	1,774	98,880	1,763,540	319,580	1,935
941,113	3,039	1,628	0	1,653	99,550	1,852,070	331,898	1,820
895,089	2,920	1,761	0	1,476	91,899	1,690,366	303,823	1,628
928,281	2,772	2,051	0	1,469	90,322	1,686,444	301,935	1,620
890,804	2,757	2,261	0	1,564	85,168	1,886,663	324,009	1,726
894,778	2,954	2,386	0	1,686	85,051	1,602,955	286,294	1,829
902,103	3,262	2,495	0	1,556	86,186	1,644,479	292,784	1,703
901,090	2,978	1,981	0	1,558	79,353	1,454,225	261,633	1,689
886,778	2,824	1,644	0	1,489	84,191	1,561,135	280,004	1,629
895,687	2,779	1,450	0	1,439	83,785	1,559,955	279,495	1,580
921,196	2,677	1,914	0	1,552	88,671	1,683,689	300,138	1,702
947,008	3,200	966	0	1,793	93,353	1,756,695	313,879	1,950
946,952	3,221	1,650	0	1,796	98,295	1,725,920	314,085	1,953
958,191	3,039	1,611	0	1,670	99,015	1,813,784	326,359	1,833
915,815	2,920	1,743	0	1,486	91,506	1,655,808	298,900	1,635
952,448	2,772	2,030	0	1,479	89,993	1,653,095	297,228	1,627
907,114	2,757	2,237	0	1,576	84,818	1,853,973	319,372	1,736
945,267	2,954	2,386	0	1,736	85,647	1,596,792	285,994	1,879
991,723	3,262	2,495	0	1,621	86,802	1,637,890	292,445	1,767
984,364	2,978	1,981	0	1,619	79,960	1,448,923	261,456	1,749
985,229	2,824	1,644	0	1,563	84,864	1,555,244	279,807	1,703
1,004,862	2,779	1,450	0	1,515	84,487	1,554,443	279,373	1,654
1,038,504	2,677	1,914	0	1,612	89,335	1,679,488	300,157	1,762
1,055,459	3,200	966	0	1,876	94,009	1,752,812	313,932	2,032
1,058,032	3,221	1,650	0	1,867	98,999	1,722,121	314,192	2,024
1,086,640	3,039	1,611	0	1,764	99,785	1,809,629	326,476	1,927
1,043,455	2,920	1,743	0	1,548	92,347	1,651,443	299,051	1,697

222,638	6,090	51,524	298,347	670,922	2,232	33,391	15,297	14,548	1,103	1,459
224,456	6,057	51,688	306,099	661,474	4,752	33,710	13,205	13,964	1,060	1,469
241,824	6,943	53,787	383,825	661,173	4,910	32,566	16,089	16,159	1,036	1,534
291,544	8,901	65,056	363,812	708,892	10,584	32,942	17,544	11,505	1,202	1,457
273,986	8,890	60,646	361,366	702,052	34,001	34,456	18,929	15,013	1,217	1,462
261,024	6,944	58,363	357,512	723,410	34,001	35,490	14,460	14,356	1,372	1,797
249,850	6,659	57,985	252,080	719,638	32,904	32,612	17,640	15,247	1,236	1,663
221,007	6,129	52,464	322,757	695,748	57,511	34,530	13,611	16,549	1,327	1,661
228,611	7,067	52,400	312,703	674,192	71,496	31,978	13,792	17,529	1,612	1,538
265,154	7,158	57,348	333,022	696,984	96,311	32,057	13,321	19,266	1,378	1,517
240,157	6,755	55,346	319,920	705,505	115,990	36,802	12,852	19,030	1,363	1,613
234,279	6,380	54,306	322,514	669,353	107,654	36,202	12,917	16,768	1,149	1,421
231,094	6,321	52,699	301,737	675,932	136,301	33,158	15,190	14,748	1,081	1,464
228,140	6,156	52,260	308,314	664,683	134,424	33,732	13,214	14,028	1,039	1,460
242,163	6,953	53,330	377,422	654,349	143,071	31,556	15,590	16,086	1,015	1,536
258,042	7,878	59,031	336,714	673,570	142,488	31,651	16,856	10,598	1,178	1,429
273,382	8,871	59,761	352,758	690,695	152,446	33,021	18,141	14,929	1,193	1,432
256,955	6,836	56,975	347,018	708,773	159,960	34,036	13,867	14,180	1,345	1,760
251,143	6,693	57,392	247,010	709,763	159,336	31,402	16,985	15,216	1,212	1,627
225,479	6,253	52,394	318,179	688,658	167,251	33,165	13,073	16,612	1,301	1,631
218,281	6,748	50,187	299,957	656,172	163,368	30,787	13,278	17,105	1,580	1,510
269,605	7,278	57,971	335,351	699,904	176,849	31,979	13,288	19,306	1,350	1,513
234,656	6,600	53,406	305,796	685,224	200,806	34,614	12,088	18,757	1,335	1,606
231,830	6,313	53,592	317,593	662,406	203,952	35,529	12,677	16,607	1,126	1,422
238,128	6,514	52,710	294,656	665,797	246,115	31,094	14,244	14,904	1,060	1,460
229,392	6,190	52,045	304,857	659,958	257,832	32,943	12,905	14,013	1,018	1,460
242,823	6,972	53,216	375,076	651,880	286,738	31,129	15,379	16,023	995	1,533
258,731	7,899	58,951	335,164	671,471	292,558	31,320	16,680	10,584	1,154	1,432
270,402	8,774	59,137	349,168	686,090	302,310	32,706	17,968	14,779	1,169	1,436
257,858	6,860	56,943	345,884	707,056	302,310	33,724	13,740	14,142	1,318	1,767
244,411	6,514	56,175	242,654	700,983	292,558	31,050	16,795	14,949	1,187	1,635
221,611	6,146	51,636	314,079	682,871	302,310	32,849	12,948	16,404	1,275	1,639
221,729	6,854	50,511	300,271	656,397	292,558	30,466	13,140	17,127	1,549	1,516
260,079	7,021	55,839	322,595	682,214	302,310	30,679	12,748	18,915	1,323	1,506
222,583	6,261	50,531	288,593	660,457	304,914	32,543	11,364	18,283	1,309	1,601
228,241	6,215	52,681	311,795	654,223	288,234	34,811	12,421	16,410	1,103	1,415
234,890	6,425	51,537	285,929	653,145	311,163	29,780	13,642	14,739	1,038	1,456
220,989	5,963	50,465	296,973	648,723	303,646	32,358	12,675	13,679	997	1,455
241,944	6,946	52,761	370,290	646,714	317,934	30,495	15,066	15,916	1,527	1,527
269,830	8,238	61,412	348,951	689,622	311,710	32,563	17,342	10,841	1,131	1,424
277,609	9,008	59,855	349,638	686,359	327,308	32,040	17,602	14,911	1,146	1,428
255,231	6,790	56,195	340,619	699,771	331,474	33,062	13,471	14,007	1,292	1,757
244,683	6,521	55,823	239,963	695,726	325,318	30,444	16,467	14,887	1,164	1,628
220,798	6,123	51,175	310,243	677,256	338,766	32,230	12,704	16,297	1,249	1,633
223,261	6,902	50,116	295,282	648,960	329,350	29,388	12,675	17,089	1,518	1,510
265,185	7,159	55,820	318,132	675,062	382,215	29,243	12,151	19,073	1,323	1,517
224,238	6,307	50,718	288,882	660,892	408,776	32,418	11,321	18,334	1,612	1,612
230,015	6,264	52,893	312,192	654,781	384,897	34,696	12,380	16,468	1,103	1,426
239,247	6,544	51,798	284,152	650,637	434,816	28,994	13,282	14,875	1,038	1,467
222,860	6,013	50,693	297,459	649,472	429,190	32,248	12,633	13,741	997	1,467
236,309	6,785	51,857	365,856	641,651	452,176	30,423	15,030	15,750	975	1,538
271,729	8,296	61,316	345,965	685,560	445,990	31,870	16,973	10,891	1,131	1,434
278,021	9,021	59,343	343,918	678,772	469,536	31,002	17,032	14,922	1,146	1,438
257,218	6,843	56,454	341,474	700,795	478,216	32,990	13,441	14,062	1,292	1,771

