

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

**DIRECT TESTIMONY
AND EXHIBITS
OF
RICHARD BOEHNKE**

On Behalf of
Great Lakes Renewable Energy Association

September 30, 2025

1 **Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

2 A: Richard Boehnke. My business address is 714 Madison Pl., Ann Arbor, Michigan 48103.

3 **Q: BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

4 A: I am the principal and founder of Lake State Labs LLC and am an expert in the design,
5 development, planning, and deployment of Virtual Power Plants (VPPs).

6 **Q: ON WHOSE BEHALF ARE YOU SUBMITTING THIS DIRECT TESTIMONY?**

7 A: I appear here in my capacity as an expert witness on behalf of the Great Lakes Renewable
8 Energy Association.

9 **Q: PLEASE SUMMARIZE YOUR QUALIFICATIONS, EXPERIENCE, AND**
10 **EDUCATION.**

11 A: I bring over a decade of experience and a unique and rigorous foundation to energy
12 market innovation and policy, grounded in advanced academic training and hands-on
13 industry leadership. I hold a Master of Science (MSc) and Master of Engineering (ir.) in
14 Sustainable Energy Technology from Delft University of Technology in the Netherlands,
15 where I studied as a Fulbright Scholar. The TU Delft SET Program is internationally
16 recognized for its interdisciplinary approach, blending engineering, economics, and
17 policy to prepare graduates to address complex challenges at the intersection of
18 technology, society, and governance. This skillset is critical to support regulators in
19 navigating the evolving landscape of Distributed Energy Resources (DERs) and grid
20 modernization. My graduate research, published in the Journal of Cleaner Production,
21 focused on overcoming barriers to municipal climate action, reflecting my commitment
22 to identifying and sharing practical, policy-relevant solutions in energy systems.

1 During my tenure at Recurve, I served as Director of Demand Flexibility Markets, where
2 I led the design, development, and implementation of the Demand FLEXmarkets, a novel
3 form of VPP. As Director, I led the creation of resource aggregations that transacted on
4 more than \$35 million of delivered system benefits within 18 months. The opportunity
5 and benefits of the Demand FLEXmarket model were identified and funded by the
6 California Public Utilities Commission in 2021, recognizing the potential to swiftly and
7 cost-effectively address capacity shortfalls for peak demand.

8 As Director, I was responsible for all aspects of the business unit, including program
9 design, compliance, plan development, measurement and verification (M&V), client
10 management, and stakeholder engagement. Earlier, as Program Manager at Franklin
11 Energy, I led cross-functional teams in designing and executing multimillion-dollar
12 energy efficiency (EE) programs for commercial, industrial, and public sector clients.

13 My experience designing and implementing VPPs and demand-side programs is critical
14 in supporting the Michigan Public Service Commission (“Commission”) and Consumers
15 Energy Company (“Consumers Energy or “the Company” in addressing current load
16 growth, managing DERs, and fluctuating demand. As an industry and implementation
17 expert in demand flexibility, I am uniquely positioned to support regulatory and policy
18 development in Michigan to drive innovation, grid reliability, and cost-effective
19 regulations for ratepayers. My resume is provided as Exhibit GLREA-1 (RB-1).

20 **Q: HAVE YOU TESTIFIED BEFORE THE COMMISSION PREVIOUSLY?**

21 **A:** No.

**Q: HAVE YOU TESTIFIED OR PROVIDED COMMENTS IN SIMILAR STATE
REGULATORY PROCEEDINGS?**

A: No.

Q: What papers did you use in preparing your testimony?

A: The papers cited in this testimony provide the foundational policy, technological, and economic evidence demonstrating that Virtual Power Plants (VPPs) are a mature, essential, and cost-effective grid resource that can be fully integrated into utility planning in Michigan. These papers provide evidence that establishes the value proposition of VPPs and that are capable of providing utility-scale, utility-grade services, delivering affordable, reliable, and resilient power to ratepayers.

Crucially, the cited cost analyses prove that VPPs are low-cost solutions, costing significantly less per kW-year than conventional resources, and that they can be deployed rapidly to address immediate challenges. Furthermore, the sources detail regulatory roadmaps for VPP integration, providing evidence and examples from other states successful implementations of VPPs. This can support regulators in their direction of utilities to fairly consider VPPs alongside conventional capital investments, utilizing standardized frameworks to ensure transparent, comprehensive valuation of grid benefits. This testimony draws upon these documents to provide data and context when advocating for specific MPSC actions:

1. Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

- 1 2. Consumers Energy, 2019, 2019 Clean Energy Plan, Accessed at
2 [https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-](https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374)
3 [resource-plan-summary.ashx?la=en&hash=](https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374)
4 [9F602E19FE385367FA25C66B6779532142CBD374](https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374), on 9/23/2025
- 5 3. Duke Nicholas Institute for Energy, Environment & Sustainability, “Rethinking
6 Load Growth”, 2025, Accessed at
7 <https://nicholasinstitute.duke.edu/publications/rethinking-load-growth>, on 9/23/2025
- 8 4. Rocky Mountain Institute, January 2025, “Reality Check: Dispatchability and
9 Reliability Are Not the Same Thing”, Accessed at [https://rmi.org/reality-check-](https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/)
10 [dispatchability-and-reliability-are-not-the-same-thing/](https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/), on 9/23/2025
- 11 5. Rocky Mountain Institute, February 2018, “Pushing the Limit: How Demand
12 Flexibility Can Grow the Market for Renewable Energy”, Accessed at
13 <https://rmi.org/demand-flexibility-can-grow-market-renewable-energy>, on 9/23/2025
- 14 6. Rocky Mountain Institute, VP3, July 2024, “Meeting Summer Peaks: The Need
15 for VPPs”, Accessed at [https://rmi.org/wp-](https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf)
16 [content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf](https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf), on 9/23/2025
- 17 7. Department of Energy, September 2023, “Pathways to Commercial Liftoff:
18 VPPs”
- 19 8. Rocky Mountain Institute, VP3, March 2025, “Supporting a Reliable Grid: The
20 Opportunity for VPPs in Michigan”, Accessed at [https://rmi.org/wp-](https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_For_Virtual_Power_Plants_In_Michigan.pdf)
21 [content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_F](https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_For_Virtual_Power_Plants_In_Michigan.pdf)
22 [or_Virtual_Power_Plants_In_Michigan.pdf](https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_For_Virtual_Power_Plants_In_Michigan.pdf), on 9/23/2025

- 1 9. Rocky Mountain Institute, September 2024, “ Power Shift: How VPPs Unlock
2 Cleaner, More Affordable Electricity Systems”, Accessed at [https://rmi.org/wp-](https://rmi.org/wp-content/uploads/dlm_uploads/2024/10/power_shift_virtual_power_plants_appendix.pdf)
3 [content/uploads/dlm_uploads/2024/10/power_shift_virtual_power_plants_appendix.pdf](https://rmi.org/wp-content/uploads/dlm_uploads/2024/10/power_shift_virtual_power_plants_appendix.pdf),
4 on 9/23/2025
- 5 10. Rocky Mountain Institute, VP3, 2023, “VPPs, Real Benefits”, Accessed at
6 <https://rmi.org/insight/virtual-power-plants-real-benefits>, on 9/23/2025
- 7 11. Rocky Mountain Institute, VP3, February 2024, “VPP POLICY PRINCIPLES”,
8 Accessed at [https://rmi.org/wp-](https://rmi.org/wp-content/uploads/dlm_uploads/2024/02/vpp_policy_principles_updated.pdf)
9 [content/uploads/dlm_uploads/2024/02/vpp_policy_principles_updated.pdf](https://rmi.org/wp-content/uploads/dlm_uploads/2024/02/vpp_policy_principles_updated.pdf), on 9/23/2025
- 10 12. MPSC, October 2023, “2021 & 2022 Utility Energy Waste Reduction Programs
11 Annual Report on the Implementation of PA 295”, Accessed at
12 [https://www.michigan.gov/mpsc/-](https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/regulatory/reports/pa295-ewr/2021-2022_EWR-Report-to-the-Legislature.pdf)
13 [/media/Project/Websites/mpsc/regulatory/reports/pa295-ewr/2021-2022_EWR-Report-to-](https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/regulatory/reports/pa295-ewr/2021-2022_EWR-Report-to-the-Legislature.pdf)
14 [the-Legislature.pdf](https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/regulatory/reports/pa295-ewr/2021-2022_EWR-Report-to-the-Legislature.pdf), on 9/23/2025
- 15 13. Clean Energy Group, February 2021, “Connected Solutions, A New State
16 Funding Mechanism to Make Battery Storage Accessible to All”, Accessed at
17 <https://www.cesa.org/wp-content/uploads/connected-solutions-policy.pdf>, on 9/23/2025
- 18 14. Rewiring America, September 2025, “Homegrown energy: How household
19 upgrades can meet 100 percent of data center demand growth”, Accessed at
20 [https://www.rewiringamerica.org/research/homegrown-energy-report-ai-data-center-](https://www.rewiringamerica.org/research/homegrown-energy-report-ai-data-center-demand)
21 [demand](https://www.rewiringamerica.org/research/homegrown-energy-report-ai-data-center-demand), on 9/23/2025

1 15. Rocky Mountain Institute, 2024, “Virtual Power Plant Flipbook” Accessed at
2 <https://rmi.org/insight/virtual-power-plant-flipbook/?submitted=1#thank-you> on
3 9/23/2025

4 16. Centre for Net Zero, September 2025, “AI in Charge, Large-Scale Experimental
5 Evidence on Electric Vehicle Charging Demand, Accessed at
6 [https://www.centrefornetzero.org/papers/ai-in-charge-large-scale-experimental-evidence-](https://www.centrefornetzero.org/papers/ai-in-charge-large-scale-experimental-evidence-on-electric-vehicle-charging-demand)
7 [on-electric-vehicle-charging-demand](https://www.centrefornetzero.org/papers/ai-in-charge-large-scale-experimental-evidence-on-electric-vehicle-charging-demand) on 9/25/2025

8 **Q: ARE YOU SPONSORING ANY ADDITIONAL EXHIBITS?**

9 A: Yes. I am sponsoring Consumers Energy’s Answers to GLREA’s first Discovery
10 Request as Exhibit GLREA-2 (RB-2). I am sponsoring Consumers Energy’s Answer to
11 GLREA’s Second Discovery Request as Exhibit GLREA-3 (RB-3).

12 **Q: WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

13 A: My testimony focuses on how the Commission and Consumers Energy, the Company,
14 can enable the deployment of VPPs in Michigan. Building from my expertise and
15 extensive research, I will share implementation and policy recommendations. The
16 objective is to support the development of transparent cost and value assessments for all
17 grid services, which would create a foundational market framework for VPPs. My
18 testimony advocates for VPPs as a means to swiftly and cost-effectively deliver
19 affordable, reliable, and resilient power to ratepayers.

20 Further, as Michigan utilities prepare their upcoming Integrated Resource Plans (IRP),
21 this testimony will assist in providing a foundation for the utilities to plan and then
22 deliver premium, affordable services to all ratepayers. As cost-effective resources that

1 can be swiftly deployed as shown in the testimony below, VPPs offer a critical alternative
2 to new, expensive assets like gas peaker plants, with basic VPPs costing significantly less
3 per kW-year (\$43) than a Utility-Scale Battery (\$69) or a Gas Peaker Plant (\$99).¹

4 One fundamental difference when considering this testimony regarding VPPs is an
5 understanding why we use electricity. Ratepayers use electricity to heat our homes, cook
6 our food, and for cold beer and hot showers.² The aim of the electricity grid and the
7 Company is to provide these services to customers affordably, reliably, and with
8 resilience - it is not to simply push more electrons. The goal of this testimony is to
9 advocate for the inclusion of VPPs as grid resources that drive down costs for ratepayers,
10 while improving the reliability and resilience of the grid.

11 **Q: Why bring this testimony before the Commission?**

12 A: The Company committed to the ambitious goal of delivering 20% of demand through the
13 Energy Waste Reduction (EWR) programs by 2030³ in their 2019 Clean Energy Plan.
14 Yet, according to Witness Michael P. Kelly, the company still positions DERs as limited
15 technologies that cannot deliver required improvements in reliability and resiliency that
16 have been shown in a multitude of cases nationally to have the capacity not only to
17 deliver improvements to reliability and resilience but also contribute directly to energy

¹Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

² Paul Gerke, Factor This, October 2024, 'Customers just want hot showers and cold beer': The challenges and opportunities of VPPs, Accessed at <https://www.renewableenergyworld.com/solar/customers-just-want-hot-showers-and-cold-beer-the-challenges-and-opportunities-of-virtual-power-plants>, on 9/23/2025

³ Consumers Energy, 2019, 2019 Clean Energy Plan, Accessed at <https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374>, on 9/23/2025

1 demand.⁴

2 “While distributed energy resources have an important role in the state’s energy future,
3 they are not the answer to achieving desired improvements in reliability and resiliency.
4 To achieve the desired improvements in reliability and resiliency, the Company must
5 focus on hardening and improving the performance of its distribution system through
6 improving poles and wires.”⁵

7 Simultaneously, while the Company holds this position that DERs are insufficient to
8 deliver reliability and resiliency, it also appears, according to witness Michael P. Kelly,
9 that the Company has also not evaluated the potential impacts EE, DR, DER programs, or
10 VPPs can deliver to the Company’s transmission and distribution planning. Impacts that
11 other utilities are currently not piloting but procuring at scale around the country.⁶

12 Several statements made by Company witnesses show the EE, DR, and DER programs
13 not being valued for the grid resources they deliver, nor are they being used when
14 planning infrastructure investments.

15 “The Company has not quantified the impacts of EE, DR, or DER programs on its
16 distribution infrastructure planning.”⁷

17 “Any potential deemed or calculated impacts of the EE, DR, and DER programs do not

⁴ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁵ U-21870 Exhibit No.: A-129 (MPK-19) Page: 9 of 165 Witness: MPKelly Date: June 2025

⁶ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁷ Discovery: Witness: Michael P. Kelly Date: August 26, 2025 U21870-GLREA-CE-0301 Page 1 of 1, Exhibit 2

1 currently impact distribution infrastructure planning.”⁸

2 “The Company does not currently account for the locational or temporal value of DERs,
3 and does not currently measure impacts of DERs on the operational performance of the
4 grid.”⁹

5 The Company states in Direct Testimony that it is currently evaluating the use of solar
6 and batteries in supporting the LVD Substations Capacity program. However, this
7 analysis appears to be nascent, and the Company is requesting to pilot a program to
8 understand how non-wire solutions (NWS) could impact their systems as opposed to
9 deploying large-scale resources or aggregations.

10 “The Company has been exploring the potential for considering NWS as another
11 alternative LVD substation capacity solution in recent years. Through recent pilots, the
12 Company has refined its selection criteria for identifying potential LVD substations
13 where NWS can be considered, with criteria including the peak load reduction needed,
14 the timeframe of the projected need, customer mix, and other factors. The Company has
15 already begun considering NWS, including solar and batteries, in some of its concept
16 approvals for projects in this sub-program. However, as Company witness Kelly
17 discusses in his direct testimony, the Company is also still early in the process of
18 exploring how NWS can solve capacity and reliability issues on the system, and the
19 Company is developing a new pilot in 2025 to better understand NWS applications.”¹⁰

20 Incorporating NWS, specifically VPPs, has been impactful to utilities nationally, and

⁸Discovery: Witness: Michael P. Kelly Date: August 26, 2025 U21870-GLREA-CE-0302 Page 1 of 1, Exhibit 2

⁹Discovery: Witness: Alex M. Gast Date: August 26, 2025 U21870-GLREA-CE-0299 Page 1 of 1, Exhibit 2

¹⁰ U-21870 DIRECT TESTIMONY, Megan L. Hayward, Page 131, Line 13-22

1 there is an abundance of work that has already been completed, as will be discussed
2 throughout this testimony, showing the direct impacts VPPs are currently delivering. A
3 new pilot program will be insufficient to show the potential of VPPs and too limited to
4 deliver the grid services and capacity as required to accommodate rapid load growth.

5 Further, the Company has committed to delivering 20% of demand to be fulfilled using
6 the EWR Programs that implement DERs. How is it possible for the Company to rely on
7 the EWR Programs to deliver these resources when the impact of those same resources
8 are not quantified in infrastructure planning?

9 The Company's position that these resources are insufficient to achieve reliability and
10 resiliency has been shown to be outdated by an ever growing number of VPPs actively
11 delivering capacity resources to the grid at lower cost than traditional generation.¹¹ As a
12 result, I am bringing this testimony regarding VPPs to the Commission on behalf of
13 ratepayers to inform the Commission regarding the vast potential realized around the
14 country of VPPs in aggregating DERs to deliver affordable, reliable, and resilient
15 services to ratepayers.

16 **Q: What is a Virtual Power Plant (VPP)?**

17 **A:** According to the Department of Energy:

18 "VPPs are aggregations of distributed energy resources (DERs) such as rooftop solar with behind-
19 the-meter batteries, electric vehicles (EVs) and chargers, electric water heaters, smart buildings and
20 their controls, and flexible commercial and industrial loads that can balance electricity demand and
21 supply and provide utility-scale and utility-grade grid services like a traditional power plant. VPPs

¹¹ Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

1 enroll DER owners—including residential, commercial, and industrial electricity consumers—in a
2 variety of participation models that offer rewards for contributing to efficient grid operations.”¹²

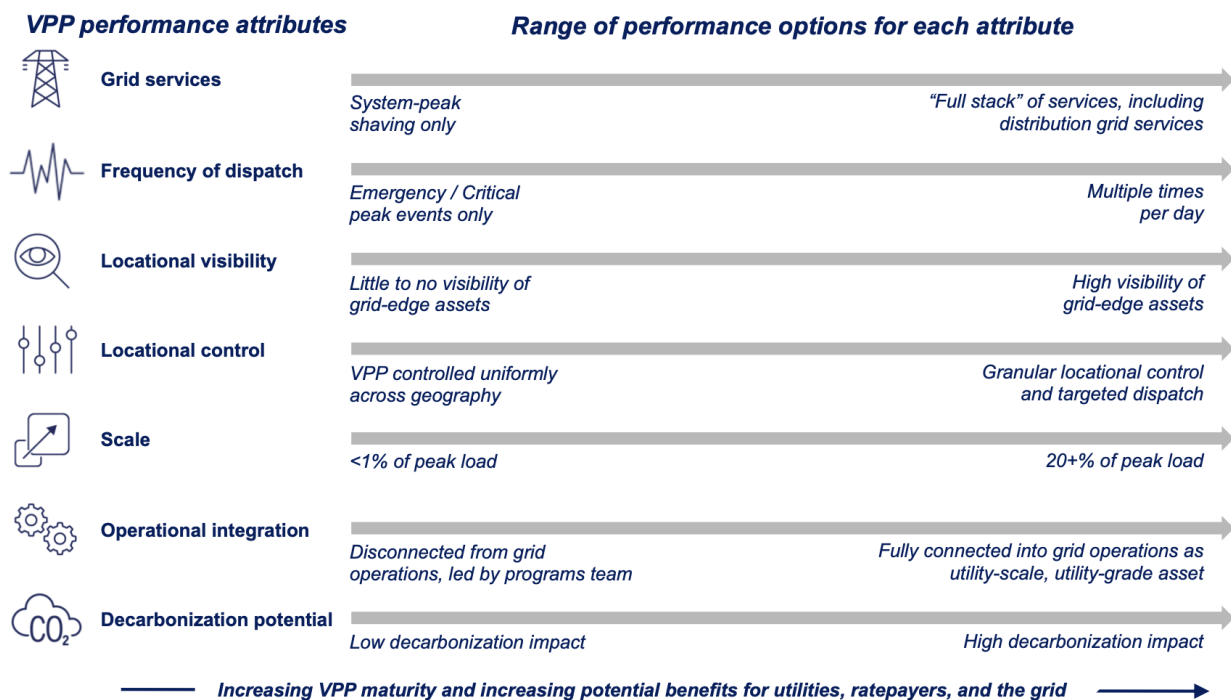
3 As stated in the Department of Energy’s definition, VPPs can be aggregated from a wide
4 variety of demand-side resources relying upon various models of enrollment,
5 participation, and compensation. Throughout this testimony, I will provide an overview
6 of these models, what is currently occurring in the United States, and deliver
7 recommendations for the Michigan Public Services Commission to begin the process of
8 enabling VPPs in Michigan.

9 With the wide variety of aggregation models, VPPs also have significant variability in
10 what services they provide and who is controlling their aggregation and output. Figure 1
11 below, from the Department of Energy’s Pathways to Commercial Liftoff: VPPs 2025
12 Update illustrates the significant range of performance options available when
13 considering procuring a VPP.

14 Figure 1: VPP Performance Attributes and Corresponding Range of Performance
15 Options¹³

¹²Department of Energy Website, Accessed at <https://www.energy.gov/lpo/virtual-power-plants-projects>, on 9/23/2025

¹³ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025



From Figure 1, VPPs do not, inherently, provide the full-stack of grid resources as do traditional generation operations. This flexibility offers grid operators the opportunity to procure the specific resources (e.g. peak shaving or frequency regulation) that are required without burdening ratepayers with billions of dollars of infrastructure costs to build, interconnect, and upgrade the transmission and distribution for traditional generation¹⁴ to sit dormant up to 8,720 hours per year.¹⁵

Fundamentally, the goal of deploying VPPs, like any traditional source of grid upgrade, is system reliability and affordably delivering resource adequacy and operational reliability to ratepayers.

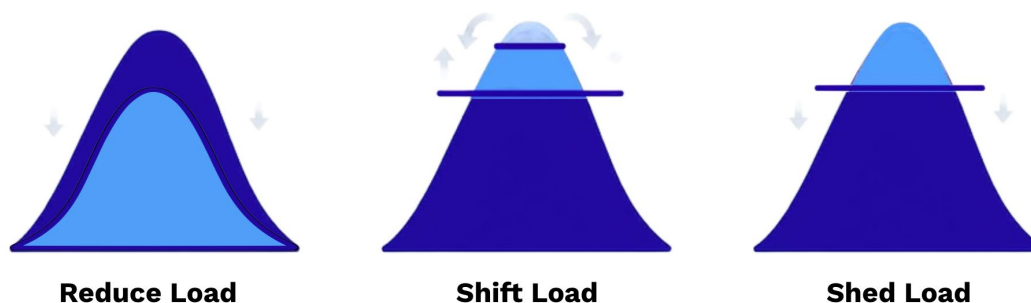
Q: What functions can a Virtual Power Plant (VPP) serve for the grid?

¹⁴ Nicholas Cunningham, Gas Outlook, "Costs to build gas plants triple, says CEO of NextEra Energy", Accessed at <https://gasoutlook.com/analysis/costs-to-build-gas-plants-triple-says-ceo-of-nextera-energy>, on 9/10/2025

¹⁵ Duke Nicholas Institute for Energy, Environment & Sustainability, "Rethinking Load Growth", 2025, Accessed at <https://nicholasinstitute.duke.edu/publications/rethinking-load-growth>, on 9/23/2025

A: VPPs can generate a variety of impacts for the grid, depending on what resources are included and how they are aggregated. Fundamentally, VPPs have the capacity to support resource adequacy, operational reliability, and resiliency.¹⁶ With rapid load growth, specifically focused on accommodating peak demand, I will focus here on how a VPP can support the grid through three general strategies as seen in Figure 2. Each of these plots is a stylized representation of a demand curve from a customer, with demand on the y axis and time on the x axis, to illustrate each different function.

Figure 2: Strategies for Virtual Power Plant Resource Deployment



Reduce Load: Load reductions are delivered by resources that persistently reduce the electricity demand load at the host location. The assets deployed could include EE, solar generation, and other resources that persistently reduce demand. Aggregations focused on reducing load address the challenge of load growth directly by procuring load reductions at peak times creating additional space on the grid. See the case study regarding the Market Access Programs in California below.

Shift Load: The second service commonly aggregated in a VPP is load shifting. Load

¹⁶Rocky Mountain Institute, January 2025, “Reality Check: Dispatchability and Reliability Are Not the Same Thing”, Accessed at <https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/>, on 9/23/2025

1 shifting is the ability to shift demand from peak hours to off-peak times.¹⁷ The assets
2 deployed could include storage in the form of hot water heaters, pre-heating or pre-
3 cooling the built environment with smart thermostats, battery storage, managed electric
4 vehicle charging, etc.... Some of these resources also have the potential to be called upon
5 daily to support frequency regulation¹⁸ - see the National Grid Connected Solutions
6 (Massachusetts and New York) and Arizona Public Service (APS) Cool Rewards
7 (Arizona) case studies below for impacts delivered from these sorts of aggregations. The
8 capability to shift load also provides the potential to limit wind and solar curtailment, by
9 shifting demand into times of excess generation, increasing the value of the energy
10 generated through intermittent sources.¹⁹

11 **Shed Load:** The third common service of a VPP is load shedding. Distinct from load
12 shifting, load shedding is a protective method of power control where, during a peak day,
13 the load is intentionally disconnected or shed so that the available electricity supply can
14 meet the remaining demand.²⁰ While load shedding is relatively common for commercial
15 and industrial customers, VPPs can also aggregate large numbers of residential
16 ratepayers, offering significant potential to address system constraints at the generation,
17 transmission, and distribution levels.

18 Unlike traditional generation, VPPs have the capacity to efficiently balance the timing of
19 demand with available supply, facilitating the alleviation of system constraints and can

¹⁷Rocky Mountain Institute, January 2025, "Reality Check: Dispatchability and Reliability Are Not the Same Thing", Accessed at <https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/>, on 9/23/2025

¹⁸Ibid

¹⁹Rocky Mountain Institute, February 2018, "Pushing the Limit: How Demand Flexibility Can Grow the Market for Renewable Energy", Accessed at <https://rmi.org/demand-flexibility-can-grow-market-renewable-energy>, on 9/23/2025

²⁰Wikipedia, "Load Shedding", Accessed at https://en.wikipedia.org/wiki/Load_shedding, on 9/23/2025

cite resources at the point of grid stress.²¹ See Figure 3 for further exploration of the services VPPs can provide when aggregating battery storage. While this is only one type of resource aggregation, the figure provides not only an account of what grid services can be delivered but also what services are not valued in current markets.’

As seen in the figure below, VPPs have the capability to deliver real-time services such as voltage support depending on the assets aggregated. Unlike traditional generation, these can be sited where necessary and rapidly deployed.

Figure 3: Potential services provided by grid-interconnected battery storage²²

Valued in markets	Proposed or early adoption in markets	Not valued in markets
Grid Service	Service Type	Definition
Energy	Energy and Capacity	The generation of electric power over time as transported across a transmission system. (i)
Firm Capacity	Energy and Capacity	Power that, in theory, is available at all times and guaranteed to deliver, even under adverse conditions. (ii)
Ramping Reserves	Ancillary Services	Used to help meet variations in the net load; increasingly considered to manage variability in net load from wind and solar energy. (iii)
Voltage Support	Ancillary Services	Used to maintain voltage within tolerance levels; provided by local resources. (iv)
Black-Start Capability	Ancillary Services	Capacity that can be started without either external power or a reference grid frequency, and that can then provide power to start other generators. (v)
Transmission Upgrade Deferral	Transmission Services	When an energy storage system shifts the timing of power flows in the transmission network to reduce loading on key transmission corridors, helping to avoid costly equipment failures and extending the life of existing assets. (vi)
Transmission Congestion Relief	Transmission Services	Avoidance of transmission congestion, which "occurs when there is not enough transmission capability to support all requests for transmission services". (vii)
Distribution Upgrade Deferral	Distribution Services	The ability to defer investments in conventional transmission and distribution (T&D) infrastructure. (viii)
Distribution Voltage Support	Distribution Services	The provision or absorption of reactive power to the grid to maintain acceptable voltage. (ix)
Resilience	Behind-the-Meter Applications	Ability to provide backup power and keep the lights on during a grid outage. (RMI definition)

This is a subset and illustrative set of grid services provided by battery storage. Other services include but are not limited to Inertial Response, Fast Frequency Response, Primary Frequency Response, Frequency Regulation, Contingent Spinning Reserves, Replacement Nonspin Reserves, Distribution Loss Reduction, Power Quality, Reliability, Time-of-Use and Real-Time Pricing, and Demand Charge Management.

Definition Sources: i, ii, iii, iv, v, vi, vii, viii, ix.

Ancillary Services are services that ensure reliability and support the transmission of electricity from generation sites to customer loads. (EIA)

Source: Adapted from NREL illustration • Get the data • Created with Datawrapper

²¹Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

²²Rocky Mountain Institute, January 2025, "Reality Check: Dispatchability and Reliability Are Not the Same Thing", Accessed at <https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/>, on 9/23/2025

1 Figure 3 breaks out a suite of grid services that a VPP could provide the electricity grid.
2 Critical for this discussion is the lack of the consistent valuation of the deferral of grid
3 upgrades to the transmission and distribution systems, grid services that could likely
4 offset the roughly \$3.4 Billion in the Company's filing. Through aggregating peak
5 reductions in the form of EE and load shifting, VPPs can increase reliability and
6 resilience by decreasing demand at critical peaks while also offering the potential for
7 islandable systems, when energy storage is part of the aggregation. Since VPPs can be
8 configured to provide multiple grid services, known as value stacking, operators have the
9 potential to shift incentives over time to meet the needs of a changing grid.²³

10 **Q: You mentioned Energy Efficiency as a resource to be aggregated, how are measures**
11 **that reduce load impactful as they are not dispatchable?**

12 A: Dispatchability is the ability of a resource to turn on or off or to scale its power output on
13 demand during normal operating conditions. The ability to dispatch a resource is a
14 prominent topic in discussions about power generation, power plant retirements, and new
15 resource additions in anticipation of growing demand, specifically with regards to
16 VPPs.²⁴ However, while dispatch features prominently in current discussions, the focus
17 on the ability to dispatch resources distracts from a critical goal of aggregations like
18 VPPs: system reliability. See Figure 4 below to further understand the difference between
19 dispatchability and reliability below.

²³Rocky Mountain Institute, VP3, July 2024, "Meeting Summer Peaks: The Need for VPPs", Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf, on 9/23/2025

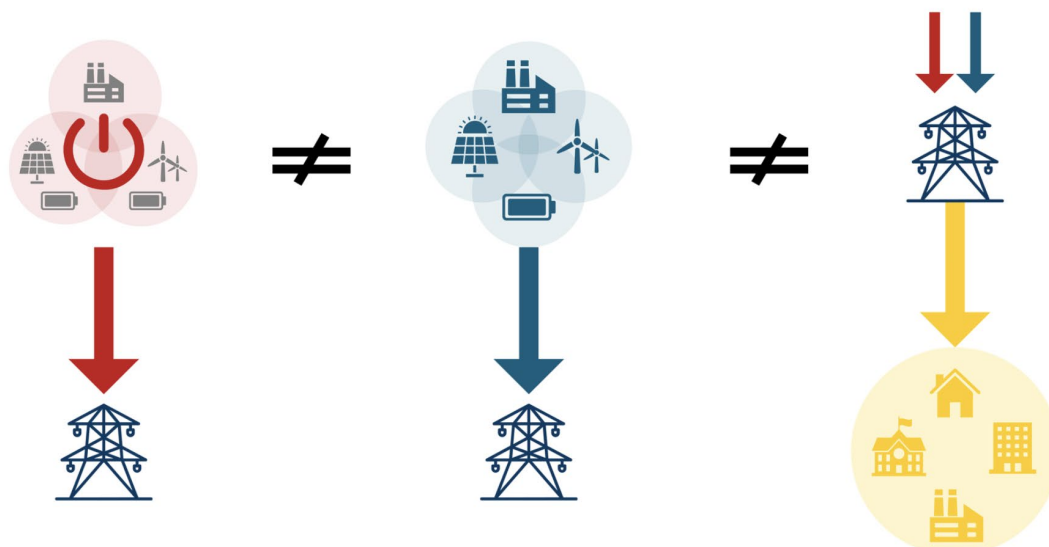
²⁴Rocky Mountain Institute, January 2025, "Reality Check: Dispatchability and Reliability Are Not the Same Thing", Accessed at <https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/>, on 9/23/2025

1 Figure 4: Dispatchability, resource reliability, and system reliability provide different attributes to the
2 electricity system²⁵

Dispatchability reflects the ability for a resource to turn on or off or increase or decrease its power output on demand during normal operating conditions.

Resource Reliability reflects the ability of a resource to generate electricity and support the grid during normal operating conditions and periods of grid risk.

System Reliability reflects the ability of the grid to meet customer demand during normal operating conditions and periods of grid risk.



3 Exhibit 1. Dispatchability, resource reliability, and system reliability provide different attributes to the electricity system.

4
5 As defined in Figure 4, System Reliability, or the combination of resource adequacy and
6 operational reliability, is the ability of the grid to meet customer demand under all
7 conditions. While dispatch is a key component to deliver services reliably, load
8 reductions based on the Levelized Cost of Energy from EE are commonly cited as the
9 cheapest to procure.²⁶

10 “The reality is that dispatchability, on its own, is an insufficient and potentially
11 misleading criterion for evaluating new resource additions. In fact, so-called
12 “dispatchable” resources can and have failed to dispatch, leading to major outages. A

²⁵Ibid

²⁶ ACEEE, “Energy Efficiency as a Resource”, Accessed at <https://www.aceee.org/topic/energy-efficiency-as-a-resource>, on 9/23/2025

1 disproportionate focus on the dispatchability of specific generation resources risks
2 steering discussions away from what really matters — achieving and maintaining a
3 reliable and affordable power system....

4 Ultimately, what matters most for customers isn't dispatchability, or even resource-level
5 reliability, but rather system reliability — the grid's ability to meet consumer demand
6 during normal operating conditions and periods of grid risk. Critically, system reliability
7 can be supported by both “dispatchable” and “intermittent” resources, along with the
8 underlying transmission network.”²⁷

9 While traditional resources and a centralized model of Utility control are familiar, they do
10 not guarantee dispatchability nor the reliability of those assets:

11 1. In December of 2022, ISO-NE declared a “capacity deficiency” and levied \$39M
12 in fines for power plants failure to perform²⁸

13 2. The PJM region suffered capacity-related outages in December of 2022. PJM
14 believed they had almost 29 GW of reserve capacity, but more than 23% of generating
15 capacity in PJM was unavailable. 46 GW of fossil-fueled power plants were out of
16 service. PJM announced penalties that may reach \$2B.²⁹

17 Dispatch and utility control is appealing in part because it is an extension of the
18 centralized systems utilities have relied upon since they were established in the 20th

²⁷Rocky Mountain Institute, January 2025, “Reality Check: Dispatchability and Reliability Are Not the Same Thing”, Accessed at <https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/>, on 9/23/2025

²⁸ David Sharp, Power Grid International, “New England ISO levies \$39M in fines to power plants for coming up short in December”, January 10, 2023. Accessed at: <https://www.powergrid.com/policy-regulation/new-england-iso-levies-39m-in-fines-to-power-plants-for-coming-up-short-in-december/> on 3/4/2023.

²⁹ Clarion Energy Content Directors, Power Engineering, “PJM describes widespread generation failures during December cold wave”, January 12, 2023. Accessed at <https://www.powereng.com/nuclear/pjm-describes-widespread-generation-failures-during-december-cold-wave/> on 3/5/2023.

century. However, as complexity continues to increase, decentralized and diverse resources will be required to manage and reliably deliver services to customers.³⁰

Q: How can the grid accommodate VPPs if they don't generate more electricity?

A: The current electricity grid is a balancing act between demand and supply. As can be seen from the MISO operations display in Figure 5 below for an average day in August, the supply and demand for electricity across MISO fluctuates by roughly 35 gigawatts in one day.

Figure 5: MISO Operations Displays - Real-Time Total Load³¹

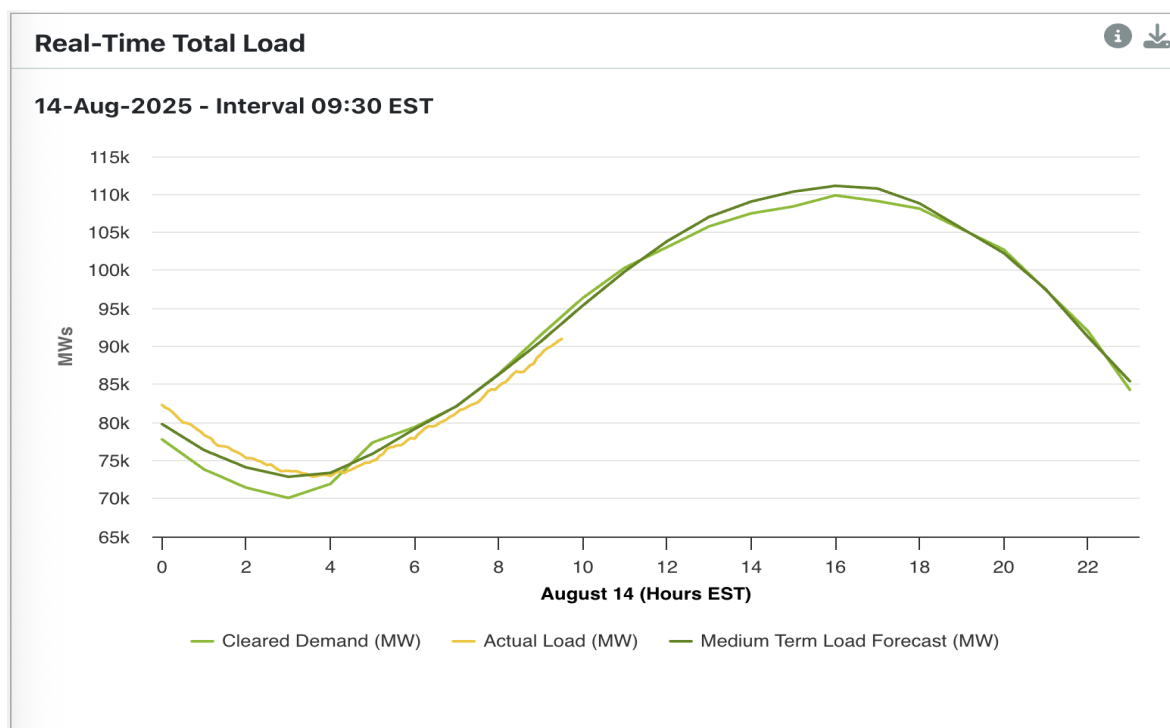


Figure 5 illustrates the vast amount of resources operating within the MISO territory to

³⁰ Rocky Mountain Institute, January 2025, "Reality Check: Dispatchability and Reliability Are Not the Same Thing", Accessed at <https://rmi.org/reality-check-dispatchability-and-reliability-are-not-the-same-thing/>, on 9/23/2025

³¹ MISO, Operations Displays, Accessed at <https://www.misoenergy.org/markets-and-operations/real-time--market-data/operations-displays>, on 8/14/2025

1 provide power to customers, and the daily ramping up and down of those resources to
2 meet demand. This plot shows there is generally excess generation capacity available
3 most of the time and that, generally, the grid does not suffer from an energy shortfall;
4 rather, the system struggles in peak times, requiring additional power. The critical
5 difference here is between energy and power demands. Energy has no time-based
6 component whereas power does. And, as can be seen by the operations display chart, the
7 timing of additional demand could be critical.

8 As seen in the Operations Display, the current MISO territory - in which Consumers
9 Energy falls - does not broadly struggle with total energy supply. However, spikes in
10 demand can be caused by a variety of reasons from weather events to the fluctuation of
11 solar generation.³² These demand spikes coupled with new load growth are driving
12 conversations on how this growth can be accommodated. According to a study from the
13 Nicholas Institute for Energy, Environment & Sustainability, MISO can accommodate an
14 incredible amount of load growth, up to 18.5 GW, if that load can be flexible up to 1% of
15 the year in 1.7-2.5-hour periods as can be seen in Figure 6 below.³³

16 Figure 6: System Headroom Enabled by Load Curtailment of New Load in GW³⁴

³²Marc Spieler, NVIDIA, July 2025, "How AI Factories Can Help Relieve Grid Stress", Accessed at <https://blogs.nvidia.com/blog/ai-factories-flexible-power-use>, on 9/23/2025

³³ Duke Nicholas Institute for Energy, Environment & Sustainability, "Rethinking Load Growth", 2025, Accessed at <https://nicholasinstitute.duke.edu/publications/rethinking-load-growth>, on 9/23/2025

³⁴ Duke Nicholas Institute for Energy, Environment & Sustainability, "Rethinking Load Growth", 2025, Accessed at <https://nicholasinstitute.duke.edu/publications/rethinking-load-growth>, on 9/23/2025

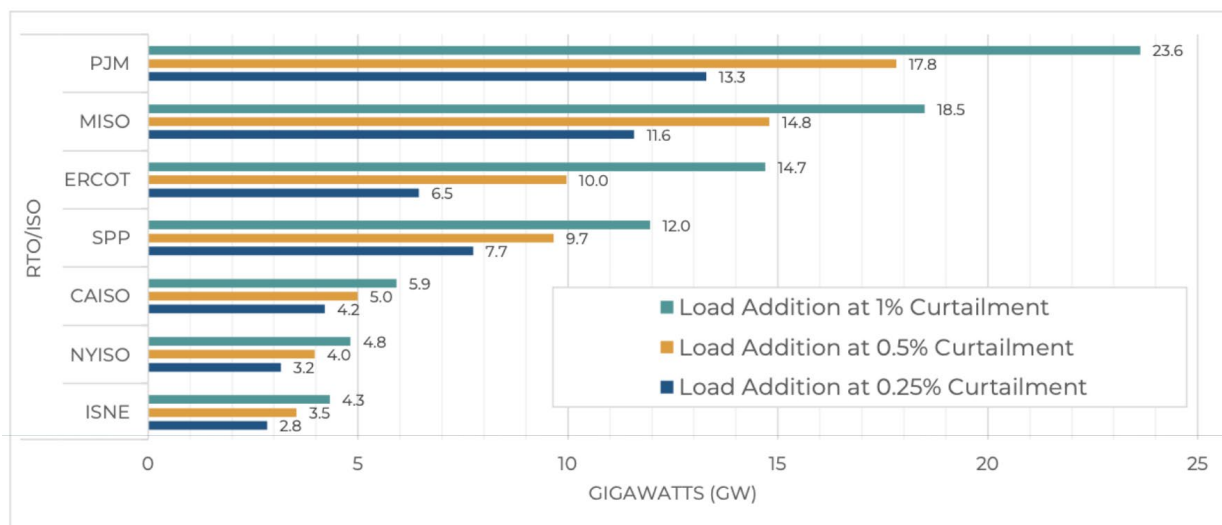


Figure 6 shows that demand flexibility can be a critical asset when attempting to add additional load to a service territory. Analysis of the US power system shows that between 76 GW and 215 GW of new load could be integrated across various balancing authorities, provided the load can be curtailed during peak stress periods. MISO, specifically, is identified as having high headroom potential, approximately 18.5 GW of new load additions at 1% curtailment.³⁵ To clarify, that is 18.5 GW of available growth solely if that load were able to be flexible at peak times. This does not include the impacts that VPPs could also deliver the existing system. Since VPPs have the capability to aggregate flexibility in the forms of load reductions, shifting, and peak shaving, they offer significant potential to deliver affordable, reliable, and resilient services to ratepayers, complimenting the addition of flexible loads.