20,908	1,909	1,317	1,349	1,021	2	16	18	5,554	13	85
19,772	1,913	1,315	1,352	1,020	1	16	22	5,548	14	85
19,527	1,923	1,315	1,364	988	1	19	21	5,553	13	81
19,497	1,962	1,299	1,378	984	2	16	40	5,555	11	81
19,620	1,991	1,343	1,366	952	2	16	43	5,555	13	80
20,200	1,846	1,422	1,313	1,061	2	15	21	5,561	14	89
20,140	1,844	1,415	1,303	1,054	3	14	34	5,568	13	86
20,115	1,826	1,430	1,325	1,049	3	16	27	5,558	13	87
20,095	1,824	1,365	1,326	1,046	3	22	28	5,567	14	84
20,546	1,863	1,334	1,341	1,037	4	17	23	5,557	14	86
20,733	1,882	1,389	1,347	1,038	4	17	17	5,581	14	85
20,343	1,873	1,352	1,349	1,025	4	15	22	5,558	13	84
20,936	1,912	1,319	1,351	1,022	4	16	18	5,555	13	85
19,798	1,916	1,317	1,354	1,022	4	16	22	5,548	14	85
19,552	1,926	1,317	1,366	989	4	19	21	5,553	13	81
19,522	1,965	1,301	1,380	985	4	16	40	5,555	11	81
19,645	1,994	1,345	1,368	953	4	16	43	5,556	13	80
20,225	1,849	1,424	1,315	1,063	4	15	21	5,561	14	89
20,165	1,846	1,417	1,305	1,055	4	14	34	5,568	13	86
20,139	1,828	1,432	1,327	1,050	4	16	27	5,558	13	87
20,120	1,826	1,367	1,327	1,047	4	22	28	5,567	14	84
20,571	1,866	1,336	1,342	1,038	4	17	23	5,558	14	86
20,758	1,884	1,390	1,348	1,039	4	17	17	5,581	14	85
20,367	1,875	1,353	1,350	1,026	4	15	22	5,558	13	84
20,960	1,914	1,320	1,352	1,023	4	16	18	5,555	13	85
19,821	1,918	1,318	1,355	1,023	4	16	22	5,549	14	85
19,575	1,928	1,318	1,367	990	4	19	21	5,554	13	81
19,544	1,967	1,302	1,381	986	4	16	40	5,556	11	81
19,667	1,996	1,346	1,369	954	4	16	43	5,556	13	80
20,248	1,851	1,426	1,316	1,063	4	15	21	5,562	14	89
20,187	1,849	1,418	1,306	1,056	4	14	34	5,569	13	86
20,161	1,830	1,433	1,328	1,051	4	16	27	5,559	13	87
20,141	1,828	1,368	1,328	1,048	4	22	28	5,568	14	84
20,592	1,867	1,337	1,343	1,039	4	17	23	5,558	14	86
20,779	1,886	1,391	1,349	1,040	4	17	17	5,582	14	85
20,388	1,877	1,354	1,351	1,026	4	15	22	5,559	13	84
20,981	1,916	1,321	1,353	1,024	4	16	18	5,556	13	85
19,841	1,920	1,319	1,356	1,024	4	16	22	5,549	14	85
19,594	1,930	1,319	1,368	991	4	19	21	5,554	13	81
19,563	1,969	1,303	1,382	987	4	16	40	5,556	11	81
19,685	1,998	1,347	1,369	954	4	16	43	5,557	13	80
20,266	1,852	1,427	1,317	1,064	4	15	21	5,562	14	89
20,206	1,850	1,419	1,307	1,056	4	14	34	5,569	13	86
20,179	1,832	1,434	1,329	1,052	4	16	27	5,559	13	87
20,159	1,830	1,369	1,329	1,049	5	22	28	5,568	14	84
20,610	1,869	1,338	1,344	1,040	5	17	23	5,558	14	86
20,797	1,888	1,393	1,351	1,040	5	17	17	5,582	14	85
20,405	1,878	1,355	1,352	1,027	5	15	22	5,559	13	84
20,999	1,917	1,322	1,354	1,025	5	16	18	5,556	13	85
19,857	1,922	1,320	1,357	1,024	5	16	22	5,549	14	85
19,610	1,932	1,320	1,369	992	5	19	21	5,554	13	81
19,578	1,971	1,304	1,383	987	5	16	40	5,557	11	81
19,701	2,000	1,348	1,371	955	5	16	43	5,557	13	80
20,282	1,854	1,428	1,318	1,065	5	15	21	5,563	14	89