While Figure 6 shows the available headroom within MISO, I recommend a similar assessment be performed within the Company's service territory to illuminate the available potential for load additions when flexibility is considered. Further, this analysis

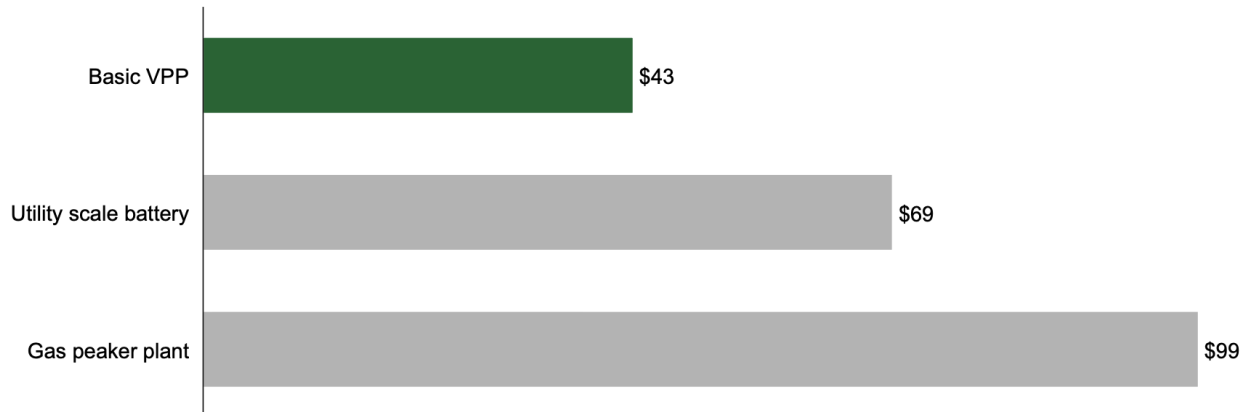
³⁵Ibid

could also assess the additional potential for deploying VPPs to support grid reliability without adding additional traditional generation capacity.³⁶ Such an assessment could be formally required within the Integrated Resource Plan (IRP) process to ensure VPPs are analyzed as resource alternatives alongside conventional capacity expansion.

Q: How could procuring demand flexibility from VPPs impact Michigan ratepayers?

A: First, through cost of services. Figure 7 below, from the Department of Energy's Liftoff Report Update in 2025, shows the net cost to a utility for the deployment of a 400 MW resource across three resource types, a Basic VPP, a Utility-Scale Battery System, and a Gas Peaker Plant.

Figure 7: Comparison of net cost to an example utility of providing 400 MW resource adequacy across three options, Net cost per kW-year³⁷



As shown in Figure 7, procuring a 400MW resource from a VPP is roughly 60% of the cost of a battery system of the same size, and roughly 40% of the cost of traditional

³⁶Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

³⁷Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

1 generation. A Basic VPP offers capacity at a cost of \$43 per kW-year, compared to \$69
2 per kW-year for a Utility-Scale Battery and \$99 per kW-year for a Gas Peaker Plant.

3 According to the Department of Energy, deploying 80-160 GW of VPPs nationwide by
4 2030 could support affordability, reliability, and resilience, redirecting grid spending
5 from peaker plants to supporting ratepayers while reducing overall grid costs.³⁸ Beyond
6 being the lowest-cost resource, VPPs have the potential to defer or prevent the need for
7 investment in costly infrastructure while supporting safety, reliability, and service quality
8 operating parameters.³⁹

9 “On the distribution grid, VPPs can help utilities defer costly system upgrades by shaving
10 localized peak loads that would otherwise trigger the installation of new equipment.... A
11 whitepaper co-authored by AES Indiana and Camus Energy found that deploying
12 visibility solutions to detect where EVs are located on the grid and transitioning to grid-
13 optimized managed charging programs could defer upgrades to 85% of eligible feeders
14 and service transformers for an average of 8.5 years compared to a business-as-usual
15 scenario. Capital cost savings from deferring upgrades were estimated to avoid close to
16 \$1B in cost overruns over the next decade, with savings going directly to consumers.”⁴⁰

17 The savings from reduced generation, transmission, and distribution accrue to all
18 ratepayers, not only the participants in the VPP.⁴¹ A study from the Rocky Mountain

³⁸ Department of Energy, September 2023, “Pathways to Commercial Liftoff: VPPs”

³⁹ Rocky Mountain Institute, VP3, March 2025, “Supporting a Reliable Grid: The Opportunity for VPPs in Michigan”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_For_Virtual_Power_Plants_In_Michigan.pdf, on 9/23/2025

⁴⁰ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁴¹ Ibid

1 Institute found that VPP-enabled portfolios would reduce generation costs by 20% for all
2 ratepayers.⁴² Demonstrating the history of resource aggregations, in 2014, the Brooklyn
3 Queens Demand Management Program allowed ConEdison in New York to defer a
4 \$1.2B substation upgrade, instead spending \$200M on DERs and demand reduction
5 measures.⁴³

6 Beyond the cost of delivery, VPPs have been deployed in remarkably short timeframes,
7 often delivering services in as little as 6 to 12 months⁴⁴, considerably faster than the
8 median deployment time of 42 months for a gas peaker plant. National Grid deployed
9 their VPP in less than 4 months in preparation for the summer months⁴⁵, Where
10 traditional generation and transmission infrastructure can take years or even decades to
11 deploy due to siting, interconnection, and development timelines.⁴⁶ The backlog to order
12 a gas turbine for a peaker plant can be up to seven years.⁴⁷

⁴²Rocky Mountain Institute, September 2024, “Power Shift: How VPPs Unlock Cleaner, More Affordable Electricity Systems”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/10/power_shift_virtual_power_plants_appendix.pdf, on 9/23/2025

⁴³ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

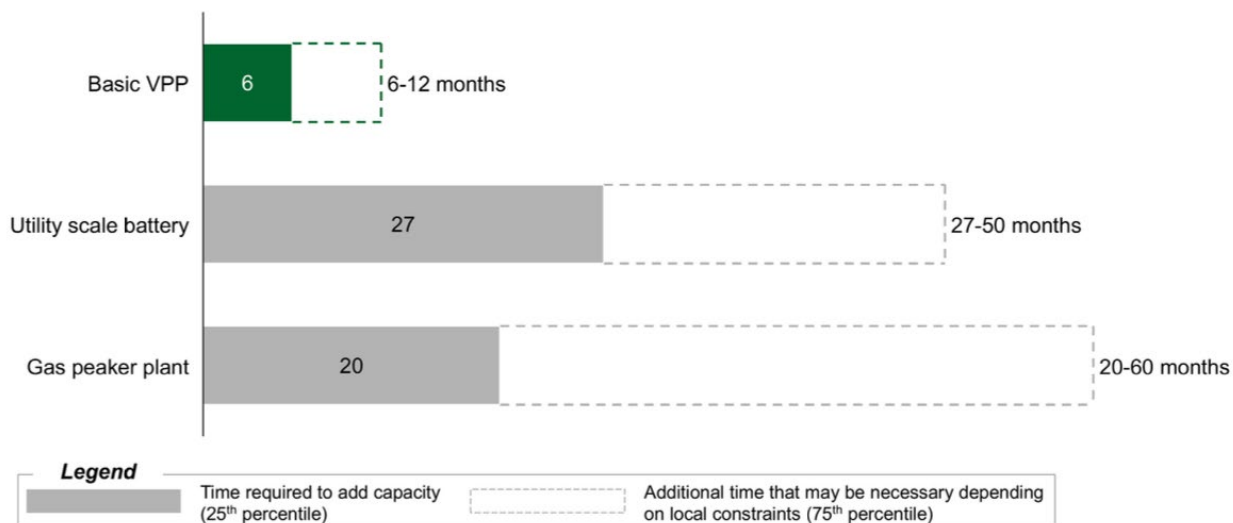
⁴⁴Rocky Mountain Institute, VP3, July 2024, “Meeting Summer Peaks: The Need for VPPs”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf, on 9/23/2025

⁴⁵Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁴⁶Rocky Mountain Institute, VP3, 2023, “VPPs, Real Benefits”, Accessed at <https://rmi.org/insight/virtual-power-plants-real-benefits>, on 9/23/2025

⁴⁷Jared Anderson, S&P Global, May 2025, “US gas-fired turbine wait times as much as seven years; costs up sharply”, Accessed at <https://www.spglobal.com/commodity-insights/en/news-research/latest-news/electric-power/052025-us-gas-fired-turbine-wait-times-as-much-as-seven-years-costs-up-sharply>, on 9/23/2025

Figure 8: Timeline to add 20 MW of dispatchable peaking capacity, months⁴⁸



Beyond the benefits of limiting costs and significant reductions in time to deliver capacity, VPPs offer host customers compensation for delivering grid resources. This value can come in the form of a variety of methods from tariff designs, rebates, on-bill savings, to direct payments.⁴⁹

Q: Why are Virtual Power Plants critical for the Commission to consider as grid resources?

A: VPPs are critical for the Commission to consider because they are key to supporting the rapid load growth and capacity needs facing the U.S., projected to require over 200 GW of peak demand capacity by 2030.⁵⁰ According to the Company's 2019 Clean Energy Plan, 20% of the energy demand, MW not MWh, within their portfolio would be

⁴⁸Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁴⁹Ibid

⁵⁰Department of Energy, September 2023, "Pathways to Commercial Liftoff: VPPs"

1 delivered through customer EE programs (see Figure 9 below).⁵¹ This still represents an
2 ambitious goal and commitment of the Company to deliver affordable, reliable, and
3 resilient energy resources to ratepayers. With less than five years left to accomplish this
4 goal, resource aggregations like VPPs are still unstudied by the utility, and the impacts of
5 EE and DR resources are not quantified when planning and procuring infrastructure to
6 support the grid.

7 “While distributed energy resources have an important role in the state’s energy future,
8 they are not the answer to achieving desired improvements in reliability and resiliency.
9 To achieve the desired improvements in reliability and resiliency, the Company must
10 focus on hardening and improving the performance of its distribution system through
11 improving poles and wires.”⁵²

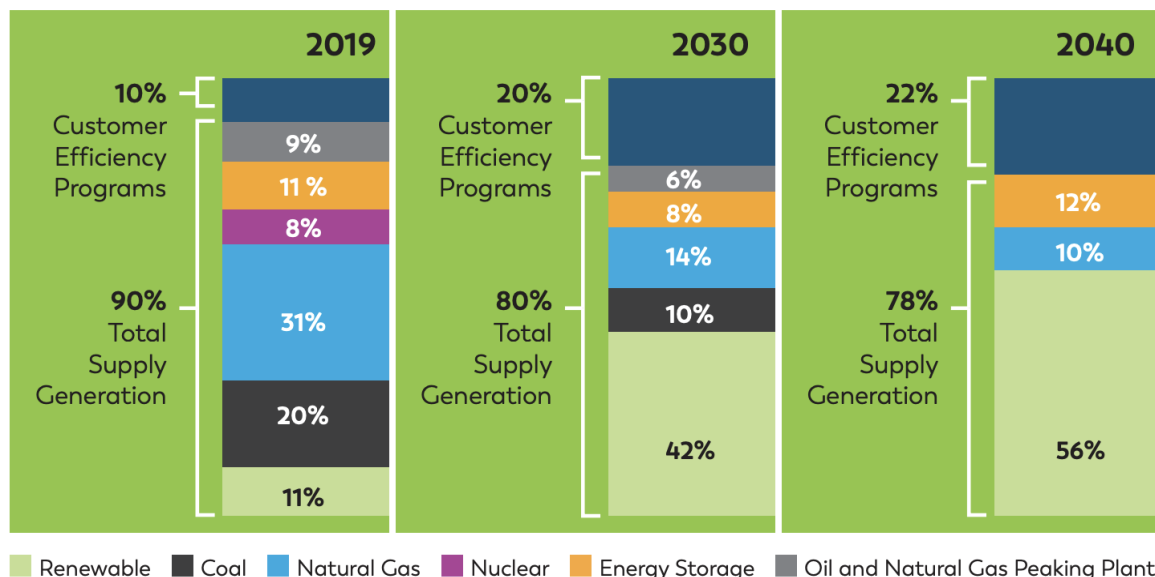
12 Further, in discovery, the company shared that it has no budget for research and
13 development for VPPs, no current pilot programs to deliver VPPs to customers, nor have
14 they conducted any cost-benefit analysis of deployment of virtual plants.⁵³

⁵¹ Consumers Energy, 2019, 2019 Clean Energy Plan, Accessed at <https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374>, on 9/23/2025

⁵² U-21870 Exhibit No.: A-129 (MPK-19) Page: 9 of 165 Witness: MPKelly Date: June 2025

⁵³Discovery: Witness: Michael P. Kelly 1 Date: August 26, 2025 U21870-GLREA-CE-0275 Page 1 of 1, Exhibit 2

Figure 9: Clean Energy Plan Electric Capacity by Fuel Source (Megawatts)⁵⁴



Deploying VPPs is essential for utilities to integrate DERs, such as solar, storage, and electric vehicles, which are foundational components of a VPP.⁵⁵ Policymakers and regulators should require utilities to include VPPs in current planning processes, such as the IRP process, as a resource option.⁵⁶ For example, other utilities, such as Northern States Power Company (doing business as Xcel Energy) in Minnesota, are actively incorporating large distributed capacity procurement programs (400–1,000 MW capacity) into their IRP analysis.⁵⁷

⁵⁴ Consumers Energy, 2019, 2019 Clean Energy Plan, Accessed at <https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374>, on 9/23/2025

⁵⁵ Rocky Mountain Institute, VP3, 2023, “VPPs, Real Benefits”, Accessed at <https://rmi.org/insight/virtual-power-plants-real-benefits>, on 9/23/2025

⁵⁶ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁵⁷ Department of Energy, September 2023, “Pathways to Commercial Liftoff: VPPs”

Q: Where are VPPs being deployed as grid resources?

A: Cataloged in the Department of Energy’s Liftoff Report Update⁵⁸ and the Rocky Mountain Institute’s report on the real benefits of VPPs⁵⁹ are a variety of examples cataloging VPP aggregations that are delivering impacts to the grid, delivering those impacts through a variety of models. Further, there are additional aggregation models that have been developed and deployed around the country, including the Market Access Programs in California. I will provide short summaries of several of these programs below.

1. National Grid Connected Solutions (Massachusetts and New York)⁶⁰

- Capacity: The program was launched in under four months and provides up to 250 MW of peak shaving benefits. Reduced peak demand by 2% in 2024.
- Devices Enrolled: A multi-device VPP that utilizes a heterogeneous aggregation of Distributed Energy Resources (DERs), including smart thermostats, batteries, and EV chargers.
- Budget/Upfront Investment: Launched with less than \$500k in upfront investment. Residential customers receive \$25–\$50 upfront per thermostat and an additional \$20 for staying enrolled. For batteries, there are 0% interest

⁵⁸Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁵⁹Rocky Mountain Institute, VP3, 2023, “VPPs, Real Benefits”, Accessed at <https://rmi.org/insight/virtual-power-plants-real-benefits>, on 9/23/2025

⁶⁰Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

1 7-year loans and a \$275/kW performance incentive. Commercial customers
2 receive \$30–\$200/kW performance incentives.

- 3 ● Impacts: It has provided an estimated \$300M in system benefits since its
4 inception by reducing the need for power plant and grid buildout and
5 decreasing energy use during expensive peak times. It has also met regulatory
6 goals and reduced the cost of DER ownership by compensating participants.
7 During events, thermostats pre-cool and then reduce AC load, with batteries
8 dispatching for the latter part of events.

9 **2. Arizona Public Service (APS) Cool Rewards (Arizona)⁶¹**

- 10 ● Capacity: As of 2024, the program's VPP size is 160 MW (2% of system
11 peak). It helped shed nearly 100 MW during hot summer months in 2022.⁶²
12 It is part of a broader APS VPP portfolio which reached 193 MW as of
13 November 2024.
- 14 ● Participants: The program has enrolled 97,500+ thermostats and 72,000
15 customers, representing 5% of APS's 1.4 million customers.⁶³ It has also
16 been noted to have 60,000 thermostats enrolled.
- 17 ● Devices Enrolled: Primarily smart thermostats.
- 18 ● Budget/Upfront Investment: Customers received an additional \$85 off
19 upfront by pre-enrolling, and there's a \$50 one-time enrollment credit and a

⁶¹Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁶²Rocky Mountain Institute, VP3, 2023, "VPPs, Real Benefits", Accessed at <https://rmi.org/insight/virtual-power-plants-real-benefits>, on 9/23/2025

⁶³Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

1 \$30 credit towards the purchase of a smart thermostat. A \$35 annual
2 participation credit is also provided.

- 3 ● Impacts: The program successfully shed up to 160 MW of load, reducing peak
4 demand. It effectively reduces energy use on Arizona's hottest summer days
5 and shifts energy demand to when more solar power is available. APS also
6 communicates the social impacts of participation to maintain customer
7 engagement.

8 **3. Green Mountain Power (GMP) Energy Storage System (ESS) Leasing**
9 **Program (Vermont) ⁶⁴**

- 10 ● Capacity: As of 2024, the VPP size is 36 MW (5% of system peak).
- 11 ● Participating Customers: Over 4,800 customers are enrolled.
- 12 ● Devices Enrolled: Behind-the-meter (BTM) batteries, specifically Tesla
13 Powerwalls or equivalent compatible equipment. The VPP offers backup
14 power, peaking capacity, emissions reduction, and transmission benefits.
- 15 ● Upfront Investment: This is a utility-owned and operated VPP, with the utility
16 allowed to include customer-leased batteries in its rate base. Customers
17 receive backup power at a significantly lower price than if they purchased a
18 non-enrolled battery.
- 19 ● Impacts: The program has reduced costs for all customers by decreasing
20 GMP's capacity obligation in ISO-New England by 36+ MW per year,
21 resulting in up to \$3M in system cost savings in some years. It has also

⁶⁴Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

generated \$250,000 in revenue from frequency regulation and improved customer resilience by providing backup power during extreme weather events.

4. Rocky Mountain Power (RMP) Wattsmart (Utah)⁶⁵

- Capacity: As of November 2024, the VPP size is 28 MW (0.5% of system peak), with a near-term goal of reaching 100 MW.
- Participating Customers: Over 5,000 customers enrolled.
- Devices Enrolled: Primarily behind-the-meter (BTM) batteries that integrate using IEEE 2030.5 protocols.
- Budget/Upfront Investment: An upfront investment cost of \$5 million. Participants receive an upfront cash enrollment incentive of up to \$600 per kW and an annual bill credit of \$15 per kW starting in the second year.
- Impacts: The program delivers high-value grid services and increases battery adoption. It reduces costs for all customers by storing excess renewable energy during low-cost periods and discharging during high-cost peaks. It has improved customer resilience by providing backup power and demonstrated high usage for real-time system needs by calling 153 real-time frequency response events from October 2023 to November 2024. The program has also contributed to developing standards for battery manufacturers and an open innovation platform.

5. ConEdison Brooklyn Queens Demand Management Program (New York)⁶⁶

⁶⁵Ibid

⁶⁶ Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf,

- Capacity: Not explicitly defined as a VPP, but aggregated DERs and demand reduction measures. The PSC ordered Con Edison to look at non-traditional investments as ways to manage demand growth.⁶⁷
- Participating Customers: Ratepayers within Brooklyn Queens
- Devices Enrolled: DERs and demand reduction measures.
- Budget/Upfront Investment: \$200M.
- Impacts: Deferred a \$1.2B substation upgrade in 2014. The utility continued procurement of additional load reduction above the original 41 MW of non-traditional customer-side electricity demand reduction solutions (projected 44.5 MW by 2021) and 11 MW of non-traditional utility-side solutions (projected 18 MW by 2021).⁶⁸

6. California Market Access Programs

- Capacity: As of available 2023 reporting, the program forecasted 6.6 GW of peak savings.⁶⁹ In response to Governor Newsom’s July 30, 2021 Emergency Proclamation, which directed state agencies to address a statewide shortage of electricity, the Commission authorized the Market Access Program as a

on 9/23/2025

⁶⁷ Coley Girouard, Utility Dive, March 2019, “BQDM program demonstrates benefits of non-traditional utility investments”, Accessed at <https://www.utilitydive.com/news/bqdm-program-demonstrates-benefits-of-non-traditional-utility-investments/550110>, on 9/23/2025

⁶⁸ Coley Girouard, Utility Dive, March 2019, “BQDM program demonstrates benefits of non-traditional utility investments”, Accessed at <https://www.utilitydive.com/news/bqdm-program-demonstrates-benefits-of-non-traditional-utility-investments/550110>, on 9/23/2025

⁶⁹ California Public Utilities Commission, “Market Access Program”, Accessed at <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/market-access-program#:~:text=Market%20Access%20Program%20Combined%20Reporting%20%E2%80%93%20September%202023>, on 9/23/2025

strategy to reduce peak demand.⁷⁰ The programs were authorized December 2, 2021.⁷¹

- Participating Customers: Commercial and Residential
- Devices Enrolled: A multi-device VPP
- Budget/Upfront Investment: The CPUC funded a new, two-year Market Access program funded at \$150 million statewide.⁷²
- Documented Events/Impacts: As of 2023 reporting, the program forecasted 6.6 GW of peak savings.⁷³ Market Access incentivizes peak savings (7 to 9pm) during the summers of 2022 and 2023, with payments based on actual savings at the meter.⁷⁴

This sample of deployed VPPs are illustrative of the potential these aggregations offer utilities. Program models have not only been piloted but also have been implemented broadly, delivering significant and persistent impacts to the grid, utilities, and ratepayers. Far from being nascent systems to be piloted, VPPs are already delivering significant grid impacts nationally.

Q: How do these Virtual Power Plant aggregations work?

A: Each of these VPPs created a market for grid resources to be bought and sold. In order to

⁷⁰ Ibid

⁷¹ California Public Utilities Commission, “Rulemaking 13-11-005”, Accessed at <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M429/K805/429805997.PDF>, on 9/23/2025

⁷² Ibid

⁷³ California Public Utilities Commission, “Market Access Program”, Accessed at <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/energy-efficiency/market-access-program#:~:text=Market%20Access%20Program%20Combined%20Reporting%20%E2%80%93%20September%202023>, on 9/23/2025

⁷⁴ Ibid

1 facilitate this, three conditions were met:

2 First, the resource to be traded was defined by a standard of weights and measures. For
3 many of these markets, defining the resource also meant defining the technology that
4 could participate, in many cases, battery storage. However, VPPs are fundamentally a
5 distributed, technology-neutral solution.⁷⁵

6 Therefore, rather than focusing on a specific technology to deliver services, the
7 Commission could focus on enabling policies and programs that procure grid services in
8 a technology-agnostic way. Given the variety of resources that can be aggregated, from
9 EE and DR, to batteries, thermal storage, and electric vehicle charging, etc..., creating a
10 robust and transparent standard of weights and measures would enable all of these
11 technologies to simultaneously participate.

12 This no-black-boxes standard would create an ecosystem where the device itself is not
13 the critical factor but, rather, what resource the device delivers through its aggregation.⁷⁶

14 Given the rapid development of new technologies, this technology-agnostic approach to
15 M&V would allow for new and emerging technologies to be valued in the market for
16 their delivered performance without significant programmatic changes allowing their
17 incorporation into the system. The result of this approach would maintain the focus of
18 VPPs on delivering affordable, reliable, and resilient power to ratepayers.

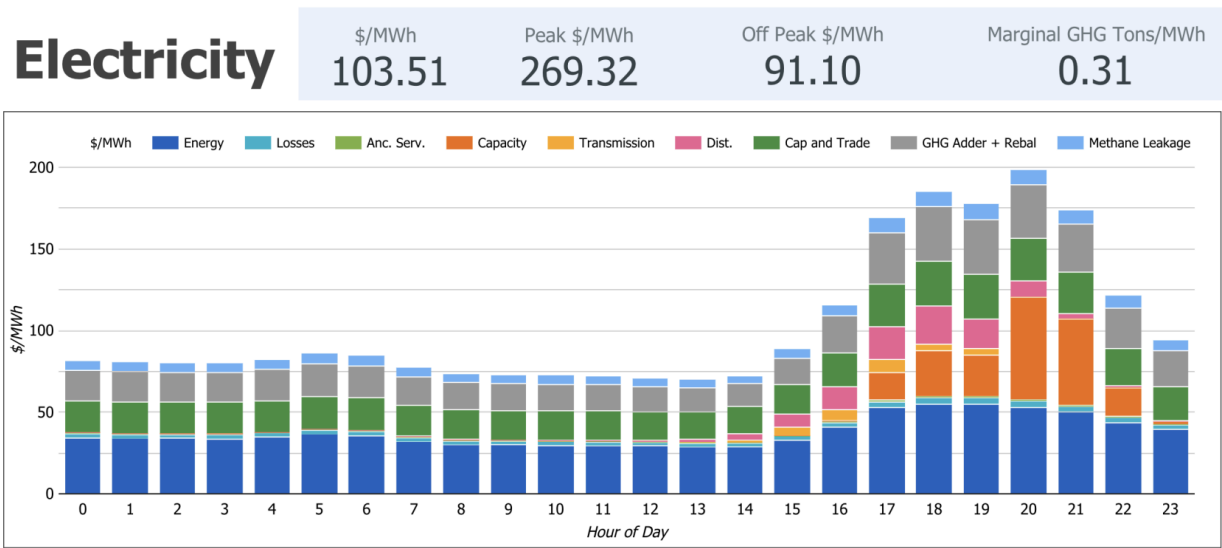
19 Second, the resource must be valued. Each of these programs uses a different valuation

⁷⁵Market, January 2025, “Virtual Power Plant Profiles and Inventory”, Accessed at https://eta-publications.lbl.gov/sites/default/files/2025-03/vpp_profiles_and_inventory_singl-pgs_fnl_3-25.pdf, on 9/23/2025

⁷⁶Rocky Mountain Institute, VP3, February 2024, “VPP POLICY PRINCIPLES”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/02/vpp_policy_principles_updated.pdf, on 9/23/2025

for the demand flexibility delivered. Some use a base rate per kWh delivered, others offer upfront incentives. However, similar to the valuation of the Market Access Programs in California, the Commission’s October 12, 2023 in case U-20898 initiated the development of the Benefits Cost Analysis Tool. According to its mandate, the Open-Source Benefit-Cost Analysis model will be capable of modeling state-specific jurisdiction-specific test for DERs to be available for use in 2026.⁷⁷ Figure 10 below shows the potential model outputs from the tool.

Figure 10: OS-BCA Model Outputs: NPV Benefits⁷⁸



With these soon-to-be publicly available data, utilities, end-use-customers, and aggregators will be able to understand the value of the marginal MWh in Michigan. This

⁷⁷MPSC, “Benefit Cost Tool Collaborative”, Accessed at <https://www.michigan.gov/mpsc/commission/workgroups/benefit-cost-analysis-tool-collaborative>, on 9/23/2025

⁷⁸ MPSC, January 2025, “Toolset for Benefit-Cost Analysis (BCA) of Distributed Energy Resources (DERs) in Michigan”, Accessed at <https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/workgroups/benefit-cost-analysis/Presentation-12925.pdf?rev=db5c44da178545cf85aa6ff3186cb5aa&hash=6FEACDAE7802C5F16051F294638B99B4>, on 9/23/2025

1 tool enables all parties to begin to develop business cases to create VPPs based on the
2 potential value that could be generated by trading on demand flexibility. As can be seen
3 in Figure 10, the cost of a marginal MWh is not static throughout the day; there is a
4 dynamic cost that is more than twice as valuable in the evening as it is in the middle of
5 the day.

6 The final element that each of these VPP case studies requires is a mechanism to trade on
7 the resource. In each of the above case studies, the utility was the single buyer for the
8 energy and provided the incentives to hosts, entities that adopted the technologies, and/or
9 aggregators, entities that aggregate the resources, to deliver services. While the single-
10 buyer system is most prevalent and could be straightforward to enable in Michigan, a
11 multi-buyer system could also be envisioned should a marketplace be established for
12 demand-flexibility resources to be bought and sold. This could enable large consumers to
13 purchase demand flexibility from host sites, providing incentives for the technology and
14 entering into Power Purchase Agreements with aggregators to provide flexibility outside
15 of traditional sources of generation and opening another value stream for host
16 ratepayers.⁷⁹

17 **Q: What systems of measurement and verification exist the Commission could adopt?**

18 A: There are many ways to measure the impacts of retrofitting host sites. I recommend that
19 any adopted system be transparent, replicable, and measured at the meter, ensuring the
20 reliability of and accurate valuation of resources delivered. Further, a transparent, open-
21 sourced system provides all parties the knowledge of how performance will be assessed

⁷⁹Rewiring America, September 2025, “Homegrown energy: How household upgrades can meet 100 percent of data center demand growth”, Accessed at <https://www.rewiringamerica.org/research/homegrown-energy-report-ai-data-center-demand>, on 9/23/2025

1 prior to installation. This no-black-boxes approach would create an auditable system that
2 is not based on trust, but, rather, the delivery of demand flexibility, creating the
3 foundation for valuation and payments. Further, this would “enable inclusion of all DER
4 technologies in VPPs... ensuring no preference is given to particular technologies where
5 multiple technology types can meet the identified need.”⁸⁰ This aligns with the
6 understanding that the majority of the resources delivered by a VPP relate to how
7 technology is used rather than the specific components implemented.⁸¹

8 One such system for M&V is OpenDSM, formerly the OpenEEmeter, from the Linux
9 Foundation for Energy. In 2024, the Department of Energy approved the OpenEEmeter
10 for measured pathway software verification in the Inflation Reduction Act (IRA) Home
11 Efficiency Rebates (HOMES) Program.⁸²

12 “By standardizing calculation methods for normalized metered energy consumption through open
13 source software, state energy offices can now confidently implement performance-based efficiency
14 incentives with full transparency and accountability. This will result in the cost of energy-saving
15 retrofits of existing housing stock being reduced, which will both lower carbon emissions and save
16 Americans money on their monthly energy bills OpenEEmeter’s approval demonstrates the
17 project’s high levels of effectiveness in ensuring transparency and standardization in energy
18 efficiency programs. The software’s open nature allows for:

- 19
- Public review and verification of measurement methods

⁸⁰Rocky Mountain Institute, VP3, February 2024, “VPP POLICY PRINCIPLES”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/02/vpp_policy_principles_updated.pdf, on 9/23/2025

⁸¹ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁸²LF Energy, “US Department of Energy Validates Open Source Approach for IRA HOMES Programs”, Accessed at <https://lfenergy.org/us-department-of-energy-validates-open-source-approach-for-ira-homes-programs>, on 9/23/2025

- 1 • Community-driven improvements and innovations
- 2 • Consistent implementation across different platforms and programs
- 3 • Reduced barriers to entry for new market participants
- 4 • Enhanced trust in program outcomes”⁸³

5
6 Regardless of the system of measurement chosen, it remains crucial that the system
7 delivers accurate, timely, and unbiased measurements of demand flexibility. Through
8 greeting this no-black-boxes approach, all parties involved would have a full
9 understanding of what resources were delivered, how they were valued, and why they
10 received a given payment. Further, connecting to an open-source national standard could
11 increase the speed of innovation as companies in compliance with that system could
12 immediately bring their businesses to Michigan ratepayers.

13 **Q: What steps could the Commission and staff take to begin the process of**
14 **deployment?**

15 A: I will discuss this in greater detail further in this testimony, and it is important to
16 understand the potential that exists based on the current program funding and
17 infrastructure.

18 As mentioned earlier, the Company is not currently using their EWR programs or VPPs
19 to impact infrastructure planning, yet the EWR programs are critical for hitting the
20 Company’s 2030 targets. However, I have also shown that similar programs are currently
21 offering significant grid resources nationally. The Commission could implement a

⁸³LF Energy, “US Department of Energy Validates Open Source Approach for IRA HOMES Programs”, Accessed at <https://lfenergy.org/us-department-of-energy-validates-open-source-approach-for-ira-homes-programs>, on 9/23/2025

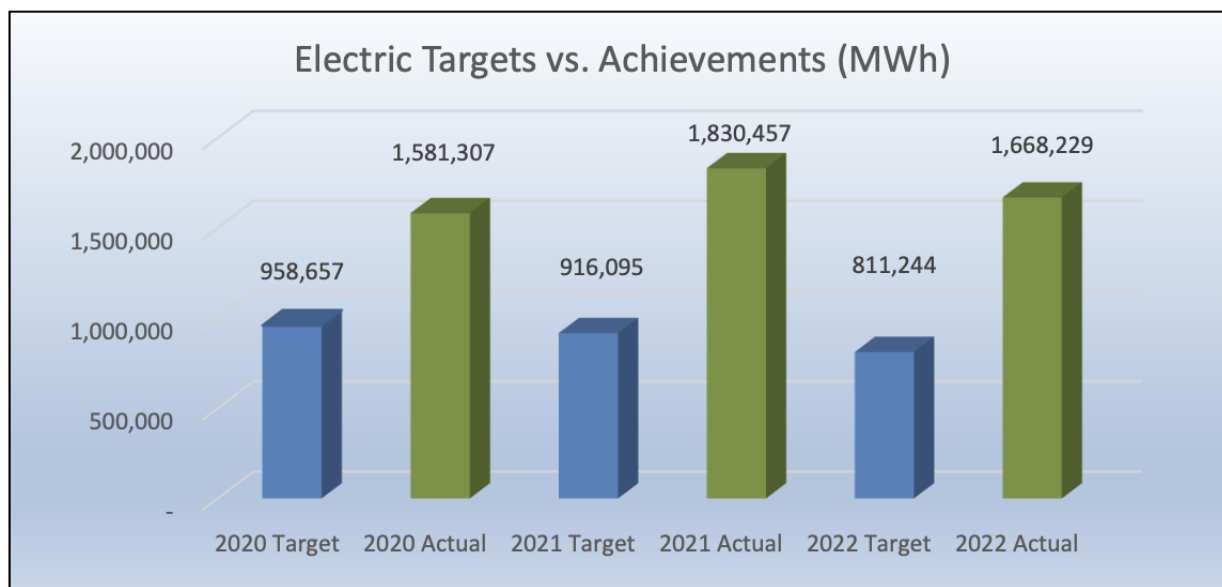
framework, to be discussed below, where the EWR became a launching point for VPPs.

Since the EWR programs are already ratebased, it is entirely possible that the first VPPs in Michigan could be launched without securing additional funding, while providing immediate impacts to all ratepayers' energy bills.

Q: To some, VPPs sound like a rebrand of the state Energy Waste Reduction programs, which have been highly successful. How are they different?

A: The existing EWR programs have been successful based on how they were designed and measured. As seen below, the electric EWR programs in Michigan from the Commission report of October 4, 2023, showed that the electric utilities consistently outperformed their established targets.

Figure 11: Electric Targets vs. Actual Savings Achieved⁸⁴



⁸⁴ MPSC, October 2023, “2021 & 2022 Utility Energy Waste Reduction Programs Annual Report on the Implementation of PA 295”, Accessed at https://www.michigan.gov/mpsc/-/media/Project/Websites/mpsc/regulatory/reports/pa295-ewr/2021-2022_EWR-Report-to-the-Legislature.pdf, on 9/23/2025

1 “in 2022, aggregate EWR program expenditures of \$517 million by all natural gas and electric
2 utilities in the state were estimated to result in lifecycle savings to customers of \$1.39 billion. For
3 every dollar spent on EWR programs in 2022, customers should realize benefits of \$2.68. Data
4 provided to the Commission in EWR provider annual reports indicated that EWR resources were
5 obtained at a cost of \$24.12/MWh.”⁸⁵

6 Further, the Commission report found that the electric utility providers programs had an
7 average Utility System Resource Cost Test score of 3.5 and 2.3, where a score of 1.0
8 means the benefits are equal to the costs⁸⁶, showing that the programs, based on their
9 current design and evaluation standards are very successful.

10 While these programs have achieved in the current environment, their systems of
11 implementation and evaluation are insufficient to deliver the peak reductions or
12 infrastructure support to drive affordability, reliability, and resilience for customers. This
13 is illustrated by the Company not using quantified impacts from their EE, DR, or DER
14 programs as a part of their infrastructure planning processes as noted earlier from
15 witnesses Kelly and Gast.^{87 88 89}

16 The Company does not meter the impact of the assets the EWR programs install, nor do
17 they use the programs impacts as a part of infrastructure planning as this is not required
18 by the Commission. This is a critical distinction between the EWR programs and VPPs -
19 VPPs are procured as infrastructure and are measured and valued based on what they
20 deliver to the grid, not on deemed or calculated impacts. These impacts and grid

⁸⁵ Ibid

⁸⁶ Ibid

⁸⁷ Discovery: Witness: Michael P. Kelly Date: August 26, 2025 U21870-GLREA-CE-0301 Page 1 of 1, Exhibit 2

⁸⁸ Discovery: Witness: Michael P. Kelly Date: August 26, 2025 U21870-GLREA-CE-0302 Page 1 of 1, Exhibit 2

⁸⁹ Discovery: Witness: Alex M. Gast Date: August 26, 2025 U21870-GLREA-CE-0299 Page 1 of 1, Exhibit 2

1 resources delivered by all assets installed by the EWR programs can be metered, the
2 Utilities in Michigan are not required to do so as part of the EWR programs. As a result,
3 the programs impact on peak demand, resource adequacy, and resilience are all,
4 currently, unknown and unstudied.

5 Simultaneously, while the Company does not measure the impact of the DERs they are
6 installing, they also argue that those resources are not yet able to deliver reliability and
7 resilience to the grid.

8 “While distributed energy resources have an important role in the state’s energy future,
9 they are not the answer to achieving desired improvements in reliability and resiliency. To
10 achieve the desired improvements in reliability and resiliency, the Company must focus on
11 hardening and improving the performance of its distribution system through improving
12 poles and wires.”⁹⁰

13 This lack of transparent, meter-based measurement, verification, and valuation of the
14 assets creates a “black box”, effectively preventing these assets from being procured by
15 the utility to deliver affordable resources to the grid. As such, VPPs are not simply a
16 rebrand of the EWR programs. Rather, they represent the crucial next step in their
17 development, where resources are measured at the meter, unlike the current EWR
18 programs in Michigan, which rely upon deemed savings impacts.

19 “Traditionally, electric efficiency has referred to reducing the net consumption of
20 electricity. Reducing peak demand by shifting it to off-peak times does not entail a net
21 reduction in consumption, but instead achieves efficiencies across the grid by flattening

⁹⁰Case No.: U-21870 Exhibit No.: A-129 (MPK-19) Page: 9 of 165 Witness: MPKelly Date: June 2025

load curves, easing grid congestion, reducing the need for grid overbuild, and reducing dependence on fast-ramping generation resources such as fossil fuel peaker plants (see Figures 8A and 8B). Although net consumption is not reduced, ratepayer costs can be reduced significantly.

FIGURE 8A

Traditional Efficiency Reduces Net Consumption, but Does Not Shift Peaks

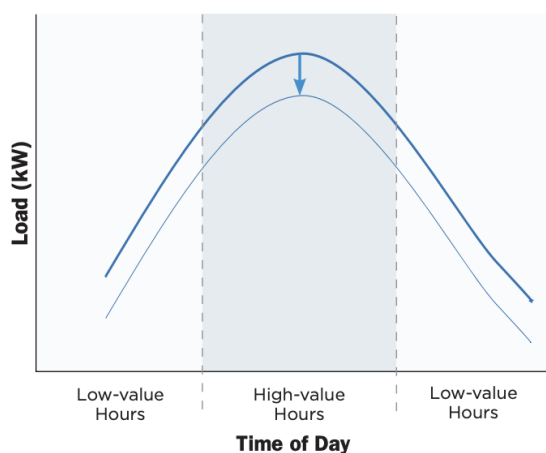
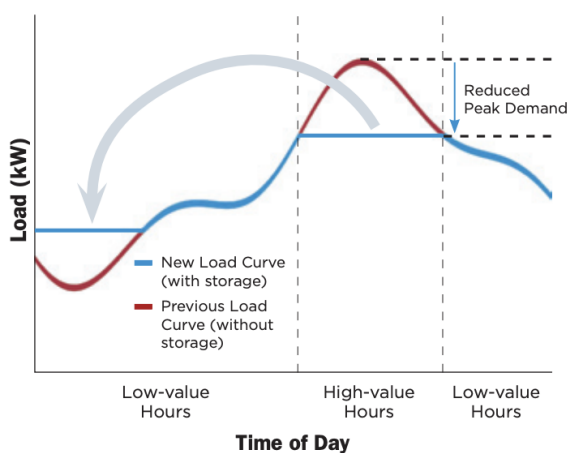


FIGURE 8B

Peak Demand Reduction Shifts Peaks, but Does Not Reduce Net Consumption



Redefining efficiency—Not all load hours should be valued the same!

In order to achieve this new type of efficiency, the definition of “efficiency” in state statutes and other documents may need to be expanded. Terms used to express this concept within an efficiency plan may include “demand reduction,” “peak demand reduction,” “peak shifting” and “active (or advanced) demand response.”⁹¹

Rather than focusing on a net reduction in energy consumed annually, the EWR programs could be focused on delivering persistent peak demand reductions, breaking the existing silos between EE, DR, and DERs and allowing the procurement of true VPPs. This would require a transparent M&V system that would measure the time-based impacts of the

⁹¹Clean Energy Group, February 2021, “Connected Solutions, A New State Funding Mechanism to Make Battery Storage Accessible to All”, Accessed at <https://www.cesa.org/wp-content/uploads/connected-solutions-policy.pdf>, on 9/23/2025

1 EWR programs at the meter regardless of the retrofit, so the delivered impacts on peak
2 demand could be measured, valued, and paid for. Such a change would enable
3 homeowners and other hosts to leverage their own properties as energy infrastructure in
4 the established marketplaces as part of the solution to meet growing demand.⁹²

5 **Q: Why is measurement and verification a critical area of focus of VPPs?**

6 A: The existing EWR programs have built infrastructure to a point and delivered outsized
7 impacts based on calculated savings, this has been impactful at a time of stagnant load
8 growth. However, in this time of rapid growth of peak demand⁹³, there is a need to
9 reimagine the programs to deliver cost-effective impacts to solve these challenges, using
10 technologies that have already been rate based to measure the impact: smart meters.

11 “Energy efficiency programs have traditionally focused on addressing long-term load
12 growth and reducing customer energy bills rather than serving as reliable grid resources.
13 However, as utilities work to decarbonize power generation, buildings, and
14 transportation, demand-side programs (e.g. energy efficiency, load shifting,
15 electrification, and DR programs) must evolve into dependable, scalable grid assets.
16 Ultimately, decarbonizing the power grid will require both supply and demand-side
17 solutions. While supply-side production is easily quantified, measuring the impacts of
18 demand-side programs has historically been challenging due to inconsistent and opaque
19 measurement methodologies.⁹⁴

⁹²Rewiring America, September 2025, “Homegrown energy: How household upgrades can meet 100 percent of data center demand growth”, Accessed at <https://www.rewiringamerica.org/research/homegrown-energy-report-ai-data-center-demand>, on 9/23/2025

⁹³ U-21870 Exhibit No.: A-129 (MPK-19) Page: 31 of 165 Witness: MPKelly Date: June 2025

⁹⁴LF Energy, OpenDSM, Accessed at <https://lfenergy.org/projects/opensdm>, on 9/23/2025

1 The adoption of a transparent system of M&V would represent a critical step in
2 identifying the value of DERs and assessing them as grid-reliable resources. Further, if
3 the implementation of the EWR programs over the past 5 years were analyzed, the
4 Company could identify which DERs delivered outsized impacts historically and, using
5 that analysis, identify which prospective customers offer significant potential to deliver
6 impacts.

7 **Q: How could the existing Energy Waste Reduction support deploying VPPs?**

8 A: The EWR Programs represent an ideal scaling opportunity for VPPs prior to utility
9 procurement. The programs are rate-based and thus have a consistent cashflow to be
10 invested for the purpose of delivering benefits to ratepayers.

11 To begin, conducting a meter-based analysis of all implemented programs for the past 3
12 years would provide a baseline of data for the EE, DR, and DERs installed at host sites.
13 This measurement would provide baseline data for understanding the metered impacts
14 and peak load reductions delivered by the past programs and identify the customer
15 characteristics and retrofit combinations that delivered outsized impacts on peak
16 reductions.

17 These data would provide the current EWR programs an understanding of how to
18 proactively serve customers. Such an assessment would also assist program
19 administrators and regulators in adapting for the upcoming program cycle to maximize
20 peak savings, aggregate demand flexibility, and deploy VPPs. Further, not only would
21 this analysis support the EWR programs directly, it would also serve utility infrastructure
22 planning as such a baseline of impacts could support an analysis of what resources could
23 be procured from EE, DR, and DERs at host customer sites moving forward. Using the

1 Benefits Cost Analysis tool, these analyzed resources could be valued and their
2 procurement weighted against conventional resources.

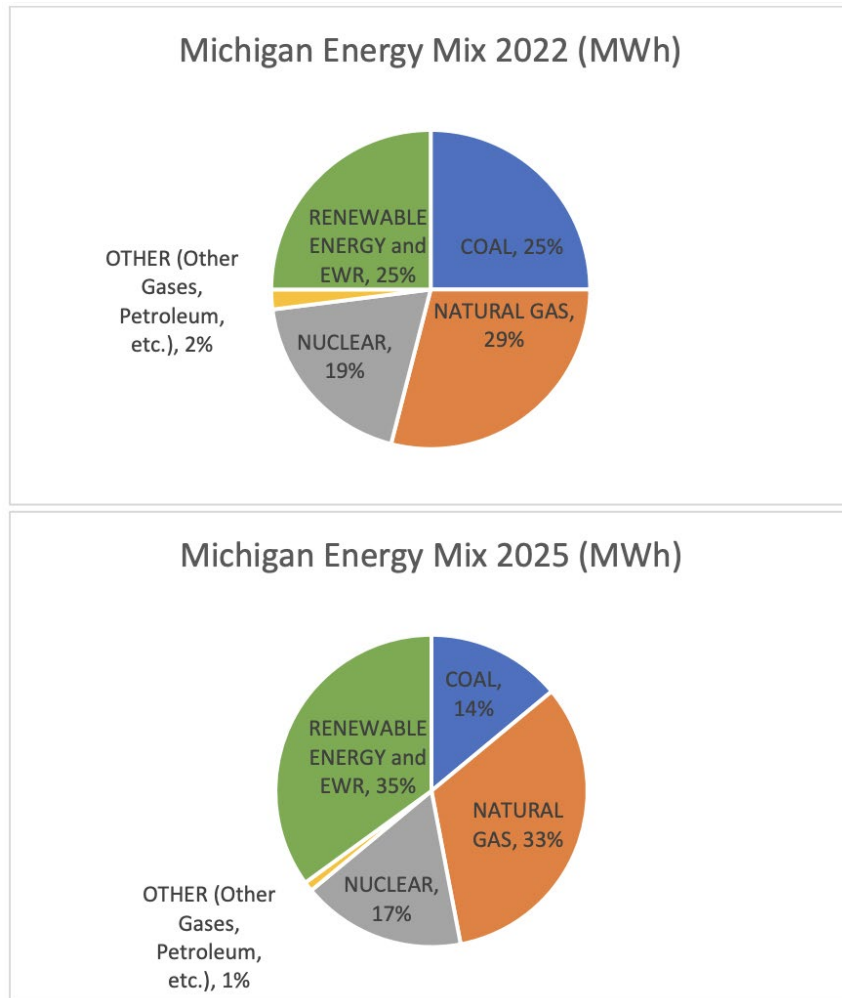
3 This analysis and valuation could create the business case for aggregators and host
4 customers to participate, should they be compensated based on the measured impacts of
5 their retrofits. As results are delivered, the funding for these resources could come not
6 from the EWR programs, but from the utility procuring power and demand flexibility
7 from the aggregated VPP.

8 The Company has ambitious goals to deliver 20% of capacity through Customer EE
9 programs by 2030⁹⁵. However, the current programs are not measured at the meter, so the
10 actual delivery of peak power cannot be assessed. Further, as seen in in Figure 12 below
11 from the Public Service Commission's 2023 report on the EWR Programs, the total
12 projected supply from Renewable Energy and the EWR programs was projected to be
13 30% in 2025, less than half the 62% promised in the previous integrated resource Plan for
14 2030.⁹⁶

⁹⁵ Consumers Energy, 2019, 2019 Clean Energy Plan, Accessed at <https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374>, on 9/23/2025

⁹⁶ Consumers Energy, 2019, 2019 Clean Energy Plan, Accessed at <https://www.consumersenergy.com/-/media/CE/Documents/sustainability/integrated-resource-plan-summary.ashx?la=en&hash=9F602E19FE385367FA25C66B6779532142CBD374>, on 9/23/2025

Figure 12: Michigan's Electric Resource Mix – 2022 vs. Projected 2025



This shows that while current EWR programs have delivered mightily to this point, they are not yet sufficient to be used in planning infrastructure for the company.⁹⁷ There remains significant room to grow to deliver 20% of the Company's capacity by 2030. The measurement at the meter of the EWR programs would verify the performance of implemented measures and remove the impacts from the "black box" the utility has been hiding them in.

⁹⁷ Discovery: Witness: Michael P. Kelly Date: August 26, 2025 U21870-GLREA-CE-0302 Page 1 of 1, Exhibit 2

1 **Q: How long would it take to deploy a Virtual Power Plant?**

2 A: Depending on the resource aggregation, program design, M&V, and funding stream,
3 VPPs can be deployed in relatively short timeframes. National Grid deployed their VPP
4 in less than 4 months in preparation for the summer months.⁹⁸

5 “Relatively basic VPPs that deliver bulk system peaking capacity can be launched in a short
6 timeframe (<6 months) with minimal upfront cost (<\$1M), while providing high-value peak
7 shaving benefits to ratepayers and the grid. These basic VPPs can build additional capabilities over
8 time and establish a foundation for more sophisticated models in several ways. Grid services,
9 frequency of dispatch, and scale can all increase incrementally if and when needed. Within the
10 utility, operating a basic VPP at scale produces a wealth of historical DER and participant behavior
11 data that can be used to train predictive models of VPP performance; this can help a utility set
12 appropriate incentive payment levels, set event frequency limits to prevent participant attrition, test
13 automatic enrollment effectiveness, and more. Building the VPP’s dispatch ‘track record’ can also
14 help grid planning teams better understand the value of the resource and model the VPP resource
15 into future generation, transmission, and distribution investment scenarios. Outside of the utility,
16 customers become familiar with VPP participation options and participants grow accustomed to
17 potential changes in behavior (if any). Regulators also gain familiarity and comfort with VPPs as a
18 reliable tool to manage the grid more affordably and reliably.”⁹⁹

19 The case studies above and the Department of Energy’s Liftoff report show that VPPs
20 can be deployed swiftly, and at dramatically reduced costs per kW procured.¹⁰⁰

⁹⁸ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

⁹⁹ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

¹⁰⁰ Real Reliability The Value of Virtual Power: https://www.brattle.com/wp-content/uploads/2023/04/Real-Reliability-The-Value-of-Virtual-Power_5.3.2023.pdf

Q: If VPPs were to be deployed, what is the utility's role?

A: The potential roles actors can take in deploying VPPs are discussed in Figure 13 from The VPP Flipbook from the Rocky Mountain Institute below. The four primary roles discussed are: Resource Offtaker, Customer Enrollment, Program Operator, and Customer Payment Channel.

Figure 13: What Is The Utility's Role in a VPP¹⁰¹

Resource Offtaker

- Responsible for determining the operating conditions of the VPP (i.e., calling the events) and settling the energy resources.
- Other actors who could play this role, beyond the utility: for wholesale market regions, resources can be dispatched (market-aware) or bid into the market (market-integrated)

Program Operator

- Responsible for coordinating devices and aggregations to perform when called upon by the resource offtaker.
- Operators may utilize a distributed energy resources management system (DERMS) to help manage multiple data inputs to optimize and automate operations and value stack across technologies.
- Other actors who could play this role, beyond the utility: third-party service provider

Customer Enrollment

- Responsible for enrolling and aggregating DERs
- Other actors who could play this role, beyond the utility: third-party aggregators, installers, and/or original equipment manufacturers (OEMs)

Customer Payment Channel

- Responsible for delivering customer payments or incentives.
- Other actors who could play this role, beyond the utility: third-party aggregators and/or OEMs. Can be the same or different as the party responsible for customer enrollment.

Utilities may procure many or all VPP services from third-party technology and service providers. Utilities and third parties often share in the responsibility of marketing and communicating programs to customers to maximize customer enrollment.

An alternative way to describe the above roles required to run a VPP are:

1. Buyer (Resource Offtaker): The entity that is purchasing demand flexibility from the VPP.
2. Seller (Customer Enrollment): The entity that is aggregating and selling the demand flexibility.
3. Program Administrator (Program Operator): The entity that is coordinating the

¹⁰¹Rocky Mountain Institute, 2024, "Virtual Power Plant Flipbook" Accessed at <https://rmi.org/insight/virtual-power-plant-flipbook/?submitted=1#thank-you> on 9/23/2025

operation of the VPP.

4. Market Manager (Customer Payment Channel): The entity responsible for measurement, verification, valuation, and payment for delivered grid resources.

5. Hosts: Entities that are hosting the technology to be aggregated.

Each of these primary roles can be operated by the utility, however, they need not be. Rather, it is critical to create a Market where the resources aggregated in VPPs can be bought and sold. Effective VPP design includes the opportunity to integrate multiple technologies and vendors, encouraging partnerships that leverage complementary capabilities. Each role may be distributed based on the conditions of the market in which the VPP is operating and the needs of the grid. This opens the possibilities for both Utility- and 3rd-Party- aggregated VPPs. Rather than focusing on a specific type of aggregation, regulation could be developed to facilitate the rapid deployment of resources, agnostic to the operator, rather, focused on the affordable delivery of resources.

Creating VPPs as a market where individuals and aggregators can trade resources is critical because it allows hosts that already have technologies available to sell the grid resources they have available. For example, there are roughly 100,000 battery-electric and plug-in hybrid vehicles driving in Michigan today, a number that is only expected to grow, representing up to 575 MW and 1.6 GWh of capacity available to the grid today¹⁰² if hosts participated. In terms of scale, this is a greater amount of capacity than was

¹⁰² Richard Boehnke, Utility Dive, July 2025, "Reimagining the grid for the 21st century with virtual power plants", Accessed at, <https://www.utilitydive.com/news/reimagining-the-grid-for-the-21st-century-with-virtual-power-plants/754077>, on 9/25/2025

1 cleared in the 2025 MISO Planning Resource Auction.¹⁰³ Further, in a study of over
2 13,000 participants, Octopus Energy found that managed charging provides significant
3 load-shifting and led to a 42% reduction in peak household electricity use.¹⁰⁴ With a
4 market to buy and sell demand flexibility, based on transparent, replicable measurement,
5 verification, and valuation, those resources already installed in Michigan could be
6 aggregated to immediately and affordably support the electricity grid.

7 **Q: What are the expectations of the host sites or customers?**

8 A: Similar to the utility roles, there are several ways that customers can be involved in a
9 VPP. One initial decision is who owns the equipment that is being aggregated into the
10 VPP. Customers may bring their own devices or purchase one with aggregator support, or
11 have one purchased for them by the entity procuring the electricity because it is more cost
12 effective than traditional generation.¹⁰⁵ Coupled the value the hosts commit to providing
13 the grid, the technologies they install could also increase the efficiency, safety, comfort,
14 and resiliency of their residences, and these DERS could be financed using a variety of
15 mechanisms.¹⁰⁶ Figure 14 shows the variety of roles that impact host customers.

¹⁰³ SYSO, May 2025, “MISO’s 2025/26 Capacity Auction: New Curve, Higher Prices, Shrinking Surplus”, Accessed at <https://www.sysotechnologies.com/2025/05/15/miso-2025-2026-capacity-auction-results> on 9/25/2025

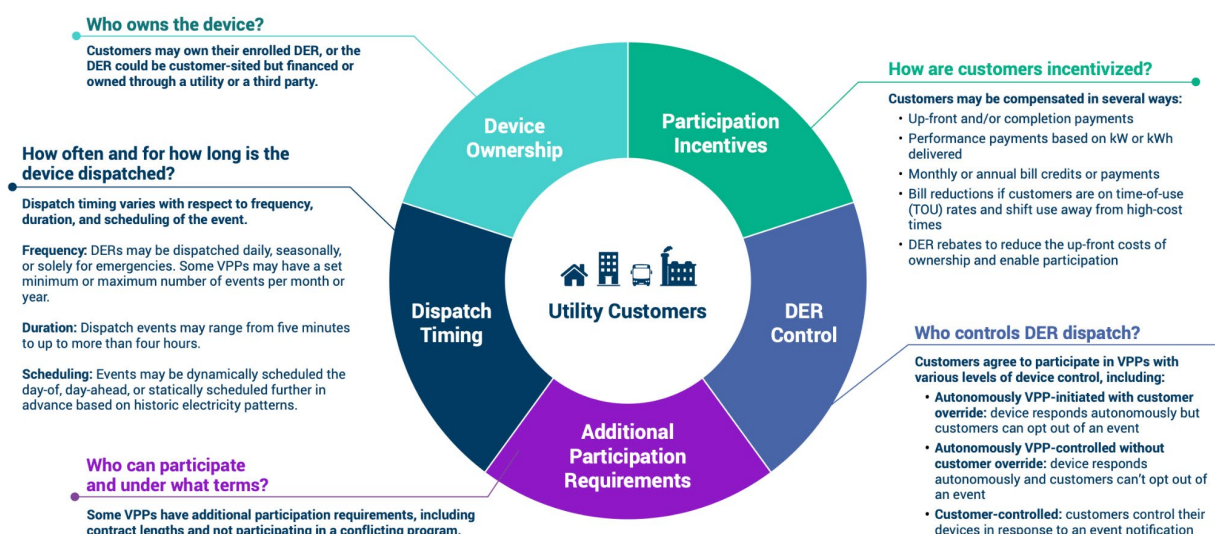
¹⁰⁴ Centre for Net Zero, September 2025, “AI in Charge, Large-Scale Experimental Evidence on Electric Vehicle Charging Demand, Accessed at <https://www.centrefornetzero.org/papers/ai-in-charge-large-scale-experimental-evidence-on-electric-vehicle-charging-demand> on 9/25/2025

¹⁰⁵ Rewiring America, September 2025, “Homegrown energy: How household upgrades can meet 100 percent of data center demand growth”, Accessed at <https://www.rewiringamerica.org/research/homegrown-energy-report-ai-data-center-demand>, on 9/23/2025

¹⁰⁶ Ibid

Figure 14: How are Customers Engaged in a VPP¹⁰⁷

There are various ways with different levels of involvement to engage customers in VPP decisions.



Successful VPP deployments must focus on equity, ensuring participation models address unique adoption barriers faced by low-to-moderate income (LMI) and disadvantaged communities.¹⁰⁸ Streamlining customer experience during enrollment and participation to limit the burden and maximize the benefits of participation is a key component of effective VPP design. In order to maximize the immediate impacts of VPPs, it is critical to allow aggregations of residential customers, not limiting the size of the aggregated assets only to larger entities.¹⁰⁹

The decisions surrounding host engagement rely upon the VPP design and the resource being aggregated. However, this is why the focus on replicable, transparent, meter-based

¹⁰⁷Rocky Mountain Institute, 2024, “Virtual Power Plant Flipbook” Accessed at <https://rmi.org/insight/virtual-power-plant-flipbook/?submitted=1#thank-you> on 9/23/2025

¹⁰⁸Department of Energy, September 2023, “Pathways to Commercial Liftoff: VPPs”

¹⁰⁹ Rocky Mountain Institute, VP3, March 2025, “Supporting a Reliable Grid: The Opportunity for VPPs in Michigan”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_For_Virtual_Power_Plants_In_Michigan.pdf, on 9/23/2025

1 evaluation is critical. With clear M&V, the mode of operation and host engagement is
2 then a choice for the entity aggregating the resources based on their business model.
3 Regardless, the impact of that aggregation is weighed in a standard, replicable way,
4 allowing for other aggregations of resources and business models to participate as well,
5 being paid on the delivery of the procured resource, not on the specifics of the
6 aggregation design.

7 **Q: What is the role of regulators in enabling VPPs?**

8 A: The Commission has the ability to support VPP deployments in several ways. As part of
9 their mandate to ensure affordable and reliable electricity service and focusing on how
10 VPPs can address near-term challenges, as seen in Figure 15 below, the Commission can
11 direct the Company to fairly consider VPPs prior to conventional capital investments,
12 including bulk power generation, transmission, and distribution due to studies showing
13 the significant cost savings to ratepayers.¹¹⁰

¹¹⁰Department of Energy, January 2025, "Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

1 Figure 15: How VPPs address near-term grid challenges¹¹¹

Near-term grid challenge	VPP value proposition	Example
 Reliability: Rapid demand growth	Impact #1: VPPs provide valuable peak shaving benefits 10-20% of 2030 peak demand could be served by VPPs	• Portland General Electric's VPP reduced peak demand load by 2% in 2024; PGE is targeting 25% of peak demand met by flexible load solutions by 2030.
	Impact #2: VPPs are quick to deploy Basic VPPs can be operationalized in <6 months to meet rapid growth	• National Grid launched its ConnectedSolutions program in under 4 months to provide peak shaving benefits.
 Affordability: Upward pressure on customer costs from growing capital investments	Impact #3: VPPs are low-cost solutions VPP peaking capacity is 40%+ cheaper than a conventional peaker plant VPPs can reduce distribution costs by providing greater locational visibility and control VPPs can offset energy bills by compensating customers	• ConEdison deferred a \$1.2B substation upgrade, spending \$200M on DERs and demand reduction measures instead. • United Power used 95 MW of flexible DER capacity and improved grid visibility to reduce transformer outages from 25,000 min/year to near 0. • San Diego Community Power uses their Solar Battery Savings Program to incentivize customers to adopt residential batteries for daily dispatch to realize \$5M of Resource Adequacy savings.
 Resilience: Increasingly frequent extreme weather events	Impact #4: VPPs improve grid reliability and resilience Solar with batteries and/or fuel generator VPPs can provide backup power during emergencies	• Duke Energy spent \$14.5M on a microgrid to provide reliable power to a rural town at a lower cost than alternatives. • Green Mountain Power's Zero Outages initiative plans to combine traditional resilience approaches with energy storage deployment through batteries and microgrids.

As mentioned in the above testimony, it is critical to establish:

1. A transparent, replicable system of M&V based on metered impacts
 2. A transparent valuation of the resources to be aggregated, enabling cost comparisons to be created between VPPs and conventional generation and business plans to be developed for their deployment.
 3. A market where the aggregations of VPPs can be bought and sold
- Another key role regulators can play is to ensure VPPs are compensated fairly with robust funding streams. The lack of integrated procurement in California, for example, has begun to eliminate one of the worlds largest VPPs run by the Demand Side, Grid

¹¹¹Department of Energy, January 2025,"Pathways to Commercial Liftoff: VPPs 2025 Update" Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

1 Support program, which manages more than 200 MW in capacity according to the
2 California Energy Commission.¹¹²

3 “Compensation structures such as ongoing performance payments for the provision of
4 grid services and/or time-varying or dynamic tariffs can unlock sustainable participation
5 from these assets to maintain the customer buy-in and support the grid needs in time of
6 summer stress. Regulators can add review and advance DER compensation, rate design,
7 and performance payment policies that fairly compensate for the services DERs provide -
8 including emergency summer response services - in a technology-neutral way.”¹¹³

9 **Q: What have regulators done to enable successful Virtual Power Plants in other**
10 **states?**

11 A: See below from the Clean Energy Group regarding the ConnectedSolutions program.
12 While these recommendations pertain directly to designing a successful program
13 delivering grid resources using stationary batteries, they offer a roadmap for the
14 Commission to begin working towards broad VPP deployment. Note, this report was
15 completed in February of 2021, and the program continues to deliver significant
16 resources to the grid, directly contrasting the perspective of the Company that EE, DR,
17 DERs, and VPPs are either to nascent or insufficient to reliably deliver.¹¹⁴

- 18 1. “Follow the steps taken in other states, with appropriate adaptations. These include:
19 a. Integrate peak demand reduction into the state’s energy efficiency plan

¹¹² PV Magazine, September 2025, “California cuts funding for nation’s largest virtual power plant”, Accessed at <https://pv-magazine-usa.com/2025/09/15/california-cuts-funding-for-nations-largest-virtual-power-plant> on 9/23/2025

¹¹³ Rocky Mountain Institute, VP3, July 2024, “Meeting Summer Peaks: The Need for VPPs”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf, on 9/23/2025

¹¹⁴ See direct testimony from witnesses Gast and Kelly above

- 1 b. Specify that BTM batteries are eligible as a peak-reducing or active demand response
- 2 measure
- 3 c. Show that batteries pass the cost/benefit test required for inclusion in the efficiency
- 4 plan
- 5 d. Require efficiency plan administrators to develop a customer battery program within
- 6 the efficiency plan
- 7 e. Ensure that the state's related policy goals are supported by the battery program
- 8 f. Review existing regulations and program rules for needed updates to accommodate
- 9 BTM batteries and allow benefit stacking.
- 10 g. Address distribution system hosting capacity shortfalls as necessary
- 11 2. Provide incentives and financing to help cover up-front costs. The ConnectedSolutions
- 12 model can provide a customer payback through utility pay-for-performance contracts, but
- 13 the customer still has to pay the up-front costs of purchasing and installing a battery. The
- 14 addition of an up-front rebate and/or low- or no-cost financing to this model can help
- 15 customers overcome the initial cost barrier, especially in the case of low- and moderate-
- 16 income customers.
- 17 3. Offer long-duration customer contracts. The duration of customer pay-for-performance
- 18 contracts is critically important for risk reduction and financing—the longer the better.
- 19 4. Allow power export to the grid. Allowing power export in addition to load reduction, and
- 20 counting exported power toward customer performance payments, prevents regional peak
- 21 demand reduction contributions from being limited by the size of the customer's load. This
- 22 is important for project economics, especially for residential and small commercial
- 23 customers, and allows the full grid benefits of BTM batteries to be realized.

1 5. Avoid excessive metering requirements. Simple solutions, such as using inverter readings,
2 are recommended over more complicated and costly solutions, such as requiring customers
3 to install multiple electric meters to monitor battery charging and discharging.

4 6. Coordinate between clean energy incentive programs. BTM battery storage customers may
5 need to stack multiple incentives and revenue streams to make their investment pay off; for
6 that to happen, the state's suite of clean energy regulations and programs must work
7 together.

8 7. Recognize the value of customer resilience. To make pay-for-performance battery
9 programs work, state policymakers and utility program administrators need to
10 acknowledge and support the resilience needs of individuals and communities.

11 8. Predict and address interconnection barriers early. Numerous BTM storage projects have
12 been delayed or cancelled due to unexpected high costs of interconnection when line
13 upgrades are required. When developing BTM solar and storage programs, states should
14 assess utility hosting capacity”¹¹⁵

15 Rather than focusing on a specific technology, I recommend the Commission and Staff
16 focus on enabling VPPs aggregating all DERs, including but not limited to: EE measures
17 (home insulation, heat pumps, smart thermostats, etc...), energy storage (heat pump
18 water heaters, home batteries, electric vehicle charging), and distributed generation
19 resources like solar panels.

20 **Q: What are the steps to deploying a Virtual Power Plant?**

21 **A: Prior to launching a VPP, beyond the recommendations listed above: Establishing**

¹¹⁵Clean Energy Group, February 2021, “Connected Solutions, A New State Funding Mechanism to Make Battery Storage Accessible to All”, Accessed at <https://www.cesa.org/wp-content/uploads/connected-solutions-policy.pdf>, on 9/23/2025

1 transparent and replicable M&V, Valuation, and a Market; data access must also be
2 considered.

3 “Lack of access to high quality customer energy data, grid data, and information about
4 the ownership and location of DERs limits aggregators’ ability to establish and operate
5 reliable VPPs that can participate in wholesale markets. Hourly and daily customer
6 energy data is required for aggregators to complete wholesale market processes such as
7 receiving customer consent to access data, calculating baselines and performance, and
8 implementing settlement procedures. Most ISO/RTOs require VPP aggregators to use
9 customer energy data from utility-owned meters, yet most utilities limit third-party data
10 access, citing cybersecurity and data privacy concerns. Aggregators must follow varied
11 and often lengthy processes to access customer energy data from utilities, which makes it
12 difficult to know if, when, and in what format data will be shared across utilities even
13 within the same ISO/RTO region. Aggregators have had limited success in improving
14 data access rules despite filing complaints and requesting improvements. FERC has
15 stated that customer usage data access is not within FERC’s jurisdiction, leaving it to
16 individual ISO/RTOs, states, tribes, or utilities to determine data access policies.”¹¹⁶

17 While the Company does allow meter-data access to aggregators, those data are provided
18 in excel spreadsheets.¹¹⁷ This process, which requires a customer signature and valid
19 Letter of Authorization¹¹⁸ from the customer, places a high burden on the aggregator and
20 can create delays in analysis and project development. Further, without broad use of

¹¹⁶ Department of Energy, January 2025, “Pathways to Commercial Liftoff: VPPs 2025 Update” Accessed at https://virtual-peaker.com/wp-content/uploads/2025/09/2025-Jan-LIFTOFF_DOE_VirtualPowerPlantsUpdate.pdf, on 9/23/2025

¹¹⁷ Discovery: Witness: Jeffrey A. Myrom Date: August 26, 2025 U21870-GLREA-CE-0271 Page 1 of 2

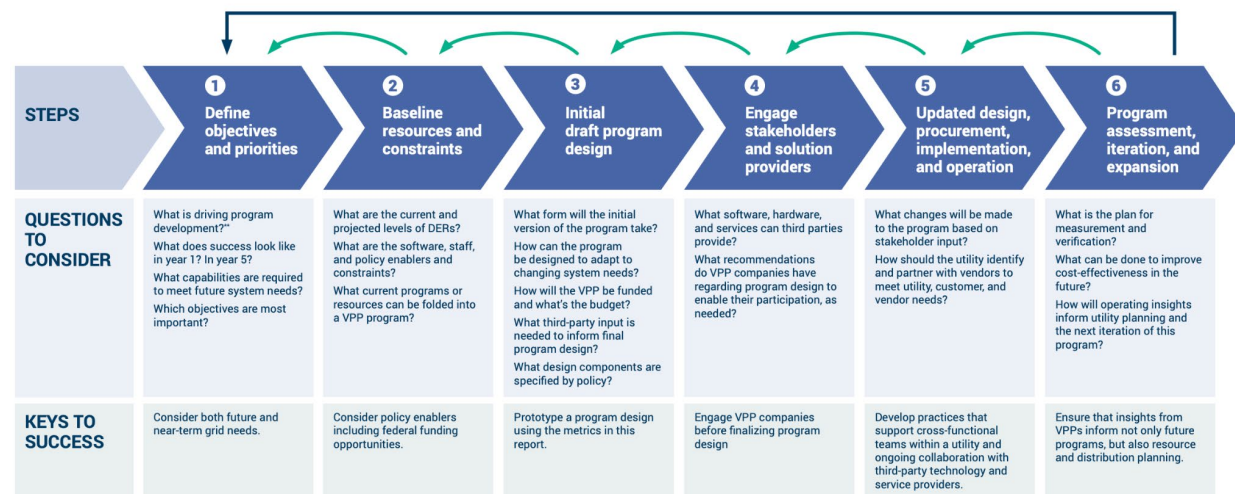
¹¹⁸ Discovery: Witness: Jeffrey A. Myrom Date: August 26, 2025 U21870-GLREA-CE-0271 Page 1 of 2

Advanced Metering Infrastructure data to analyze and identify customers with the greatest need, aggregators do not have the telemetry capabilities to identify hosts for critical grid infrastructure that will be aggregated into a VPP.

Once these conditions are met, the steps to deploy a VPP are similar to those for beginning any project and are listed in Figure 16 below.

A. Figure 16: What are the steps to deploy VPPs?¹¹⁹

VPP design and initial implementation involves six main steps for utilities*



* The six steps are not strictly linear. Insights will be iteratively incorporated to refine design and inform implementation.

** VPPs may be developed in response to a policy mandate, planning need, or proactively to test and develop new capabilities. In all instances, the same six general steps will apply.

VPPs have the capability to adapt to the evolving grid. As opposed to a static asset or aggregation, as with conventional generation, the valuation of procured resources can change over time and change the resources that are purchased without the same, significant investment of a large, fixed asset. This flexibility in contracting allows the VPP to meet the evolving system needs and technology capabilities. This capacity is maximized when developing and maintaining technology-neutral programs that enable

¹¹⁹Rocky Mountain Institute, 2024, "Virtual Power Plant Flipbook" Accessed at <https://rmi.org/insight/virtual-power-plant-flipbook/?submitted=1#thank-you> on 9/23/2025

1 flexible participation and value stacking to procure all resources that a given technology
2 can provide.¹²⁰ Remember, a well-maintained gas peaker plant can last for 30-40 years¹²¹,
3 and we build the infrastructure to facilitate that lifespan. Similar care and support should
4 be given to developing VPPs to ensure the longevity of their delivered grid services.

5 Further to enable robust VPPs, as recommended in Meeting Summer Peaks: The Need for
6 VPPs from the Rocky Mountain Institute, it is critical to focus on effective program
7 design to enable the ongoing delivery of grid services from VPPs.

8 “EFFECTIVE PROGRAM DESIGN

- 9 1. Open access in a VPP to integrate multiple technologies, vendors, and programs.
10 2. Develop partnerships that leverage third-party capacity and complementary
11 capabilities.
12 3. Streamline customer experience during enrollment and participation.
13 4. Execute long-term programs (5+ years) with enrollment and operating terms to
14 improve cost-effectiveness.
15 5. Incentivize DERs to enable additional customer participation.”¹²²

16 Critical to enabling VPPs is working with the Company to analyze, develop, and
17 implement planning processes that will then integrate VPPs into the Company's
18 procurement processes. According to questions in discovery from Witness Scott A.

¹²⁰Rocky Mountain Institute, VP3, February 2024, “VPP POLICY PRINCIPLES”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/02/vpp_policy_principles_updated.pdf, on 9/23/2025

¹²¹ Brenda Rose, Medium, April 2023, “What is the typical lifespan of a gas-fired power plant and how is maintenance and replacement managed?”, Accessed at <https://medium.com/@Breadarose/what-is-the-typical-lifespan-of-a-gas-fired-power-plant-and-how-is-maintenance-and-replacement-24aec33dad14> on 9/23/2025

¹²²Rocky Mountain Institute, VP3, July 2024, “Meeting Summer Peaks: The Need for VPPs”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2024/06/VPP_reliability_brief.pdf, on 9/23/2025

1 McPhail, “no peak demand reductions are included in the load forecast related to VPP”¹²³
2 and Laura M. Connolly, “The Company has not completed cost/benefit analysis of VPPs
3 compared to traditional company assets.”¹²⁴ This lack of analysis or forecasting into these
4 resources represents an opportunity for the Commission to assist the Company to deploy
5 these processes, partner with industry experts, and rapidly procure grid services from
6 VPPs. Further, the absence of including VPPs in the utilities procurement processes will
7 increase the likelihood of purchasing underutilized generation assets, curtailment and
8 even stranded assets.

9 **Q: What are your recommendations to the Commission?**

10 A: As demonstrated above, VPPs are significantly less costly and faster to implement than
11 traditional resources. Further, the utilities have rate-based funding streams from the EWR
12 programs to begin deployment without additional capital expenditures. Finally, there are
13 hundreds of thousands of non-aggregated assets in the State in the form of electric
14 vehicles to home batteries, thermostats to heat-pump-water heaters, distributed
15 generation, and more that are currently available for deployment. In order to
16 operationalize the suite of these resources, I recommend a suite of actions to begin laying
17 the foundation for VPP development and aggregation.

18 **Immediate Recommendations:**

19 1. Establishing a transparent, replicable system of M&V based measured results.

20 The Commission staff could adopt OpenDSM, or another, similar robust system and

¹²³ Discovery: Witness: Scott A. Mcphail Date: August 26, 2025 U21870-GLREA-CE-0282 Page 1 of 1, Exhibit 2

¹²⁴ Witness: Laura M. Connolly Date: August 26, 2025 U21870-GLREA-CE-0297 Page 1 of 1, Exhibit GLREA-3.

1 should enlist an expert to assist the MPSC gain the intelligence to launch the system
2 within the next 12 months.

3 2. Complete a meter-based assessment Backcast and Targeting Exercise of the
4 Company's EWR programs (Energy Efficiency, Demand Response, and Distributed
5 Energy Resource programs) for the past 3 years using the established meter-based,
6 transparent, replicable system of M&V cited in item 1 within the next 12 months.

7 a. The study should be completed by a 3rd party in a transparent, replicable manner
8 to facilitate consistent data and impact reporting.

9 b. This M&V system could then be used to measure the impacts of future EWR
10 programs as well as future VPPs.

11 c. The study should include an assessment of customer sites served, retrofits
12 implemented, and delivered savings both total, and peak savings.

13 d. The study should also include an analysis of participating customers' electricity-
14 usage profiles to understand which types of customer loads would likely deliver
15 outsized impacts for future program implementations.

16 e. The Targeting Exercise should assess all non-participants in the Company's service
17 territory to understand their loadshape characteristics, peak load, and have the
18 capability of identifying which customers may benefit from specific retrofits. An
19 example of this analysis is that completed by Recurve for Ameren Illinois.¹²⁵

¹²⁵ Recurve, 2024, "Recurve Supports Ameren Illinois' Community Small Business Energy Efficiency Program During COVID", Accessed at <https://www.youtube.com/watch?v=CIDGP1d0Q2Y> on 9/29/2025

1 f. The assessments should include a valuation of delivered resources, or value
2 potential as identified in the Targeting Exercise, using the Benefits Cost Analysis
3 tool.

4 3. The Commission can require that VPPs be included in the Company's Integrated
5 Resource Planning (IRP) process, not only to support the fulfillment of the Company's
6 past commitment that 20% of energy demand be met by EWR programs by 2030 but to
7 expand up on it to deliver affordable services to ratepayers.

8 4. Require the assessment of the EWR programs cited in recommendation 2 as a
9 foundation for assessing the cost of delivery for a VPP and supplementing with results
10 from currently delivering VPPs aggregating batteries, thermostats, heat pumps, and a
11 variety of other technologies.

12 **2026 Recommendations:**

13 5. Complete an assessment similar to the headroom assessment conducted in
14 Rethinking Load Growth from the Nicholas Institute for Energy, Environment &
15 Sustainability for the MISO Zone 7, aggregating also to Consumers and DTEs territories.
16 This assessment would show the currently available headroom on the Company's grid
17 and identify critical geographic areas for deployment of VPPs.

18 6. Deploy the Benefits Cost Analysis tool in Quarter 1 of 2026, focusing the
19 development to support business planning for VPP and consistent valuation of grid
20 services across resources (e.g. VPPs and traditional generation).

21 7. The Commission should allow the aggregation of residential and small
22 commercial retail customers participating in wholesale markets and unbundle existing

1 retail tariff mechanisms. This would build on the progress from Case U-21099 and fully
2 lift the partial ban on aggregators of retail customers, allowing the aggregation of
3 residential and smaller C&I customers with appropriate customer protections.¹²⁶

4 **Q: Does this complete your testimony?**

5 **A:** Yes.