11,352	3,166	39,320	226,469	648,287	4,752,000	2,087,311	593,775	2,517	78,238	17,263	29,622
12,384	3,610	40,917	281,473	669,454	4,910,400	1,728,420	757,520	2,910	81,847	18,828	30,628
14,953	4,536	50,077	263,986	720,632	5,292,000	2,037,917	435,929	2,071	110,574	17,887	30,238
13,965	4,465	45,156	264,606	737,821	17,000,400	2,220,419	445,127	2,703	94,636	18,373	31,149
12,922	3,761	41,030	272,265	681,730	17,000,400	2,328,436	702,839	2,582	101,362	20,238	33,065
12,406	3,611	40,965	193,400	682,970	10,968,000	2,256,638	524,934	2,738	97,118	19,387	30,694
10,987	3,356	36,691	243,509	663,174	19,170,400	2,127,322	509,323	2,978	104,464	19,188	31,720
11,376	3,875	38,386	235,836	644,664	23,832,000	1,481,192	496,405	3,149	118,747	18,225	29,762
12,906	3,842	42,977	248,367	671,875	24,077,700	1,878,439	570,723	3,467	95,307	17,537	30,441
11,583	3,590	39,848	237,427	679,758	28,997,400	2,153,008	778,083	3,410	100,362	18,875	31,229
11,516	3,407	40,171	239,093	653,218	26,913,600	2,363,242	599,183	3,017	90,468	16,862	28,289
11,038	3,307	39,961	223,299	661,139	34,075,200	2,040,966	860,967	2,655	84,955	17,284	30,161
11,523	3,213	39,691	227,693	650,352	33,606,000	2,083,021	592,814	2,528	76,497	17,158	29,442
12,385	3,610	40,504	276,276	661,446	35,767,800	1,670,299	732,337	2,897	79,989	18,855	30,670
13,218	4,009	45,375	243,963	683,760	35,622,000	1,954,498	418,218	1,908	108,189	17,531	29,637
13,916	4,449	44,435	257,924	724,867	38,111,400	2,124,144	425,974	2,687	92,615	17,996	30,509
12,705	3,698	39,999	263,889	667,008	39,990,000	2,229,005	672,951	2,550	99,201	19,826	32,392
12,454	3,625	40,499	189,298	672,830	39,834,000	2,170,931	504,901	2,733	95,153	18,973	30,039
11,196	3,420	36,600	239,788	655,675	41,812,800	2,041,402	488,671	2,989	102,332	18,834	31,135
10,849	3,695	36,722	225,972	626,730	40,842,000	1,424,703	477,389	3,073	116,292	17,888	29,212
13,106	3,901	43,403	249,912	674,097	44,212,200	1,873,874	569,098	3,474	93,371	17,497	30,372
11,304	3,503	38,416	226,772	659,644	50,201,400	2,024,999	731,661	3,361	98,299	18,796	31,098
11,383	3,367	39,606	235,269	645,885	50,988,000	2,319,283	587,778	2,988	88,657	16,867	28,297
11,361	3,404	39,934	217,898	650,675	61,528,800	1,913,923	807,108	2,683	83,304	17,236	30,078
11,573	3,227	39,492	224,975	645,189	64,458,000	2,034,316	578,743	2,525	74,951	17,157	29,440
12,405	3,616	40,381	274,361	658,410	71,684,400	1,647,685	722,190	2,885	78,413	18,809	30,596
13,238	4,016	45,275	242,667	681,080	73,139,400	1,934,093	413,562	1,905	105,985	17,576	29,712
13,749	4,396	43,933	255,119	719,466	75,577,380	2,103,847	421,596	2,660	90,752	18,049	30,599
12,735	3,707	39,942	262,842	664,865	75,577,380	2,208,609	666,539	2,543	97,210	19,896	32,506
12,107	3,524	39,607	185,831	663,987	73,139,400	2,146,633	498,956	2,684	93,191	19,069	30,190
10,992	3,358	36,040	236,535	649,662	75,577,380	2,021,918	483,751	2,951	100,287	18,925	31,285
11,009	3,750	36,929	226,056	626,466	73,139,400	1,409,866	472,144	3,076	114,011	17,968	29,342
12,630	3,760	41,774	240,247	656,559	75,577,380	1,797,683	545,761	3,403	91,503	17,418	30,234
10,712	3,319	36,318	213,874	635,325	76,228,380	1,903,849	687,758	3,276	96,383	18,733	30,993
11,195	3,312	38,902	230,826	637,435	72,058,620	2,272,445	575,689	2,952	86,846	16,789	28,167
11,195	3,354	39,014	211,310	637,847	77,790,780	1,833,019	772,769	2,653	81,574	17,184	29,987
11,138	3,106	38,264	219,019	633,750	75,911,400	1,998,178	568,285	2,465	73,405	17,095	29,333
12,348	3,599	40,006	270,692	652,733	79,483,380	1,614,131	707,288	2,866	76,837	18,739	30,482
13,793	4,184	47,130	252,494	699,007	77,927,400	2,010,835	429,714	1,951	103,874	17,471	29,534
14,102	4,509	44,434	255,309	719,262	81,826,980	2,061,014	412,754	2,683	88,966	17,942	30,418
12,594	3,665	39,388	258,685	657,570	82,868,580	2,165,232	653,236	2,518	95,292	19,789	32,331
12,110	3,524	39,330	183,662	658,568	81,329,400	2,104,736	488,971	2,673	91,385	18,987	30,061
10,942	3,342	35,693	233,510	643,898	84,691,380	1,983,820	474,422	2,931	98,242	18,856	31,171
11,075	3,772	36,607	222,101	618,818	65,869,920	1,358,769	455,032	3,069	111,635	17,894	29,222
12,867	3,830	41,722	236,712	649,106	76,443,024	1,712,009	519,754	3,431	91,425	17,540	30,446
10,782	3,341	36,420	213,900	635,192	81,755,184	1,894,794	684,490	3,284	96,303	18,867	31,215
11,272	3,335	39,025	230,918	637,431	76,979,392	2,262,867	573,271	2,962	86,774	16,918	28,382
11,393	3,413	39,179	209,816	634,859	86,963,184	1,783,065	751,721	2,677	81,507	17,321	30,227
11,223	3,130	38,404	219,190	633,949	85,837,920	1,989,622	565,863	2,476	73,343	17,238	29,579
12,051	3,512	39,288	267,224	647,084	90,435,184	1,608,834	704,983	2,836	76,773	18,880	30,711
13,879	4,210	47,018	250,123	694,320	89,197,920	1,966,269	420,215	1,960	103,789	17,593	29,741
14,112	4,512	44,018	250,923	710,735	93,907,184	1,992,473	399,056	2,685	88,892	18,071	30,636
12,682	3,691	39,538	259,122	658,006	95,643,184	2,158,583	651,258	2,528	95,213	19,943	32,583
12,212	3,554	39,498	183,943	659,169	94,237,920	2,097,552	487,338	2,685	91,309	19,162	30,338

**Cycle MWh Forecast**

Month	MetrixND		Part III Att 016		Att 016 - MetrixND	
	Residential	Bundled	Residential	Bundled	Residential	Bundled
May-26	869,919	869,919	869,919	869,919	0	0
Jun-26	990,864	990,864	990,864	990,864	0	0
Jul-26	1,246,649	1,246,649	1,296,649	1,296,649	50,000	50,000
Aug-26	1,269,873	1,269,873	1,269,873	1,269,873	0	0
Sep-26	1,144,726	1,144,726	1,084,726	1,084,726	-60,000	-60,000
Oct-26	940,877	940,877	900,877	900,877	-40,000	-40,000
Nov-26	934,719	934,719	874,719	874,719	-60,000	-60,000
Dec-26	1,072,507	1,072,507	1,062,507	1,062,507	-10,000	-10,000
Jan-27	1,203,524	1,203,524	1,193,524	1,193,524	-10,000	-10,000
Feb-27	1,124,095	1,124,095	1,124,095	1,124,095	0	0
Mar-27	1,074,425	1,074,425	1,079,425	1,079,425	5,000	5,000
Apr-27	948,231	948,231	938,231	938,231	-10,000	-10,000
<b>Total</b>	<b>12,820,409</b>	<b>12,820,409</b>	<b>12,685,409</b>	<b>12,685,409</b>	<b>-135,000</b>	<b>-135,000</b>

Month	MetrixND		Part III Att 016		Att 016 - MetrixND	
	Commercial	Choice	Commercial	Choice	Commercial	Choice
May-26	859,844	68,863	900,908	70,976	41,064	2,113
Jun-26	936,505	73,235	980,342	75,298	43,837	2,063
Jul-26	1,035,566	76,833	1,013,134	79,064	-22,432	2,231
Aug-26	1,041,024	81,062	1,086,762	83,209	45,738	2,147
Sep-26	997,986	81,606	1,028,128	83,725	30,142	2,119
Oct-26	897,682	75,029	945,015	77,174	47,333	2,145
Nov-26	871,424	73,625	913,022	75,866	41,598	2,241
Dec-26	886,713	69,667	889,563	71,562	2,850	1,895
Jan-27	908,065	70,080	1,082,116	72,112	174,051	2,032
Feb-27	897,639	70,837	934,151	72,986	36,512	2,149
Mar-27	899,518	65,358	921,300	67,284	21,782	1,926
Apr-27	859,984	69,172	931,974	71,274	71,990	2,102
<b>Total</b>	<b>11,091,950</b>	<b>875,367</b>	<b>11,626,415</b>	<b>900,530</b>	<b>534,465</b>	<b>25,163</b>

**Cycle MWh Forecast**

Month	MetrixND		Part III Att 016		Att 016 - MetrixND	
	Bundled	Choice	Bundled	Choice	Bundled	Choice
May-26	723,626	197,260	851,157	210,147	127,531	12,887
Jun-26	737,126	212,148	870,643	225,085	133,517	12,937
Jul-26	744,731	221,352	874,036	234,121	129,305	12,769
Aug-26	756,995	216,942	898,024	229,795	141,029	12,853
Sep-26	764,570	228,359	913,590	241,240	149,020	12,881
Oct-26	721,034	207,788	872,139	220,643	151,105	12,855
Nov-26	747,053	206,992	906,643	219,751	159,590	12,759
Dec-26	716,428	207,674	870,798	245,779	154,370	38,105
Jan-27	692,053	198,510	893,558	211,478	201,505	12,968
Feb-27	724,732	203,724	932,782	216,575	208,050	12,851
Mar-27	706,495	178,770	932,634	191,844	226,139	13,074
Apr-27	726,944	192,737	945,061	205,635	218,117	12,898
<b>Total</b>	<b>8,761,787</b>	<b>2,472,256</b>	<b>10,761,062</b>	<b>2,652,093</b>	<b>1,999,275</b>	<b>179,837</b>

**Question:**

2. Within the "Forecast" Transformation Table, please explain the 0.9 and 0.1 weightings applied to the usage per customer models within the "ResDelCyc\_XEE" forecasting model.