¹²⁶Rocky Mountain Institute, VP3, March 2025, “Supporting a Reliable Grid: The Opportunity for VPPs in Michigan”, Accessed at https://rmi.org/wp-content/uploads/dlm_uploads/2025/03/Supporting_A_Reliable_Grid_The_Opportunity_For_Virtual_Power_Plants_In_Michigan.pdf, on 9/23/2025

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

EXHIBIT GLREA-1

**TO TESTIMONY OF
RICHARD BOEHNKE**

On Behalf of
Great Lakes Renewable Energy Association

September 30, 2025

Richard Boehnke

734.646.8641 • rick.boehnke@gmail.com

EDUCATION

Delft University of Technology August 2015 - August 2017
Master of Science (MSc.) and Master of Engineering (ir.): Sustainable Energy Technology Delft, Netherlands
Master Thesis: Engaging Cities – Overcoming Barriers to Climate Action
Fulbright Scholar

University of Michigan August 2007 - April 2012
Bachelor of Science: Biochemistry Ann Arbor, Michigan

Washtenaw Community College January 2025 – Present
Continuing Education - Welding Ann Arbor, Michigan

Louisiana State University August 2023 – December 2024
Graduate Student - Ceramics Baton Rouge, Louisiana

Arapahoe Community College and Community College of Denver January 2022 – May 2023
Continuing Education - Art Foundation Courses Littleton & Denver, Colorado

EXPERIENCE

Director, Demand Flexibility Markets August 2021 – January 2023

Customer Solutions Manager August 2020 – August 2021
Recurve Remote

- Developed strategic business unit from \$0 - \$5M in revenue deploying novel Virtual Power Plant (VPP) implementation, creating a market transacting on \$35M within 18 months
- Led all aspects of new strategic business unit, including product development, client management, process/program design and implementation, stakeholder engagement, and hiring
- Directed vision, writing, and execution of state-compliant Measurement & Verification (M&V) and Implementation Plans for novel VPP deployment
- Drove development of software products to visualize program data and analytics, support internal program implementation, and fulfill external client needs
- Managed contracts, analytics, reporting, and deliverables for 16 utility clients, 50% of company's client base
- Leveraged research and data analytics to develop novel program designs, expand infrastructure planning, and increase grid impacts by up to 300% while maintaining existing utility program budgets
- Provided thought leadership to deploy energy efficiency and demand-side programs as grid infrastructure and connected programs with project finance

Program Manager – Commercial, Industrial, and Public Sectors July 2018 – July 2020
Franklin Energy Chicago, Illinois

- Spearheaded design and execution of utility energy efficiency programs, \$8M+ portfolio, for commercial, industrial, and public sectors, aligning cross-functional teams to optimize budget allocation and program ROI
- Led program teams to identify and administer energy projects securing 17M+ m³ of annual natural gas savings, exceeding client KPIs while maintaining high client retention and satisfaction
- Pioneered data-driven program strategies, analyzing participant feedback and energy metrics to refine outreach, boost portfolio-wide savings, and cost-effectively hit increased program targets
- Built and maintained cross-functional partnerships with engineering, operations, sales, and external stakeholders to hone program processes, accelerate implementation timelines, and expand market reach
- Cultivated trusted advisor relationships with utility clients, driving 100% contract renewals through tailored, client-centric solutions

Richard Boehnke

734.646.8641 • rick.boehnke@gmail.com

Researcher – Energy Projects & Policy

October 2016 – September 2017

Ecofys, A Navigant Company

Utrecht, Netherlands

- Established international network of 26 organizations, including 20 municipal governments, to collaboratively share deployment strategies; identified efficiencies to reduce costs of over \$200,000 annually
- Researched and spread good practices to reduce information and financial barriers and speed implementation of municipal clean energy and transportation programs
- First author of publication in the Journal of Cleaner Production
- Evaluated climate policies in collaboration with Energy Policies, Urban Energy, and Sustainable Industries & Services departments to identify growth opportunities for business
- Identified new areas to add project value and increase RFP wins through stakeholder interviews and analysis of municipal and national energy and emissions data

Ceramics Instructor

February 2025 – Present

Clay Work Studio

Ann Arbor, Michigan

- Designed curriculum emphasizing problem-solving and material exploration for diverse skill levels
- Shared collaborative mentoring in quality control and sustainable practices for technical outputs

Graduate Student – Ceramics

August 2023 – December 2024

Louisiana State University

Baton Rouge, Louisiana

- Appointed to the search committee for the Dean of the College of Art and Design for two years
- Selected as founding resident for 3-week Open Experimental Studio summer residency at Glassell Gallery
- Organized an artist lunch with Beth Cavener for 20 students from LSU and University of Louisiana Lafayette
- Teacher, mentor, and coach for students in the College of Art and Design

PUBLICATIONS

- **Journal of Cleaner Production, 2019** - “Good practices in local climate mitigation action by small and medium-sized cities; exploring meaning, implementation and linkage to actual lowering of carbon emissions in thirteen municipalities in The Netherlands”
- **American Council for an Energy-Efficient Economy, Summer Study 2022** - “Demand FLEXmarket -- Creating a Market Access Model to Unleash Solutions Providers and Scale Demand Flexibility”
- **Ceramics Monthly – Clay Culture, May 2023** – “Sustainability in Ceramics – Just Because You Made It, Doesn’t Make It Special”

ADDITIONAL EDUCATION & CERTIFICATIONS

Fellow, Clean Energy Leadership Institute, Chicago, IL

September 2020

Certified Energy Manager (CEM), Association of Energy Engineers (AEE)

April 2020

Fulbright Scholarship, Delft University of Technology

August 2015 – August 2017

SHOWS & EXHIBITIONS

- **2-Day Demonstration Workshop**, Ann Arbor Potters’ Guild, Ann Arbor, MI 2025
- **The Art of the Cup**, Center for Southern Craft & Design, Exhibiting Artist, New Orleans, LA 2024
- **Ceramics Now!**, Exhibiting Artist, Lafayette, LA 2024
- **The Mudflat Cup Show** juried by Martha Grover, Sommerville, MA 2024
- **Crescent City Clay Fest**, Exhibiting Artist, New Orleans, LA 2023
- **9 Weeks**, Exhibiting Artist, Baton Rouge, LA 2023
- **University of Mississippi National Juried Graduate Exhibition**, Honorable Mention 2023
- **Artistonish Magazine 35th Issue**, Online 2023
- **The Dock Gallery, Sculpture Show**, Denver, CO 2023
- **Arapahoe Community College Fine Art Student Exhibition**, Denver, CO 2022
- **Ann Arbor Street Art Fair, the Original 2010**, Emerging Artist, Ann Arbor, MI 2010
- **Yourist Gallery, Exquisite Cup**, Exhibiting Artist, Ann Arbor, MI 2009

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

EXHIBIT GLREA-2

**TO TESTIMONY OF
RICHARD BOEHNKE**

On Behalf of
Great Lakes Renewable Energy Association

September 30, 2025



August 26, 2025

Via Electronic Mail

Don L. Keskey, Esq.
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823

RE: Case No. U-21870 – In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief.

Dear Mr. Keskey:

Attached to this letter are copies of the following documents:

- A copy of your August 14, 2025 interrogatories with our internal numbering system annotated in the margins;
- Consumers Energy Company's response to 21870-GLREA-CE-0270-0278, 0280-0282, 0287-0289, 0291-0293, 0295-0299, 0301-0302; and
- The attachments pertaining to 0272, 0273, and 0274 are being provided electronically to all parties.

A Proof of service has been electronically filed in this docket. Please contact me if you have any questions regarding this matter.

Sincerely,

 Digitally signed by Gary
A. Gensch, Jr.
Date: 2025.08.26
16:38:59 -04'00'

Gary A. Gensch, Jr.

CC Parties Per Attachment 1 to the Proof of Service

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

**FIRST DISCOVERY REQUEST OF
THE GREAT LAKES RENEWABLE ENERGY ASSOCIATION
TO CONSUMERS ENERGY COMPANY**

TO: mpsec filings@cmsenergy.com
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The Great Lakes Renewable Energy Association (GLREA) serves this First Discovery Request upon Consumers Energy Company. Please serve copies of all responses, attachments, and documents to GLREA counsel Don L. Keskey at donkeskey@publiclawresourcecenter.com and to GLREA Experts Richard Boehnke at rick.boehnke@gmail.com, John Richter at johnrichter@pm.me and Robert Rafson at rob@charthouseenergy.com.

INTERROGATORIES AND REQUESTS FOR DOCUMENTS

I. Data Focus and Transparency:

21870-GLREA-CE-0270

1. At what intervals does the company collect real-time usage data from residential ratepayers?
 - a. Is data collected on a circuit or even sub-circuit level for devices (such as EVs, thermostats, etc...)? If so, what is the frequency of this data collection (e.g., every 5 minutes, every 15 minutes)?

21870-GLREA-CE-0271

2. What usage data is made available to third-party aggregators, program implementors, or other entities, and how is it provided?

- a. How is ratepayer meter data used to optimize program delivery and drive impacts?
 - i. Are customers targeted based on their loadshapes and peak usage?
 - ii. How is non-participant data used to support customer targeting?
- b. Is there a standardized data-sharing protocol (e.g., Green Button Connect or company API)? If not, please explain the process for data exchange.

21870-GLREA-CE-0272

3. Please provide zip code-level list of required infrastructure upgrades for the next 10 years including the cost of the equipment. Also:

- a. Please list the reason for the upgrades
- b. How is meter data used to inform these decisions?
- c. How do existing energy efficiency, demand response, DER, or VPP programs impact these planned developments?
- d. For investments impacting peak capacity, please list
 - i. The current peak capacity of the area in kW or MW
 - ii. The current peak demand in kW or MW
 - iii. The projected peak demand that necessitates requires the upgrade in kW or MW
 - iv. The number of ratepayers served

21870-GLREA-CE-0273

4. What is the company's policy for protecting the privacy of customer data while providing access for innovation?

- a. What measures are in place to ensure that data is anonymized and used only for program-related purposes?

21870-GLREA-CE-0274

5. Please share outage data at the granularity of zip codes and/or substations across the company's service territory for the past 5 years:

- a. How many outages were experienced within each zip code or substation unit?
- b. How many hours were ratepayers without power?
- c. How many ratepayers were without power?

- d. What was the reason for each outage recorded?
- e. For an average day, what is the low and peak load?
- f. What is the limit of power available to this location before a load curtailment event occurs?
- g. Which areas are listed as income qualified, income eligible, low income, etc...?

II. Company Research and Development (R&D):

21870-GLREA-CE-0275

- 6. Please provide all cost-benefit analyses that have been conducted on Virtual Power Plant (VPP) programs and proposals

- a. What assumptions were made regarding customer participation rates, technology costs, delivered peak impacts, and avoided company infrastructure costs?
- b. How is it anticipated that VPPs would be funded by the company?
- c. What is the percentage of peak demand was calculated that could be addressed through VPPs?

21870-GLREA-CE-0276

- 7. What percentage of the company's total R&D budget is allocated to VPPs and other distributed energy resources (DERs)? Please provide a breakdown of this spending for the last three years.

- a. What research has been funded? At what levels?

21870-GLREA-CE-0277

- 8. Please provide a list of all pilot programs regarding virtual power plants, Demand Response, or EV Charging the company has initiated or participated in over the past 3 years.

- a. For each program, include the objective, timeline, budget, and a summary of the key findings and outcomes.

21870-GLREA-CE-0278

- 9. What is the company's strategy for integrating emerging DER technologies, such as vehicle-to-grid (V2G) capable electric vehicles and smart appliances into current or future programs?

- a. What groups are partnering across the company to coordinate and drive impacts?

21870-GLREA-CE-0279

10. How is the company incorporating VPPs into its load forecasting and long-term resource planning models?

- a. How are VPPs considered as an alternative to traditional generation or transmission and distribution (T&D) infrastructure? Why?
- b. What level of cost and cost deferment has been assessed for VPP delivery?

21870-GLREA-CE-0280

11. What partnerships has the company formed with other utilities, technology providers, VPP aggregators, and academic institutions to explore or advance its VPP capabilities?

21870-GLREA-CE-0281

12. What has the Edison Electric Institute written about VPPs?
 - a. What studies have been made available?
 - b. What calculations, spreadsheets, or other data have been provided?

21870-GLREA-CE-0282

13. What assumptions regarding DR, EE, and VPPs are built into load growth calculations?
 - a. How do DR, EE, and VPPs support peak demand reductions?
 - a. 4 critical peaks in the summer
 - b. highest peak in each of 12 months

III. Peak Impacts from Existing Programs:

21870-GLREA-CE-0283

14. Please provide all data that shows peak demand reduction as measured at the meter, not deemed from a technical reference manual, from existing energy efficiency, demand response, and VPP programs for the past three years.

- a. Please share the calculated, modeled, deemed peak impacts from existing energy efficiency, demand response, and VPP programs for the past three years.
- b. Please share the methodology for measuring impacts at the meter that has been used for these programs
- c. Please share the research done to show the effectiveness and accuracy of the M&V methodology used to measure peak impacts of existing programs

21870-GLREA-CE-0284

15. For each existing residential program (energy efficiency, Demand Response, DER, or VPP), please provide the following measured data:

- a. The total number of enrolled customers and devices.
- b. The average and maximum load reduction achieved during a peak event.
- c. The value to the grid delivered, company cost savings, customer incentives
- d. The number of events dispatched in the last 3 years, and the duration of each event called
- e. The dispatch success rate (i.e., the percentage of devices that responded as expected).
- f. What criteria are used to trigger a demand response event? Is it based on a pre-determined schedule, or is it in response to real-time grid conditions?

21870-GLREA-CE-0285

16. What is the total cost of residential programs (energy efficiency, Demand Response, DER, or VPP) programs to date?

- a. Please provide a detailed breakdown of how the measured peak impacts have resulted in tangible benefits for ratepayers, such as avoided or deferred Generation, Transmission, and Distribution upgrades.

21870-GLREA-CE-0286

17. What metrics does the company use to measure customer satisfaction with these programs?

- a. Are there any data on customer churn rates or complaints related to the programs' operations?

21870-GLREA-CE-0287

18. How did the company derive \$1/kW for critical peak payments for the Critical Peak Pricing program?

a. What is the math behind this decision?

IV. Regulatory and Policy Strategy:

21870-GLREA-CE-0288

19. What are the company's top three regulatory barriers to developing and implementing VPPs, and what specific policy changes or new regulations is the company advocating for to overcome these barriers?

21870-GLREA-CE-0289

20. How do the company's current and planned EE, DR, DER, and VPP programs align with the state's climate, clean energy, and decarbonization goals?

a. Please provide specific examples of how VPPs are helping the company meet these targets.

21870-GLREA-CE-0290

21. How is the company evaluating VPPs and other EE, DR, and DERs as potential non-wires alternatives to traditional Generation, Transmission, and Distribution infrastructure investments?

a. Please provide examples of any Generation, Transmission, and Distribution projects that have been deferred or replaced by EE, DR, DER, or VPP projects.

21870-GLREA-CE-0291

22. What specific changes has the company made to its wholesale market participation rules, planning, forecasting, or processes to comply with FERC Order 2222?

a. What are the key challenges the company has faced in doing so?

21870-GLREA-CE-0292

23. What changes to the company's rate design (e.g., time-of-use rates, performance-based rates) are being considered or proposed to reflect the value of VPPs and incentivize customer participation?

V. Equity and Customer Engagement:

21870-GLREA-CE-0293

24. What specific measures is the company taking to ensure that programs are accessible and beneficial to low-income customers, renters, and other underserved communities?

- a. How do the company's programs include an impactful low-income or equity-focused component?

21870-GLREA-CE-0294

25. What is the company's stance on working with third-party aggregators of EE, DR, and DER assets?

- a. What is the current process for these third parties to interact with the company's systems and enroll customers?
- b. What, if any, are the company's plans to develop a market for VPP services?

21870-GLREA-CE-0295

26. How is the company ensuring that customer-owned DERs (e.g., rooftop solar, batteries, Electric Vehicles) are a central part of its infrastructure strategy?

VI. Financial and Cost Recovery:

21870-GLREA-CE-0296

27. Please provide the marginal hourly cost per MWh per hour of the year of grid services for ratepayers, projected out for 20 years, or as far as has been forecasted.

- a. Please provide the breakdown/itemization of these costs including but not limited to: energy, losses, ancillary services, capacity, transmission, distribution, and any other adders or other costs associated with the delivery of power to residential ratepayers

21870-GLREA-CE-0297

28. How does the company's internal analysis compare the cost and benefits of a VPP to a traditional company asset (e.g., a natural gas peaker plant or a substation upgrade)?

- a. Please provide examples of these comparative analyses.
- b. What assumptions underpin this analysis?

21870-GLREA-CE-0298

29. For all VPP-related research, pilots, and investments, please provide a detailed breakdown of the costs and the quantifiable avoided costs of implementation (e.g., deferred T&D investments, avoided peaker plant costs, wholesale market savings).

VII. Measurement and Verification

21870-GLREA-CE-0299

30. Please provide a detailed breakdown of the company's methodology for measuring and valuing the impacts of grid services provided by distributed energy resources.

- a. How do these calculations account for the locational and temporal value of these resources?
- b. How does the company measure impacts of DERs on the grid, in particular regarding peak hours?

21870-GLREA-CE-0300

31. What process does the company undergo to provide settlement to participating customers and aggregators in EE, DR, and DER programs?

- a. What is the timeline for an individual payment after an installation, event, measurement period?

21870-GLREA-CE-0301

32. How do the measured impacts from EE, DR, and DER programs impact the company's infrastructure planning?

21870-GLREA-CE-0302

33. How do the deemed or calculated impacts from EE, DR, and DER programs impact the company's infrastructure planning?

Respectfully submitted,

Don L. Keskey

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Dated: August 14, 2025

U21870-GLREA-CE-0270 (Partial)

Page 1 of 1

Question:

1. At what intervals does the company collect real-time usage data from residential ratepayers?
 - a. Is data collected on a circuit or even sub-circuit level for devices (such as EVs, thermostats, etc...)? If so, what is the frequency of this data collection (e.g., every 5 minutes, every 15 minutes)?

Response:

This response addresses the question regarding data collection from residential customers.

The Company collects usage data from residential customers at 60-minute intervals from the meter using advanced metering infrastructure (AMI).

- a. The Company does not collect data at the circuit or sub-circuit level for individual devices such as thermostats. For customers participating in the Smart Thermostat Demand Response program, usage data is collected from the meter during demand response events to evaluate load reduction.

On an as-needed basis, the Company can manually aggregate meter-level data to higher system levels such as circuit, feeder, or transformer, if required for operational or analytical purposes.

Witness: BRITTANI A. GRAY

Date: August 26, 2025

U21870-GLREA-CE-0270 (Partial)
Page 1 of 1

Question:

1. At what intervals does the company collect real-time usage data from residential ratepayers?
 - a. Is data collected on a circuit or even sub-circuit level for devices (such as EVs, thermostats, etc...)? If so, what is the frequency of this data collection (e.g., every 5 minutes, every 15 minutes)?

Response:

This answer is in specific response to electric vehicle (EV) load monitoring.

For the residential program, the Company utilizes whole-home meter disaggregation to collect hourly load data for each participating EV on a monthly basis.

For commercial and public EV charging loads that are separately metered, the Company collects data via our monthly billing cycles, which also utilizes hourly data.

Witness: Jeffrey A. Myrom

Date: August 26, 2025

U21870-GLREA-CE-0271

Page 1 of 2

Question:

2. What usage data is made available to third-party aggregators, program implementors, or other entities, and how is it provided?

a. How is ratepayer meter data used to optimize program delivery and drive impacts?

i. Are customers targeted based on their loadshapes and peak usage?

ii. How is non-participant data used to support customer targeting?

b. Is there a standardized data-sharing protocol (e.g., Green Button Connect or company API)? If not, please explain the process for data exchange.

Response:

To share usage data with third-party aggregators, program implementors, or other entities the Company requires that there be a valid Letter of Authorization (“LOA”) on file or else usage data will not be released. The LOA is the tool that establishes that there is a relationship between the aggregator and the customer. If there is an LOA on file, the Company will usually provide seasonal peak data for the specific customer.

Data typically includes registrations (reflecting the correct registration values submitted into MISO, consistent with the customer’s historical usage data) and checks that submitted amounts (seasonal peak demand matches what is ultimately used in program registrations) are accurate and properly validated, and ensuring the load amount tied to the registration reflects what the customer can actually provide in a demand response event.

Data is provided via excel spreadsheets

- a. Ratepayer interval meter data is a critical input for optimizing program delivery and ensuring measurable impacts. This data enables third-party aggregators to effectively collaborate with customers in developing tailored Energy Reduction Plans (“ERPs”) and determine appropriate nomination amounts. By leveraging interval data—in addition to direct engagement to understand the customer’s operational profile—aggregators can more accurately forecast and commit to load reductions. This process enhances Consumers Energy’s ability to meet its capacity reduction obligations submitted to MISO, thereby supporting grid reliability and aligning with regulatory expectations for demand response performance.

- i. Consumers Energy has not issued formal guidance to third-party aggregators regarding specific methodologies for customer targeting based on load shapes or peak usage patterns. As a result, aggregators independently determine their outreach strategies, which may vary based on their own analysis of customer interval data and operational characteristics. While load profile considerations

U21870-GLREA-CE-0271
Page 2 of 2

are likely part of their evaluation, there is currently no standardized approach mandated by Consumers Energy for this aspect of customer engagement.

- ii. As noted in subpart (i), Consumers Energy has not provided formal guidance to third-party aggregators regarding customer targeting methodologies. Consequently, Consumers does not have visibility into whether or how non-participant data is utilized by aggregators to inform their outreach strategies.

- b. The Company has historically directed third party aggregators to “Green Button Connect” and/or have also utilized the “Business Center – Release of Customer Information Form” (aka the LOA). More information on this can be found on the Company’s Data Sharing Center website: [Consumers Energy - Green Button Home](#).

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0272 (Partial)

Page 1 of 1

Question:

3. Please provide zip code-level list of required infrastructure upgrades for the next 10 years including the cost of the equipment. Also:

a. Please list the reason for the upgrades

b. How is meter data used to inform these decisions?

c. How do existing energy efficiency, demand response, DER, or VPP programs impact these planned developments?

d. For investments impacting peak capacity, please list

i. The current peak capacity of the area in kW or MW

ii. The current peak demand in kW or MW

iii. The projected peak demand that necessitates requires the upgrade in kW or MW

iv. The number of ratepayers served

Response:

Regarding HVD, substation, and Metro projects:

- a. The Company has not identified projects for the next 10 years. All projects for the bridge period and test year in the instant case are listed in Exhibits A-109 (MLH-3) and A-110 (MLH-4). These lists include the municipal location of each project; note that some projects span multiple municipalities and are identified by county.
- b. Meter data, SCADA data, and DSCADA data are used along with load forecasts to project load on the HVD System for building the overall HVD System power flow model (refer to the discussion on page 120, line 5, through page 122, line 13, of my direct testimony) which is used to monitor and project the loading on the HVD System as a whole.
- c. These programs generally do not impact planned projects listed in Exhibits A-109 (MLH-3) and A-110 (MLH-4). Refer to page 131, lines 12 through 22, of my direct testimony regarding how non-wires solutions may impact the LVD Substations Capacity sub-program.
- d. For LVD Substations Capacity projects, please refer to my Attachment 1 to this response. For HVD Lines and Substations Capacity projects, please refer to my Attachment 2 to this response.

Witness: Megan L. Hayward

Date: August 26, 2025

U21870-GLREA-CE-0272 (Partial)

Page 1 of 1

Question:

3. Please provide zip code-level list of required infrastructure upgrades for the next 10 years including the cost of the equipment. Also:

- a. Please list the reason for the upgrades
- b. How is meter data used to inform these decisions?
- c. How do existing energy efficiency, demand response, DER, or VPP programs impact these planned developments?
- d. For investments impacting peak capacity, please list
 - i. The current peak capacity of the area in kW or MW
 - ii. The current peak demand in kW or MW
 - iii. The projected peak demand that necessitates requires the upgrade in kW or MW
 - iv. The number of ratepayers served

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis that Consumers Energy has not performed and is not relevant and proportional to the needs of the case. Without waiving this objection, Consumers Energy responds as follows:

Regarding LVD lines projects:

- a. The Company has not identified projects for the next 10 years. All projects for the bridge period and test year in the instant case are listed in Exhibits A-166 (JMP-1) and A-167 (JMP-2). These lists include the municipal location of each project; note that some projects span multiple municipalities and are identified by county.
- b. The Company uses AMI data in a variety of ways to inform LVD lines planning decisions. Please refer to the following locations of my direct testimony: page 44, lines 3 through 9; page 81, line 20, through page 82, line 4; page 84, line 9, through page 85, line 2; page 88, lines 1 through 17; page 108, lines 1 through 12; and page 123, lines 10 through 19.
- c. These programs generally do not impact planned projects listed in Exhibits A-166 (JMP-1) and A-167 (JMP-2).
- d. For LVD Lines Capacity projects, please refer to Attachment 1 to this response for bridge period projects and Attachment 2 to this response for test year projects. Capacity is provided in kVA, instead of kW or MW, because kVA is used by the Company in assessing peak capacity for these assets. Some LVD Lines Capacity projects were initiated by substation capacity projects from prior years rather than by peak capacity issues on the LVD lines assets themselves.

Witness: Jennifer M Partlan

Date: August 26, 2025

U21870-GLREA-CE-0273

Page 1 of 1

Question:

4. What is the company's policy for protecting the privacy of customer data while providing access for innovation?

a. What measures are in place to ensure that data is anonymized and used only for program-related purposes?

Response:

Consumers Energy takes securing customer data very seriously.

The Company has an internal Security Data Standard that is owned and maintained by IT Security. Roles and access requests are managed internally to ensure that only employees who need access to customer data are provided.

The Company's external data protection policy may be found in U21870-GLREA-CE-0273_ATT_1 , as well as in C17. of the Company's tariff. Collection and use of customer data is detailed within.

- a. A summary of the guidelines the Company uses for anonymizing external data before it is shared is noted below. This process is a part of the internal Security Data Standard owned by IT Security.

RESIDENTIAL

- a. 1 customer cannot make up more than 15% of the consumption/metric
- b. More than 15 customers

Non-RESIDENTIAL

- c. 1 customer cannot make up more than 50% of the consumption/metric
- d. More than 4 customers

Witness: Jessica R. Byrom

Date: August 26, 2025

U21870-GLREA-CE-0274

Page 1 of 1

Question:

5. Please share outage data at the granularity of zip codes and/or substations across the company's service territory for the past 5 years:

- a. How many outages were experienced within each zip code or substation unit?
- b. How many hours were ratepayers without power?
- c. How many ratepayers were without power?
- d. What was the reason for each outage recorded?
- e. For an average day, what is the low and peak load?
- f. What is the limit of power available to this location before a load curtailment event occurs?
- g. Which areas are listed as income qualified, income eligible, low income, etc...?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis Consumers Energy has not performed and is not relevant and proportional to the needs of the case. Without waiving this objection, Consumers Energy responds as follows:

Please refer to Attachment 1 to this discovery response for the data relating to subparts a through d, listing data by substation. The number of discrete outage events are shown for each year, along with the cumulative outage hours (i.e., the numerator in SAIDI calculations), the total number of customers experiencing an outage (i.e., the numerator in SAIFI calculations), and the number of outages tied to each cause code.

Substation-level data relevant to subpart e was provided in Company witness Hayward's attachment to discovery response 21870-MNSC-CE-0207.

The Company does not have a defined limit of power on its substations at which load curtailment would take place. While each substation has a maximum capacity rating, exceeding that rating does not automatically lead to curtailment. Equipment can operate for a limited amount of time at emergency ratings, and in many areas the Company is able to transfer load to be served from a different substation if necessary. Additionally, I am not aware of any occasions in which the Company has curtailed load to customers due to high load on a substation. The Company makes prudent investments in substation capacity to ensure that sustained overloads do not happen.

Certain areas of the Company's service territory are defined as EJ communities, as discussed on page 71, line 23, through page 73, line 6 of my direct testimony (see also the references in footnote 17 of my direct testimony). Underlying data on where these communities are located were provided in my workpaper MPK-WP-1.

Witness: Michael P. Kelly 1

Date: August 26, 2025

U21870-GLREA-CE-0275

Page 1 of 1

Question:

6. Please provide all cost-benefit analyses that have been conducted on Virtual Power Plant (VPP) programs and proposals

- a. What assumptions were made regarding customer participation rates, technology costs, delivered peak impacts, and avoided company infrastructure costs?
- b. How is it anticipated that VPPs would be funded by the company?
- c. What is the percentage of peak demand was calculated that could be addressed through VPPs?

Response:

The Company has not conducted any cost-benefit analysis on VPP programs or proposals. Please note that this response does not cover any DR or EE programs and proposals.

- a. As stated above, the Company has not conducted any cost-benefit analysis on VPP programs or proposals.
- b. The Company has not developed a position on how VPPs would be funded.
- c. The Company has not conducted these calculations.

Witness: Scott A. Mcphail

Date: August 26, 2025

U21870-GLREA-CE-0276
Page 1 of 1

Question:

7. What percentage of the company's total R&D budget is allocated to VPPs and other distributed energy resources (DERs)? Please provide a breakdown of this spending for the last three years.

a. What research has been funded? At what levels?

Response:

The Company does not have the requested type of R&D budget.

Witness: Scott A. Mcphail

Date: August 26, 2025

U21870-GLREA-CE-0277 (Partial)
Page 1 of 3

Question:

8. Please provide a list of all pilot programs regarding virtual power plants, Demand Response, or EV Charging the company has initiated or participated in over the past 3 years.

a. For each program, include the objective, timeline, budget, and a summary of the key findings and outcomes.

Response:

In the last three years, the Company has participated in or led the following pilots related to Virtual Power Plants, Demand Response and EV Charging:

- **DR Generator, Residential**

- Objective: Test energy demand potential on dispatchable home generators to call on during an energy demand event.
- Timeline: 2021-2022
- Budget
 - 2021: O&M - \$390,000; Capital - \$537,000
 - 2022: O&M - \$472,000; Capital - \$575,000
- Summary: The pilot experienced significant enrollment challenges and showed decreased demand potential year over year with increased costs. The pilot was not cost effective, and the Company discontinued it in 2022.

- **DR Generator, Small + Medium Business**

- Objective: Test energy demand potential on dispatchable generators at small- to medium-sized businesses to call on during an energy demand event.
- Timeline: 2022-2023
- Budget:
 - 2022: O&M - \$232,000
- Summary: In the Settlement Agreement for Case No. U-21233, the Company agreed to truncate the pilot phase and commercialize the program while continuing to analyze its performance and costs. During commercialization, the Company uncovered a smaller than expected customer market due to equipment and/or software constraints, resulting

U21870-GLREA-CE-0277 (Partial)

Page 2 of 3

in zero program enrollments. After switching to a different vendor, the Company again found a lack of available market and was not able to test demand savings potential. The program was sunset in 2023.

- **DR Multi-Use Switch, Residential**

- Objective: Test load reduction potential on direct load control switches used in the AC Peak Cycling Program on residential water heaters, pool pumps, and hot tub heaters.
- Timeline: 2020-2022
- Budget:
 - 2022: O&M - \$121,000; Capital - \$187,000
 - 2023: O&M - \$422,000; Capital - \$924,000
- Summary: Originally proposed as the Customized Load Control Switch pilot in the Company's 2018 DR Reconciliation filing in Case No. U-20563, the pilot became the multi-use switch pilot and eventually commercialized as part of the Device Cycling Program that included AC Peak Cycling and the Electric Water Heater DR Programs. The Electric Water Heater Program enrolled approximately 2,000 participants before shutting down operations at the end of 2023 due to cost effectiveness and DR program restructuring.

- **DR Smart Home Pilot, Residential**

- Objective: Test energy demand potential on dispatchable home smart plugs to call on during an energy demand event.
- Timeline: 2021-2023
- Budget:
 - 2021: O&M - \$115,000
 - 2022: O&M - \$899,000
 - 2023: O&M - \$184,000
- Summary: The pilot showed low customer satisfaction after customers experienced communication issues between the smart plugs and app to control the demand as well as no significant increase in capacity. The Company sunset the pilot in 2023.

- **DR Low-Income Pilot Research**

- Objective: Research DR participation rates and barriers with low-income customers to assess how better to provide this customer segment with access to DR opportunities.
- Timeline: 2021-2022
- Budget:

U21870-GLREA-CE-0277 (Partial)
Page 3 of 3

- 2021: O&M - \$76,000
- 2022: O&M - \$98,000
- Summary: The research indicated that low-income customers primarily participate in DR programs to save money on their energy bills, but participants should be provided additional reminders and insights on how to save energy during events to encourage continued participation and benefits. Newer participants were less likely to have started making their homes more energy efficient, including equipment upgrades (such as new appliances or efficient HVAC), and were less familiar with ways to save energy. Given this, the Company decided to transition learnings to the Residential DR team to inform an improved customer experience for low-income customers rather than proceed to pilot a new type of DR offering for these customers.

Witness: Alex M. Gast
Date: August 26, 2025

U21870-GLREA-CE-0277 (Partial)
Page 1 of 1

Question:

8. Please provide a list of all pilot programs regarding virtual power plants, Demand Response, or EV Charging the company has initiated or participated in over the past 3 years.

a. For each program, include the objective, timeline, budget, and a summary of the key findings and outcomes.

Response:

The Company has not conducted any pilot programs regarding virtual power plants.

Witness: Scott A. Mcphail

Date: August 26, 2025

U21870-GLREA-CE-0278
Page 1 of 1

Question:

9. What is the company's strategy for integrating emerging DER technologies, such as vehicle-to-grid (V2G) capable electric vehicles and smart appliances into current or future programs?
- a. What groups are partnering across the company to coordinate and drive impacts?

Response:

This response is specific to electric vehicles (EV). The near-term strategy for the Company is to continue to monitor the cost and capabilities of bidirectional charging before engaging in a pilot or potential permanent program. The reason for this is that bidirectional chargers are significantly more expensive than a networked or unnetworked Level 2 (L2) charger, and the installation costs are also significantly higher for customers. In total, there is a significant price barrier for customers to engage in bidirectional charging, and thus adoption is presently low. That said, we do expect that more EVs will offer bidirectional capabilities in the future and that costs will come down as the market grows and thus will continue to monitor market developments.

Witness: Jeffrey A. Myrom
Date: August 26, 2025

U21870-GLREA-CE-0280 (Partial)
Page 1 of 1

Question:

11. What partnerships has the company formed with other utilities, technology providers, VPP aggregators, and academic institutions to explore or advance its VPP capabilities?

Response:

The Company has not formed partnerships to explore or advance its VPP capabilities.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0280 (Partial)
Page 1 of 1

Question:

11. What partnerships has the company formed with other utilities, technology providers, VPP aggregators, and academic institutions to explore or advance its VPP capabilities?

Response:

The Company is not engaged in any partnerships regarding VPPs.

Witness: Scott A. Mcphail

Date: 8/25/2025

U21870-GLREA-CE-0281
Page 1 of 1

Question:

12. What has the Edison Electric Institute written about VPPs?
- a. What studies have been made available?
 - b. What calculations, spreadsheets, or other data have been provided?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis that Consumers Energy has not performed, requests information that is not in the Company's possession, and is not relevant and proportional to the needs of the case. Without waiving this objection, Consumers Energy responds as follows:

The Company has not developed a synthesis of Edison Electric Institute's work related to VPPs.

Witness: Scott A. Mcphail
Date: August 26, 2025

U21870-GLREA-CE-0282

Page 1 of 1

Question:

13. What assumptions regarding DR, EE, and VPPs are built into load growth calculations?

a. How do DR, EE, and VPPs support peak demand reductions?

a. 4 critical peaks in the summer

b. highest peak in each of 12 months

Response:

- a. Please refer to my direct testimony, starting on page 19 (line 18) to page 20 (line 10) for peak demand reductions. No peak demand reductions are included in the load forecast related to VPP.
- b. I have made no change to the 4CP based on DR, EE or VPP.
- c. I have made no change to the 12CP based on DR, EE or VPP.

Witness: Eugène M. Breuring

Date: August 21, 2025

U21870-GLREA-CE-0287

Page 1 of 1

Question:

18. How did the company derive \$1/kW for critical peak payments for the Critical Peak Pricing program?
- a. What is the math behind this decision?

Response:

The \$1.00/kWh critical peak price was originally \$0.95/kWh, approved in Case No. U-17735. The Company justified setting the price at this level to incent customers to take action to shift/reduce energy consumption. In Case No. U-20697, the Company proposed increasing it to \$1.00/kWh to simplify communications.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0288
Page 1 of 1

Question:

19. What are the company's top three regulatory barriers to developing and implementing VPPs, and what specific policy changes or new regulations is the company advocating for to overcome these barriers?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis that the Company has not performed. Without waiving this objection, Consumers Energy responds as follows:

The Company has not developed a ranking of regulatory barriers to developing and implementing VPPs. However, from the perspective of electric distribution, some regulatory considerations include:

- The Company has not been granted approval to recover the costs of developing DERMS. The lack of DERMS prevents the Company from being able to orchestrate the operation of DERs.
- Some VPP applications may be developed through the Commission's expedited pilot process, but this process is still new, and no pilots have yet been approved through this process. The Company plans to propose a non-wires solutions pilot through this process (see discovery response 21870-GLREA-CE-290).
- The MPSC is hosting a Distributed Energy Resources Benefit Cost Analysis Collaborative as part of the Commission's October 12, 2023 order in Case No. U-20898. The work in this collaborative is ongoing, and an open-source tool to serve as a model for benefit-cost analysis has not yet been finalized.

Witness: MICHAEL P. KELLY

Date: August 26, 2025

U21870-GLREA-CE-0289

Page 1 of 1

Question:

20. How do the company's current and planned EE, DR, DER, and VPP programs align with the state's climate, clean energy, and decarbonization goals?

a. Please provide specific examples of how VPPs are helping the company meet these targets.

Response:

As part of assessing its portfolio in light of planned cases and other regulatory, legal, and political inputs to the day-to-day planning and operations, the Company remains committed to both the State of Michigan's goals, as well as its own stated goal of decarbonization by 2040.

The Company's Demand Response (DR) and Energy Efficiency (here EWR) plans reflect these goals in significant ways, including an increased focus on customer input and the low- to middle-income customers.

The Company offers a DR portfolio comprising both business and residential programs. The DR portfolio helps balance Michigan's electricity need to help protect the grid, react to emergencies, and avoid the cost and environmental impact of additional generation infrastructure to serve system peaks. The reduction in peak load resulting from the DR portfolio is intended to relieve stress on the electric system in a more cost-effective manner than purchasing capacity from the market or building additional generation resources to meet peak demand.

The Company's current proposed portfolio for its EWR program will continue to provide all customers with opportunities to reduce their energy usage, decrease their environmental impact, and lower their utility bills. In adopting a 2% electric savings goal, Consumers Energy is among a small group of utilities in the U.S. that recognize the environmental imperative of addressing the climate crisis and the critical role of energy efficiency. Its EWR goals are one way the Company is taking action to contribute to Michigan's Healthy Climate Plan and its own corporate philosophy of protecting people, planet, and prosperity.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0291

Page 1 of 1

Question:

22. What specific changes has the company made to its wholesale market participation rules, planning, forecasting, or processes to comply with FERC Order 2222?

a. What are the key challenges the company has faced in doing so?

Response:

Consumers Energy is actively monitoring and participating in the MISO Distributed Energy Resource Task Force. The Company is also active in MPSC work groups and discussions on the topic. The primary change the Company has made in this space is coordinating with MISO, the MPSC, and Aggregators of Retail Choice to review and approve registrations of Load Modifying Resources in the Consumers Energy Electric Distribution Company Footprint.

- A) A key challenge is the workload associated with coordinating, reviewing and approving valid registrations because it requires a lot of manual processing and the development of automation tools is pending FERC 2222 requirement finalization.

Witness: Megan L. Metz

Date: August 22, 2025

U21870-GLREA-CE-0292

Page 1 of 1

Question:

23. What changes to the company's rate design (e.g., time-of-use rates, performance based rates) are being considered or proposed to reflect the value of VPPs and incentivize customer participation?

Response:

The Company is not proposing any changes currently.

Witness: Laura M. Connolly

Date: August 26, 2025

U21870-GLREA-CE-0293

Page 1 of 2

Question:

24. What specific measures is the company taking to ensure that programs are accessible and beneficial to low-income customers, renters, and other underserved communities?

a. How do the company's programs include an impactful low-income or equity-focused component?

Response:

The Energy Assistance team is committed to making programs accessible and impactful for low-income customers, renters, and underserved communities by using a multi-channel communication strategy, including digital outreach, social media, email, robo and CSR calls, bill inserts, letters, postcards, and dedicated program microsites, to ensure customers are informed and supported.

The Company's grassroots efforts are led by a dedicated outreach specialist who actively engages with vulnerable communities, attending over 50 events annually and maintaining 60–75 monthly touchpoints with 20–25 partner agencies that serve low- and moderate-income customers. Support is tailored to each agency's needs, ranging from one-time training to ongoing collaboration.

Another public outreach initiative focused on access for Energy and Environmental Justice (EEJ) communities is the Energizing Equity series led by the Community Affairs and Diversity, Equity, and Inclusion function. Launched in January 2025, the series consists of quarterly in-person engagements led by Consumers Energy and co-hosted by external community partners across Flint, Jackson, Kalamazoo, and Grand Rapids. These sessions aim to connect customers with programs, resources, and information to save money and improve the overall safety and well-being outcomes for community members. In conjunction with bridging information access gaps, the goal is to also capture community member feedback and perspective on energy related topics spanning safety, reliability, affordability, clean energy supply, customer programs, and community sustainability.

The Green Giving program is designed to provide low-income customers with access to renewable energy resources, along with bill credits generated from the sale of that renewable energy. To ensure targeted outreach, the program is actively collaborating with Michigan Energy Assistance Program (MEAP) agencies to identify and enroll eligible customers in need. Additionally, Green Giving integrates with the Helping Neighbors initiative, which uses geo-targeting to reach households located within low-income census tracts. This strategic approach enhances our ability to connect with underserved communities. To further simplify access, the program also offers a streamlined online enrollment process. With just a few clicks, customers can explore available offerings and enroll in programs that help reduce their monthly energy bills.

Consumers Energy proactively collaborates with trusted partners, including Michigan 2-1-1, tax advocacy groups, local nonprofits, MEAP agencies, DHHS, and the MPSC, to ensure customers have access to reliable support when they need it most. Through these partnerships, the Company can share data, insights, and communication strategies to create a clear, coordinated path to assistance, making it easier for customers to navigate available resources with confidence.

U21870-GLREA-CE-0293

Page 2 of 2

Finally, Consumers Energy plays a proactive role in shaping energy assistance programs through active participation in MEAP workgroups and MPSC subcommittees, helping to align communications, enhance program design, and explore co-branded marketing opportunities with agency partners. Consumers Energy's CARE MB program offers a sustainable path to energy stability by helping customers develop consistent bill payment habits, reduce past-due balances, and become more mindful of their energy use. It's designed to empower customers with the tools and support they need to take control of their energy journey.

Witness: Jessica R. Byrom

Date: August 26, 2025

U21870-GLREA-CE-0295

Page 1 of 1

Question:

26. How is the company ensuring that customer-owned DERs (e.g., rooftop solar, batteries, Electric Vehicles) are a central part of its infrastructure strategy?

Response:

Please see the discussion in Exhibit A-129 (MPK-19), the sections “Challenges from Customer Technology Adoption,” beginning on page 31, and “Non-Load Challenges from Customer Technology Adoption,” beginning on page 34.

Witness: Michael P. Kelly

Date: August 26, 2025

U21870-GLREA-CE-0296
Page 1 of 1

Question:

27. Please provide the marginal hourly cost per MWh per hour of the year of grid services for ratepayers, projected out for 20 years, or as far as has been forecasted.

a. Please provide the breakdown/itemization of these costs including but not limited to: energy, losses, ancillary services, capacity, transmission, distribution, and any other adders or other costs associated with the delivery of power to residential ratepayers

Response:

The Company does not have such a forecast.

Witness: Laura M. Connolly

Date: August 26, 2025

U21870-GLREA-CE-0297

Page 1 of 1

Question:

28. How does the company's internal analysis compare the cost and benefits of a VPP to a traditional company asset (e.g., a natural gas peaker plant or a substation upgrade)?

- a. Please provide examples of these comparative analyses.
- b. What assumptions underpin this analysis?

Response:

The Company has not completed cost/benefit analysis of VPPs compared to traditional company assets.

- a. N/A
- b. N/A

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0298
Page 1 of 1

Question:

29. For all VPP-related research, pilots, and investments, please provide a detailed breakdown of the costs and the quantifiable avoided costs of implementation (e.g., deferred T&D investments, avoided peaker plant costs, wholesale market savings).

Response:

The Company has not completed research, pilot studies, or investments into VPPs.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0299

Page 1 of 1

Question:

30. Please provide a detailed breakdown of the company's methodology for measuring and valuing the impacts of grid services provided by distributed energy resources.

- a. How do these calculations account for the locational and temporal value of these resources?
- b. How does the company measure impacts of DERs on the grid, in particular regarding peak hours?

Response:

The Company does not currently account for the locational or temporal value of DERs, and does not currently measure impacts of DERs on the operational performance of the grid. When customers apply to interconnect DERs, the Company does perform needed interconnection studies to ensure that the DERs will not negatively impact the distribution system or impact the transmission system.

Witness: Michael P. Kelly

Date: August 26, 2025

U21870-GLREA-CE-0301

Page 1 of 1

Question:

32. How do the measured impacts from EE, DR, and DER programs impact the company's infrastructure planning?

Response:

The Company has not quantified the impacts of EE, DR, or DER programs on its distribution infrastructure planning.

Witness: Michael P. Kelly

Date: August 26, 2025

U21870-GLREA-CE-0302
Page 1 of 1

Question:

33. How do the deemed or calculated impacts from EE, DR, and DER programs impact the company's infrastructure planning?

Response:

Any potential deemed or calculated impacts of the EE, DR, and DER programs do not currently impact distribution infrastructure planning. As explained by Witness McPhail in his testimony starting on page 60, the Load Flow Tool Upgrade is required for the Company to incorporate DER into planning.

Witness: Michael P. Kelly

Date: August 26, 2025



August 26, 2025

Via Electronic Mail

Don L. Keskey, Esq.
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823

RE: Case No. U-21870 – In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief.

Dear Mr. Keskey:

Attached to this letter are copies of the following documents:

- A copy of your August 14, 2025 interrogatories with our internal numbering system annotated in the margins;
- Consumers Energy Company's response to 21870-GLREA-CE-0270-0278, 0280-0282, 0287-0289, 0291-0293, 0295-0299, 0301-0302; and
- The attachments pertaining to 0272, 0273, and 0274 are being provided electronically to all parties.

A Proof of service has been electronically filed in this docket. Please contact me if you have any questions regarding this matter.

Sincerely,

Gary A. Gensch, Jr.

CC Parties Per Attachment 1 to the Proof of Service

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

**FIRST DISCOVERY REQUEST OF
THE GREAT LAKES RENEWABLE ENERGY ASSOCIATION
TO CONSUMERS ENERGY COMPANY**

TO: mpsc.filings@cmsenergy.com
Gary A. Gensch, Jr. (garygenschjr@cmsenergy.com)
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Mark R. Ruskewicz (mark.ruskewicz@cmsenergy.com)

The Great Lakes Renewable Energy Association (GLREA) serves this First Discovery Request upon Consumers Energy Company. Please serve copies of all responses, attachments, and documents to GLREA counsel Don L. Keskey at donkeskey@publiclawresourcecenter.com and to GLREA Experts Richard Boehnke at rick.boehnke@gmail.com, John Richter at johnrichter@pm.me and Robert Rafson at rob@charthouseenergy.com.

INTERROGATORIES AND REQUESTS FOR DOCUMENTS

I. Data Focus and Transparency:

21870-GLREA-CE-0270

1. At what intervals does the company collect real-time usage data from residential ratepayers?
 - a. Is data collected on a circuit or even sub-circuit level for devices (such as EVs, thermostats, etc...)? If so, what is the frequency of this data collection (e.g., every 5 minutes, every 15 minutes)?

21870-GLREA-CE-0271

2. What usage data is made available to third-party aggregators, program implementors, or other entities, and how is it provided?

- a. How is ratepayer meter data used to optimize program delivery and drive impacts?
 - i. Are customers targeted based on their loadshapes and peak usage?
 - ii. How is non-participant data used to support customer targeting?
- b. Is there a standardized data-sharing protocol (e.g., Green Button Connect or company API)? If not, please explain the process for data exchange.

21870-GLREA-CE-0272

3. Please provide zip code-level list of required infrastructure upgrades for the next 10 years including the cost of the equipment. Also:

- a. Please list the reason for the upgrades
- b. How is meter data used to inform these decisions?
- c. How do existing energy efficiency, demand response, DER, or VPP programs impact these planned developments?
- d. For investments impacting peak capacity, please list
 - i. The current peak capacity of the area in kW or MW
 - ii. The current peak demand in kW or MW
 - iii. The projected peak demand that necessitates requires the upgrade in kW or MW
 - iv. The number of ratepayers served

21870-GLREA-CE-0273

4. What is the company's policy for protecting the privacy of customer data while providing access for innovation?

- a. What measures are in place to ensure that data is anonymized and used only for program-related purposes?

21870-GLREA-CE-0274

5. Please share outage data at the granularity of zip codes and/or substations across the company's service territory for the past 5 years:

- a. How many outages were experienced within each zip code or substation unit?
- b. How many hours were ratepayers without power?
- c. How many ratepayers were without power?

- d. What was the reason for each outage recorded?
- e. For an average day, what is the low and peak load?
- f. What is the limit of power available to this location before a load curtailment event occurs?
- g. Which areas are listed as income qualified, income eligible, low income, etc...?

II. Company Research and Development (R&D):

21870-GLREA-CE-0275

6. Please provide all cost-benefit analyses that have been conducted on Virtual Power Plant (VPP) programs and proposals

- a. What assumptions were made regarding customer participation rates, technology costs, delivered peak impacts, and avoided company infrastructure costs?
- b. How is it anticipated that VPPs would be funded by the company?
- c. What is the percentage of peak demand was calculated that could be addressed through VPPs?

21870-GLREA-CE-0276

7. What percentage of the company's total R&D budget is allocated to VPPs and other distributed energy resources (DERs)? Please provide a breakdown of this spending for the last three years.

- a. What research has been funded? At what levels?

21870-GLREA-CE-0277

8. Please provide a list of all pilot programs regarding virtual power plants, Demand Response, or EV Charging the company has initiated or participated in over the past 3 years.

- a. For each program, include the objective, timeline, budget, and a summary of the key findings and outcomes.

21870-GLREA-CE-0278

9. What is the company's strategy for integrating emerging DER technologies, such as vehicle-to-grid (V2G) capable electric vehicles and smart appliances into current or future programs?

- a. What groups are partnering across the company to coordinate and drive impacts?

21870-GLREA-CE-0279

- 10. How is the company incorporating VPPs into its load forecasting and long-term resource planning models?

- a. How are VPPs considered as an alternative to traditional generation or transmission and distribution (T&D) infrastructure? Why?
- b. What level of cost and cost deferment has been assessed for VPP delivery?

21870-GLREA-CE-0280

- 11. What partnerships has the company formed with other utilities, technology providers, VPP aggregators, and academic institutions to explore or advance its VPP capabilities?

21870-GLREA-CE-0281

- 12. What has the Edison Electric Institute written about VPPs?
 - a. What studies have been made available?
 - b. What calculations, spreadsheets, or other data have been provided?

21870-GLREA-CE-0282

- 13. What assumptions regarding DR, EE, and VPPs are built into load growth calculations?
 - a. How do DR, EE, and VPPs support peak demand reductions?
 - a. 4 critical peaks in the summer
 - b. highest peak in each of 12 months

III. Peak Impacts from Existing Programs:

21870-GLREA-CE-0283

- 14. Please provide all data that shows peak demand reduction as measured at the meter, not deemed from a technical reference manual, from existing energy efficiency, demand response, and VPP programs for the past three years.

- a. Please share the calculated, modeled, deemed peak impacts from existing energy efficiency, demand response, and VPP programs for the past three years.
- b. Please share the methodology for measuring impacts at the meter that has been used for these programs
- c. Please share the research done to show the effectiveness and accuracy of the M&V methodology used to measure peak impacts of existing programs

21870-GLREA-CE-0284

15. For each existing residential program (energy efficiency, Demand Response, DER, or VPP), please provide the following measured data:

- a. The total number of enrolled customers and devices.
- b. The average and maximum load reduction achieved during a peak event.
- c. The value to the grid delivered, company cost savings, customer incentives
- d. The number of events dispatched in the last 3 years, and the duration of each event called
- e. The dispatch success rate (i.e., the percentage of devices that responded as expected).
- f. What criteria are used to trigger a demand response event? Is it based on a pre-determined schedule, or is it in response to real-time grid conditions?

21870-GLREA-CE-0285

16. What is the total cost of residential programs (energy efficiency, Demand Response, DER, or VPP) programs to date?

- a. Please provide a detailed breakdown of how the measured peak impacts have resulted in tangible benefits for ratepayers, such as avoided or deferred Generation, Transmission, and Distribution upgrades.

21870-GLREA-CE-0286

17. What metrics does the company use to measure customer satisfaction with these programs?

- a. Are there any data on customer churn rates or complaints related to the programs' operations?

21870-GLREA-CE-0287

18. How did the company derive \$1/kW for critical peak payments for the Critical Peak Pricing program?

a. What is the math behind this decision?

IV. Regulatory and Policy Strategy:

21870-GLREA-CE-0288

19. What are the company's top three regulatory barriers to developing and implementing VPPs, and what specific policy changes or new regulations is the company advocating for to overcome these barriers?

21870-GLREA-CE-0289

20. How do the company's current and planned EE, DR, DER, and VPP programs align with the state's climate, clean energy, and decarbonization goals?

a. Please provide specific examples of how VPPs are helping the company meet these targets.

21870-GLREA-CE-0290

21. How is the company evaluating VPPs and other EE, DR, and DERs as potential non-wires alternatives to traditional Generation, Transmission, and Distribution infrastructure investments?

a. Please provide examples of any Generation, Transmission, and Distribution projects that have been deferred or replaced by EE, DR, DER, or VPP projects.

21870-GLREA-CE-0291

22. What specific changes has the company made to its wholesale market participation rules, planning, forecasting, or processes to comply with FERC Order 2222?

a. What are the key challenges the company has faced in doing so?

21870-GLREA-CE-0292

23. What changes to the company's rate design (e.g., time-of-use rates, performance-based rates) are being considered or proposed to reflect the value of VPPs and incentivize customer participation?

V. Equity and Customer Engagement:

21870-GLREA-CE-0293

24. What specific measures is the company taking to ensure that programs are accessible and beneficial to low-income customers, renters, and other underserved communities?

- a. How do the company's programs include an impactful low-income or equity-focused component?

21870-GLREA-CE-0294

25. What is the company's stance on working with third-party aggregators of EE, DR, and DER assets?

- a. What is the current process for these third parties to interact with the company's systems and enroll customers?
- b. What, if any, are the company's plans to develop a market for VPP services?

21870-GLREA-CE-0295

26. How is the company ensuring that customer-owned DERs (e.g., rooftop solar, batteries, Electric Vehicles) are a central part of its infrastructure strategy?

VI. Financial and Cost Recovery:

21870-GLREA-CE-0296

27. Please provide the marginal hourly cost per MWh per hour of the year of grid services for ratepayers, projected out for 20 years, or as far as has been forecasted.

- a. Please provide the breakdown/itemization of these costs including but not limited to: energy, losses, ancillary services, capacity, transmission, distribution, and any other adders or other costs associated with the delivery of power to residential ratepayers

21870-GLREA-CE-0297

28. How does the company's internal analysis compare the cost and benefits of a VPP to a traditional company asset (e.g., a natural gas peaker plant or a substation upgrade)?

- a. Please provide examples of these comparative analyses.
- b. What assumptions underpin this analysis?

21870-GLREA-CE-0298

29. For all VPP-related research, pilots, and investments, please provide a detailed breakdown of the costs and the quantifiable avoided costs of implementation (e.g., deferred T&D investments, avoided peaker plant costs, wholesale market savings).

VII. Measurement and Verification

21870-GLREA-CE-0299

30. Please provide a detailed breakdown of the company's methodology for measuring and valuing the impacts of grid services provided by distributed energy resources.

- a. How do these calculations account for the locational and temporal value of these resources?
- b. How does the company measure impacts of DERs on the grid, in particular regarding peak hours?

21870-GLREA-CE-0300

31. What process does the company undergo to provide settlement to participating customers and aggregators in EE, DR, and DER programs?

- a. What is the timeline for an individual payment after an installation, event, measurement period?

21870-GLREA-CE-0301

32. How do the measured impacts from EE, DR, and DER programs impact the company's infrastructure planning?

21870-GLREA-CE-0302

33. How do the deemed or calculated impacts from EE, DR, and DER programs impact the company's infrastructure planning?

Respectfully submitted,

Don L. Keskey

Don L. Keskey (P23003)
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Telephone: (517) 999-7572
E-mail: donkeskey@publiclawresourcecenter.com

Dated: August 14, 2025

U21870-GLREA-CE-0270 (Partial)

Page 1 of 1

Question:

1. At what intervals does the company collect real-time usage data from residential ratepayers?
 - a. Is data collected on a circuit or even sub-circuit level for devices (such as EVs, thermostats, etc...)? If so, what is the frequency of this data collection (e.g., every 5 minutes, every 15 minutes)?

Response:

This response addresses the question regarding data collection from residential customers.

The Company collects usage data from residential customers at 60-minute intervals from the meter using advanced metering infrastructure (AMI).

a. The Company does not collect data at the circuit or sub-circuit level for individual devices such as thermostats. For customers participating in the Smart Thermostat Demand Response program, usage data is collected from the meter during demand response events to evaluate load reduction.

On an as-needed basis, the Company can manually aggregate meter-level data to higher system levels such as circuit, feeder, or transformer, if required for operational or analytical purposes.

Witness: BRITTANI A. GRAY

Date: August 26, 2025

U21870-GLREA-CE-0270 (Partial)

Page 1 of 1

Question:

1. At what intervals does the company collect real-time usage data from residential ratepayers?
 - a. Is data collected on a circuit or even sub-circuit level for devices (such as EVs, thermostats, etc...)? If so, what is the frequency of this data collection (e.g., every 5 minutes, every 15 minutes)?

Response:

This answer is in specific response to electric vehicle (EV) load monitoring.

For the residential program, the Company utilizes whole-home meter disaggregation to collect hourly load data for each participating EV on a monthly basis.

For commercial and public EV charging loads that are separately metered, the Company collects data via our monthly billing cycles, which also utilizes hourly data.

Witness: Jeffrey A. Myrom

Date: August 26, 2025

U21870-GLREA-CE-0271

Page 1 of 2

Question:

2. What usage data is made available to third-party aggregators, program implementors, or other entities, and how is it provided?

a. How is ratepayer meter data used to optimize program delivery and drive impacts?

i. Are customers targeted based on their loadshapes and peak usage?

ii. How is non-participant data used to support customer targeting?

b. Is there a standardized data-sharing protocol (e.g., Green Button Connect or company API)? If not, please explain the process for data exchange.

Response:

To share usage data with third-party aggregators, program implementors, or other entities the Company requires that there be a valid Letter of Authorization (“LOA”) on file or else usage data will not be released. The LOA is the tool that establishes that there is a relationship between the aggregator and the customer. If there is an LOA on file, the Company will usually provide seasonal peak data for the specific customer.

Data typically includes registrations (reflecting the correct registration values submitted into MISO, consistent with the customer’s historical usage data) and checks that submitted amounts (seasonal peak demand matches what is ultimately used in program registrations) are accurate and properly validated, and ensuring the load amount tied to the registration reflects what the customer can actually provide in a demand response event.

Data is provided via excel spreadsheets

- a. Ratepayer interval meter data is a critical input for optimizing program delivery and ensuring measurable impacts. This data enables third-party aggregators to effectively collaborate with customers in developing tailored Energy Reduction Plans (“ERPs”) and determine appropriate nomination amounts. By leveraging interval data—in addition to direct engagement to understand the customer’s operational profile—aggregators can more accurately forecast and commit to load reductions. This process enhances Consumers Energy’s ability to meet its capacity reduction obligations submitted to MISO, thereby supporting grid reliability and aligning with regulatory expectations for demand response performance.
 - i. Consumers Energy has not issued formal guidance to third-party aggregators regarding specific methodologies for customer targeting based on load shapes or peak usage patterns. As a result, aggregators independently determine their outreach strategies, which may vary based on their own analysis of customer interval data and operational characteristics. While load profile considerations

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Page 2 of 2

are likely part of their evaluation, there is currently no standardized approach mandated by Consumers Energy for this aspect of customer engagement.

- ii. As noted in subpart (i), Consumers Energy has not provided formal guidance to third-party aggregators regarding customer targeting methodologies. Consequently, Consumers does not have visibility into whether or how non-participant data is utilized by aggregators to inform their outreach strategies.

- b. The Company has historically directed third party aggregators to “Green Button Connect” and/or have also utilized the “Business Center – Release of Customer Information Form” (aka the LOA). More information on this can be found on the Company’s Data Sharing Center website: [Consumers Energy - Green Button Home](#).

Witness: Alex M. Gast
Date: August 26, 2025

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Question:

3. Please provide zip code-level list of required infrastructure upgrades for the next 10 years including the cost of the equipment. Also:

a. Please list the reason for the upgrades

b. How is meter data used to inform these decisions?

c. How do existing energy efficiency, demand response, DER, or VPP programs impact these planned developments?

d. For investments impacting peak capacity, please list

i. The current peak capacity of the area in kW or MW

ii. The current peak demand in kW or MW

iii. The projected peak demand that necessitates requires the upgrade in kW or MW

iv. The number of ratepayers served

Response:

Regarding HVD, substation, and Metro projects:

- a. The Company has not identified projects for the next 10 years. All projects for the bridge period and test year in the instant case are listed in Exhibits A-109 (MLH-3) and A-110 (MLH-4). These lists include the municipal location of each project; note that some projects span multiple municipalities and are identified by county.
- b. Meter data, SCADA data, and DSCADA data are used along with load forecasts to project load on the HVD System for building the overall HVD System power flow model (refer to the discussion on page 120, line 5, through page 122, line 13, of my direct testimony) which is used to monitor and project the loading on the HVD System as a whole.
- c. These programs generally do not impact planned projects listed in Exhibits A-109 (MLH-3) and A-110 (MLH-4). Refer to page 131, lines 12 through 22, of my direct testimony regarding how non-wires solutions may impact the LVD Substations Capacity sub-program.
- d. For LVD Substations Capacity projects, please refer to my Attachment 1 to this response. For HVD Lines and Substations Capacity projects, please refer to my Attachment 2 to this response.

Witness: Megan L. Hayward

Date: August 26, 2025

U21870-GLREA-CE-0272 (Partial)

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Question:

3. Please provide zip code-level list of required infrastructure upgrades for the next 10 years including the cost of the equipment. Also:

- a. Please list the reason for the upgrades
- b. How is meter data used to inform these decisions?
- c. How do existing energy efficiency, demand response, DER, or VPP programs impact these planned developments?
- d. For investments impacting peak capacity, please list
 - i. The current peak capacity of the area in kW or MW
 - ii. The current peak demand in kW or MW
 - iii. The projected peak demand that necessitates requires the upgrade in kW or MW
 - iv. The number of ratepayers served

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis that Consumers Energy has not performed and is not relevant and proportional to the needs of the case. Without waiving this objection, Consumers Energy responds as follows:

Regarding LVD lines projects:

- a. The Company has not identified projects for the next 10 years. All projects for the bridge period and test year in the instant case are listed in Exhibits A-166 (JMP-1) and A-167 (JMP-2). These lists include the municipal location of each project; note that some projects span multiple municipalities and are identified by county.
- b. The Company uses AMI data in a variety of ways to inform LVD lines planning decisions. Please refer to the following locations of my direct testimony: page 44, lines 3 through 9; page 81, line 20, through page 82, line 4; page 84, line 9, through page 85, line 2; page 88, lines 1 through 17; page 108, lines 1 through 12; and page 123, lines 10 through 19.
- c. These programs generally do not impact planned projects listed in Exhibits A-166 (JMP-1) and A-167 (JMP-2).
- d. For LVD Lines Capacity projects, please refer to Attachment 1 to this response for bridge period projects and Attachment 2 to this response for test year projects. Capacity is provided in kVA, instead of kW or MW, because kVA is used by the Company in assessing peak capacity for these assets. Some LVD Lines Capacity projects were initiated by substation capacity projects from prior years rather than by peak capacity issues on the LVD lines assets themselves.

Witness: Jennifer M Partlan

Date: August 26, 2025

U21870-GLREA-CE-0273

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Question:

4. What is the company's policy for protecting the privacy of customer data while providing access for innovation?

a. What measures are in place to ensure that data is anonymized and used only for program-related purposes?

Response:

Consumers Energy takes securing customer data very seriously.

The Company has an internal Security Data Standard that is owned and maintained by IT Security. Roles and access requests are managed internally to ensure that only employees who need access to customer data are provided.

The Company's external data protection policy may be found in U21870-GLREA-CE-0273_ATT_1 , as well as in C17. of the Company's tariff. Collection and use of customer data is detailed within.

a. A summary of the guidelines the Company uses for anonymizing external data before it is shared is noted below. This process is a part of the internal Security Data Standard owned by IT Security.

RESIDENTIAL

- a. 1 customer cannot make up more than 15% of the consumption/metric
- b. More than 15 customers

Non-RESIDENTIAL

- c. 1 customer cannot make up more than 50% of the consumption/metric
- d. More than 4 customers

Witness: Jessica R. Byrom

Date: August 26, 2025

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Page 1 of 1

Question:

5. Please share outage data at the granularity of zip codes and/or substations across the company's service territory for the past 5 years:

- a. How many outages were experienced within each zip code or substation unit?
- b. How many hours were ratepayers without power?
- c. How many ratepayers were without power?
- d. What was the reason for each outage recorded?
- e. For an average day, what is the low and peak load?
- f. What is the limit of power available to this location before a load curtailment event occurs?
- g. Which areas are listed as income qualified, income eligible, low income, etc...?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis Consumers Energy has not performed and is not relevant and proportional to the needs of the case. Without waiving this objection, Consumers Energy responds as follows:

Please refer to Attachment 1 to this discovery response for the data relating to subparts a through d, listing data by substation. The number of discrete outage events are shown for each year, along with the cumulative outage hours (i.e., the numerator in SAIDI calculations), the total number of customers experiencing an outage (i.e., the numerator in SAIFI calculations), and the number of outages tied to each cause code.

Substation-level data relevant to subpart e was provided in Company witness Hayward's attachment to discovery response 21870-MNSC-CE-0207.

The Company does not have a defined limit of power on its substations at which load curtailment would take place. While each substation has a maximum capacity rating, exceeding that rating does not automatically lead to curtailment. Equipment can operate for a limited amount of time at emergency ratings, and in many areas the Company is able to transfer load to be served from a different substation if necessary. Additionally, I am not aware of any occasions in which the Company has curtailed load to customers due to high load on a substation. The Company makes prudent investments in substation capacity to ensure that sustained overloads do not happen.

Certain areas of the Company's service territory are defined as EJ communities, as discussed on page 71, line 23, through page 73, line 6 of my direct testimony (see also the references in footnote 17 of my direct testimony). Underlying data on where these communities are located were provided in my workpaper MPK-WP-1.

Witness: Michael P. Kelly 1

Date: August 26, 2025

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Question:

6. Please provide all cost-benefit analyses that have been conducted on Virtual Power Plant (VPP) programs and proposals

- a. What assumptions were made regarding customer participation rates, technology costs, delivered peak impacts, and avoided company infrastructure costs?
- b. How is it anticipated that VPPs would be funded by the company?
- c. What is the percentage of peak demand was calculated that could be addressed through VPPs?

Response:

The Company has not conducted any cost-benefit analysis on VPP programs or proposals. Please note that this response does not cover any DR or EE programs and proposals.

- a. As stated above, the Company has not conducted any cost-benefit analysis on VPP programs or proposals.
- b. The Company has not developed a position on how VPPs would be funded.
- c. The Company has not conducted these calculations.

Witness: Scott A. Mcphail

Date: August 26, 2025

U21870-GLREA-CE-0276

Page 1 of 1

Question:

7. What percentage of the company's total R&D budget is allocated to VPPs and other distributed energy resources (DERs)? Please provide a breakdown of this spending for the last three years.

a. What research has been funded? At what levels?

Response:

The Company does not have the requested type of R&D budget.

Witness: Scott A. Mcphail

Date: August 26, 2025

U21870-GLREA-CE-0277 (Partial)
Page 1 of 3

Question:

8. Please provide a list of all pilot programs regarding virtual power plants, Demand Response, or EV Charging the company has initiated or participated in over the past 3 years.

a. For each program, include the objective, timeline, budget, and a summary of the key findings and outcomes.

Response:

In the last three years, the Company has participated in or led the following pilots related to Virtual Power Plants, Demand Response and EV Charging:

- **DR Generator, Residential**

- Objective: Test energy demand potential on dispatchable home generators to call on during an energy demand event.
- Timeline: 2021-2022
- Budget
 - 2021: O&M - \$390,000; Capital - \$537,000
 - 2022: O&M - \$472,000; Capital - \$575,000
- Summary: The pilot experienced significant enrollment challenges and showed decreased demand potential year over year with increased costs. The pilot was not cost effective, and the Company discontinued it in 2022.

- **DR Generator, Small + Medium Business**

- Objective: Test energy demand potential on dispatchable generators at small- to medium-sized businesses to call on during an energy demand event.
- Timeline: 2022-2023
- Budget:
 - 2022: O&M - \$232,000
- Summary: In the Settlement Agreement for Case No. U-21233, the Company agreed to truncate the pilot phase and commercialize the program while continuing to analyze its performance and costs. During commercialization, the Company uncovered a smaller than expected customer market due to equipment and/or software constraints, resulting

U21870-GLREA-CE-0277 (Partial)

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in zero program enrollments. After switching to a different vendor, the Company again found a lack of available market and was not able to test demand savings potential. The program was sunset in 2023.

- **DR Multi-Use Switch, Residential**

- Objective: Test load reduction potential on direct load control switches used in the AC Peak Cycling Program on residential water heaters, pool pumps, and hot tub heaters.
- Timeline: 2020-2022
- Budget:
 - 2022: O&M - \$121,000; Capital - \$187,000
 - 2023: O&M - \$422,000; Capital - \$924,000
- Summary: Originally proposed as the Customized Load Control Switch pilot in the Company's 2018 DR Reconciliation filing in Case No. U-20563, the pilot became the multi-use switch pilot and eventually commercialized as part of the Device Cycling Program that included AC Peak Cycling and the Electric Water Heater DR Programs. The Electric Water Heater Program enrolled approximately 2,000 participants before shutting down operations at the end of 2023 due to cost effectiveness and DR program restructuring.

- **DR Smart Home Pilot, Residential**

- Objective: Test energy demand potential on dispatchable home smart plugs to call on during an energy demand event.
- Timeline: 2021-2023
- Budget:
 - 2021: O&M - \$115,000
 - 2022: O&M - \$899,000
 - 2023: O&M - \$184,000
- Summary: The pilot showed low customer satisfaction after customers experienced communication issues between the smart plugs and app to control the demand as well as no significant increase in capacity. The Company sunset the pilot in 2023.

- **DR Low-Income Pilot Research**

- Objective: Research DR participation rates and barriers with low-income customers to assess how better to provide this customer segment with access to DR opportunities.
- Timeline: 2021-2022
- Budget:

U21870-GLREA-CE-0277 (Partial)
Page 3 of 3

- 2021: O&M - \$76,000
- 2022: O&M - \$98,000
- Summary: The research indicated that low-income customers primarily participate in DR programs to save money on their energy bills, but participants should be provided additional reminders and insights on how to save energy during events to encourage continued participation and benefits. Newer participants were less likely to have started making their homes more energy efficient, including equipment upgrades (such as new appliances or efficient HVAC), and were less familiar with ways to save energy. Given this, the Company decided to transition learnings to the Residential DR team to inform an improved customer experience for low-income customers rather than proceed to pilot a new type of DR offering for these customers.

Witness: Alex M. Gast
Date: August 26, 2025

U21870-GLREA-CE-0277 (Partial)
Page 1 of 1

Question:

8. Please provide a list of all pilot programs regarding virtual power plants, Demand Response, or EV Charging the company has initiated or participated in over the past 3 years.

a. For each program, include the objective, timeline, budget, and a summary of the key findings and outcomes.

Response:

The Company has not conducted any pilot programs regarding virtual power plants.

Witness: Scott A. Mcphail

Date: August 26, 2025

U21870-GLREA-CE-0278

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Question:

9. What is the company's strategy for integrating emerging DER technologies, such as vehicle-to-grid (V2G) capable electric vehicles and smart appliances into current or future programs?

a. What groups are partnering across the company to coordinate and drive impacts?

Response:

This response is specific to electric vehicles (EV). The near-term strategy for the Company is to continue to monitor the cost and capabilities of bidirectional charging before engaging in a pilot or potential permanent program. The reason for this is that bidirectional chargers are significantly more expensive than a networked or unnetworked Level 2 (L2) charger, and the installation costs are also significantly higher for customers. In total, there is a significant price barrier for customers to engage in bidirectional charging, and thus adoption is presently low. That said, we do expect that more EVs will offer bidirectional capabilities in the future and that costs will come down as the market grows and thus will continue to monitor market developments.

Witness: Jeffrey A. Myrom

Date: August 26, 2025

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Page 1 of 1

Question:

11. What partnerships has the company formed with other utilities, technology providers, VPP aggregators, and academic institutions to explore or advance its VPP capabilities?

Response:

The Company has not formed partnerships to explore or advance its VPP capabilities.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0280 (Partial)
Page 1 of 1

Question:

11. What partnerships has the company formed with other utilities, technology providers, VPP aggregators, and academic institutions to explore or advance its VPP capabilities?

Response:

The Company is not engaged in any partnerships regarding VPPs.

Witness: Scott A. Mcphail

Date: 8/25/2025

U21870-GLREA-CE-0281
Page 1 of 1

Question:

12. What has the Edison Electric Institute written about VPPs?
- a. What studies have been made available?
 - b. What calculations, spreadsheets, or other data have been provided?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis that Consumers Energy has not performed, requests information that is not in the Company's possession, and is not relevant and proportional to the needs of the case. Without waiving this objection, Consumers Energy responds as follows:

The Company has not developed a synthesis of Edison Electric Institute's work related to VPPs.

Witness: Scott A. Mcphail
Date: August 26, 2025

U21870-GLREA-CE-0282
Page 1 of 1

Question:

13. What assumptions regarding DR, EE, and VPPs are built into load growth calculations?
- a. How do DR, EE, and VPPs support peak demand reductions?
 - a. 4 critical peaks in the summer
 - b. highest peak in each of 12 months

Response:

- a. Please refer to my direct testimony, starting on page 19 (line 18) to page 20 (line 10) for peak demand reductions. No peak demand reductions are included in the load forecast related to VPP.
- b. I have made no change to the 4CP based on DR, EE or VPP.
- c. I have made no change to the 12CP based on DR, EE or VPP.

Witness: Eugène M. Breuring
Date: August 21, 2025

U21870-GLREA-CE-0287
Page 1 of 1

Question:

18. How did the company derive \$1/kW for critical peak payments for the Critical Peak Pricing program?
- a. What is the math behind this decision?

Response:

The \$1.00/kWh critical peak price was originally \$0.95/kWh, approved in Case No. U-17735. The Company justified setting the price at this level to incent customers to take action to shift/reduce energy consumption. In Case No. U-20697, the Company proposed increasing it to \$1.00/kWh to simplify communications.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0288
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Question:

19. What are the company's top three regulatory barriers to developing and implementing VPPs, and what specific policy changes or new regulations is the company advocating for to overcome these barriers?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requests an analysis that the Company has not performed. Without waiving this objection, Consumers Energy responds as follows:

The Company has not developed a ranking of regulatory barriers to developing and implementing VPPs. However, from the perspective of electric distribution, some regulatory considerations include:

- The Company has not been granted approval to recover the costs of developing DERMS. The lack of DERMS prevents the Company from being able to orchestrate the operation of DERs.
- Some VPP applications may be developed through the Commission's expedited pilot process, but this process is still new, and no pilots have yet been approved through this process. The Company plans to propose a non-wires solutions pilot through this process (see discovery response 21870-GLREA-CE-290).
- The MPSC is hosting a Distributed Energy Resources Benefit Cost Analysis Collaborative as part of the Commission's October 12, 2023 order in Case No. U-20898. The work in this collaborative is ongoing, and an open-source tool to serve as a model for benefit-cost analysis has not yet been finalized.

Witness: MICHAEL P. KELLY

Date: August 26, 2025

U21870-GLREA-CE-0289

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Question:

20. How do the company's current and planned EE, DR, DER, and VPP programs align with the state's climate, clean energy, and decarbonization goals?

a. Please provide specific examples of how VPPs are helping the company meet these targets.

Response:

As part of assessing its portfolio in light of planned cases and other regulatory, legal, and political inputs to the day-to-day planning and operations, the Company remains committed to both the State of Michigan's goals, as well as its own stated goal of decarbonization by 2040.

The Company's Demand Response (DR) and Energy Efficiency (here EWR) plans reflect these goals in significant ways, including an increased focus on customer input and the low- to middle-income customers.

The Company offers a DR portfolio comprising both business and residential programs. The DR portfolio helps balance Michigan's electricity need to help protect the grid, react to emergencies, and avoid the cost and environmental impact of additional generation infrastructure to serve system peaks. The reduction in peak load resulting from the DR portfolio is intended to relieve stress on the electric system in a more cost-effective manner than purchasing capacity from the market or building additional generation resources to meet peak demand.

The Company's current proposed portfolio for its EWR program will continue to provide all customers with opportunities to reduce their energy usage, decrease their environmental impact, and lower their utility bills. In adopting a 2% electric savings goal, Consumers Energy is among a small group of utilities in the U.S. that recognize the environmental imperative of addressing the climate crisis and the critical role of energy efficiency. Its EWR goals are one way the Company is taking action to contribute to Michigan's Healthy Climate Plan and its own corporate philosophy of protecting people, planet, and prosperity.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0291

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Question:

22. What specific changes has the company made to its wholesale market participation rules, planning, forecasting, or processes to comply with FERC Order 2222?

a. What are the key challenges the company has faced in doing so?

Response:

Consumers Energy is actively monitoring and participating in the MISO Distributed Energy Resource Task Force. The Company is also active in MPSC work groups and discussions on the topic. The primary change the Company has made in this space is coordinating with MISO, the MPSC, and Aggregators of Retail Choice to review and approve registrations of Load Modifying Resources in the Consumers Energy Electric Distribution Company Footprint.

- A) A key challenge is the workload associated with coordinating, reviewing and approving valid registrations because it requires a lot of manual processing and the development of automation tools is pending FERC 2222 requirement finalization.

Witness: Megan L. Metz

Date: August 22, 2025

U21870-GLREA-CE-0292

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Question:

23. What changes to the company's rate design (e.g., time-of-use rates, performance based rates) are being considered or proposed to reflect the value of VPPs and incentivize customer participation?

Response:

The Company is not proposing any changes currently.

Witness: Laura M. Connolly

Date: August 26, 2025

U21870-GLREA-CE-0293

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Question:

24. What specific measures is the company taking to ensure that programs are accessible and beneficial to low-income customers, renters, and other underserved communities?

a. How do the company's programs include an impactful low-income or equity-focused component?

Response:

The Energy Assistance team is committed to making programs accessible and impactful for low-income customers, renters, and underserved communities by using a multi-channel communication strategy, including digital outreach, social media, email, robo and CSR calls, bill inserts, letters, postcards, and dedicated program microsites, to ensure customers are informed and supported.

The Company's grassroots efforts are led by a dedicated outreach specialist who actively engages with vulnerable communities, attending over 50 events annually and maintaining 60–75 monthly touchpoints with 20–25 partner agencies that serve low- and moderate-income customers. Support is tailored to each agency's needs, ranging from one-time training to ongoing collaboration.

Another public outreach initiative focused on access for Energy and Environmental Justice (EEJ) communities is the Energizing Equity series led by the Community Affairs and Diversity, Equity, and Inclusion function. Launched in January 2025, the series consists of quarterly in-person engagements led by Consumers Energy and co-hosted by external community partners across Flint, Jackson, Kalamazoo, and Grand Rapids. These sessions aim to connect customers with programs, resources, and information to save money and improve the overall safety and well-being outcomes for community members. In conjunction with bridging information access gaps, the goal is to also capture community member feedback and perspective on energy related topics spanning safety, reliability, affordability, clean energy supply, customer programs, and community sustainability.

The Green Giving program is designed to provide low-income customers with access to renewable energy resources, along with bill credits generated from the sale of that renewable energy. To ensure targeted outreach, the program is actively collaborating with Michigan Energy Assistance Program (MEAP) agencies to identify and enroll eligible customers in need. Additionally, Green Giving integrates with the Helping Neighbors initiative, which uses geo-targeting to reach households located within low-income census tracts. This strategic approach enhances our ability to connect with underserved communities. To further simplify access, the program also offers a streamlined online enrollment process. With just a few clicks, customers can explore available offerings and enroll in programs that help reduce their monthly energy bills.

Consumers Energy proactively collaborates with trusted partners, including Michigan 2-1-1, tax advocacy groups, local nonprofits, MEAP agencies, DHHS, and the MPSC, to ensure customers have access to reliable support when they need it most. Through these partnerships, the Company can share data, insights, and communication strategies to create a clear, coordinated path to assistance, making it easier for customers to navigate available resources with confidence.

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Page 2 of 2

Finally, Consumers Energy plays a proactive role in shaping energy assistance programs through active participation in MEAP workgroups and MPSC subcommittees, helping to align communications, enhance program design, and explore co-branded marketing opportunities with agency partners. Consumers Energy's CARE MB program offers a sustainable path to energy stability by helping customers develop consistent bill payment habits, reduce past-due balances, and become more mindful of their energy use. It's designed to empower customers with the tools and support they need to take control of their energy journey.

Witness: Jessica R. Byrom
Date: August 26, 2025

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Question:

26. How is the company ensuring that customer-owned DERs (e.g., rooftop solar, batteries, Electric Vehicles) are a central part of its infrastructure strategy?

Response:

Please see the discussion in Exhibit A-129 (MPK-19), the sections “Challenges from Customer Technology Adoption,” beginning on page 31, and “Non-Load Challenges from Customer Technology Adoption,” beginning on page 34.

Witness: Michael P. Kelly

Date: August 26, 2025

U21870-GLREA-CE-0296
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Question:

27. Please provide the marginal hourly cost per MWh per hour of the year of grid services for ratepayers, projected out for 20 years, or as far as has been forecasted.

a. Please provide the breakdown/itemization of these costs including but not limited to: energy, losses, ancillary services, capacity, transmission, distribution, and any other adders or other costs associated with the delivery of power to residential ratepayers

Response:

The Company does not have such a forecast.

Witness: Laura M. Connolly

Date: August 26, 2025

U21870-GLREA-CE-0297

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Question:

28. How does the company's internal analysis compare the cost and benefits of a VPP to a traditional company asset (e.g., a natural gas peaker plant or a substation upgrade)?

- a. Please provide examples of these comparative analyses.
- b. What assumptions underpin this analysis?

Response:

The Company has not completed cost/benefit analysis of VPPs compared to traditional company assets.

- a. N/A
- b. N/A

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0298
Page 1 of 1

Question:

29. For all VPP-related research, pilots, and investments, please provide a detailed breakdown of the costs and the quantifiable avoided costs of implementation (e.g., deferred T&D investments, avoided peaker plant costs, wholesale market savings).

Response:

The Company has not completed research, pilot studies, or investments into VPPs.

Witness: Alex M. Gast

Date: August 26, 2025

U21870-GLREA-CE-0299

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Question:

30. Please provide a detailed breakdown of the company's methodology for measuring and valuing the impacts of grid services provided by distributed energy resources.