**Response:**

The weightings are applied to the separate residential usage models to increase flexibility in modeling. The second model (ResDelCycUse\_XEE2) was created to put more weight on the previous twelve months, where the original model (ResDelCycUse\_XEE) uses the full history with the regression modeling. For this current forecasting model, less weight is added to the 12-month lag model (10%) and the majority to the original model (90%).

**Witness:** Eugène M. Breuring

**Date:** July 25, 2025

**Question:**

3. Within the "Forecast" Transformation Table, please explain the 0.4 and 0.6 weightings applied to the individual models that make up the "ComDelCyc\_XEE" forecasting model.

**Response:**

As in the answer to ST-CE-0085, the commercial projections utilize two separate models ("ComDelCycUse\_XEE" and "ComDelCyc\_XEE"). The transformation tables provide weights to each model to increase flexibility in modeling.

**Witness:** Eugène M. Breuring

**Date:** July 25, 2025

## Company Commercial Deliveries Forecast Model Statistic Comparison

Model	kWh Use-Per-Customer Model	Aggregate MWh Model
	ComDelCycUse_XEE	ComDelCyc_XEE
Iters	15	1
Adj Obs	125	126
Coefs	11	8
Err DF	114	118
Y Mean	5212.44	1152116.53
Y Var	179288.654	9640104382
Y Std Dev	423.425	98184.033
TSS	22231793.14	1.20501E+12
R-Sq	0.914	0.887
Adj R-Sq	0.907	0.88
AIC	9.81	20.929
BIC	10.059	21.109
F Stat	110.322	115.623
F-Stat Prob	0	0
Log-L	-779.48	-1489.32
MSS	20322689.39	1.06868E+12
SSE	1909103.74	1.36331E+11
MSE	16746.524	1155348392
Std Err	129.408	33990.416
MAD	96.44	26500.428
MAPE	1.87%	2.31%
DW Stat	2.094	1.116
DurbinH	0	0
Ljung-Box	46.23	199.37
LB Prob	0.0041	0
Skew	-0.172	-0.158
Kurt	3.284	2.986
JB	1.039	0.523
Prob. JB	0.5949	0.7698
F Obs	0	0
FMAD	0	0
FMAPE	0.00%	0.00%
F Avg Err	0	0
F Avg % Err	0.00%	0.00%
FRMSE	0	0
Theils IC	0	0
T Bias	0.00%	0.00%
T Var	0.00%	0.00%
T Covar	0.00%	0.00%

Actual	Weather Normal	Actual	W
-8,363	-26,804	32,597	
6,611	5,358	37,216	
45,756	18,162	97,236	
71,036	20,367	126,841	
-9,456	-20,859	46,765	
9,116	12,236	43,643	
41,544	40,917	81,369	
77,574	70,154	108,951	
26,869	28,570	60,052	

ComDelCycUse_XEE		ComDelCyc_XEE	
Actual	Weather Normal	Actual	W
69,942,670	718,442,086	1,062,555,056	
43,707,028	28,710,629	1,385,011,237	1
2,093,635,751	329,842,262	9,454,893,099	4
5,046,089,144	414,801,247	16,088,525,124	5
89,421,191	435,087,034	2,186,927,076	1
83,108,818	149,715,781	1,904,752,805	2
1,725,912,245	1,674,239,351	6,620,837,674	6
6,017,795,293	4,921,620,196	11,870,239,777	1
721,928,114	816,228,901	3,606,239,101	3

ComDelCycUse_XEE		ComDelCyc_XEE	
Actual	Weather Normal	Actual	W
8,363	26,804	32,597	
6,611	5,358	37,216	
45,756	18,162	97,236	
71,036	20,367	126,841	
9,456	20,859	46,765	
9,116	12,236	43,643	
41,544	40,917	81,369	
77,574	70,154	108,951	
26,869	28,570	60,052	

ComDelCycUse_XEE		ComDelCyc_XEE	
Actual	Weather Normal	Actual	W
0.7%	2.3%	2.8%	
0.6%	0.5%	3.2%	
3.9%	1.6%	8.2%	
6.5%	1.9%	11.6%	
0.9%	2.1%	4.7%	
0.9%	1.2%	4.3%	
4.0%	3.9%	7.8%	
7.3%	6.6%	10.3%	
2.6%	2.8%	5.9%	

ComDelCycUse_XEE	ComDelCycUse_XEE	ComDelCyc_XEE	Co
Actual	Weather Normal	Actual	W
1,765,726,695	1,054,298,610	6,019,997,883	4
42,021	32,470	77,589	
32,925	27,047	70,519	
3.0%	2.6%	6.5%	

Value	Model
1,054,298,610	ComDelCycUse_XEE

**Question:**

1. Please explain why the commercial and industrial customer count data and corresponding forecasts found within MetrixND do not include the Retail Open Access (choice) customers that are shown in Part III, Attachments 014 and 016.

**Response:**

Only bundled (full service) customers are modeled using regression modeling. Retail Open Access (choice) customers, due to the static nature of its count trends, are modeled using the most recent actual count at the time of modeling.

**Witness:** Eugène M. Breuring

**Date:** July 25, 2025

**Model Coefficients for ComCycUPC\_XEE\_Staff (Staff Commercial Use Per Customer Model)**

Variable	Coefficient	StdErr	T-Stat	P-Value	Units	Definition
CONST	773.293	540.729	1.43	15.54%		Constant term
Degree_Days.CycHDD60_15	0.338	0.051	6.635	0.00%		RES,COM
Degree_Days.CycCDD60_15	3.468	0.126	27.51	0.00%		RES,COM,IND
Variables.Nov2016	-354.64	118.633	-2.989	0.34%		
Variables.May2020	-311.722	122.695	-2.541	1.24%		
Variables.ComUseCalibration	1.52	0.287	5.303	0.00%		
Variables.CycBillDays	67.264	8.911	7.548	0.00%		
External_Adjustments.COVID19	-495.632	70.828	-6.998	0.00%		
Economic_Indicators.NONMFGEMP	1.175	0.28	4.188	0.01%		
AR(1)	0.119	0.098	1.219	22.54%		

Line No.	Model	(a) ComCycUPC_XEE_Staff	(b) ComDelCycUse_XEE	(c) ComDelCyc_XEE
1	Iters	16	15	1
2	Adj Obs	125	125	126
3	Coefs	9	11	8
4	Err DF	115	114	118
5	Y Mean	5192.44	5212.44	1152116.53
6	Y Var	178020.62	179288.654	9640104382
7	Y Std Dev	421.925	423.425	98184.033
8	TSS	22074556.86	22231793.14	1.20501E+12
9	R-Sq	0.928	0.914	0.887
10	Adj R-Sq	0.923	0.907	0.88
11	AIC	9.607	9.81	20.929
12	BIC	9.833	10.059	21.109
13	F Stat	165.334	110.322	115.623
14	F-Stat Prob	0	0	0
15	Log-L	-767.8	-779.48	-1489.32
16	MSS	20490923.97	20322689.39	1.06868E+12
17	SSE	1583632.89	1909103.74	1.36331E+11
18	MSE	13770.721	16746.524	1155348392
19	Std Err	117.349	129.408	33990.416
20	MAD	82.849	96.44	26500.428
21	MAPE	1.61%	1.87%	2.31%
22	DW Stat	1.989	2.094	1.116
23	DurbinH	1.171	0	0
24	Ljung-Box	34.72	46.23	199.37
25	LB Prob	0.0727	0.0041	0
26	Skew	-0.574	-0.172	-0.158
27	Kurt	5.078	3.284	2.986
28	JB	29.358	1.039	0.523
29	Prob. JB	0	0.5949	0.7698
30	F Obs	0	0	0
31	FMAD	0	0	0
32	FMAPE	0.00%	0.00%	0.00%
33	F Avg Err	0	0	0
34	F Avg % Err	0.00%	0.00%	0.00%
35	FRMSE	0	0	0
36	Theils IC	0	0	0
37	T Bias	0.00%	0.00%	0.00%
38	T Var	0.00%	0.00%	0.00%
39	T Covar	0.00%	0.00%	0.00%

	Company Forecast		Staff Forecast1		
$r(e) = y_t - \hat{y}_t$	Actual	Weather Normal	Actual	Weather Normal	
Jul-24	38,942	7,494	31,890	441	
Aug-24	44,420	36,001	39,711	31,293	
Sep-24	54,266	12,755	51,863	10,352	
Oct-24	70,911	25,390	71,142	25,621	
Nov-24	-62,517	-43,090	-67,685	-48,258	
Dec-24	-37,349	-7,432	-45,124	-15,207	
Jan-25	6,787	-45,896	-821	-53,504	
Feb-25	75,850	-928	75,132	-1,646	
Mar-25	-5,938	1,542	-16,528	-9,049	

	Company Forecast		Staff Forecast1		
ed error (e) <sup>2</sup>	Actual	Weather Normal	Actual	Weather Normal	
Jul-24	1,516,500,329	56,158,088	1,016,951,638	194,728	10
Aug-24	1,973,101,808	1,296,063,361	1,576,996,134	979,231,822	7
Sep-24	2,944,808,298	162,695,382	2,689,805,820	107,173,428	5
Oct-24	5,028,435,159	644,638,897	5,061,245,346	656,420,781	4
Nov-24	3,908,363,288	1,856,712,766	4,581,312,563	2,328,842,285	:
Dec-24	1,394,972,870	55,234,475	2,036,199,346	231,250,416	1
Jan-25	46,064,726	2,106,416,196	674,846	2,862,710,118	5
Feb-25	5,753,246,772	860,664	5,644,788,874	2,709,546	6
Mar-25	35,256,519	2,376,993	273,185,031	81,881,505	7

	Company Forecast		Staff Forecast1		
ute error  e	Actual	Weather Normal	Actual	Weather Normal	
Jul-24	38,942	7,494	31,890	441	
Aug-24	44,420	36,001	39,711	31,293	
Sep-24	54,266	12,755	51,863	10,352	
Oct-24	70,911	25,390	71,142	25,621	
Nov-24	62,517	43,090	67,685	48,258	
Dec-24	37,349	7,432	45,124	15,207	
Jan-25	6,787	45,896	821	53,504	
Feb-25	75,850	928	75,132	1,646	
Mar-25	5,938	1,542	16,528	9,049	

	Company Forecast		Staff Forecast1		
e  / y <sub>t</sub> * 100	Actual	Weather Normal	Actual	Weather Normal	
Jul-24	3.1%	0.6%	2.5%	0.0%	
Aug-24	3.5%	2.8%	3.1%	2.4%	
Sep-24	4.6%	1.1%	4.4%	0.9%	
Oct-24	7.2%	2.7%	7.2%	2.7%	
Nov-24	7.3%	4.9%	7.9%	5.5%	
Dec-24	3.7%	0.7%	4.4%	1.4%	
Jan-25	0.6%	4.0%	0.1%	4.7%	
Feb-25	6.5%	0.1%	6.4%	0.2%	
Mar-25	0.6%	0.1%	1.6%	0.9%	

	Company Forecast	Company Forecast	Staff Forecast1	Staff Forecast1	St
quared error	2,511,194,419	686,795,203	2,542,351,067	805,601,626	5
quared error	50,112	26,207	50,422	28,383	
bsolute error	44,109	20,058	44,433	21,708	
centage error	4.1%	1.9%	4.2%	2.1%	

	Actual		Weather Normal	
Minimum	Value	Model	Value	Model
quared error	2,511,194,419	Company Forecast	686,795,203	Company Forecast
quared error	50,112	Company Forecast	26,207	Company Forecast
bsolute error	44,109	Company Forecast	20,058	Company Forecast
centage error	4.1%	Company Forecast	1.9%	Company Forecast

	Company Forecast		Staff Forecast
error (e) = $y_t - \hat{y}_t$	Actual	Weather Normal	Actual
Jul-24	8,742	-8,785	-5,475
Aug-24	16,150	13,906	4,614
Sep-24	66,137	40,694	40,801
Oct-24	92,850	43,252	64,505
Nov-24	19,576	14,005	-7,909
Dec-24	26,653	30,881	12,521
Jan-25	60,435	59,766	42,521
Feb-25	88,776	80,978	72,873
Mar-25	41,266	43,069	27,135

	Company Forecast		Staff Forecast
squared error (e) <sup>2</sup>	Actual	Weather Normal	Actual
Jul-24	76,415,020	77,172,008	29,978,488
Aug-24	260,808,195	193,374,333	21,287,308
Sep-24	4,374,143,854	1,655,993,497	1,664,755,107
Oct-24	8,621,059,362	1,870,744,154	4,160,862,773
Nov-24	383,200,205	196,138,905	62,549,274
Dec-24	710,371,844	953,615,162	156,770,979
Jan-25	3,652,360,216	3,572,018,983	1,808,049,898
Feb-25	7,881,206,584	6,557,387,897	5,310,535,342
Mar-25	1,702,855,521	1,854,973,216	736,288,145

	Company Forecast		Staff Forecast
absolute error  e	Actual	Weather Normal	Actual
Jul-24	8,742	8,785	5,475
Aug-24	16,150	13,906	4,614
Sep-24	66,137	40,694	40,801
Oct-24	92,850	43,252	64,505
Nov-24	19,576	14,005	7,909
Dec-24	26,653	30,881	12,521
Jan-25	60,435	59,766	42,521
Feb-25	88,776	80,978	72,873
Mar-25	41,266	43,069	27,135

	Company Forecast		Staff Forecast
percentage error ( e  / $y_t$ ) * 100	Actual	Weather Normal	Actual
Jul-24	0.8%	0.8%	0.5%
Aug-24	1.5%	1.3%	0.4%
Sep-24	6.1%	3.8%	3.7%
Oct-24	9.2%	4.5%	6.4%
Nov-24	2.1%	1.5%	0.9%
Dec-24	2.8%	3.3%	1.3%
Jan-25	6.2%	6.1%	4.4%
Feb-25	9.0%	8.3%	7.4%
Mar-25	4.3%	4.5%	2.9%

	Company Forecast	Company Forecast	Staff Forecast
mean squared error	3,073,602,311	1,881,268,684	1,550,119,702
root mean squared error	55,440	43,374	39,372
mean absolute error	46,731	37,260	30,928
mean absolute percentage error	4.7%	3.8%	3.1%

	Actual		Weather Normal
Minimum	Value	Model	Value
mean squared error	1,550,119,702	Staff Forecast	919,869,864
root mean squared error	39,372	Staff Forecast	30,329
mean absolute error	30,928	Staff Forecast	24,637
mean absolute percentage error	3.1%	Staff Forecast	2.5%

Dec-24	75,016	73,907	7
Jan-25	75,504	75,546	7
Feb-25	78,307	78,685	7
Mar-25	71,586	71,483	6

	Company Forecast		Staff Forecast
error (e) = $y_t - \hat{y}_t$	Actual	Weather Normal	Actual
Jul-24	7,471	6,557	6,416
Aug-24	8,824	9,815	7,926
Sep-24	10,507	8,356	8,435
Oct-24	11,669	10,597	9,300
Nov-24	4,701	-1,131	2,379
Dec-24	3,180	2,071	2,070
Jan-25	5,004	5,046	3,621
Feb-25	7,624	8,002	6,369
Mar-25	5,513	5,410	4,486

	Company Forecast		Staff Forecast
squared error (e) <sup>2</sup>	Actual	Weather Normal	Actual
Jul-24	55,819,995	42,994,380	41,168,623
Aug-24	77,869,012	96,335,992	62,826,898
Sep-24	110,396,292	69,817,221	71,148,618
Oct-24	136,165,561	112,304,887	86,490,000
Nov-24	22,096,975	1,279,568	5,658,414
Dec-24	10,111,395	4,290,781	4,284,246
Jan-25	25,040,016	25,459,694	13,111,641
Feb-25	58,125,376	64,036,325	40,564,161
Mar-25	30,393,169	29,271,021	20,124,196