- a. How do these calculations account for the locational and temporal value of these resources?
- b. How does the company measure impacts of DERs on the grid, in particular regarding peak hours?

Response:

The Company does not currently account for the locational or temporal value of DERs, and does not currently measure impacts of DERs on the operational performance of the grid. When customers apply to interconnect DERs, the Company does perform needed interconnection studies to ensure that the DERs will not negatively impact the distribution system or impact the transmission system.

Witness: Michael P. Kelly

Date: August 26, 2025

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Page 1 of 1

Question:

32. How do the measured impacts from EE, DR, and DER programs impact the company's infrastructure planning?

Response:

The Company has not quantified the impacts of EE, DR, or DER programs on its distribution infrastructure planning.

Witness: Michael P. Kelly

Date: August 26, 2025

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Page 1 of 1

Question:

33. How do the deemed or calculated impacts from EE, DR, and DER programs impact the company's infrastructure planning?

Response:

Any potential deemed or calculated impacts of the EE, DR, and DER programs do not currently impact distribution infrastructure planning. As explained by Witness McPhail in his testimony starting on page 60, the Load Flow Tool Upgrade is required for the Company to incorporate DER into planning.

Witness: Michael P. Kelly

Date: August 26, 2025

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Line No.	(a) Sub-Program	(b) Project Description, Line, Substation, or Location	(c) Projected		(d) Units	(e) Unit Type	(f) Investment Category	(g) Location	(h) Benefit Type	(i) Benefit	(ii) Current Peak		(iii) Current Peak		(iv) Projected Peak		(v) Number of Customers
			Period	Spending							Capacity (kVA)	Demand (kVA)	Demand (kVA)	Demand (kVA)			
1	LVD Lines Capacity	DARE ALGER_FOREST LAKE LCP 098		12	1	Project	Overloaded Equipment Upgrades	DEEP RIVER TOWNSHIP	Overload Failure Reduction; Customers	43	166.88	119.6	225.288			43	
2	LVD Lines Capacity	DARE ALGER_SKIDWAY LCP 981		13	1	Project	Overloaded Equipment Upgrades	CHURCHILL TOWNSHIP	Overload Failure Reduction; Customers	103	249.824	221.6	257.31872			103	
3	LVD Lines Capacity	DARE ASHMAN CIRCLE SUGNET LCP 402		2	1	Project	Overloaded Equipment Upgrades	MIDLAND	Overload Failure Reduction; Customers	17	38.4	57.9	64.128			17	
4	LVD Lines Capacity	DARE BACKUS-SPRINGBROOK LCP 240		30	1	Project	Overloaded Equipment Upgrades	MARKEE TOWNSHIP	Overload Failure Reduction; Customers	445	921.6	379.6	995.328			445	
5	LVD Lines Capacity	DARE BACKUS-SPRINGBROOK LCP 241		2	1	Project	Overloaded Equipment Upgrades	MARKEE TOWNSHIP	Overload Failure Reduction; Customers	444	348	365.3	588.12			444	
6	LVD Lines Capacity	DARE BAY ROAD_DAVIS ROAD LCP 811 ISO		6	1	Project	Overloaded Equipment Upgrades	SAGINAW	Overload Failure Reduction; Customers	36	99.936	145.9	132.91488			36	
7	LVD Lines Capacity	DARE BRECKENRIDGE_WHEELER LCP 691		59	1	Project	Overloaded Equipment Upgrades	WHEELER TOWNSHIP	Overload Failure Reduction; Customers	314	307.2	237.4	460.8			314	
8	LVD Lines Capacity	DARE BUTTERFIELD LINDEN LCP 704		10	1	Project	Overloaded Equipment Upgrades	BROOKS TOWNSHIP	Overload Failure Reduction; Customers	60	99.936	80.7	104.9328			60	
9	LVD Lines Capacity	DARE BUTTERFIELD LINDEN LCP 723		508	1	Project	Overloaded Equipment Upgrades	BROOKS TOWNSHIP	Overload Failure Reduction; Customers	132	76.8	85.6	117.504			132	
10	LVD Lines Capacity	DARE BUTTERFIELD M-82 LCP 536		22	1	Project	Overloaded Equipment Upgrades	BROOKS TOWNSHIP	Overload Failure Reduction; Customers	67	99.936	122.1	199.872			67	
11	LVD Lines Capacity	DARE BUTTERFIELD M-82 LCP 641		11	1	Project	Overloaded Equipment Upgrades	BROOKS TOWNSHIP	Overload Failure Reduction; Customers	118	166.88	231.8	175.224			118	
12	LVD Lines Capacity	DARE CALEDONIA 92ND ST LCP 506		18	1	Project	Overloaded Equipment Upgrades	CALEDONIA	Overload Failure Reduction; Customers	48	166.88	206	218.6128			48	
13	LVD Lines Capacity	DARE CAMDEN_MONTGOMERY LCP 283		14	1	Project	Overloaded Equipment Upgrades	CAMDEN TOWNSHIP	Overload Failure Reduction; Customers	105	336	196.7	372.96			105	
14	LVD Lines Capacity	DARE Camelot Lake Coleman LCP 360		20	1	Project	Overloaded Equipment Upgrades	GREENDALE TOWNSHIP	Overload Failure Reduction; Customers	171	249.824	346.3	359.74656			171	
15	LVD Lines Capacity	Dare Casino/Leaton LCP 888		49	1	Project	Overloaded Equipment Upgrades	CHIPPEWA TOWNSHIP	Overload Failure Reduction; Customers	881	1392	1227.2	1990.56			881	
16	LVD Lines Capacity	DARE18 EIGHT PT WHT BIRCH LCP 531		419	1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	633	464	696	784.16			633	
17	LVD Lines Capacity	DARE18 EIGHT PT WHT BIRCH LCP 531 PT 2		285	1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	633	464	696	784.16			633	
18	LVD Lines Capacity	DARE18 EIGHT PT WHT BIRCH LCP 531 PT 3		72	1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	633	464	696	784.16			633	
19	LVD Lines Capacity	DARE18 EIGHT PT WHT BIRCH LCP 531 UG		12	1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	633	464	696	784.16			633	
20	LVD Lines Capacity	Dare Crystal_Crystal Rd LCP 483_494_533		36	1	Project	Overloaded Equipment Upgrades	CRYSTAL TOWNSHIP	Overload Failure Reduction; Customers	556	672	454.5	1209.6			556	
21	LVD Lines Capacity	DARE CUTLERVILLE_SPARTAN LCP 775 rm reg		23	1	Project	Overloaded Equipment Upgrades	BYRON TOWNSHIP	Overload Failure Reduction; Customers	375	2421.504	3654.7	3632.256			375	
22	LVD Lines Capacity	DARE DEXTER TRAIL MILNER LCP 115		16	1	Project	Overloaded Equipment Upgrades	STOCKBRIDGE TOWNSHIP	Overload Failure Reduction; Customers	255	307.2	188.2	525.312			255	
23	LVD Lines Capacity	DARE DOBSON ROAD_HALF MOON LCP 375		15	1	Project	Overloaded Equipment Upgrades	MOSCOW TOWNSHIP	Overload Failure Reduction; Customers	26	192	233.3	264.96			26	
24	LVD Lines Capacity	DARE EDMORE/SIX LAKES LCP 372 PT1		200	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	181	499.616	487.3	909.30112			181	
25	LVD Lines Capacity	DARE EDMORE/SIX LAKES LCP 372 PT2		340	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	181	499.616	487.3	909.30112			181	
26	LVD Lines Capacity	DARE EDMORE/SIX LAKES LCP 372 PT3		218	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	181	499.616	487.3	909.30112			181	
27	LVD Lines Capacity	DARE EDMORE/SIX LAKES LCP 372 PT4		36	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	181	499.616	487.3	909.30112			181	
28	LVD Lines Capacity	DARE Ft Custer - Harmonia LCP 207		163	1	Project	Overloaded Equipment Upgrades	BATTLE CREEK	Overload Failure Reduction; Customers	496	576	369.4	927.36			496	
29	LVD Lines Capacity	DARE GRANT MASON DRIVE LCP 235		213	1	Project	Overloaded Equipment Upgrades	GRANT	Overload Failure Reduction; Customers	186	307.2	257.8	599.04			186	
30	LVD Lines Capacity	DARE GREENWOOD_INDIAN LAKE LCP 746		66	1	Project	Overloaded Equipment Upgrades	GLADWIN	Overload Failure Reduction; Customers	575	332.768	366.4	685.50208			575	
31	LVD Lines Capacity	DARE GREENWOOD_INDIAN LAKE LCP 765		54	1	Project	Overloaded Equipment Upgrades	ALGER	Overload Failure Reduction; Customers	156	249.824	269.6	514.63744			156	
32	LVD Lines Capacity	DARE GROVER/TRIANGLE LCP 441		78	1	Project	Overloaded Equipment Upgrades	EMERSON TOWNSHIP	Overload Failure Reduction; Customers	311	153.6	267.7	230.4			311	
33	LVD Lines Capacity	DARE GUN LAKE_ENGLAND LCP 314		4	1	Project	Overloaded Equipment Upgrades	YANKEE SPRINGS TOWNSH	Overload Failure Reduction; Customers	1093	912	1380.3	1386.24			1,093	
34	LVD Lines Capacity	DARE GUN LAKE_ENGLAND LCP 319		29	1	Project	Overloaded Equipment Upgrades	YANKEE SPRINGS TOWNSH	Overload Failure Reduction; Customers	58	153.6	99	233.472			58	
35	LVD Lines Capacity	DARE HART DISTRIBUTION LCP 451		20	1	Project	Overloaded Equipment Upgrades	HART	Overload Failure Reduction; Customers	22	86.4	95.7	141.696			22	
36	LVD Lines Capacity	DARE HART DISTRIBUTION LCP 451 - UG		7	1	Project	Overloaded Equipment Upgrades	HART	Overload Failure Reduction; Customers	22	86.4	95.7	141.696			22	
37	LVD Lines Capacity	DARE Harvard Lake_Courtland LCP 411		26	1	Project	Overloaded Equipment Upgrades	COURTLAND TOWNSHIP	Overload Failure Reduction; Customers	70	153.6	261.9	293.376			70	
38	LVD Lines Capacity	DARE HESPERIA RURAL LCP 325 PART 1		267	1	Project	Overloaded Equipment Upgrades	DENVER TOWNSHIP	Overload Failure Reduction; Customers	126	144	239.04	208.8			126	
39	LVD Lines Capacity	DARE HESPERIA RURAL LCP 325 PART 2		158	1	Project	Overloaded Equipment Upgrades	HESPERIA	Overload Failure Reduction; Customers	126	144	239.04	208.8			126	
40	LVD Lines Capacity	DARE HESPERIA RURAL LCP 325 PART 3		367	1	Project	Overloaded Equipment Upgrades	HESPERIA	Overload Failure Reduction; Customers	126	144	239.04	208.8			126	
41	LVD Lines Capacity	DARE HESPERIA RURAL LCP 325 PART 4		350	1	Project	Overloaded Equipment Upgrades	HESPERIA	Overload Failure Reduction; Customers	126	144	239.04	208.8			126	
42	LVD Lines Capacity	DARE HESPERIA RURAL LCP 325 PART 5		350	2	Project	Overloaded Equipment Upgrades	HESPERIA	Overload Failure Reduction; Customers	127	144	239.04	208.8			127	
43	LVD Lines Capacity	DARE HESPERIA RURAL LCP 325 PART 6		333	3	Project	Overloaded Equipment Upgrades	HESPERIA	Overload Failure Reduction; Customers	128	144	239.04	208.8			128	
42	LVD Lines Capacity	DARE18 HUNT ROAD_HUNT ROAD LCP 0408		510	1	Project	Overloaded Equipment Upgrades	ADRIAN TOWNSHIP	Overload Failure Reduction; Customers	147	374.4	395.5	411.84			147	
43	LVD Lines Capacity	DARE ITHACA/FAIR GROUNDS LCP 313		9	1	Project	Overloaded Equipment Upgrades	EMERSON TOWNSHIP	Overload Failure Reduction; Customers	45	192	143.7	288			45	
44	LVD Lines Capacity	DARE JASPER REDSTONE LCP 852		35	1	Project	Overloaded Equipment Upgrades	COE TOWNSHIP	Overload Failure Reduction; Customers	130	336	347.8	490.56			130	
45	LVD Lines Capacity	DARE KALAMO HWY ADD PHASE		119	1	Project	Overloaded Equipment Upgrades	CHARLOTTE	Overload Failure Reduction; Customers	319	Sub triggered					319	
46	LVD Lines Capacity	DARE KAWKAWLIN-RUSSELL LCP 433		11	1	Project	Overloaded Equipment Upgrades	KAWKAWLIN	Overload Failure Reduction; Customers	322	768	565.4	883.2			322	
47	LVD Lines Capacity	DARE KIPP HULL LCP5297 250 I		20	1	Project	Overloaded Equipment Upgrades	MASON	Overload Failure Reduction; Customers	108	332.768	517.7	648.8976			108	
48	LVD Lines Capacity	DARE Kolassa_Kosmerick LCP 383		16	1	Project	Overloaded Equipment Upgrades	NOBLE TOWNSHIP	Overload Failure Reduction; Customers	23	76.8	113	148.224			23	
49	LVD Lines Capacity	DARE LAWRENCE CHRISTIE LAKE		38	1	Project	Overloaded Equipment Upgrades	LAWRENCE TOWNSHIP	Overload Failure Reduction; Customers	415	960	1593.6	2160			415	
50	LVD Lines Capacity	DARE Levely Sturgeon LCP 295		20	1	Project	Overloaded Equipment Upgrades	EDENVILLE TOWNSHIP	Overload Failure Reduction; Customers	32	99.936	128.5	108.93024			32	
	LVD Lines Capacity Subtotal			5,711													

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	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(ii)	(iii)	(iv)	(v)
			Projected							Current Peak	Current Peak	Projected Peak	
No.	Sub-Program	Project Description, Line, Substation, or Location	Period Spending	Units	Unit Type	Investment Category	Location	Benefit Type	Benefit	Capacity (kVA)	Demand (kVA)	Demand (kVA)	Number of Customers
	Capacity												
1	LVD Lines Capacity	DARE LKleANN-BUNDYHILL-608ISO-OVERLOAD	13	1	Project	Overloaded Equipment Upgrades	SOMERSET TOWNSHIP	Overload Failure Reduction; Customers	91	166.88	307.6	205.2624	91
2	LVD Lines Capacity	DARE Loomis-Loomis LCP 654	20	1	Project	Overloaded Equipment Upgrades	OLIVE TOWNSHIP	Overload Failure Reduction; Customers	185	307.2	442.2	528.384	185
3	LVD Lines Capacity	DARE Marker Lake_Kyser Rd LCP 590	325	1	Project	Overloaded Equipment Upgrades	BOSTON TOWNSHIP	Overload Failure Reduction; Customers	342	480	710	744	342
4	LVD Lines Capacity	DARE MCBAIN-LAKE CITY LCP 758	27	1	Project	Overloaded Equipment Upgrades	REEDER TOWNSHIP	Overload Failure Reduction; Customers	137	249.824	125.9	387.2272	137
5	LVD Lines Capacity	DARE MIDDLETON_NEWARK LCP 701	6	1	Project	Overloaded Equipment Upgrades	FULTON TOWNSHIP	Overload Failure Reduction; Customers	58	115.2	89.4	163.584	58
6	LVD Lines Capacity	DARE MIDDLETON_NEWARK LCP 826	51	1	Project	Overloaded Equipment Upgrades	FULTON TOWNSHIP	Overload Failure Reduction; Customers	82	307.2	269.8	491.52	82
7	LVD Lines Capacity	DARE MILL GROVE ALLEGAN HYDRO LCP 923	18	1	Project	Overloaded Equipment Upgrades	VALLEY TOWNSHIP	Overload Failure Reduction; Customers	57	166.88	163.6	188.5744	57
8	LVD Lines Capacity	DARE NASHVILLE VERMONTVILLE	35	1	Project	Overloaded Equipment Upgrades	VERMONTVILLE	Overload Failure Reduction; Customers	375	307.2	341.2	497.664	375
9	LVD Lines Capacity	DARE Olivet College 415	60	1	Project	Overloaded Equipment Upgrades	WALTON TOWNSHIP	Overload Failure Reduction; Customers	500	480	400.7	748.8	500
10	LVD Lines Capacity	DARE OwossoGould M-52 PH I OliverSt	551	1	Project	Overloaded Equipment Upgrades	OWOSSO	Overload Failure Reduction; Customers	2100	Sub triggered			2100
11	LVD Lines Capacity	DARE PARAMOUNT/NORTHLAND FARMS LCP-792	384	1	Project	Overloaded Equipment Upgrades	GRAND RAPIDS	Overload Failure Reduction; Customers	90	374.4	296.7	561.6	90
12	LVD Lines Capacity	DARE Peninsula/Mapleton LCP 7518	78	1	Project	Overloaded Equipment Upgrades	TRAVERSE CITY	Overload Failure Reduction; Customers	1325	1652.976	1699.4	2975.3568	1325
13	LVD Lines Capacity	DARE PICKERE-INDIAN LAKE	16	1	Project	Overloaded Equipment Upgrades	PAVILION TOWNSHIP	Overload Failure Reduction; Customers	815	1344	959.7	1921.92	815
14	LVD Lines Capacity	DARE PLAINWELL_HEIGHTS LCP 852	10	1	Project	Overloaded Equipment Upgrades	PLAINWELL	Overload Failure Reduction; Customers	1131	960	1356.1	1555.2	1131
15	LVD Lines Capacity	DARE PRESCOTT_LOGAN LCP 575	169	1	Project	Overloaded Equipment Upgrades	RENO TOWNSHIP	Overload Failure Reduction; Customers	124	249.824	131.4	254.82048	124
16	LVD Lines Capacity	DARE PRESCOTT_MAPLE RIDGE LCP 332	114	1	Project	Overloaded Equipment Upgrades	MASON TOWNSHIP	Overload Failure Reduction; Customers	166	332.768	136.3	469.20288	166
17	LVD Lines Capacity	DARE RIVERDALE_SUMNER LCP 080	93	1	Project	Overloaded Equipment Upgrades	SUMNER TOWNSHIP	Overload Failure Reduction; Customers	547	1920	397.1	3033.6	547
18	LVD Lines Capacity	DARE RIVERDALE_RIVERDALE 008	41	1	Project	Overloaded Equipment Upgrades	SEVILLE TOWNSHIP	Overload Failure Reduction; Customers	195	249.824	317.5	394.72192	195
19	LVD Lines Capacity	DARE Saranac_Saranac LCP 740	39	1	Project	Overloaded Equipment Upgrades	BOSTON TOWNSHIP	Overload Failure Reduction; Customers	135	384	516.4	568.32	135
20	LVD Lines Capacity	DARE SAUGATUCK_DOUGLAS LCP 085	5	1	Project	Overloaded Equipment Upgrades	DOUGLAS TOWNSHIP	Overload Failure Reduction; Customers	75	115.2	159.1	170.496	75
21	LVD Lines Capacity	DARE SAUGATUCK_SILVER LAKE LCP 875	5	1	Project	Overloaded Equipment Upgrades	SAUGATUCK TOWNSHIP	Overload Failure Reduction; Customers	64	153.6	238.9	250.368	64
22	LVD Lines Capacity	DARE SHEPHERD_FOREST HILL LCP 181	29	1	Project	Overloaded Equipment Upgrades	PINE RIVER TOWNSHIP	Overload Failure Reduction; Customers	158	480	222.2	806.4	158
23	LVD Lines Capacity	Dare Silver Lake Silver Pines LCP 446	131	1	Project	Overloaded Equipment Upgrades	TRAVERSE CITY	Overload Failure Reduction; Customers	481	576	657.1	835.2	481
24	LVD Lines Capacity	DARE SIMMONS_DAM RD LCP 259	33	1	Project	Overloaded Equipment Upgrades	WEST BRANCH	Overload Failure Reduction; Customers	172	249.824	279.7	267.31168	172
25	LVD Lines Capacity	DARE SIMMONS_DAM RD LCP 616	33	1	Project	Overloaded Equipment Upgrades	WEST BRANCH	Overload Failure Reduction; Customers	124	249.824	238.2	229.83808	124
26	LVD Lines Capacity	DARE SMALLWOOD DAM_WOODEN SHOE LCP 555	38	1	Project	Overloaded Equipment Upgrades	HAY TOWNSHIP	Overload Failure Reduction; Customers	527	696	443.2	821.28	527
27	LVD Lines Capacity	DARE SMITH CREEK_SKIPARK LCP 170	33	1	Project	Overloaded Equipment Upgrades	WEST BRANCH	Overload Failure Reduction; Customers	112	166.88	186.5	175.224	112
28	LVD Lines Capacity	DARE SPICEBUSH_LACOTA ISO 102	33	1	Project	Overloaded Equipment Upgrades	CASCO TOWNSHIP	Overload Failure Reduction; Customers	31	99.936	77.7	110.92896	31
29	LVD Lines Capacity	DARE SPICEBUSH_LACOTA ISO 803	20	1	Project	Overloaded Equipment Upgrades	CASCO TOWNSHIP	Overload Failure Reduction; Customers	96	166.88	147.6	180.2304	96
30	LVD Lines Capacity	DARE STONEY CORNERS-DAIRY LCP 343	720	1	Project	Overloaded Equipment Upgrades	RICHLAND TOWNSHIP	Overload Failure Reduction; Customers	60	166.88	110	283.696	60
31	LVD Lines Capacity	DARE STONEY CORNERS-STONE LGD LCP 5061	38	1	Project	Overloaded Equipment Upgrades	CADILLAC	Overload Failure Reduction; Customers	170	249.824	314	359.74656	170
32	LVD Lines Capacity	DARE Sturgeon Perrine LCP 261	12	1	Project	Overloaded Equipment Upgrades	MIDLAND	Overload Failure Reduction; Customers	55	153.6	255.1	239.616	55
33	LVD Lines Capacity	DARE TEKONSHA_TEKONSHA LCP 221	2	1	Project	Overloaded Equipment Upgrades	CLARENDON TOWNSHIP	Overload Failure Reduction; Customers	60	249.6	312.6	349.44	60
34	LVD Lines Capacity	DARE UPTON MARKETPLACE LCP328-300A	10	1	Project	Overloaded Equipment Upgrades	GRAND LEGGE	Overload Failure Reduction; Customers	1081	1440	2390.4	2592	1081
35	LVD Lines Capacity	DARE WHITTEMORE_SAND LAKE LCP 007	60	1	Project	Overloaded Equipment Upgrades	GRANT TOWNSHIP	Overload Failure Reduction; Customers	387	333	549.792	359.64	387
36	LVD Lines Capacity	DARE WHITTEMORE_SAND LAKE LCP 603	42	1	Project	Overloaded Equipment Upgrades	GRANT TOWNSHIP	Overload Failure Reduction; Customers	504	333	549.792	539.46	504
37	LVD Lines Capacity	DARE WHITTEMORE_SAND LAKE LCP 605	84	1	Project	Overloaded Equipment Upgrades	GRANT TOWNSHIP	Overload Failure Reduction; Customers	312	250	414.336	317.5	312
38	LVD Lines Capacity	DARE WOODWARD-PLEASANT LK LCP 982	283	1	Project	Overloaded Equipment Upgrades	HARING TOWNSHIP	Overload Failure Reduction; Customers	207	332.768	143.3	372.70016	207
39	LVD Lines Capacity	DARE15 CRANBROOK 11 MILE PT. 1	278	1	Project	Overloaded Equipment Upgrades	EMMETT TOWNSHIP	Overload Failure Reduction; Customers	310	672	766.08	1014.72	310
40	LVD Lines Capacity	DARE15 CRANBROOK 11 MILE PT. 2	236	1	Project	Overloaded Equipment Upgrades	EMMETT TOWNSHIP	Overload Failure Reduction; Customers	310	672	766.08	1014.72	310
41	LVD Lines Capacity	DARE15 CRANBROOK 11 MILE PT. 3	219	1	Project	Overloaded Equipment Upgrades	EMMETT TOWNSHIP	Overload Failure Reduction; Customers	310	672	766.08	1014.72	310
42	LVD Lines Capacity	DARE15 CRANBROOK 11 MILE PT. 4	187	1	Project	Overloaded Equipment Upgrades	EMMETT TOWNSHIP	Overload Failure Reduction; Customers	310	672	766.08	1014.72	310
43	LVD Lines Capacity	DARE15 CRANBROOK 17 OHS	36	1	Project	Overloaded Equipment Upgrades	BATTLE CREEK	Overload Failure Reduction; Customers	17	672	766.08	1014.72	17
44	LVD Lines Capacity	DARE16 HARLEM_QUINCY ST LCP 475 #2	182	1	Project	Overloaded Equipment Upgrades	HOLLAND	Overload Failure Reduction; Customers	346	672	497	1182.72	346
45	LVD Lines Capacity	DARE17 15 MILE ROAD/15 MILE ROAD 605 1	623	1	Project	Overloaded Equipment Upgrades	MARENGO TOWNSHIP	Overload Failure Reduction; Customers	174	167	278.88	203.74	174
46	LVD Lines Capacity	DARE17 CAMELOT LAKE/LOOMIS LCP 467	18	1	Project	Overloaded Equipment Upgrades	CHIPPewa TOWNSHIP	Overload Failure Reduction; Customers	57	153.6	164.1	153.6	57
47	LVD Lines Capacity	DARE17 FENNWILE/COMMERCIAL***	725	1	Project	Overloaded Equipment Upgrades	CLYDE TOWNSHIP	Overload Failure Reduction; Customers	784	153.6	140.9	221.184	784
48	LVD Lines Capacity	DARE17 MAGNUS EAGL CRNR LCP 823 PH3	148	1	Project	Overloaded Equipment Upgrades	CLARE	Overload Failure Reduction; Customers	45	480	796.8	772.8	45
49		LVD Lines Capacity Subtotal	6,312										

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Date: June 2025

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(ii)	(iii)	(iv)	(v)		
	Line No.	Sub-Program	Project Description, Line, Substation, or Location	Period	Spending	Units	Unit Type	Investment Category	Location	Benefit Type	Benefit	Current Peak Capacity (kVA)	Current Peak Demand (kVA)	Projected Peak Demand (kVA)	Number of Customers
		Capacity													
	1	LVD Lines Capacity	DARE17 MT FOREST ,MT FOREST LCP 616	29		1	Project	Overloaded Equipment Upgrades	BENTLEY	Overload Failure Reduction; Customers	85	153.6	207.7	227.328	85
	2	LVD Lines Capacity	DARE17 MT PLEASANT/BROADWAY FUSES	14		1	Project	Overloaded Equipment Upgrades	MOUNT PLEASANT	Overload Failure Reduction; Customers	596	115.2	152.8	185.472	596
	3	LVD Lines Capacity	DARE17 SURREY/SURREY LCP 711	16		1	Project	Overloaded Equipment Upgrades	HARRISON	Overload Failure Reduction; Customers	182	345.6	390.6	463.104	182
	4	LVD Lines Capacity	DARE17HAGADORN-BEAUMONT	149		1	Project	Overloaded Equipment Upgrades	EAST LANSING	Overload Failure Reduction; Customers	210	480	202.6	609.6	210
	5	LVD Lines Capacity	DARE18 BRECKENRIDGE/VILLAGE LCP 603	2		1	Project	Overloaded Equipment Upgrades	BRECKENRIDGE	Overload Failure Reduction; Customers	128	153.6	148.2	227.328	128
	6	LVD Lines Capacity	DARE18 DEER LK/CRANBERRY LCP 268	576		1	Project	Overloaded Equipment Upgrades	HARRISON	Overload Failure Reduction; Customers	318	384	380.1	718.08	318
	7	LVD Lines Capacity	DARE18NAPOLEON/WOLF LK-CADY RD	368		1	Project	Overloaded Equipment Upgrades	NAPOLEON TOWNSHIP	Overload Failure Reduction; Customers	340	307.2	171.2	408.576	340
	8	LVD Lines Capacity	DARE19BENTHEIM-140TH AVE LCP341-PT 1*	215		1	Project	Overloaded Equipment Upgrades	OVERSEL TOWNSHIP	Overload Failure Reduction; Customers	110	249.6	467	404.352	110
	9	LVD Lines Capacity	DARE19 BENTHEIM-140TH AVE LCP341-PT 2*	281		1	Project	Overloaded Equipment Upgrades	OVERSEL TOWNSHIP	Overload Failure Reduction; Customers	110	249.6	467	404.352	110
	10	LVD Lines Capacity	DARE19 Clyde Rd ,State Rd	44		1	Project	Overloaded Equipment Upgrades	IONIA	Overload Failure Reduction; Customers	345	332.7648	468.3	452.56448	345
	11	LVD Lines Capacity	DARE19 EIGHT POINT WHITE BIRCH LCP 830 1	270		1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	317	336	408.7	497.28	317
	12	LVD Lines Capacity	DARE19 EIGHT POINT WHITE BIRCH LCP 830 2	283		1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	317	336	408.7	497.28	317
	13	LVD Lines Capacity	DARE19 EIGHT POINT WHITE BIRCH LCP 830 3	20		1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	317	336	408.7	497.28	317
	14	LVD Lines Capacity	DARE19 Hemlock/Hemlock LCP 688	46		1	Project	Overloaded Equipment Upgrades	RICHLAND TOWNSHIP	Overload Failure Reduction; Customers	128	249.6	299.5	384.384	128
	15	LVD Lines Capacity	DARE19 PECK RD ORC-IDA LCP 828	96		1	Project	Overloaded Equipment Upgrades	GREENVILLE	Overload Failure Reduction; Customers	469	192	406.3	481.92	469
	16	LVD Lines Capacity	DARE21 DEER LAKE CRANBRY LCP 303	20		1	Project	Overloaded Equipment Upgrades	HARRISON	Overload Failure Reduction; Customers	989	672	536.8	1014.72	989
	17	LVD Lines Capacity	DARE21 EIGHT POINT WHITE BRCH LCP 565	213		1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	165	464	696	784.16	165
	18	LVD Lines Capacity	DARE21 EIGHT POINT WHITE BRCH LCP 565 UG	12		1	Project	Overloaded Equipment Upgrades	LAKE	Overload Failure Reduction; Customers	165	464	696	784.16	165
	19	LVD Lines Capacity	DARE21 FIFTEEN MILE 15 MILE LCP 258	16		1	Project	Overloaded Equipment Upgrades	MARENGO TOWNSHIP	Overload Failure Reduction; Customers	48	166.88	163.1	170.2176	48
	20	LVD Lines Capacity	DARE21 FIFTEEN MILE A DRIVE LCP 113	8		1	Project	Overloaded Equipment Upgrades	MARSHALL TOWNSHIP	Overload Failure Reduction; Customers	179	249.824	343.7	347.25536	179
	21	LVD Lines Capacity	DARE21 INGHAM-GREENWOOD LCP 844-65	5		1	Project	Overloaded Equipment Upgrades	JACKSON	Overload Failure Reduction; Customers	1	249.6	71.8	274.56	1
	22	LVD Lines Capacity	DARE21 Levely ,Sturgeon LCP 111	12		1	Project	Overloaded Equipment Upgrades	HOPE TOWNSHIP	Overload Failure Reduction; Customers	128	249.824	285.2	252.32224	128
	23	LVD Lines Capacity	DARE21 LOVEJOY Braden LCP 847 ISOLATOR	50		1	Project	Overloaded Equipment Upgrades	DEERFIELD TOWNSHIP	Overload Failure Reduction; Customers	69	249.824	362.2	384.72896	69
	24	LVD Lines Capacity	DARE21 Nineteen Mile-Cement LCP 184	15		1	Project	Overloaded Equipment Upgrades	GREEN TOWNSHIP	Overload Failure Reduction; Customers	37	115.2	163.6	161.28	37
	25	LVD Lines Capacity	DARE21-TEKONSHA-WAGNER LCP 245	17		1	Project	Overloaded Equipment Upgrades	BURLINGTON TOWNSHIP	Overload Failure Reduction; Customers	240	249.6	364.1	386.88	240
	26	LVD Lines Capacity	DARE22 DEER LAKE BALL AVE LCP 413	29		1	Project	Overloaded Equipment Upgrades	HARRISON	Overload Failure Reduction; Customers	150	153.6	203	262.656	150
	27	LVD Lines Capacity	Dare22 Parnall Parnall RD LCP 0436	3		1	Project	Overloaded Equipment Upgrades	JACKSON	Overload Failure Reduction; Customers	43	153.6	181	228.864	43
	28	LVD Lines Capacity	DARE21 BALCOM-BANKERS-LCP 795	259		1	Project	Overloaded Equipment Upgrades	READING TOWNSHIP	Overload Failure Reduction; Customers	38	115.2	108.5	164.736	38
	29	LVD Lines Capacity	DARE CARY-MOSCOW-242-WOODBROOK	47		1	Project	Overloaded Equipment Upgrades	CHAMPEL TOWNSHIP	Overload Failure Reduction; Customers	231	499.616	761.8	569.56224	231
	30	LVD Lines Capacity	DARE CHAPIN ,MARION LCP 925	7		1	Project	Overloaded Equipment Upgrades	SOPHER TOWNSHIP	Overload Failure Reduction; Customers	216	384	541.6	591.36	216
	31	LVD Lines Capacity	DARE Clear Lake Harvey Road LCP 216	65		1	Project	Overloaded Equipment Upgrades	GRASS LAKE	Overload Failure Reduction; Customers	60	153.6	206.4	244.224	60
	32	LVD Lines Capacity	DARE DIVISION ,PIEDMONT LCP 117	85		1	Project	Overloaded Equipment Upgrades	GRAND RAPIDS	Overload Failure Reduction; Customers	353	1152	1217	1647.36	353
	33	LVD Lines Capacity	DARE24 GREGORY UNADILLA LCP 765	20		1	Project	Overloaded Equipment Upgrades	UNADILLA TOWNSHIP	Overload Failure Reduction; Customers	98	153.6	162.8	316.416	98
	34	LVD Lines Capacity	DARE213 NAPOLEON/WOLF LK-NAPOLEON RD	704		1	Project	Overloaded Equipment Upgrades	NAPOLEON TOWNSHIP	Overload Failure Reduction; Customers	109	192	317.6	320.64	109
	35	LVD Lines Capacity	DARE N MUSKEGON STATE PARK LCP 076	327		1	Project	Overloaded Equipment Upgrades	NORTH MUSKEGON	Overload Failure Reduction; Customers	842	1652.976	915.3	2380.28544	842
	36	LVD Lines Capacity	DARE21 Stockbridge ,Morton	20		1	Project	Overloaded Equipment Upgrades	STOCKBRIDGE TOWNSHIP	Overload Failure Reduction; Customers	125	249.6	228.2	414.336	125
	37	LVD Lines Capacity	DARE RIX RD FAIRLANE LCP 128	423		1	Project	Overloaded Equipment Upgrades	OSHTEMO TOWNSHIP	Overload Failure Reduction; Customers	565	384	387.9	483.84	565
	38	LVD Lines Capacity	DARE17 COTTAGE GROVE/PREVO LCP 871 - PT1	766		1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	379	921.6	797	1428.48	379
	39	LVD Lines Capacity	DARE21 MIDDLETON/MIDDLETON LCP 945	281		1	Project	Overloaded Equipment Upgrades	MIDDLETON	Overload Failure Reduction; Customers	50	76.8	86.3	113.664	50
	40	LVD Lines Capacity	DARE21 MANNISNDING CEDAR LCP 231	8		1	Project	Overloaded Equipment Upgrades	LAKE GEORGE	Overload Failure Reduction; Customers	287	76.8	110.5	210.432	287
	41	LVD Lines Capacity	DARE COLON ,PALMER LCP 722	34		1	Project	Overloaded Equipment Upgrades	COLON TOWNSHIP	Overload Failure Reduction; Customers	318	480	796.8	816	318
	42	LVD Lines Capacity	DARE GERRISH-GOLF CLUB LCP 956	148		1	Project	Overloaded Equipment Upgrades	BEAVER CREEK TOWNSHIP	Overload Failure Reduction; Customers	225	240	279.2	340.8	225
	43	LVD Lines Capacity	DARE GERRISH-GOLF CLUB LCP 956 PT 2	333		1	Project	Overloaded Equipment Upgrades	BEAVER CREEK TOWNSHIP	Overload Failure Reduction; Customers	225	240	279.2	340.8	225
	44	LVD Lines Capacity	DARE SPICEBUSH ,LACOTA ISO 106	33		1	Project	Overloaded Equipment Upgrades	LEE TOWNSHIP	Overload Failure Reduction; Customers	38	99.936	67.5	109.9296	38
	45	LVD Lines Capacity	DARE SPICEBUSH-LESTER LAKE ISO 446	36		1	Project	Overloaded Equipment Upgrades	GRAND JUNCTION	Overload Failure Reduction; Customers	199	332	237.8	365.2	199
	46	LVD Lines Capacity	DARE OBERLIN ,MERIDITH LCP 690	75		1	Project	Overloaded Equipment Upgrades	SHERMAN TOWNSHIP	Overload Failure Reduction; Customers	382	249.824	406.3	317.27648	382
	47	LVD Lines Capacity	DARE17 OBERLIN/BENMARK LCP 327 1/2	392		1	Project	Overloaded Equipment Upgrades	GLADWIN	Overload Failure Reduction; Customers	183	480	502.8	801.6	183
	48	LVD Lines Capacity	DARE22 OBERLIN PRATT LAKE LCP 398	103		1	Project	Overloaded Equipment Upgrades	GLADWIN	Overload Failure Reduction; Customers	329	166.88	342.9	353.7856	329
	49	LVD Lines Capacity	DARE22 OBERLIN PRATT LAKE LCP 408	536		1	Project	Overloaded Equipment Upgrades	GLADWIN	Overload Failure Reduction; Customers	614	332.768	648.9	625.60384	614
	50	LVD Lines Capacity	DARE PARAMOUNT/NORTHLAND FARMS LCP-744	257		1	Project	Overloaded Equipment Upgrades	GRAND RAPIDS	Overload Failure Reduction; Customers	143	576	463.1	858.24	143
	51	LVD Lines Capacity	DARE17 PRICE ROAD/PRICE LCP 153	388		1	Project	Overloaded Equipment Upgrades	LINCOLN TOWNSHIP	Overload Failure Reduction; Customers	249	480	616.6	614.4	249
	52	LVD Lines Capacity	DARE17 OTSEGO ,OTSEGO	71		1	Project	Overloaded Equipment Upgrades	OTSEGO TOWNSHIP	Overload Failure Reduction; Customers	595	480	652.1	691.2	595
	53	LVD Lines Capacity	DARE RANGER LAKE ,KOKOSING LCP 591	24		1	Project	Overloaded Equipment Upgrades	HALE	Overload Failure Reduction; Customers	241	332.768	331.4	432.5984	241
	54	LVD Lines Capacity	DARE RANGER LAKE ,LUPTON LCP 522	52		1	Project	Overloaded Equipment Upgrades	LUPTON	Overload Failure Reduction; Customers	284	249.824	314.6	324.7712	284
	55	LVD Lines Capacity	DARE RATIGAN ,GREELEY LCP 353	36		1	Project	Overloaded Equipment Upgrades	GRATTAN TOWNSHIP	Overload Failure Reduction; Customers	70	307.2	205.8	445.44	70
	56	LVD Lines Capacity	DARE PORTSMOUTH/BLUMFIELD LCP 255	401		1	Project	Overloaded Equipment Upgrades	SAGINAW	Overload Failure Reduction; Customers	386	499.616	819.4	594.54304	386
	57	LVD Lines Capacity	DARE PORTSMOUTH/INDIANTOWN LCP 133	385		1	Project	Overloaded Equipment Upgrades	MUNGER	Overload Failure Reduction; Customers	315	499.616	609.3	594.54304	315
	58	LVD Lines Capacity	DARE Saranac ,Saranac LCP 882	218		1	Project	Overloaded Equipment Upgrades	BOSTON TOWNSHIP	Overload Failure Reduction; Customers	149	480	391.7	648	149
	59	LVD Lines Capacity	DARE18 PEACH RIDGE/BALLARD OHLN CONV PT2	457		1	Project	Sub Capacity-associated Line Work	SPARTA	Overload Failure Reduction; Customers	380	Substation Voltage Conversion Project			380
	60	LVD Lines Capacity	DARE18 PEACH RIDGE/BALLARD OHLN CONV PT2	24		1	Project	Sub Capacity-associated Line Work	SPARTA	Overload Failure Reduction; Customers	380	Substation Voltage Conversion Project			380
	61	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT2 10F2	831		1	Project	Sub Capacity-associated Line Work	CONKLIN	Overload Failure Reduction; Customers	153	Substation Voltage Conversion Project			153
	62	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT2 20F2	704		1	Project	Sub Capacity-associated Line Work	CHESTER TOWNSHIP	Overload Failure Reduction; Customers	153	Substation Voltage Conversion Project			153
	63	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT4 10F2	428		1	Project	Sub Capacity-associated Line Work	CONKLIN	Overload Failure Reduction; Customers	410	Substation Voltage Conversion Project			410
	64	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT4 20F2	288		1	Project	Sub Capacity-associated Line Work	SPARTA TOWNSHIP	Overload Failure Reduction; Customers	410	Substation Voltage Conversion Project			410
	65	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT4 UGL	67		1	Project	Sub Capacity-associated Line Work	SPARTA TOWNSHIP	Overload Failure Reduction; Customers	410	Substation Voltage Conversion Project			410
	66	LVD Lines Capacity	DARE21 TAMARACK-LAKEVIEW CONV PH 2.1.5.1	237		1	Project	Sub Capacity-associated Line Work	LAKEVIEW	Overload Failure Reduction; Customers	538	Substation Voltage Conversion Project			538
	67	LVD Lines Capacity	DARE21 TAMARACK-LAKEVIEW CONV PH 2.1.5.2	405		1	Project	Sub Capacity-associated Line Work	LAKEVIEW	Overload Failure Reduction; Customers	538	Substation Voltage Conversion Project			538
	68	LVD Lines Capacity	DARE21 TAMARACK-LAKEVIEW CONV PH 2.1.5.3	323		1	Project	Sub Capacity-associated Line Work	LAKEVIEW	Overload Failure Reduction; Customers	538	Substation Voltage Conversion Project			538
	69	LVD Lines Capacity	DARE21 TAMARACK-LAKEVIEW CONV PH 2.1.5.4	243		1	Project	Sub Capacity-associated Line Work	LAKEVIEW	Overload Failure Reduction; Customers	538	Substation Voltage Conversion Project			538
	70	LVD Lines Capacity	DARE Palo Substation LVD Rebuild	3208		1	Project	Sub Capacity-associated Line Work	RONALD TOWNSHIP	Overload Failure Reduction; Customers	934	Substation Upgrade Project			934
	71	LVD Lines Capacity	LVD Lines Capacity Subtotal		16,528										
	72	LVD Lines Capacity	LVD Lines Capacity Total		28,551										