	Company Forecast		Staff Forecast
absolute error  e	Actual	Weather Normal	Actual
Jul-24	7,471	6,557	6,416
Aug-24	8,824	9,815	7,926
Sep-24	10,507	8,356	8,435
Oct-24	11,669	10,597	9,300
Nov-24	4,701	1,131	2,379
Dec-24	3,180	2,071	2,070
Jan-25	5,004	5,046	3,621
Feb-25	7,624	8,002	6,369
Mar-25	5,513	5,410	4,486

	Company Forecast		Staff Forecast
absolute percentage error ( e  / $y_t$ ) * 100	Actual	Weather Normal	Actual
Jul-24	8.6%	7.6%	7.4%
Aug-24	9.6%	10.5%	8.6%
Sep-24	11.1%	9.1%	8.9%
Oct-24	13.2%	12.2%	10.5%
Nov-24	5.8%	1.5%	3.0%
Dec-24	4.2%	2.8%	2.8%
Jan-25	6.6%	6.7%	4.8%
Feb-25	9.7%	10.2%	8.1%
Mar-25	7.7%	7.6%	6.3%

	Company Forecast	Company Forecast	Staff Forecast
mean squared error	58,446,421	49,532,208	38,375,200
root mean squared error	7,645	7,038	6,195
mean absolute error	7,166	6,332	5,667
mean absolute percentage error	8.5%	7.6%	6.7%

	Actual		Weather Normal
Minimum	Value	Model	Value
mean squared error	38,375,200	Staff Forecast	34,220,109

683,986      683,891      723,864      683,594      683,593

Company Forecast		Staff Forecast1		Staff Forecast2	
Actual	Weather Normal	Actual	Weather Normal	Actual	Weather Normal
-60,863	-62,522	7,935	6,277	18,913	17,255
-9,456	-8,355	61,424	62,525	74,787	75,888
3,399	3,862	78,245	78,708	94,548	95,011
-31,541	-36,427	30,784	25,897	29,812	24,926
-31,615	-33,960	39,966	37,621	36,145	33,800
-6,858	-7,615	72,986	72,229	51,906	51,148
-40,542	-40,537	42,262	42,267	14,940	14,945
-43,030	-43,030	35,217	35,217	19,376	19,376
-39,878	-39,973	18,292	18,197	393	298

Company Forecast		Staff Forecast1		Staff Forecast2	
Actual	Weather Normal	Actual	Weather Normal	Actual	Weather Normal
3,704,362,324	3,908,964,596	62,967,830	39,400,566	357,700,706	297,725,949
89,416,077	69,807,312	3,772,926,513	3,909,386,004	5,593,122,669	5,759,005,695
11,555,657	14,917,439	6,122,250,496	6,194,911,484	8,939,294,295	9,027,050,216
994,811,341	1,326,959,114	947,668,201	670,675,327	888,784,560	621,289,025
999,524,660	1,153,304,014	1,597,268,373	1,415,322,335	1,306,438,621	1,142,414,312
47,028,593	57,990,586	5,326,963,552	5,216,975,714	2,694,223,534	2,616,168,541
1,643,652,953	1,643,254,044	1,786,061,430	1,786,477,310	223,202,405	223,349,438
1,851,586,064	1,851,574,015	1,240,261,741	1,240,271,602	375,415,425	375,420,851
1,590,249,301	1,597,824,740	334,608,971	331,147,187	154,465	88,893

Company Forecast		Staff Forecast1		Staff Forecast2	
Actual	Weather Normal	Actual	Weather Normal	Actual	Weather Normal
60,863	62,522	7,935	6,277	18,913	17,255
9,456	8,355	61,424	62,525	74,787	75,888
3,399	3,862	78,245	78,708	94,548	95,011
31,541	36,427	30,784	25,897	29,812	24,926
31,615	33,960	39,966	37,621	36,145	33,800
6,858	7,615	72,986	72,229	51,906	51,148
40,542	40,537	42,262	42,267	14,940	14,945
43,030	43,030	35,217	35,217	19,376	19,376
39,878	39,973	18,292	18,197	393	298

Company Forecast		Staff Forecast1		Staff Forecast2	
Actual	Weather Normal	Actual	Weather Normal	Actual	Weather Normal
9.2%	9.4%	1.2%	0.9%	2.6%	2.6%
1.3%	1.1%	8.3%	8.4%	9.9%	11.1%
0.4%	0.5%	10.2%	10.3%	12.4%	13.9%
4.7%	5.4%	4.6%	3.9%	4.2%	3.9%
4.5%	4.8%	5.6%	5.3%	4.9%	5.0%
1.0%	1.1%	10.2%	10.1%	7.2%	8.0%
6.0%	6.0%	6.3%	6.3%	2.1%	2.4%
6.2%	6.2%	5.1%	5.1%	2.6%	2.9%
5.8%	5.8%	2.7%	2.7%	0.1%	0.0%

Mar-25	186,753	186,756	185,847	268,243	275,533
<b>Company Forecast</b>					
$\hat{Y}_t - \hat{Y}_t$	Actual	Weather Normal	Actual	Weather Normal	Actual
Jul-24	367	35	-80,481	-80,813	-75,157
Aug-24	9,984	10,322	-78,955	-78,617	-72,656
Sep-24	-1,514	-1,397	-93,680	-93,563	-85,698
Oct-24	-3,417	-3,762	-74,622	-74,967	-75,073
Nov-24	9,103	9,035	-71,353	-71,421	-73,090
Dec-24	-13,448	-13,481	-94,420	-94,453	-104,568
Jan-25	3,528	3,528	-95,903	-95,903	-109,300
Feb-25	1,328	1,328	-101,852	-101,852	-109,436
Mar-25	906	909	-81,490	-81,487	-88,784
<b>Company Forecast</b>					
$\text{error } (e)^2$	Actual	Weather Normal	Actual	Weather Normal	Actual
Jul-24	134,916	1,212	6,477,141,624	6,530,771,678	5,648,528,162
Aug-24	99,682,213	106,545,955	6,233,876,550	6,180,615,393	5,278,880,000
Sep-24	2,293,050	1,952,727	8,775,995,236	8,754,109,820	7,344,195,500
Oct-24	11,675,889	14,155,202	5,568,442,884	5,620,102,067	5,635,955,300
Nov-24	82,865,993	81,624,178	5,091,239,763	5,101,014,950	5,342,136,500
Dec-24	180,835,337	181,723,880	8,915,042,547	8,921,274,756	10,934,362,000
Jan-25	12,446,784	12,445,655	9,197,385,409	9,197,416,098	11,946,490,000
Feb-25	1,763,584	1,763,372	10,373,829,904	10,373,846,200	11,976,238,000
Mar-25	820,836	825,790	6,640,620,100	6,640,175,172	7,882,598,000
<b>Company Forecast</b>					
$\text{error }  e $	Actual	Weather Normal	Actual	Weather Normal	Actual
Jul-24	367	35	80,481	80,813	75,157
Aug-24	9,984	10,322	78,955	78,617	72,656
Sep-24	1,514	1,397	93,680	93,563	85,698
Oct-24	3,417	3,762	74,622	74,967	75,073
Nov-24	9,103	9,035	71,353	71,421	73,090
Dec-24	13,448	13,481	94,420	94,453	104,568
Jan-25	3,528	3,528	95,903	95,903	109,300
Feb-25	1,328	1,328	101,852	101,852	109,436
Mar-25	906	909	81,490	81,487	88,784
<b>Company Forecast</b>					
$(\text{error }  e ) * 100$	Actual	Weather Normal	Actual	Weather Normal	Actual
Jul-24	0.2%	0.0%	34.3%	34.5%	32.1%
Aug-24	4.2%	4.3%	33.1%	32.9%	31.8%
Sep-24	0.6%	0.6%	39.2%	39.1%	35.6%
Oct-24	1.5%	1.7%	33.8%	34.0%	33.5%
Nov-24	4.0%	3.9%	31.0%	31.1%	33.1%
Dec-24	6.4%	6.4%	44.8%	44.8%	46.6%
Jan-25	1.7%	1.7%	45.9%	45.9%	53.2%
Feb-25	0.6%	0.6%	48.4%	48.4%	52.3%
Mar-25	0.5%	0.5%	43.6%	43.6%	47.8%

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**Question:**

4. Please explain why there is a difference in the outputs contained within the “Forecast” and “Fcst Reports” Transformation table and Part III, Attachment 016.