Consumers Energy Company

Test Year LVD Project List
For the Test Year 12 Months Ending April 30, 2027
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Witness: JMPartian
Date: June 2025

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(ii)	(iii)	(iv)	(v)	
	Line No.	Sub-Program	Project Description, Line, Substation, or Location	Projected Period Spending	Units	Unit Type	Investment Category	Location	Benefit Type	Benefit	Current Peak Capacity (kVA)	Current Peak Demand (kVA)	Projected Peak Demand (kVA)	Number of Customers
		Capacity												
1	LVD Lines Capacity	DARE BELL ROAD/ALBEE LCP 989	601	1	Project	Overloaded Equipment Upgrades	TAYMOUTH TOWNSHIP	Overload Failure Reduction; Customers	1276	144	144	152.64	1276	
2	LVD Lines Capacity	DARE BLUE STAR/PIER COVE LCP 613	619	1	Project	Overloaded Equipment Upgrades	GANGES TOWNSHIP	Overload Failure Reduction; Customers	131	307.2	365.4	374.784	131	
3	LVD Lines Capacity	DARE BRISTOL_MILLER LCP Sub	488	1	Project	Overloaded Equipment Upgrades	SAGINAW TOWNSHIP	Overload Failure Reduction; Customers	1020	#N/A	#N/A	#N/A	1020	
4	LVD Lines Capacity	DARE CARY-LKCOLUMBIA-561-DIVERSY AT HEWIT	3	1	Project	Overloaded Equipment Upgrades	COLUMBIA TOWNSHIP	Overload Failure Reduction; Customers	153	307.2	448.2	454.656	153	
5	LVD Lines Capacity	DARE CONVIS CONVIS LCP 336	9	1	Project	Overloaded Equipment Upgrades	CONVIS TOWNSHIP	Overload Failure Reduction; Customers	32	166.88	215.9	215.9	32	
6	LVD Lines Capacity	DARE PORTSMOUTH/BLUMFIELD LCP 255 PART 2	441	1	Project	Overloaded Equipment Upgrades	SAGINAW	Overload Failure Reduction; Customers	386	499.616	819.4	594.54304	386	
7	LVD Lines Capacity	DARE ROCKFORD_SUMMIT LCP-686	23	1	Project	Overloaded Equipment Upgrades	ROCKFORD	Overload Failure Reduction; Customers	99	307.2	402.6	399.36	99	
8	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT5	666	1	Project	Sub Capacity-associated Line Work	SPARTA	Overload Failure Reduction; Customers	153	Sub triggered			153	
9	LVD Lines Capacity	DARE21 LEFFINGWELL/BRADFORD EB RECON PT2	316	1	Project	Overloaded Equipment Upgrades	GRAND RAPIDS	Overload Failure Reduction; Customers	704	Canceled			704	
10	LVD Lines Capacity	DARE21 PARMA BALDWIN	32	1	Project	Overloaded Equipment Upgrades	PARMA TOWNSHIP	Overload Failure Reduction; Customers	1356	1248	224.3	1597.44	1356	
11	LVD Lines Capacity	DARE24 Fine Lake - Dowling	94	1	Project	Overloaded Equipment Upgrades	JOHNSTOWN TOWNSHIP	Overload Failure Reduction; Customers	471	249.6	346	401.856	471	
12	LVD Lines Capacity	AGNEW_WEYBURN LCP 945	90	1	Project	Overloaded Equipment Upgrades	GRAND HAVEN TOWNSHIP	Overload Failure Reduction; Customers	924	1392	1715.7	1907.04	924	
13	LVD Lines Capacity	ALCONA DAM_GLENNIE LCP	700	1	Project	Overloaded Equipment Upgrades	CURTIS TOWNSHIP	Overload Failure Reduction; Customers	903	167	167	183.7	903	
14	LVD Lines Capacity	ALDER CREEK_EAST LEROY LCP 867	130	1	Project	Overloaded Equipment Upgrades	ATHENS TOWNSHIP	Overload Failure Reduction; Customers	47	166.88	244.3	244.3	47	
15	LVD Lines Capacity	ALLENDALE_BLENDON LCP 071	350	1	Project	Overloaded Equipment Upgrades	ALLENDALE TOWNSHIP	Overload Failure Reduction; Customers	169	480	697.4	681.6	169	
16	LVD Lines Capacity	ALLENDALE_BLENDON LCP 074	90	1	Project	Overloaded Equipment Upgrades	ALLENDALE TOWNSHIP	Overload Failure Reduction; Customers	169	696	699.8	988.32	169	
17	LVD Lines Capacity	ALLENDALE_BLENDON LCP 542	85	1	Project	Overloaded Equipment Upgrades	ALLENDALE TOWNSHIP	Overload Failure Reduction; Customers	86	192	338.3	272.64	86	
18	LVD Lines Capacity	ALTO_MCCORDS LCP 564	85	1	Project	Overloaded Equipment Upgrades	BOWNE TOWNSHIP	Overload Failure Reduction; Customers	20	115.2	106.7	106.7	20	
19	LVD Lines Capacity	AU GRES_POINT LOOK-OUT LCP 553	130	1	Project	Overloaded Equipment Upgrades	WHITNEY TOWNSHIP	Overload Failure Reduction; Customers	79	249.824	91.5	262.3152	79	
20	LVD Lines Capacity	AU GRES_POINT LOOK-OUT LCP 555	210	1	Project	Overloaded Equipment Upgrades	WHITNEY TOWNSHIP	Overload Failure Reduction; Customers	79	240	155.8	155.8	79	
21	LVD Lines Capacity	AU GRES_POINT LOOK-OUT LCP 559	85	1	Project	Overloaded Equipment Upgrades	WHITNEY TOWNSHIP	Overload Failure Reduction; Customers	33	76.8	51.5	51.5	33	
22	LVD Lines Capacity	AU GRES_POINT LOOK-OUT LCP 578	85	1	Project	Overloaded Equipment Upgrades	WHITNEY TOWNSHIP	Overload Failure Reduction; Customers	46	115.2	101.1	101.1	46	
23	LVD Lines Capacity	BACKUS_SPRINGBROOK LCP 229	210	1	Project	Overloaded Equipment Upgrades	DENTON TOWNSHIP	Overload Failure Reduction; Customers	399	672	739.9	739.9	399	
24	LVD Lines Capacity	BACKUS_SPRINGBROOK LCP 251	90	1	Project	Overloaded Equipment Upgrades	DENTON TOWNSHIP	Overload Failure Reduction; Customers	382	696	649.8	649.8	382	
25	LVD Lines Capacity	BACKUS_SPRINGBROOK LCP 465	240	1	Project	Overloaded Equipment Upgrades	DENTON TOWNSHIP	Overload Failure Reduction; Customers	1985	11520	12000	13824	1985	
26	LVD Lines Capacity	BACKUS_SPRINGBROOK LCP 865	130	1	Project	Overloaded Equipment Upgrades	MARKEY TOWNSHIP	Overload Failure Reduction; Customers	262	333	333	359.64	262	
27	LVD Lines Capacity	BALZER_SANDERS LCP 143	130	1	Project	Overloaded Equipment Upgrades	AURELIUS TOWNSHIP	Overload Failure Reduction; Customers	45	166.88	160.8	160.8	45	
28	LVD Lines Capacity	BAYBERRY_PLEASANT HILL LCP 325	90	1	Project	Overloaded Equipment Upgrades	CITY OF WYOMING	Overload Failure Reduction; Customers	231	2421.504	2478.4	2478.4	231	
29	LVD Lines Capacity	BEAVER_CRUMP LCP 285	85	1	Project	Overloaded Equipment Upgrades	LARKIN TOWNSHIP	Overload Failure Reduction; Customers	55	76.8	9.9	9.9	55	
30	LVD Lines Capacity	BEECHER_ANDERSON LCP	700	1	Project	Overloaded Equipment Upgrades	CITY OF ADRIAN	Overload Failure Reduction; Customers	383	3528	4858	4980	383	
31	LVD Lines Capacity	BEERS_BALDWIN ROAD LCP 301	90	1	Project	Overloaded Equipment Upgrades	GAINES TOWNSHIP	Overload Failure Reduction; Customers	119	743.952	706.1	706.1	119	
32	LVD Lines Capacity	BEERS_BALDWIN ROAD LCP 801	85	1	Project	Overloaded Equipment Upgrades	GAINES TOWNSHIP	Overload Failure Reduction; Customers	44	153.6	74.9	74.9	44	
33	LVD Lines Capacity	BENNETT_KNOB HILL LCP 001	30	1	Project	Overloaded Equipment Upgrades	MERIDIAN TOWNSHIP	Overload Failure Reduction; Customers	1002	1440	1953.1	1953.1	1002	
34	LVD Lines Capacity	BLUE WATER_TOWNSEND ROAD LCP 741	130	1	Project	Overloaded Equipment Upgrades	BINGHAM TOWNSHIP	Overload Failure Reduction; Customers	102	249.824	458.8	458.8	102	
35	LVD Lines Capacity	BOMAN_DELAND LCP 168	85	1	Project	Overloaded Equipment Upgrades	MT MORRIS TOWNSHIP	Overload Failure Reduction; Customers	1	46.08	80.4	80.4	1	
36	LVD Lines Capacity	BOON ROAD_ROUND LAKE LCP 773	75	1	Project	Overloaded Equipment Upgrades	HARING TOWNSHIP	Overload Failure Reduction; Customers	173	480	504.4	504.4	173	
37	LVD Lines Capacity	BRECKENRIDGE_WHEELER LCP 709	85	1	Project	Overloaded Equipment Upgrades	WHEELER TOWNSHIP	Overload Failure Reduction; Customers	1	576	826.6	826.6	1	
38	LVD Lines Capacity	BREEDSVILLE_BREEDSVILLE LCP 052	85	1	Project	Overloaded Equipment Upgrades	COLUMBIA TOWNSHIP	Overload Failure Reduction; Customers	45	115.2	5.5	5.5	45	
39	LVD Lines Capacity	BREEDSVILLE_BREEDSVILLE LCP 863	130	1	Project	Overloaded Equipment Upgrades	COLUMBIA TOWNSHIP	Overload Failure Reduction; Customers	70	249.824	95.7	249.824	70	
40	LVD Lines Capacity	BURR OAK_DOUGLAS LCP 929	130	1	Project	Overloaded Equipment Upgrades	FAWN RIVER TOWNSHIP	Overload Failure Reduction; Customers	48	166.88	206.3	180.2304	48	
41	LVD Lines Capacity	CAMELOT LAKE_COLEMAN LCP 602	85	1	Project	Overloaded Equipment Upgrades	GREENDALE TOWNSHIP	Overload Failure Reduction; Customers	104	96	322.1	322.1	104	
42	LVD Lines Capacity	CAMELOT LAKE_COLEMAN LCP 802	90	1	Project	Overloaded Equipment Upgrades	GREENDALE TOWNSHIP	Overload Failure Reduction; Customers	159	696	660.8	660.8	159	
43	LVD Lines Capacity	CAMELOT LAKE_LOOMIS LCP 468	130	1	Project	Overloaded Equipment Upgrades	CHIPPewa TOWNSHIP	Overload Failure Reduction; Customers	61	166.88	170	166.88	61	
44	LVD Lines Capacity	CANNONSBURG_WEST CANNON LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	2176	2352	3239	3320	2176	
45	LVD Lines Capacity	CANNONSBURG_WEST CANNON LCP	90	1	Project	Overloaded Equipment Upgrades	CANNON TOWNSHIP	Overload Failure Reduction; Customers	777	2352	3239	3320	777	
46	LVD Lines Capacity	CANNONSBURG_WEST CANNON LCP 377	90	1	Project	Overloaded Equipment Upgrades	CANNON TOWNSHIP	Overload Failure Reduction; Customers	192	369.6	512.1	512.1	192	
47	LVD Lines Capacity	DARE CARSON CITY_BUTTERNUT LCP SUB	104	1	Project	Overloaded Equipment Upgrades	CARSON CITY	Overload Failure Reduction; Customers	406	3840	4000	4608	406	
48	LVD Lines Capacity	CARSON CITY_BUTTERNUT LCP 635	210	1	Project	Overloaded Equipment Upgrades	BLOOMER TOWNSHIP	Overload Failure Reduction; Customers	253	1344	957.6	957.6	253	
49	LVD Lines Capacity	CARSON CITY_BUTTERNUT LCP 706	85	1	Project	Overloaded Equipment Upgrades	BUSHNELL TOWNSHIP	Overload Failure Reduction; Customers	60	115.2	264	264	60	
50	LVD Lines Capacity	CASCADE_PEACE STREET LCP 324	240	1	Project	Overloaded Equipment Upgrades	CASCADE TOWNSHIP	Overload Failure Reduction; Customers	677	1728	1593.8	1593.8	677	
51	LVD Lines Capacity	CHAPIN_MARION LCP 933	210	1	Project	Overloaded Equipment Upgrades	MARION TOWNSHIP	Overload Failure Reduction; Customers	83	240	370.6	369.6	83	
52	LVD Lines Capacity	CHARLOTTE_FOOTE STREET LCP 075	85	1	Project	Overloaded Equipment Upgrades	CARMEL TOWNSHIP	Overload Failure Reduction; Customers	75	249.6	267.7	459.264	75	
53	LVD Lines Capacity	CHEBOYGAN_ALVERNO LCP 760	130	1	Project	Overloaded Equipment Upgrades	BENTON TOWNSHIP	Overload Failure Reduction; Customers	164	250.032	301.5	350.0448	164	
54	LVD Lines Capacity	CHESTER_MORRELL LCP 314	130	1	Project	Overloaded Equipment Upgrades	CHESTER TOWNSHIP	Overload Failure Reduction; Customers	120	249.824	231.4	287.2976	120	
55	LVD Lines Capacity	CHICAGO_CHICAGO LCP 431	240	1	Project	Overloaded Equipment Upgrades	GEORGETOWN TOWNSHIP	Overload Failure Reduction; Customers	587	2880	1797.1	1797.1	587	
56	LVD Lines Capacity	CLARE_FARWELL LCP 291	130	1	Project	Overloaded Equipment Upgrades	VERNON TOWNSHIP	Overload Failure Reduction; Customers	154	332.768	571.2	571.2	154	
57	LVD Lines Capacity	CLEAR LAKE_WATERLOO LCP 373	130	1	Project	Overloaded Equipment Upgrades	WATERLOO TOWNSHIP	Overload Failure Reduction; Customers	31	249.824	292.4	292.4	31	
58	LVD Lines Capacity	CLEAR LAKE_WATERLOO LCP 386	85	1	Project	Overloaded Equipment Upgrades	LYNDON TOWNSHIP	Overload Failure Reduction; Customers	24	153.6	107.6	107.6	24	
59	LVD Lines Capacity	CLEAR LAKE_WATERLOO LCP 884	85	1	Project	Overloaded Equipment Upgrades	LYNDON TOWNSHIP	Overload Failure Reduction; Customers	27	249.6	115.4	115.4	27	
60	LVD Lines Capacity	CLEAR LAKE_WATERLOO LCP 905	130	1	Project	Overloaded Equipment Upgrades	WATERLOO TOWNSHIP	Overload Failure Reduction; Customers	40	249.824	120.5	249.824	40	
61	LVD Lines Capacity	CLYDE ROAD_GLENN ROAD LCP 338	130	1	Project	Overloaded Equipment Upgrades	CITY OF IONIA	Overload Failure Reduction; Customers	130	166.88	267.8	191.912	130	
62	LVD Lines Capacity	LVD Lines Capacity Subtotal	11,290											

Consumers Energy Company

For the Test Year 12 Months Ending April 30, 2027

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Exhibit No.: A-167 (JMP-2)

Witness: JMPartla

Date: June 2025

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(ii)	(iii)	(iv)	(v)
Line No.	Sub-Program	Project Description, Line, Substation, or Location	Projected Period Spending	Units	Unit Type	Investment Category	Location	Benefit Type	Benefit	Current Peak Capacity (kW)	Current Peak Demand (kW)	Projected Peak Demand (kW)	Number of Customers
	Capacity												
1	LVD Lines Capacity	DARE08 Ridge Rd Cavanaugh Lk	254	1	Project	Overloaded Equipment Upgrades	SYLVAN TOWNSHIP	Overload Failure Reduction; Customers	84	960	408.8	1200	84
2	LVD Lines Capacity	COCHRAN_KALAMO LCP 623	35	1	Project	Overloaded Equipment Upgrades	EATON TOWNSHIP	Overload Failure Reduction; Customers	41	384	426.2	645.12	41
3	LVD Lines Capacity	COCHRAN_KALAMO LCP 628	105	1	Project	Overloaded Equipment Upgrades	CARMEL TOWNSHIP	Overload Failure Reduction; Customers	105	1440	2500	2995.2	105
4	LVD Lines Capacity	COLON_PALMER LCP 757	30	1	Project	Overloaded Equipment Upgrades	COLON TOWNSHIP	Overload Failure Reduction; Customers	527	480	600.7	816	527
5	LVD Lines Capacity	COLUMBIA_COLUMBIA LCP 224	240	1	Project	Overloaded Equipment Upgrades	CITY OF BATTLE CREEK	Overload Failure Reduction; Customers	1020	2640	1485.9	1485.9	1020
6	LVD Lines Capacity	CONVIS_CONVIS LCP	700	1	Project	Overloaded Equipment Upgrades	CONVIS TOWNSHIP	Overload Failure Reduction; Customers	1	1440	2500	0	1
7	LVD Lines Capacity	COWAN LAKE_RAMSDELL LCP 656	130	1	Project	Overloaded Equipment Upgrades	CANNON TOWNSHIP	Overload Failure Reduction; Customers	85	99.936	333.2	165.89376	85
8	LVD Lines Capacity	DEAN ROAD_SHANNON LAKE LCP 156	130	1	Project	Overloaded Equipment Upgrades	ARGENTINE TOWNSHIP	Overload Failure Reduction; Customers	124	166.88	261.4	261.4	124
9	LVD Lines Capacity	DEER LAKE_CRANBERRY LAKE LCP 112	85	1	Project	Overloaded Equipment Upgrades	HAYES TOWNSHIP	Overload Failure Reduction; Customers	302	249.6	345.4	345.4	302
10	LVD Lines Capacity	DEER LAKE_CRANBERRY LAKE LCP 333	85	1	Project	Overloaded Equipment Upgrades	HAYES TOWNSHIP	Overload Failure Reduction; Customers	187	153.6	182.6	182.6	187
11	LVD Lines Capacity	DEWITT_GENEVA LAKE LCP 070	90	1	Project	Overloaded Equipment Upgrades	CITY OF DEWITT	Overload Failure Reduction; Customers	663	167	170	183.7	663
12	LVD Lines Capacity	DIMONDALE_M-99 LCP 778	90	1	Project	Overloaded Equipment Upgrades	WINDSOR TOWNSHIP	Overload Failure Reduction; Customers	424	100	105	110	424
13	LVD Lines Capacity	DORTCH ROAD_PORTAGE LCP	30	1	Project	Overloaded Equipment Upgrades	MANISTEE TOWNSHIP	Overload Failure Reduction; Customers	1	720	948	971	1
14	LVD Lines Capacity	DURAND_CITY LCP 534	85	1	Project	Overloaded Equipment Upgrades	VERNON TOWNSHIP	Overload Failure Reduction; Customers	8	38.4	66.2	66.2	8
15	LVD Lines Capacity	EAST GRANT_MUD FLAT LCP 120	75	1	Project	Overloaded Equipment Upgrades	GRANT TOWNSHIP	Overload Failure Reduction; Customers	123	480	413.9	2193.6	123
16	LVD Lines Capacity	EAST JACKSON_TROJIAN LCP 577	90	1	Project	Overloaded Equipment Upgrades	LEONI TOWNSHIP	Overload Failure Reduction; Customers	95	369.6	379	379	95
17	LVD Lines Capacity	EAST JORDAN_IRONTON LCP 479	85	1	Project	Overloaded Equipment Upgrades	EVELINE TOWNSHIP	Overload Failure Reduction; Customers	226	288	300	345.6	226
18	LVD Lines Capacity	EAST JORDAN_IRONTON LCP 479	85	1	Project	Overloaded Equipment Upgrades	EVELINE TOWNSHIP	Overload Failure Reduction; Customers	226	288	300	345.6	226
19	LVD Lines Capacity	EDMORE_SIX LAKES LCP 266	90	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	150	696	735.5	735.5	150
20	LVD Lines Capacity	EDMORE_SIX LAKES LCP 356	130	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	147	332.768	387.1	387.1	147
21	LVD Lines Capacity	EDMORE_SIX LAKES LCP 363	30	1	Project	Overloaded Equipment Upgrades	HOME TOWNSHIP	Overload Failure Reduction; Customers	735	1920	1165.7	1165.7	735
22	LVD Lines Capacity	EDMORE_SIX LAKES LCP 373	210	1	Project	Overloaded Equipment Upgrades	BELVIDERE TOWNSHIP	Overload Failure Reduction; Customers	153	480	741.8	873.6	153
23	LVD Lines Capacity	EIGHT POINT_LAKE GEORGE LCP 101	130	1	Project	Overloaded Equipment Upgrades	FREEMAN TOWNSHIP	Overload Failure Reduction; Customers	27	99.936	82.1	82.1	27
24	LVD Lines Capacity	EIGHT POINT_LAKE GEORGE LCP 105	210	1	Project	Overloaded Equipment Upgrades	FREEMAN TOWNSHIP	Overload Failure Reduction; Customers	66	240	146.5	146.5	66
25	LVD Lines Capacity	EIGHT POINT_LAKE GEORGE LCP 109	130	1	Project	Overloaded Equipment Upgrades	FREEMAN TOWNSHIP	Overload Failure Reduction; Customers	67	166.88	153	153	67
26	LVD Lines Capacity	EIGHT POINT_LAKE GEORGE LCP 860	130	1	Project	Overloaded Equipment Upgrades	FREEMAN TOWNSHIP	Overload Failure Reduction; Customers	158	251.9466667	551.5	551.5	158
27	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 303	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	62	115.2	173.5	173.5	62
28	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 305	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	157	192	234.1	234.1	157
29	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 384	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	133	153.6	171.6	171.6	133
30	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 436	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	20	102.4	233.8	233.8	20
31	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 5054	90	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	623	696	566.4	566.4	623
32	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 529	130	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	628	499.616	602.2	602.2	628
33	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 531	210	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	628	480	582.7	811.2	628
34	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 534	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	98	192	280	280	98
35	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 541	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	120	153.6	220.3	220.3	120
36	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 564	130	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	159	166.88	277	277	159
37	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 565	85	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	159	115.2	260.1	268.416	159
38	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 583	130	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	35	49.952	71.3	71.3	35
39	LVD Lines Capacity	EIGHT POINT_LUDINGTON LCP 751	378	1	Project	Overloaded Equipment Upgrades	GARFIELD TOWNSHIP	Overload Failure Reduction; Customers	147	168.2773333	207.9	247.36768	147
40	LVD Lines Capacity	DARE EAST TAWAS_LINCOLN STREET 805	25	1	Project	Overloaded Equipment Upgrades	BALDWIN TOWNSHIP	Overload Failure Reduction; Customers	309	100	102	120	309
41	LVD Lines Capacity	DARE19 Trufant_Hunter Lake	112	1	Project	Overloaded Equipment Upgrades	PINE TOWNSHIP	Overload Failure Reduction; Customers	93	192	223.4	337.92	93
42	LVD Lines Capacity	ELLSWORTH_ELLS 09 LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	887	2352	5548	5687	887
43	LVD Lines Capacity	ELLSWORTH_CIVIC LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	195	2352	2975	3050	195
44	LVD Lines Capacity	ELSIE_CARLAND LCP 495	130	1	Project	Overloaded Equipment Upgrades	DUPLAIN TOWNSHIP	Overload Failure Reduction; Customers	174	1001.664	668	668	174
45	LVD Lines Capacity	FAIRBANKS_POST OFFICE LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	191	2750	3790	3885	191
46	LVD Lines Capacity	FAIRBANKS_WAITERS LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	498	2750	3697	3789	498
47	LVD Lines Capacity	FLETCHER_ODEN LCP 064	85	1	Project	Overloaded Equipment Upgrades	TUSCARORA TOWNSHIP	Overload Failure Reduction; Customers	179	121.6	33.7	130.112	179
48	LVD Lines Capacity	FOOTE HYDRO_DISTRIBUTION LCP 005	85	1	Project	Overloaded Equipment Upgrades	OSCODA TOWNSHIP	Overload Failure Reduction; Customers	56	192	413.9	413.9	56
49	LVD Lines Capacity	FOUR MILE_CORDS LCP	750	1	Project	Overloaded Equipment Upgrades	ALPINE TOWNSHIP	Overload Failure Reduction; Customers	504	698	908	931	504
50	LVD Lines Capacity	FOUR MILE_GREENRIDGE LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	4375	4125	5994	6144	4375
51	LVD Lines Capacity	FOURTEENTH STREET_TOBIAS STREET LCP 763	85	1	Project	Overloaded Equipment Upgrades	CITY OF FLINT	Overload Failure Reduction; Customers	51	115.2	130.7	130.7	51
52	LVD Lines Capacity	FROST_LONG LAKE LCP	700	1	Project	Overloaded Equipment Upgrades	FROST TOWNSHIP	Overload Failure Reduction; Customers	463	384	450	514.56	463
53	LVD Lines Capacity	GOGUAC_GOGUAC LCP 7170	85	1	Project	Overloaded Equipment Upgrades	CITY OF BATTLE CREEK	Overload Failure Reduction; Customers	38	38.4	69.7	69.7	38
54	LVD Lines Capacity	GOODALE_HUBBARD LCP 373	90	1	Project	Overloaded Equipment Upgrades	BEDFORD TOWNSHIP	Overload Failure Reduction; Customers	220	696	477.2	477.2	220
55	LVD Lines Capacity	GOODALE_ROOSEVELT LCP	700	1	Project	Overloaded Equipment Upgrades	CITY OF BATTLE CREEK	Overload Failure Reduction; Customers	1166	100	115	115	1166
56	LVD Lines Capacity	GRAND LEDGE_ACADEMY LCP 751	210	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND LEDGE	Overload Failure Reduction; Customers	786	1344	1742	1742	786
57	LVD Lines Capacity	GREENWOOD_RAU ROAD LCP 865	130	1	Project	Overloaded Equipment Upgrades	EDWARDS TOWNSHIP	Overload Failure Reduction; Customers	272	499.616	486.7	644.50464	272
58	LVD Lines Capacity	HARLEM_QUINCY STREET LCP	750	1	Project	Overloaded Equipment Upgrades	HOLLAND TOWNSHIP	Overload Failure Reduction; Customers	305	672	800	1182.72	305
59	LVD Lines Capacity	HARLEM_QUINCY STREET LCP	750	1	Project	Overloaded Equipment Upgrades	HOLLAND TOWNSHIP	Overload Failure Reduction; Customers	19	672	800	1182.72	19
60	LVD Lines Capacity	HARLEM_QUINCY STREET LCP 967	85	1	Project	Overloaded Equipment Upgrades	HOLLAND TOWNSHIP	Overload Failure Reduction; Customers	164	307.2	460.9	540.672	164
61		LVD Lines Capacity Subtotal	13,670										

Consumers Energy Company

For the Test Year 12 Months Ending April 30, 2027

Case No.: U-21870

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Witness: JMPartla

Date: June 2025

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(ii)	(iii)	(iv)	(v)
Line No.	Sub-Program	Project Description, Line, Substation, or Location	Projected Period Spending	Units	Unit Type	Investment Category	Location	Benefit Type	Benefit	Current Peak Capacity (kW)	Current Peak Demand (kW)	Projected Peak Demand (kW)	Number of Customers
	Capacity												
1	LVD Lines Capacity	DARE AGNEW_WEYBURN LCP 309	2	1	Project	Overloaded Equipment Upgrades	GRAND HAVEN	Overload Failure Reduction; Customers	20	307.2	358.7	442.368	20
2	LVD Lines Capacity	DARE AGNEW_WEYBURN LCP 207	2	1	Project	Overloaded Equipment Upgrades	GRAND HAVEN	Overload Failure Reduction; Customers	300	249.6	288.1	351.936	300
3	LVD Lines Capacity	DARE AGNEW_WEYBURN LCP 307	130	1	Project	Overloaded Equipment Upgrades	GRAND HAVEN	Overload Failure Reduction; Customers	125	1344	1773.2	1868.16	125
4	LVD Lines Capacity	DARE BAY HARBOR_DUNDEE LCP SUB UG CABLE	160	1	Project	Overloaded Equipment Upgrades	PETOSKEY	Overload Failure Reduction; Customers	448	1800	1800	1872	448
5	LVD Lines Capacity	DARE_BIG PRAIRIE_OXBOW LCP 915	50	1	Project	Overloaded Equipment Upgrades	BIG PRAIRIE	Overload Failure Reduction; Customers	334	192	328.3	303.36	334
6	LVD Lines Capacity	DARE BIL-MAR_POLK LCP 527	518	1	Project	Overloaded Equipment Upgrades	HOLLAND	Overload Failure Reduction; Customers	135	384	459.4	533.76	135
7	LVD Lines Capacity	DARE BLACK RIVER_FILMORE LCP 264	1	1	Project	Overloaded Equipment Upgrades	ZEELAND	Overload Failure Reduction; Customers	21	288	303.6	374.4	21
8	LVD Lines Capacity	DARE19 BLUE STAR/PIER COVE LCP 619	339	1	Project	Overloaded Equipment Upgrades	SAUGATUCK	Overload Failure Reduction; Customers	131	192	205.6	222.72	131
9	LVD Lines Capacity	DARE BLUE STAR/PIER COVE LCP 613	400	1	Project	Overloaded Equipment Upgrades	SAUGATUCK	Overload Failure Reduction; Customers	131	307.2	365.4	374.784	131
10	LVD Lines Capacity	DARE BLUE STAR_GANGES LCP 893	43	1	Project	Overloaded Equipment Upgrades	GANGES TOWNSHIP	Overload Failure Reduction; Customers	86	336	370.9	372.96	86
11	LVD Lines Capacity	DARE BRADFORD_DISTRIBUTION LCP 588	108	1	Project	Overloaded Equipment Upgrades	LEE TOWNSHIP	Overload Failure Reduction; Customers	349	50	50	66.5	349
12	LVD Lines Capacity	DARE18 ENGLISHVILLE/ENGLISHVILLE PH EXT	450	1	Project	Overloaded Equipment Upgrades	SPARTA TOWNSHIP	Overload Failure Reduction; Customers	157	307.2	258.4	414.72	157
13	LVD Lines Capacity	DARE21 Levely_Allright LCP 250	166	1	Project	Overloaded Equipment Upgrades	BUCKEYE TOWNSHIP	Overload Failure Reduction; Customers	254	499.616	479.9	574.5584	254
14	LVD Lines Capacity	DARE21 Levely_Allright LCP 239	166	1	Project	Overloaded Equipment Upgrades	BUCKEYE TOWNSHIP	Overload Failure Reduction; Customers	54	99.936	116.5	120.92256	54
15	LVD Lines Capacity	DARE21 Levely_Allright LCP 665	335	1	Project	Overloaded Equipment Upgrades	BUCKEYE TOWNSHIP	Overload Failure Reduction; Customers	669	499.616	464.1	649.5008	669
16	LVD Lines Capacity	DARE ONEKAMA_BEAR LAKE LCP 710	680	1	Project	Overloaded Equipment Upgrades	BEAR LAKE	Overload Failure Reduction; Customers	309	460.8	574.3	617.472	309
17	LVD Lines Capacity	DARE PORTSMOUTH/BLUMFIELD LCP 255	650	1	Project	Overloaded Equipment Upgrades	REESE TOWNSHIP	Overload Failure Reduction; Customers	386	499.616	819.4	594.54304	386
18	LVD Lines Capacity	DARE PORTSMOUTH/INDIANTOWN LCP 133	1,100	1	Project	Overloaded Equipment Upgrades	REESE TOWNSHIP	Overload Failure Reduction; Customers	315	499.616	609.3	594.54304	315
19	LVD Lines Capacity	DARE STARKS_HOMER LCP 429	371	1	Project	Overloaded Equipment Upgrades	MIDLAND TOWNSHIP	Overload Failure Reduction; Customers	342	696	745.3	1099.68	342
20	LVD Lines Capacity	KINGSLEY_WALTON LCP 690	24	1	Project	Overloaded Equipment Upgrades	PARADISE TOWNSHIP	Overload Failure Reduction; Customers	155	192	263.6	268.8	155
21	LVD Lines Capacity	KIPP ROAD_M-36 LCP 5315	30	1	Project	Overloaded Equipment Upgrades	INGHAM TOWNSHIP	Overload Failure Reduction; Customers	78	249.824	400.5	339.76064	78
22	LVD Lines Capacity	LAKE CITY_MOREY LCP 199	18	1	Project	Overloaded Equipment Upgrades	CALDWELL TOWNSHIP	Overload Failure Reduction; Customers	220	480	589.1	729.6	220
23	LVD Lines Capacity	DARE15 LOVEJOY-DEERFIELD PHI	1,220	1	Project	Overloaded Equipment Upgrades	COHOCTAH TOWNSHIP	Overload Failure Reduction; Customers	41	1152	1250	1440	41
24	LVD Lines Capacity	LYON MANOR_TOWN HALL LCP 912	38	1	Project	Overloaded Equipment Upgrades	LYON TOWNSHIP	Overload Failure Reduction; Customers	783	192	410.2	351.36	783
25	LVD Lines Capacity	LYONS_COLLINS-RURAL LCP 338	130	1	Project	Overloaded Equipment Upgrades	LYONS TOWNSHIP	Overload Failure Reduction; Customers	131	384	527	710.4	131
26	LVD Lines Capacity	DARE21 PORTAGE SHAYER ROAD 917	354	1	Project	Overloaded Equipment Upgrades	PORTAGE	Overload Failure Reduction; Customers	1328	153.6	264.3	248.832	1328
27	LVD Lines Capacity	DARE ALCONA DAM_GLENNIE 764	5	1	Project	Overloaded Equipment Upgrades	CURTIS TOWNSHIP	Overload Failure Reduction; Customers	51	166.88	82.5	175.224	51
28	LVD Lines Capacity	DARE ALCONA DAM_GLENNIE 768	18	1	Project	Overloaded Equipment Upgrades	CURTIS TOWNSHIP	Overload Failure Reduction; Customers	112	167	167	183.7	112
29	LVD Lines Capacity	DARE ALCONA DAM_GLENNIE 850	8	1	Project	Overloaded Equipment Upgrades	CURTIS TOWNSHIP	Overload Failure Reduction; Customers	184	167	167	183.7	184
30	LVD Lines Capacity	DARE ALCONA DAM_GLENNIE 907	7	1	Project	Overloaded Equipment Upgrades	CURTIS TOWNSHIP	Overload Failure Reduction; Customers	83	100	100	110	83
31	LVD Lines Capacity	DARE ALCONA DAM_GLENNIE 937	21	1	Project	Overloaded Equipment Upgrades	CURTIS TOWNSHIP	Overload Failure Reduction; Customers	106	250	250	275	106
32	LVD Lines Capacity	DARE ALDRICH-TRAVERSE LCP 242	69	1	Project	Overloaded Equipment Upgrades	FLINT	Overload Failure Reduction; Customers	720	384	1049.6	840.96	720
33	LVD Lines Capacity	DARE AU GRES_AU GRES LCP 644	30	1	Project	Overloaded Equipment Upgrades	AU GRES TOWNSHIP	Overload Failure Reduction; Customers	93	100	100	110	93
34	LVD Lines Capacity	DARE BREEDSVILLE GRAND JUNCTION LCP 960	11	1	Project	Overloaded Equipment Upgrades	COLUMBIA TOWNSHIP	Overload Failure Reduction; Customers	24	99.936	73.3	99.936	24
35	LVD Lines Capacity	DARE CASINO_LEATON LCP 466	280	1	Project	Overloaded Equipment Upgrades	CHIPPewa TOWNSHIP	Overload Failure Reduction; Customers	161	192	167.1	332.16	161
36	LVD Lines Capacity	DARE GREENBUSH_HARRISVILLE 402	20	1	Project	Overloaded Equipment Upgrades	HARRISVILLE TOWNSHIP	Overload Failure Reduction; Customers	54	100	100	105	54
37	LVD Lines Capacity	DARE HUBBARD LAKE_HUBBARD LAKE 600	11	1	Project	Overloaded Equipment Upgrades	HAWES TOWNSHIP	Overload Failure Reduction; Customers	319	333	380	416.25	319
38	LVD Lines Capacity	DARE LITCHFIELD_ADAMS RD LCP 557	2	1	Project	Overloaded Equipment Upgrades	LITCHFIELD TOWNSHIP	Overload Failure Reduction; Customers	8	57.6	26.6	26.6	8
39	LVD Lines Capacity	DARE LITCHFIELD_QUAKER LAKE LCP 522	7	1	Project	Overloaded Equipment Upgrades	BUTLER TOWNSHIP	Overload Failure Reduction; Customers	31	115.2	175.6	184.32	31
40	LVD Lines Capacity	DARE Maple City/Cedar LCP 060	265	1	Project	Overloaded Equipment Upgrades	MAPLE CITY	Overload Failure Reduction; Customers	127	288	310.9	420.48	127
41	LVD Lines Capacity	DARE STANDISH_STANDISH LCP 332	13	1	Project	Overloaded Equipment Upgrades	DEEP RIVER TOWNSHIP	Overload Failure Reduction; Customers	132	696	368.5	368.5	132
42	LVD Lines Capacity	DARE Starks Homer LCP 643	18	1	Project	Overloaded Equipment Upgrades	HOMER TOWNSHIP	Overload Failure Reduction; Customers	65	115.2	191	185.472	65
43	LVD Lines Capacity	DARE TWELFTH STREET_WESTFIELD LCP 084	5	1	Project	Overloaded Equipment Upgrades	TEXAS TOWNSHIP	Overload Failure Reduction; Customers	397	480	579.6	579.6	397
44	LVD Lines Capacity	DARE17 MIDDLETON/MIDDLETON LCP 954	11	1	Project	Overloaded Equipment Upgrades	MIDDLETON	Overload Failure Reduction; Customers	215	384	455.3	568.32	215
45	LVD Lines Capacity	DARE NORTHPORT LIGHTHOUSE LCP 569	5	1	Project	Overloaded Equipment Upgrades	NORTHPORT	Overload Failure Reduction; Customers	59	115.2	107.2	162.432	59
46	LVD Lines Capacity	DARE NOBLE_WHITNEY LCP 513	98	1	Project	Overloaded Equipment Upgrades	WHITNEY TOWNSHIP	Overload Failure Reduction; Customers	419	332.768	313.2	412.63232	419
47	LVD Lines Capacity	DARE N MUSKOGEE DALTON LCP 285	166	1	Project	Overloaded Equipment Upgrades	LAKETON TOWNSHIP	Overload Failure Reduction; Customers	293	576	289.9	944.64	293
48	LVD Lines Capacity	DARE MT PLEASANT/COLLEGE LCP 980	140	1	Project	Overloaded Equipment Upgrades	MOUNT PLEASANT	Overload Failure Reduction; Customers	309	384	535	506.88	309
49	LVD Lines Capacity	DARE Rodney-Rodney LCP 923	32	1	Project	Overloaded Equipment Upgrades	MECOSTA	Overload Failure Reduction; Customers	57	99.936	114.6	127.91808	57
50	LVD Lines Capacity	DARE RYNO_MORENCI LCP 358	66	1	Project	Overloaded Equipment Upgrades	MIO	Overload Failure Reduction; Customers	456	332.768	387.2	329.44032	456
51	LVD Lines Capacity	DARE Trufant_Gowen LCP 570 and 876	42	1	Project	Overloaded Equipment Upgrades	SPENCER TOWNSHIP	Overload Failure Reduction; Customers	299	115.2	14.7	220.032	299
52	LVD Lines Capacity	DARE WARNER-BURCHETT 312 ISOLATOR	140	1	Project	Overloaded Equipment Upgrades	PRAIRIEVILLE TOWNSHIP	Overload Failure Reduction; Customers	144	332.768	355.3	259.55904	144
53	LVD Lines Capacity	DARE19 SURREY SURREY LCP 708	121	1	Project	Overloaded Equipment Upgrades	FARWELL	Overload Failure Reduction; Customers	251	576	559.3	990.72	251
54	LVD Lines Capacity	DARE21 CEDAR LAKE_KINGS CORNER 702	30	1	Project	Overloaded Equipment Upgrades	OSCODA	Overload Failure Reduction; Customers	98	115.2	180.4	180.4	98
55	LVD Lines Capacity	DARE BIRCH RUN/SAGINAW ROAD LCP 515	482	1	Project	Overloaded Equipment Upgrades	BIRCH RUN TOWNSHIP	Overload Failure Reduction; Customers	274	768	757.9	867.84	274
56	LVD Lines Capacity	DARE BRIDGEPORT/DIXIE LCP 664	90	1	Project	Overloaded Equipment Upgrades	BRIDGEPORT TOWNSHIP	Overload Failure Reduction; Customers	59	192	177.9	174.72	59
57	LVD Lines Capacity	DARE Camelot Lake_Coleman LCP 513 Part 2	581	1	Project	Overloaded Equipment Upgrades	GREENDALE TOWNSHIP	Overload Failure Reduction; Customers	597	11520	12000	17971.2	597
58	LVD Lines Capacity	DARE CANNONSBURG/WEST CANNON LCP-840	470	1	Project	Overloaded Equipment Upgrades	BELMONT	Overload Failure Reduction; Customers	114	384	554.7	560.64	114
59	LVD Lines Capacity	DARE CASINO_LEATON LCP 625	20	1	Project	Overloaded Equipment Upgrades	CHIPPewa TOWNSHIP	Overload Failure Reduction; Customers	69	192	156.6	182.4	69
60	LVD Lines Capacity	DARE CONVIS CONVIS LCP 369	9	1	Project	Overloaded Equipment Upgrades	CONVIS TOWNSHIP	Overload Failure Reduction; Customers	40	166.88	278.5	186.9056	40
61		LVD Lines Capacity Subtotal	10,779										