**Response:**

The regression modeling deliveries output (as shown in the transformation tables “Forecast” and “Fcst Reports”) is the starting point of the final deliveries. The final cycle-billed deliveries are adjusted for unbilled sales (when looking at calendar deliveries in Part III), as well as adjustments to the overall model outputs when looking at overall monthly, quarterly, and annual reasonableness.

**Witness:** Eugène M. Breuring

**Date:** July 25, 2025

U21870-ST-CE-0196 (Partial)

Page 1 of 1

**Question:**

1. In Case No. U-21305, the Commission adopted Liberty’s findings and recommendations in regard to its audit of Consumers Energy.
  - a. On page 22 of Witness Kelly’s testimony, and expanded upon in further testimony, the Company evaluated 7- and 10-year “glidepaths” for SAIDI performance in addition to the 5-year presented in their 2023 distribution plan. Please confirm that these glidepaths have not meaningfully changed the Company’s intended pace of investment in its Reliability Roadmap plan.
  - b. On page 56 of Witness Partlan’s testimony, the open-wire secondary work benefits cite “improve[ing] safety by reducing the occurrence of difficult-to-repair wire downs”. Please explain how open-wire secondary lines are contributing to wire down events in comparison to non-open-wire secondary circuit wire downs or refer to where such information is provided in U-21870 or U-21585.

**Response:**

- a. To date, these alternative 7-year and 10-year glidepaths have not directly altered the Company’s intended pace of investment in the Reliability Roadmap. As stated on page 22, lines 16 through 18, of my direct testimony, the Company agreed to illustrate what these alternative glidepaths would look like as a supplement to the existing 5-year glidepath. This comparison is illustrated and discussed in more detail on pages 40 and 41 of my direct testimony, including in Figure 19. As discussed on those pages, the Company explored these slower glidepaths, but concluded that they would create unacceptable outcomes, because they would completely eliminate installation of ATR loops and zonal health investments, two of the most beneficial reliability and resiliency strategies employed by the Company, leaving the Company with a less diverse portfolio of reliability investments.

Because the Company is not actually pursuing the 7-year or 10-year glidepaths, capital spending has not been altered by them. Please refer to my direct testimony on Page 40, line 14 through Page 41, line 2 where the respective annual reductions to capital of \$35 million and \$50 million for the 7- and 10-year glidepaths are outlined. These reductions would amount to a 2.3% and a 3.3% reduction to the projected capital expenditures of \$1,529,914 for test year ending 4/30/2027 as shown in Exhibit No. A-113 (MPK-3), Page 1, Line 55, Column (I).

**Witness:** Michael P. Kelly

**Date:** August 7, 2025

U21870-ST-CE-0196 (Partial)

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**Question:**

1. In Case No. U-21305, the Commission adopted Liberty’s findings and recommendations in regard to its audit of Consumers Energy.
  - a. On page 22 of Witness Kelly’s testimony, and expanded upon in further testimony, the Company evaluated 7- and 10-year “glidepaths” for SAIDI performance in addition to the 5-year presented in their 2023 distribution plan. Please confirm that these glidepaths have not meaningfully changed the Company’s intended pace of investment in its Reliability Roadmap plan.
  - b. On page 56 of Witness Partlan’s testimony, the open-wire secondary work benefits cite “improve[ing] safety by reducing the occurrence of difficult-to-repair wire downs”. Please explain how open-wire secondary lines are contributing to wire down events in comparison to non-open-wire secondary circuit wire downs or refer to where such information is provided in U-21870 or U-21585.

**Response:**

In addition to page 54, line 20, through page 57, line 5, of my direct testimony, the issues related to open wire secondary are also discussed in detail in the Reliability Roadmap (see Exhibit A-129 (MPK-19), pages 60 through 63). The important factor with open wire secondary wire downs is that they are difficult and time consuming to repair for several reasons. For example, they are more frequently located in back lots, and breaks often occur mid-span, requiring difficult splicing to fix. Because the Company switched from installing open wire secondary to multiplex secondary in 1965, the remaining open wire secondary is now aged, brittle wire. This results in the more frequent breaks and mid-span breaks, whereas multiplex will typically flex and not break. Where multiplex does break, it typically occurs at the pole, resulting in an easier fix.

In addition to the more difficult nature of repairing open wire secondary, the Company also experiences 6% more wire downs per mile on open wire secondary when compared to Multiplex secondary.

**Witness:** Jennifer M Partlan

**Date:** August 7, 2025

U21870-ST-CE-197

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**Question:**

2. Please provide or refer to locations of data used to create Figures 6, 7, 10, 11, and 20 in Witness Kelly's testimony.

- a. In Figure 6, please explain the calculation of the standard deviation.
- b. Where possible, please provide error margins on projections in these figures.

**Response:**

- a. In Figure 6, the standard deviation is that of the 5 years of data including the reporting year. For example, the standard deviation for 2020 is calculated based upon the Company's reliability performance for 2016-2020.
- b. Error margins cannot be produced with confidence for the figures because the sample sizes are under 30:

- Figure 6 leverages data from 2010-2024 or 15 samples.
- Figure 7 is based on data from the Michigan Public Service Commission site for Distribution System Reliability Metrics which conveys Michigan utility reliability results and quartile performance from 2013-2023 or a sample size of 11. Additionally, error margins are not provided for quartile performance on the site:

<https://www.michigan.gov/mpsc/consumer/electricity/distribution-system-reliability-metrics>.

- Figure 10 leverages a sample size of 10 for the variances of the SAIDI glidepath to actual for the projections included in U-20697, U-20963, U-21224, and U-21389.
- Figure 11 leverages a sample size of 15 for the variances included in Figure 10 plus the variance in the SAIDI glidepath from U-21585.
- Figure 20 does not convey standard deviations. The Company began to include a forecast for All-weather SAIDI in the instant case and cannot test model accuracy. SAIDI excluding MEDs is discussed as part of Figure 10. Model Accuracy on CEMI-4 has not been historically tracked so no sample set exists.

**Witness:** Michael P. Kelly

**Date:** August 7, 2025

U21870-ST-CE-0304

Page 1 of 1

**Question:**

2. Refer to page 17, lines 18-19 of Company witness Partlan's testimony. Please confirm that a security assessment is the same as a visual line inspection and explain the equipment and resources to perform each.

**Response:**

Yes, security assessments are the same as visual line inspections in this context. No equipment is used for these inspections other than binoculars for inspecting inaccessible poles, or poles in locked, fenced-in areas with animals.

**Witness:** Jennifer M Partlan

**Date:** August 27, 2025

U21870-ST-CE-0306

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**Question:**

4. Refer to page 20, lines 2-5 of Company witness Partlan's testimony. Please confirm the assessment/inspection costs are within the LVD Lines Demand Failures capital spend program as provided in Exhibit A-113 (MPK-3), page 1, line 32.
  - a. If confirmed, please refer to Generally Accepted Accounting Principles (GAAP) and/or Uniform System of Accounts (USOA) that demonstrate the inspection activity is allowed to be capitalized.

**Response:**

Please refer to discovery response 21870-ST-CE-0305 for the treatment of these inspection costs.

As explained in discovery response 21870-ST-CE-0305, a portion of the assessment/inspection costs are capitalized within the LVD Lines Demand Failure Program. The FERC Uniform System of Accounts ("USofA") Electric Plant Instructions, Section 3, subsection 11, indicate that this activity qualifies for capitalization as a component of construction: "**Engineering and supervision** includes the portion of the pay and expenses of engineers, surveyors, draftsmen, inspectors, superintendents and their assistants applicable to construction work." A copy of this document is provided for reference as Attachment 1 to this response. As stated in discovery response 21870-ST-CE-0305, the Company has an annual contractor cost for security assessments of \$929,000; while the Company does not have a specifically defined cost for assessments done by Company employees, it estimates that the total internal and external costs for assessments is approximately \$1.2 million for both internal and contracted labor, which is charged to the Engineering cost center designated for LVD Planning. These assessments serve as the basis for the engineering and design of the \$25,350,000 of projected security assessment work for the test year.

**Witness:** Jennifer M Partlan

**Date:** August 27, 2025

**Question:**

4. Please refer to Figures 19 and 20 in Company Witness Kelly's testimony. Please explain how cost effectiveness, affordability, and rate impacts have been considered in these glidepaths. The explanation should detail how the 5-year glidepath is the most cost-effective option for customers.

**Response:**

The Company has not conducted a quantitative analysis of the cost-effectiveness, affordability, or rate impacts of the alternative 7-year and 10-year glidepaths. Such quantitative analysis was not part of the recommendation of the Liberty Consulting Group referenced on page 22, lines 12 and 13, of my direct testimony.

The Company's rationale for continuing with its chosen glidepath is laid out in detail on page 41, line 3, through page 45, line 13, of my direct testimony and may be summarized as follows:

- The alternative glidepaths would severely reduce or completely eliminate the most beneficial investment categories for reliability, leaving the Company with a less diverse portfolio of investments and leaving it overly reliant on line clearing.
- The alternative glidepaths would consign customers to worse than average reliability for several additional years. The Company believes that customers deserve better than average reliability, and various stakeholders continue to advocate for this as well, as discussed on page 42 of my direct testimony.
- The alternative glidepaths would prevent the Company from having a reasonable chance to earn incentives through the Commission's PBR framework, and in the case of CEMI-4 would leave the Company paying penalties for the foreseeable future. The Company believes that the Commission's Penalty and Incentive framework provides a guideline on expected levels of performance, and that utilities are meant to pursue those levels of performance rather than simply accept penalties.

The alternative glidepaths may result in *cheaper* outcomes for customers *today*, but that does not mean that these outcomes are the most cost effective for customers in the longer term. Customer bills might be lower if the Company simply neglected its system, but customers would then face very poor reliability, which would impose other kinds of external costs on them. The Company believes that its chosen glidepath yields the right level of reliability for customers, and does so with an appropriate mix of investments.

**Witness:** Michael P. Kelly

**Date:** September 15, 2025

**Question:**

1. Referring to the CE model used to project SAIDI, SAIFI, and CAIDI performance within Michael Kelly’s testimony, please provide the following:
  - a. A list of all the distribution system capital investments (programs, sub-programs, and investment categories) included in the model.
  - b. A list of all the CAIDI improvement projects included in the model
  - c. The date range of historical data used

**Response:**

- a. The distribution system capital investments included in the model are as follows:

Program	Sub-Program	Investment Category
Reliability	Lines Reliability – LVD	Zonal Health Improvements
		ATR Loops
		Pole Replacements
Reliability	Lines Reliability – HVD	Lines Rebuilds
		Pole Replacements
		Pole Top Rehabilitation Miles
Reliability	Resiliency	Fractionalization
		Overhead to Underground
		Vulnerable Communities
Demand Failures	Lines Failures – LVD	Security Assessment Inspections

- b.
  - Advanced Distribution Management System (ADMS) for All-weather SAIDI
  - CAIDI reductions resulting from improvements in SAIFI for SAIDI excluding MEDs and All-weather SAIDI
- c. 2022-2024 for SAIDI excluding MEDs and 2020-2025 for All-weather SAIDI

**Witness:** Michael P. Kelly  
**Date:** September 17, 2025

**Question:**

104. Refer to pages 44-45 of Mr. Kelly's direct testimony on the projected performance under each glidepath versus the PBR performance targets and the concern that the Company will fall short of the targets unless it increases capital spending under the currently proposed glidepath. Does the Company believe that the future performance results calculated by its modelling software provide 100% accurate predictions of future performance? If yes, provide evidence supporting that conclusion. If not, provide the percentage confidence level of those predictions and provide evidence that shows most of the predictions have come true.

**Response:**

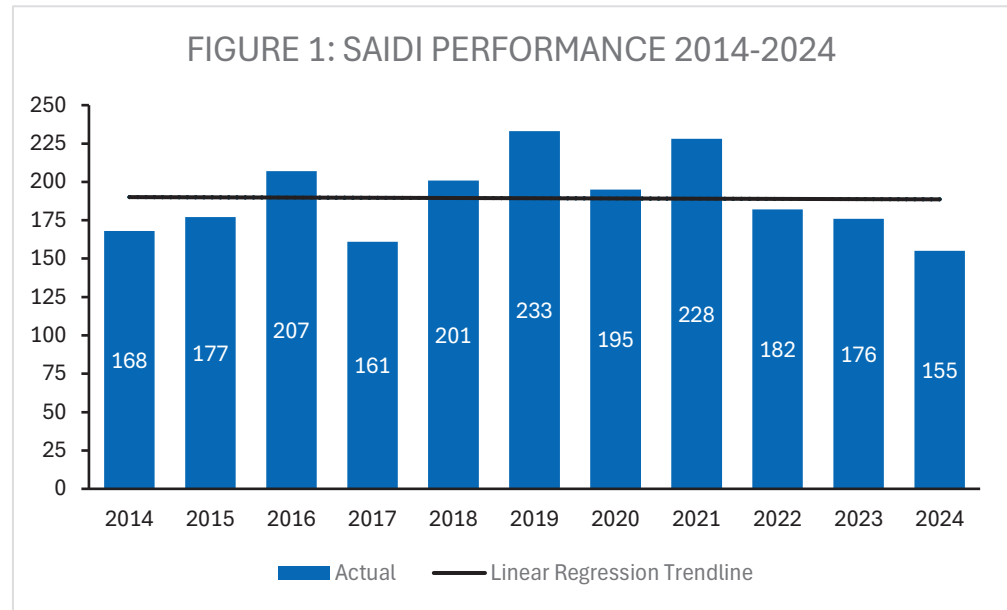
No. 100% accuracy would be an extremely unlikely level of confidence for any model, especially a model that forecasts reliability performance given the unknown impacts on the system of day-to-day weather that would not occur for more than five years from today. As discussed in discovery response 21870-ST-CE-0197, error margins cannot be produced with confidence due to the limited sample size of variances since the introduction of the modeling in U-20697.

Regardless, the Company has been using its methodology for modeling future SAIDI performance since U-20697, and as discussed in my testimony on page 29, the modeling has been accurate in projecting the trend in reliability improvements, but variances are expected in projections as the glidepaths conveyed on Pages 44-45 are the Company's perspectives on the median of likely outcomes.

**Witness:** Michael P. Kelly

**Date:** September 10, 2025

Year	Actual
2014	168
2015	177
2016	207
2017	161
2018	201
2019	233
2020	195
2021	228
2022	182
2023	176
2024	155
Avg	189.3636
Std. Dev	24.68445
CoV	0.130355



SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.0186339
R Square	0.000347222
Adjusted R	-0.110725309
Standard E	27.28495349
Observatio	11

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	2.327272727	2.327272727	0.003126085	0.956633948
Residual	9	6700.218182	744.4686869		
Total	10	6702.545455			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	483.0363636	5252.471769	0.091963629	0.928741392	-11398.88027	12364.953	-11398.88027	12364.953
X Variable :	-0.145454545	2.60151824	-0.055911407	0.956633948	-6.030497666	5.739588575	-6.030497666	5.739588575



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