Consumers Energy Company

For the Test Year 12 Months Ending April 30, 2027

Case No.: U-21870

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Witness: JMPartla

Date: June 2025

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(ii)	(iii)	(iv)	(v)	
Line No.	Sub-Program	Project Description, Line, Substation, or Location	Period	Spending	Units	Unit Type	Investment Category	Location	Benefit Type	Benefit	Current Peak Capacity (kW)	Current Peak Demand (kW)	Projected Peak Demand (kW)	Number of Customers
	Capacity													
1	LVD Lines Capacity	DARE EASTLAWN_FLAIOLIE LCP 530	4		1	Project	Overloaded Equipment Upgrades	MIDLAND	Overload Failure Reduction; Customers	1337	1440	1436.8	1436.8	1337
2	LVD Lines Capacity	DARE FREELAND_FREELAND LCP 661	229		1	Project	Overloaded Equipment Upgrades	FREELAND	Overload Failure Reduction; Customers	122	249.6	35.2	284.544	122
3	LVD Lines Capacity	DARE HENDERSHOT_CENTENNIAL LCP 585	23		1	Project	Overloaded Equipment Upgrades	ADRIAN TOWNSHIP	Overload Failure Reduction; Customers	431	1008	882.7	1199.52	431
4	LVD Lines Capacity	DARE ITHACA_FAIR GROUNDS LCP 463	47		1	Project	Overloaded Equipment Upgrades	ARCADA TOWNSHIP	Overload Failure Reduction; Customers	45	192	167.3	264.96	45
5	LVD Lines Capacity	DARE PLAINWELL_COMMERCIAL LCP 551	13		1	Project	Overloaded Equipment Upgrades	GUN PLAIN TOWNSHIP	Overload Failure Reduction; Customers	32	115.2	63.9	63.9	32
6	LVD Lines Capacity	DARE18 COGGINS_ALMEDA LCP 780	130		1	Project	Overloaded Equipment Upgrades	PINCONNING	Overload Failure Reduction; Customers	103	153.6	201.7	185.856	103
7	LVD Lines Capacity	DARE18 COWAN LAKE/RAMSDELL OVERLOADED FU	33		1	Project	Overloaded Equipment Upgrades	ROCKFORD	Overload Failure Reduction; Customers	131	153.6	166.6	179.712	131
8	LVD Lines Capacity	DARE18 DEWEY SEATING (ENG JIST ALD FEED	419		1	Project	Overloaded Equipment Upgrades	GRAND RAPIDS	Overload Failure Reduction; Customers	3615	720	725	756	3615
9	LVD Lines Capacity	DARE18 HARRISON HARRISON LCP 381	16		1	Project	Overloaded Equipment Upgrades	HARRISON	Overload Failure Reduction; Customers	292	480	474.3	542.4	292
10	LVD Lines Capacity	MARKEY_CARROCK LCP 731	62		1	Project	Overloaded Equipment Upgrades	GERRISH TOWNSHIP	Overload Failure Reduction; Customers	245	249.6	367.3	359.424	245
11	LVD Lines Capacity	MCBAIN_VOGLER CENTER LCP 064	42		1	Project	Overloaded Equipment Upgrades	CLAM UNION TOWNSHIP	Overload Failure Reduction; Customers	317	830	1071.5	1112.2	317
12	LVD Lines Capacity	MCBAIN_LAKE CITY LCP 0761	25		1	Project	Overloaded Equipment Upgrades	CLAM UNION TOWNSHIP	Overload Failure Reduction; Customers	145	100.128	27.1	115.1472	145
13	LVD Lines Capacity	DARE ST CHARLES/FERGUS LCP 387	86		1	Project	Overloaded Equipment Upgrades	ST CHARLES TOWNSHIP	Overload Failure Reduction; Customers	27	115.2	127.6	130.176	27
14	LVD Lines Capacity	DARE17 CHESANING/CHESANING LCP 360	74		1	Project	Overloaded Equipment Upgrades	CHESANING TOWNSHIP	Overload Failure Reduction; Customers	133	480	267.6	499.2	133
15	LVD Lines Capacity	DARE17 FRANKENMUTH/GERA LCP 942	86		1	Project	Overloaded Equipment Upgrades	BLUMFIELD TOWNSHIP	Overload Failure Reduction; Customers	30	153.6	162.7	150.9888	30
16	LVD Lines Capacity	DARE17 GROVER/TRIANGLE LCP 361	16		1	Project	Overloaded Equipment Upgrades	EMOURT TOWNSHIP	Overload Failure Reduction; Customers	308	384	491.5	710.4	308
17	LVD Lines Capacity	DARE17 ISABELLA/PICKARD LCP 789	7		1	Project	Overloaded Equipment Upgrades	MOUNT PLEASANT	Overload Failure Reduction; Customers	209	307.2	375.7	414.72	209
18	LVD Lines Capacity	DARE17 KAWKAWLIN/LAGOON BEACH LCP 422	105		1	Project	Overloaded Equipment Upgrades	KAWKAWLIN	Overload Failure Reduction; Customers	927	960	933.6	1104	927
19	LVD Lines Capacity	DARE17 MORLEY/HOLLAND LCP 723	49		1	Project	Overloaded Equipment Upgrades	BUENA VISTA TOWNSHIP	Overload Failure Reduction; Customers	122	384	191.3	191.3	122
20	LVD Lines Capacity	MONA LAKE_AIRPORT LCP 564	12		1	Project	Overloaded Equipment Upgrades	CITY OF NORTON SHORES	Overload Failure Reduction; Customers	1171	720	1039.6	1044	1171
21	LVD Lines Capacity	MONTEREY_30TH STREET LCP 818	60		1	Project	Overloaded Equipment Upgrades	SALEM TOWNSHIP	Overload Failure Reduction; Customers	130	369.6	512.2	535.92	130
22	LVD Lines Capacity	DARE17 PINE RIVER/RURAL LCP 219	130		1	Project	Overloaded Equipment Upgrades	ALMA	Overload Failure Reduction; Customers	93	249.6	347.6	376.896	93
23	LVD Lines Capacity	DARE17 STARKS/HOMER LCP 654	182		1	Project	Overloaded Equipment Upgrades	HOMER TOWNSHIP	Overload Failure Reduction; Customers	342	100	115	125	342
24	LVD Lines Capacity	DARE17 SWAN CREEK_MINING	771		1	Project	Overloaded Equipment Upgrades	CHESHIRE TOWNSHIP	Overload Failure Reduction; Customers	180	384	463.9	441.6	180
25	LVD Lines Capacity	DARE17 ULMER/BURT ROAD LCP 429	49		1	Project	Overloaded Equipment Upgrades	BIRCH RUN TOWNSHIP	Overload Failure Reduction; Customers	59	192	164.9	184.32	59
26	LVD Lines Capacity	DARE18 BULLOCK/STEWART LCP 421	3		1	Project	Overloaded Equipment Upgrades	HOMER TOWNSHIP	Overload Failure Reduction; Customers	122	384	290.9	418.56	122
27	LVD Lines Capacity	NEWBURG_VERNON LCP 464	30		1	Project	Overloaded Equipment Upgrades	VERNON TOWNSHIP	Overload Failure Reduction; Customers	31	99.936	166.3	108.93024	31
28	LVD Lines Capacity	OBERLIN_BENMARK LCP 589	49		1	Project	Overloaded Equipment Upgrades	BUTMAN TOWNSHIP	Overload Failure Reduction; Customers	119	166.88	192.9	357.1232	119
29	LVD Lines Capacity	DARE18 CARLETON ROAD_BECK ROAD	2		1	Project	Overloaded Equipment Upgrades	HILLSDALE TOWNSHIP	Overload Failure Reduction; Customers	46	153.6	4.9	161.28	46
30	LVD Lines Capacity	DARE18 CHAPIN/MARION LCP 141	531		1	Project	Overloaded Equipment Upgrades	MARION TOWNSHIP	Overload Failure Reduction; Customers	620	672	671.5	1034.88	620
31	LVD Lines Capacity	OBERLIN_BENMARK LCP 845	60		1	Project	Overloaded Equipment Upgrades	BUTMAN TOWNSHIP	Overload Failure Reduction; Customers	128	166.88	256.2	210.2688	128
32	LVD Lines Capacity	DARE18 JONESVILLE_JONESVILLE	2		1	Project	Overloaded Equipment Upgrades	HILLSDALE TOWNSHIP	Overload Failure Reduction; Customers	115	307.2	233.9	334.848	115
33	LVD Lines Capacity	DARE18 KINDERHOOK_LAKE DRIVE	109		1	Project	Overloaded Equipment Upgrades	OID TOWNSHIP	Overload Failure Reduction; Customers	565		Canceled		565
34	LVD Lines Capacity	DARE18 MORLEY/HOLLAND LCP 712	49		1	Project	Overloaded Equipment Upgrades	BUENA VISTA TOWNSHIP	Overload Failure Reduction; Customers	20	76.8	55.5	90.624	20
35	LVD Lines Capacity	DARE18 NAPOLEON/NORWELL-980-AUSTIN W/O B	535		1	Project	Overloaded Equipment Upgrades	NORVELL TOWNSHIP	Overload Failure Reduction; Customers	42	192	153.1	309.12	42
36	LVD Lines Capacity	OTISVILLE_IRISH ROAD LCP 072	20		1	Project	Overloaded Equipment Upgrades	FOREST TOWNSHIP	Overload Failure Reduction; Customers	33	76.8	127.6	135.936	33
37	LVD Lines Capacity	DARE18 SURREY SURREY LCP 680	202		1	Project	Overloaded Equipment Upgrades	FARWELL	Overload Failure Reduction; Customers	162	336	304.1	399.84	162
38	LVD Lines Capacity	DARE18 Watkins Christy 491	58		1	Project	Overloaded Equipment Upgrades	BATTLE CREEK TOWNSHIP	Overload Failure Reduction; Customers	80	480	400.6	436.8	80
39	LVD Lines Capacity	DARE18 WEIDMAN WEIDMAN LCP 640	242		1	Project	Overloaded Equipment Upgrades	ROSEBUSH	Overload Failure Reduction; Customers	47	240	152.6	156	47
40	LVD Lines Capacity	DARE19 BLUE STAR/PIER COVE LCP 619	522		1	Project	Overloaded Equipment Upgrades	GANGES TOWNSHIP	Overload Failure Reduction; Customers	131	192	205.6	222.72	131
41	LVD Lines Capacity	DARE19 Fine Lake - Bristol	216		1	Project	Overloaded Equipment Upgrades	ASSYRIA TOWNSHIP	Overload Failure Reduction; Customers	261	192	171.3	247.68	261
42	LVD Lines Capacity	DARE19 HARRISON STOCKWELL LCP 074	282		1	Project	Overloaded Equipment Upgrades	HARRISON	Overload Failure Reduction; Customers	222	384	385.5	410.88	222
43	LVD Lines Capacity	DARE19 Olivet Ainger LCP 521	215		1	Project	Overloaded Equipment Upgrades	WALTON TOWNSHIP	Overload Failure Reduction; Customers	268	384	333.5	333.5	268
44	LVD Lines Capacity	PETTIS ROAD_HONEY CREEK LCP 980	198		1	Project	Overloaded Equipment Upgrades	ADA TOWNSHIP	Overload Failure Reduction; Customers	31	499.616	737.6	624.52	31
45	LVD Lines Capacity	DARE21 Cedar Springs-Edgerton LCP 555	413		1	Project	Overloaded Equipment Upgrades	CEDAR SPRINGS	Overload Failure Reduction; Customers	121	332.768	445.3	389.33856	121
46	LVD Lines Capacity	DARE21 Levely_Albright LCP 250	153		1	Project	Overloaded Equipment Upgrades	TOBACCO TOWNSHIP	Overload Failure Reduction; Customers	253	499.616	479.9	574.5584	253
47	LVD Lines Capacity	DARE PORT CALCITE_WOODWARD LCP 0487 REG	221		1	Project	Overloaded Equipment Upgrades	CITY OF ROGERS CITY	Overload Failure Reduction; Customers	413	1280	1041.7	1344	413
48	LVD Lines Capacity	POTTERVILLE_M-78 LCP 655	5		1	Project	Overloaded Equipment Upgrades	WINDSOR TOWNSHIP	Overload Failure Reduction; Customers	81	153.6	270.2	268.8	81
49	LVD Lines Capacity	DARE21 Levely_Albright LCP 239	7		1	Project	Overloaded Equipment Upgrades	TOBACCO TOWNSHIP	Overload Failure Reduction; Customers	54	99.936	116.5	120.92256	54
50	LVD Lines Capacity	DARE21 Levely_Albright LCP 665	437		1	Project	Overloaded Equipment Upgrades	BILLINGS TOWNSHIP	Overload Failure Reduction; Customers	678	499.616	464.1	649.5008	678
51	LVD Lines Capacity	DARE21 PARAMOUNT/BIRD	120		1	Project	Overloaded Equipment Upgrades	GRAND RAPIDS	Overload Failure Reduction; Customers	728	2160	1329.4	2224.8	728
52	LVD Lines Capacity	DARE21 PORTAGE SHAVER RD OAKLAND	78		1	Project	Overloaded Equipment Upgrades	PORTAGE	Overload Failure Reduction; Customers	282	1152	773.3	1244.16	282
53	LVD Lines Capacity	RANGER LAKE_LUPTON LCP 087	450		1	Project	Overloaded Equipment Upgrades	PLAINFIELD TOWNSHIP	Overload Failure Reduction; Customers	254	332.768	555.4	376.02784	254
54	LVD Lines Capacity	RANGER LAKE_GOODARD LCP 185	850		1	Project	Overloaded Equipment Upgrades	PLAINFIELD TOWNSHIP	Overload Failure Reduction; Customers	258	480	496.3	609.6	258
55	LVD Lines Capacity	RANGER LAKE_LUPTON LCP 428	24		1	Project	Overloaded Equipment Upgrades	HILL TOWNSHIP	Overload Failure Reduction; Customers	529	345.6	7.4	387.072	529
56	LVD Lines Capacity	RIVERDALE_SUMNER LCP 019	24		1	Project	Overloaded Equipment Upgrades	SUMNER TOWNSHIP	Overload Failure Reduction; Customers	18	166.88	26.6	272.0144	18
57	LVD Lines Capacity	DARE21-CARLETON RD-BECK RD-UG Cable	5		1	Project	Overloaded Equipment Upgrades	HILLSDALE TOWNSHIP	Overload Failure Reduction; Customers	1	768	288.5	775.68	1
58	LVD Lines Capacity	DARE21-DOBSON RD-HALF MOON-LCP 375	95		1	Project	Overloaded Equipment Upgrades	SCPIO TOWNSHIP	Overload Failure Reduction; Customers	50	192	233.3	264.96	50
59	LVD Lines Capacity	DARE Greenwood_Rau Rd LCP 837	573		1	Project	Overloaded Equipment Upgrades	WEST BRANCH	Overload Failure Reduction; Customers	147	499.616	546.9	594.54304	147
60		LVD Lines Capacity Subtotal	9,439											

MICHIGAN PUBLIC SERVICE COMMISSION

Consumers Energy Company

Test Year LVD Project List

For the Test Year 12 Months Ending April 30, 2027

(\$000)

Case No.: U-21870

Exhibit No.: A-167 (JMP-2)

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Witness: JMPartlan

Date: June 2025

Line No.	(a) Sub-Program	(b) Project Description, Line, Substation, or Location	(c) Projected Period Spending	(d) Units	(e) Unit Type	(f) Investment Category	(g) Location	(h) Benefit Type	(i) Benefit	(ii) Current Peak Capacity (kW)	(iii) Current Peak Demand (kW)	(iv) Projected Peak Demand (kW)	(v) Number of Customers
	Capacity												
1	LVD Lines Capacity	ROGUE RIVER, ROGUE RIVER LCP 472	39	1	Project	Overloaded Equipment Upgrades	CITY OF ROCKFORD	Overload Failure Reduction; Customers	93	99,936	183.8	183.8	93
2	LVD Lines Capacity	ROSE CITY, ISLAND LAKE LCP 108	62	1	Project	Overloaded Equipment Upgrades	FOSTER TOWNSHIP	Overload Failure Reduction; Customers	472	336	440.6	376.32	472
3	LVD Lines Capacity	ROSEBUSH, STEVENSON LAKE LCP 881	90	1	Project	Overloaded Equipment Upgrades	ISABELLA TOWNSHIP	Overload Failure Reduction; Customers	148	369.6	452.8	452.8	148
4	LVD Lines Capacity	RUSSELLVILLE, VICTORIA LCP 268	240	1	Project	Overloaded Equipment Upgrades	RICHFIELD TOWNSHIP	Overload Failure Reduction; Customers	220	864	777	777	220
5	LVD Lines Capacity	RUSSELLVILLE, VICTORIA LCP 830	240	1	Project	Overloaded Equipment Upgrades	RICHFIELD TOWNSHIP	Overload Failure Reduction; Customers	408	1440	1440.8	1440.8	408
6	LVD Lines Capacity	SARANAC, KEENE LCP 868	240	1	Project	Overloaded Equipment Upgrades	KEENE TOWNSHIP	Overload Failure Reduction; Customers	81	720	876	1576.8	81
7	LVD Lines Capacity	SAUGATUCK, SILVER LAKE LCP 340	90	1	Project	Overloaded Equipment Upgrades	SAUGATUCK TOWNSHIP	Overload Failure Reduction; Customers	329	2324.64	1448.1	3789.1632	329
8	LVD Lines Capacity	SHERIDAN, FENWICK LCP 7007	85	1	Project	Overloaded Equipment Upgrades	BUSHNELL TOWNSHIP	Overload Failure Reduction; Customers	3	38.4	41.3	41.3	3
9	LVD Lines Capacity	SINCLAIR, SPECTRUM LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	13	4125	7191	7371	13
10	LVD Lines Capacity	SKYLARK, ROCKING CHAIR LCP 979	240	1	Project	Overloaded Equipment Upgrades	GRAND BLANC TOWNSHIP	Overload Failure Reduction; Customers	310	1344	1138.8	1138.8	310
11	LVD Lines Capacity	SKYLARK, SUN VALLEY LCP	700	1	Project	Overloaded Equipment Upgrades	GRAND BLANC TOWNSHIP	Overload Failure Reduction; Customers	1376	1176	1518	1556	1376
12	LVD Lines Capacity	SMALLWOOD DAM, DISTRIBUTION LCP 607	90	1	Project	Overloaded Equipment Upgrades	HAY TOWNSHIP	Overload Failure Reduction; Customers	345	696	408.6	408.6	345
13	LVD Lines Capacity	SPRUCE ROAD, BLACK RIVER LCP 187	85	1	Project	Overloaded Equipment Upgrades	HAYNES TOWNSHIP	Overload Failure Reduction; Customers	87	168	70.7	70.7	87
14	LVD Lines Capacity	ST HELEN, ARTESIA LCP 090	30	1	Project	Overloaded Equipment Upgrades	RICHFIELD TOWNSHIP	Overload Failure Reduction; Customers	851	960	755.4	755.4	851
15	LVD Lines Capacity	STANDALE, STANDALE LCP 111	85	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	363	576	935.5	935.5	363
16	LVD Lines Capacity	STANDALE, STANDALE LCP 267	85	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	324	288	784.7	784.7	324
17	LVD Lines Capacity	STANDALE, STANDALE LCP 356	85	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	269	230.4	448	448	269
18	LVD Lines Capacity	STANDISH, STERLING LCP	700	1	Project	Overloaded Equipment Upgrades	CITY OF STANDISH	Overload Failure Reduction; Customers	2050	4746	4747	5600.28	2050
19	LVD Lines Capacity	STANDISH, STERLING LCP	90	1	Project	Overloaded Equipment Upgrades	CITY OF STANDISH	Overload Failure Reduction; Customers	2050	4746	4747	5600.28	2050
20	LVD Lines Capacity	STANDISH, STERLING LCP 239	240	1	Project	Overloaded Equipment Upgrades	CITY OF STANDISH	Overload Failure Reduction; Customers	25	1824	2402.1	2402.1	25
21	LVD Lines Capacity	STARKS, HOMER LCP 429	90	1	Project	Overloaded Equipment Upgrades	HOMER TOWNSHIP	Overload Failure Reduction; Customers	238	696	745.3	1099.68	238
22	LVD Lines Capacity	STARKS, LEE LCP 769	90	1	Project	Overloaded Equipment Upgrades	HOMER TOWNSHIP	Overload Failure Reduction; Customers	452	100	115	125	452
23	LVD Lines Capacity	STEVENS, HYNES LCP	750	1	Project	Overloaded Equipment Upgrades	CITY OF GRAND RAPIDS	Overload Failure Reduction; Customers	1	950	3239	3320	1
24	LVD Lines Capacity	SURREY, MAIN STREET LCP 402	130	1	Project	Overloaded Equipment Upgrades	VERNON TOWNSHIP	Overload Failure Reduction; Customers	118	249,824	474.1	594.58112	118
25	LVD Lines Capacity	TAMARACK, AMBLE LCP 099	85	1	Project	Overloaded Equipment Upgrades	CATO TOWNSHIP	Overload Failure Reduction; Customers	83	384	443.5	537.6	83
26	LVD Lines Capacity	TAMARACK, AMBLE LCP 101	85	1	Project	Overloaded Equipment Upgrades	CATO TOWNSHIP	Overload Failure Reduction; Customers	41	249.6	254.1	254.1	41
27	LVD Lines Capacity	TAWAS, TAWAS LCP 205	210	1	Project	Overloaded Equipment Upgrades	TAWAS TOWNSHIP	Overload Failure Reduction; Customers	208	480	520	600	208
28	LVD Lines Capacity	TAWAS, TAWAS LCP 263	90	1	Project	Overloaded Equipment Upgrades	CITY OF TAWAS CITY	Overload Failure Reduction; Customers	263	696	379.9	379.9	263
29	LVD Lines Capacity	TEFT ROAD, LAKEFIELD LCP 171	90	1	Project	Overloaded Equipment Upgrades	SWAN CREEK TOWNSHIP	Overload Failure Reduction; Customers	490	167	175	192.05	490
30	LVD Lines Capacity	THORNTON, NIELSON RD LCP 7028	85	1	Project	Overloaded Equipment Upgrades	JEROME TOWNSHIP	Overload Failure Reduction; Customers	16	24	24	26.4	16
31	LVD Lines Capacity	THORNTON, WEST RIVER RD LCP 201	6	1	Project	Overloaded Equipment Upgrades	JEROME TOWNSHIP	Overload Failure Reduction; Customers	297	50	50	77	297
32	LVD Lines Capacity	THORNTON, WEST RIVER RD LCP 725	192	1	Project	Overloaded Equipment Upgrades	JEROME TOWNSHIP	Overload Failure Reduction; Customers	297	1344	878.1	878.1	297
33	LVD Lines Capacity	TRUFANT, GOWEN LCP 564	210	1	Project	Overloaded Equipment Upgrades	SPENCER TOWNSHIP	Overload Failure Reduction; Customers	165	672	606.2	606.2	165
34	LVD Lines Capacity	TRUFANT, HUNTER LAKE LCP 385	85	1	Project	Overloaded Equipment Upgrades	PINE TOWNSHIP	Overload Failure Reduction; Customers	76	192	223.4	337.92	76
35	LVD Lines Capacity	TRUFANT, HUNTER LAKE LCP 869	85	1	Project	Overloaded Equipment Upgrades	PINE TOWNSHIP	Overload Failure Reduction; Customers	239	76.8	215.4	215.4	239
36	LVD Lines Capacity	TUCKER, OAK HILL LCP	750	1	Project	Overloaded Equipment Upgrades	GROVELAND TOWNSHIP	Overload Failure Reduction; Customers	186	633	3238	3319	186
37	LVD Lines Capacity	TUCKER, OAK HILL LCP 203	85	1	Project	Overloaded Equipment Upgrades	GROVELAND TOWNSHIP	Overload Failure Reduction; Customers	187	384	841.7	841.7	187
38	LVD Lines Capacity	TUCKER, OAK HILL LCP 330	240	1	Project	Overloaded Equipment Upgrades	SPRINGFIELD TOWNSHIP	Overload Failure Reduction; Customers	723	1368	1560.5	1560.5	723
39	LVD Lines Capacity	WAMPLERS, STAGECOACH LCP 132	210	1	Project	Overloaded Equipment Upgrades	CAMBRIDGE TOWNSHIP	Overload Failure Reduction; Customers	466	672	597.8	597.8	466
40	LVD Lines Capacity	WAMPLERS, STAGECOACH LCP 173	90	1	Project	Overloaded Equipment Upgrades	CAMBRIDGE TOWNSHIP	Overload Failure Reduction; Customers	462	696	580.7	580.7	462
41	LVD Lines Capacity	DARE18 PEACH RIDGE/KENOWA CONV PT5	486	1	Project	Sub Capacity-associated Line Work	GRAND RAPIDS	Overload Failure Reduction; Customers	133	Sub triggered			133
42	LVD Lines Capacity	DARE18 PEACH RIDGE/BALLARD Conv PT3	968	1	Project	Sub Capacity-associated Line Work	GRAND RAPIDS	Overload Failure Reduction; Customers	133	Sub triggered			133
43	LVD Lines Capacity	DARE22 Tamarack-Ambles Conv phase 2-Part1	354	1	Project	Sub Capacity-associated Line Work	LAKEVIEW	Overload Failure Reduction; Customers	474	Sub triggered			474
44		LVD Lines Capacity Subtotal	9,732							#N/A	#N/A	#N/A	0
45		LVD Lines Capacity Total	54,911							#N/A	#N/A	#N/A	0



August 27, 2025

Via Electronic Mail

Don L. Keskey, Esq.
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823

RE: Case No. U-21870 – In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief.

Dear Mr. Keskey:

Attached to this letter are copies of the following documents:

- Consumers Energy Company's response to 21870-GLREA-CE-0283-0286, 0294, and 0300.

A Proof of service has been electronically filed in this docket. Please contact me if you have any questions regarding this matter.

Sincerely,

Gary A. Gensch, Jr.

CC Parties Per Attachment 1 to the Proof of Service

ConsumersEnergy
One Energy Plaza
Jackson, MI 49201-2357

www.consumersenergy.com

U21870-GLREA-CE-0283

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Question:

14. Please provide all data that shows peak demand reduction as measured at the meter, not deemed from a technical reference manual, from existing energy efficiency, demand response, and VPP programs for the past three years.

- a. Please share the calculated, modeled, deemed peak impacts from existing energy efficiency, demand response, and VPP programs for the past three years.
- b. Please share the methodology for measuring impacts at the meter that has been used for these programs
- c. Please share the research done to show the effectiveness and accuracy of the M&V methodology used to measure peak impacts of existing programs.

Response:

Regarding energy efficiency, the Company uses the State of Michigan's technical resource manual, the Michigan Energy Measures Database ("MEMD"), to determine demand savings from its Energy Waste Reduction ("EWR") measures. All data on EWR impacts, measurement methodology and Evaluation, Measurement & Verification ("EM&V") effectiveness can be found in the Company's annual filings for the last three years: Case Nos. U-21671, U-21557, and U-21312.

- a. Below are the data from Demand Response ("DR") events for the last three years:

Program	Segment	Event Date	Avg MW Savings	Peak MW Savings
ACPC	Res	06-15-2022	27.7	31.2
ACPC	Res	06-21-2022	36.9	42.2
ACPC	Res	07-19-2022	35.0	37.5
ACPC	Res	07-21-2022	39.2	40.5
DPP	Res CPP	06-15-2022	2.3	2.5
DPP	Res CPP	06-21-2022	2.8	3.2
DPP	Res CPP	06-22-2022	2.1	2.4
DPP	Res CPP	07-19-2022	2.3	2.4
DPP	Res CPP	07-21-2022	1.9	2.4
DPP	Res PTR	06-15-2022	9.0	10.4
DPP	Res PTR	06-21-2022	10.2	11.4
DPP	Res PTR	06-22-2022	10.3	11.4
DPP	Res PTR	07-19-2022	10.0	10.5
DPP	Res PTR	07-21-2022	9.2	10.3
STP	Res	06-15-2022	29.2	36.2
STP	Res	06-21-2022	19.9	24.2
STP	Res	07-19-2022	28.5	34.8

U21870-GLREA-CE-0283

Page 2 of 2

STP	Res	07-21-2022	20.4	22.9
ACPC	Res	08-24-2023	18.2	21.3
ACPC	Res	07-31-2024	41.0	43.1
ACPC	Res	08-27-2024	36.3	41.7
STP	Res	07-31-2024	38.4	48.9
STP	Res	08-27-2024	46.0	51.0
Note: Peak demand reduction is not applicable to DG.				

- b. DR--The Company's 3rd party evaluator, Cadmus, compares event participants' (i.e. the treatment group's) energy consumption with that of a randomized participant control group using a regression analysis designed to identify peak demand reduction. Detailed descriptions of the methodologies used to estimate program impacts can be found in the AC Peak Cycling, Smart Thermostat Program and Dynamic Peak Pricing evaluation reports included with the Company's 2022 DR Reconciliation filing Case No. U-21410.
- c. DR--Randomized controlled trial design is standard for program evaluation, measurement and verification as it produces an unbiased estimate of the program's impacts on peak demand and energy consumption. In addition, Cadmus regularly reassesses the composition of the control groups to ensure they are representative of the larger participant populations in each program.

Witness: Alex M. Gast

Date: August 27, 2025

U21870-GLREA-CE-0284

Page 1 of 2

Question:

15. For each existing residential program (energy efficiency, Demand Response, DER, or VPP), please provide the following measured data:

- a. The total number of enrolled customers and devices.
- b. The average and maximum load reduction achieved during a peak event.
- c. The value to the grid delivered, company cost savings, customer incentives.
- d. The number of events dispatched in the last 3 years, and the duration of each event called.
- e. The dispatch success rate (i.e., the percentage of devices that responded as expected).
- f. What criteria are used to trigger a demand response event? Is it based on a pre-determined schedule, or is it in response to realtime grid conditions?

Response:

The Company has provided responses below for its demand response programs. For energy efficiency, please see the Company's annual Energy Waste Reduction Reconciliation filings, the most recent is MPSC Case No. U-21671¹.

- a. DR-Enrollment numbers as of 8/18/2025:
STP: 64,117 customers, 67,827 devices
ACPC: 87,403 customers, 87,443 devices
DPP: 198,419 customers (PTR:173,559 / CPP: 24,860)

Distributed Generation ("DG") - As of July 30, 2025, Consumers Energy has 12,279 customers enrolled in its Distributed Generation Programs (including legacy net metering customers).

- b. Please see the Company's response to U21870-GLREA-CE-0283
DG-N/a
- c. Customer incentives for Residential DR programs:
 - ACPC: \$5 monthly bill credit during the months of June, July, and August.
 - DPP:
 - PTR – incentives are provided as bill credits, based on the energy saved during called DR events. The customer receives \$1/kWh curtailed when compared to the baseline (similar weather day conditions) of previous usage.
 - CPP – on average, customers receive between a 10%-20% discount during off-peak consumption in the summer season, compared to the standard residential

¹ [068cs00000rkXp1AAE](#)

U21870-GLREA-CE-0284

Page 2 of 2

rate. During a Critical Peak Pricing event, customers will be charged a higher rate of \$1/kWh for any electricity used during the event window between 2pm-6pm.

- STP: \$50 up-front, \$25 annual

DG-- From January 1, 2025 to July 30, 2025, Distributed Generation programs have exported 35,263 MWh of excess energy generated to the grid.

d.

Year	Program	# of Events	Time of Events
2022	ACPC	4	4pm-6pm, 2pm-6pm, 2pm-6pm, 2pm-6pm
2022	CPP	5	2pm-6pm (all five events)
2022	PTR	5	2pm-6pm (all five events)
2022	STP	4	2pm-6pm (all four events)
2023	ACPC	1	4pm-7pm
2024	ACPC	2	3pm-7pm, 3pm-5pm
2024	STP	2	3pm-7pm, 3pm-5pm
2025	ACPC	1	2pm-4pm
2025	STP	1	2pm-4pm

DG—N/a

e. DR--

- ACPC
 - i. 2022-2025: 98% dispatched successfully with ZigBee switches each year
- STP
 - ii. 2022: 99.4% dispatched successfully across the four events
 - iii. 2024: 99.4% dispatched successfully across the two events
 - iv. 2025: 99.5% dispatched successfully

DG—N/a

f. DR--

- I. Real-time grid conditions and annual MISO LMR testing requirements
- II. DR Event Triggers for real-time grid conditions:
 - MISO Operating margin less than 5%
 - MISO peak hour load forecast > 117,500 MW
 - Consumers load of 27,000 MW for four consecutive hours

DG—N/a

Witness: Alex M. Gast

Date: August 27, 2025

U21870-GLREA-CE-0285

Page 1 of 1

Question:

16. What is the total cost of residential programs (energy efficiency, Demand Response, DER, or VPP) programs to date?

- a. Please provide a detailed breakdown of how the measured peak impacts have resulted in tangible benefits for ratepayers, such as avoided or deferred Generation, Transmission, and Distribution upgrades.

Response:

Please see the Company's annual Energy Waste Reduction reconciliation filings for details on energy efficiency programs.

The Company's DR program from 2015 through 2024 has cost about \$136 million.

- a. For DR, the Company considers the value to customers in terms of capacity. This capacity value is estimated at 75% of MISO's planning year Cost of New Entry ("CONE"), \$95,351 per MW-year. In 2024, the total residential DR portfolio was valued at about \$11 million.

No data available for Distributed Generation.

Witness: Alex M. Gast

Date: August 27, 2025

U21870-GLREA-CE-0286

Page 1 of 1

Question:

17. What metrics does the company use to measure customer satisfaction with these programs?
- a. Are there any data on customer churn rates or complaints related to the programs' operations?

Response:

Consumers Energy tracks customer satisfaction and experience with its residential and business EWR portfolios via online surveys implemented by 3rd party evaluators Cadmus and TRC. The surveys track a wide range of metrics tied to the customer experience including overall satisfaction with products & the Customer Experience Index as well as specific elements that vary across products (e.g., satisfaction with equipment quality, assessor professionalism, timeliness of rebate delivery, etc.). Further details can be found in the full reports that Consumers Energy submits for all residential and business customer survey research each year as part of its EWR Annual Reconciliation.

For DR, the Company uses a series of notification and surveys, customer satisfaction metrics include:

- Customer Effort
- Overall Satisfaction (based on a 10-point scale, where 1 meant not at all satisfied and 10 meant very satisfied)
- Customer Experience Index ("CXI").

For DG, the Company offers multiple satisfaction surveys throughout its interconnection process for DG program participants, which are reviewed weekly. The Company collects data on customer complaints regarding its DG program.

- a. The Company does have data on complaints for EWR, DR and DG.

	EWR & DR	DG
2023	21	31
2024	18	37
2025 year-to-date	13	15

Witness: Alex M. Gast

Date: August 27, 2025

U21870-GLREA-CE-0294

Page 1 of 1

Question:

25. What is the company's stance on working with third-party aggregators of EE, DR, and DER assets?

- a. What is the current process for these third parties to interact with the company's systems and enroll customers?
- b. What, if any, are the company's plans to develop a market for VPP services?

Response:

Aggregators can help expand customer participation and improve performance, while Consumers Energy provides the framework, oversight, and data needed to ensure consistent reliable results. The Company generally appreciates processes that allow for efficient data transfer to facilitate reviews and coordination with third-party aggregators.

- a. At present, third-party aggregators do not have direct access to Consumers Energy's internal program or customer relationship management ("CRM") systems. Instead, aggregators work directly with customers to complete the required program documentation, including obtaining necessary signatures. These completed forms are then submitted via email to Consumers Energy's Sales and the Demand Response Operations ("DR OPS") teams for review and processing. Prior to enrollment, the DR OPS team evaluates and confirms an appropriate nomination amount based on customer data and operational insights. Additionally, aggregators support customers in automating their Energy Reduction Plans ("ERPs"), which facilitates more consistent and reliable participation in the program.

Existing DG processes are managed through MISO, and the Company only validates MISO-controlled enrollments.

- b. The Company views Virtual Power Plant (currently its EWR and DR programs) services as important to grid reliability and customer engagement. The Company's current focus is on regulatory alignment, customer participation, and technology partnerships, while continuing to benchmark and research best practices to build a sustainable market.

Witness: Alex M. Gast

Date: August 27, 2025

U21870-GLREA-CE-0300

Page 1 of 1

Question:

31. What process does the company undergo to provide settlement to participating customers and aggregators in EE, DR, and DER programs?

a. What is the timeline for an individual payment after an installation, event, measurement period?

Response:

For EE, please see the Company's annual Energy Waste Reduction Reconciliation filings, the most recent is MPSC Case No. U-21671¹.

For DR please reference my testimony starting at page 10, line 15 through page 18, line 17.

DG has an automated process to bill/credit on meter registers in SAP. Participating DG customers receive credit for accrued excess generation monthly on their energy bill for a given account.

Witness: Alex M. Gast

Date: August 27, 2025

¹ [068cs00000rkXp1AAE](#)



August 28, 2025

Via Electronic Mail

Don L. Keskey, Esq.
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823

RE: Case No. U-21870 – In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief.

Dear Mr. Keskey:

Attached to this letter are copies of the following documents:

- Consumers Energy Company's response to 21870-GLREA-CE-0279 and 0290.

A Proof of service has been electronically filed in this docket. Please contact me if you have any questions regarding this matter.

Sincerely,

Gary A. Gensch, Jr.

CC Parties Per Attachment 1 to the Proof of Service

ConsumersEnergy
One Energy Plaza
Jackson, MI 49201-2357

www.consumersenergy.com

U21870-GLREA-CE-0279 (Partial)
Page 1 of 1

Question:

10. How is the company incorporating VPPs into its load forecasting and long-term resource planning models?
- a. How are VPPs considered as an alternative to traditional generation or transmission and distribution (T&D) infrastructure? Why?
 - b. What level of cost and cost deferment has been assessed for VPP delivery?

Response:

See also the response of Company witness Mike Kelly.

For purposes of responding to this question, the Company is providing context to its Demand Response ("DR") program. The Company does not forecast DR in its real-time load forecasts. The Company registers DR in the annual MISO Planning Resource Auction and it includes DR in its Integrated Resource Plan ("IRP").

- a. DR is considered as an alternative to traditional generation in IRP modeling for purposes of obtaining Commission approval of DR program costs.
- b. The levelized cost of DR is compared to the Cost of New Entry since the primary benefit is provision of capacity.

Witness: RICHARD T. BLUMENSTOCK
Date: August 28, 2025

U21870-GLREA-CE-0279 (Partial)

Page 1 of 1

Question:

10. How is the company incorporating VPPs into its load forecasting and long-term resource planning models?

- a. How are VPPs considered as an alternative to traditional generation or transmission and distribution (T&D) infrastructure? Why?
- b. What level of cost and cost deferment has been assessed for VPP delivery?

Response:

Please also refer to the response of Company witness Blumenstock.

- a. The Company is not currently considering VPPs as alternatives to traditional distribution infrastructure.
- b. No such assessments have been made regarding electric distribution.

Witness: Michael P. Kelly

Date: August 27, 2025

U21870-GLREA-CE-0290 (Partial)
Page 1 of 1

Question:

21. How is the company evaluating VPPs and other EE, DR, and DERs as potential non-wires alternatives to traditional Generation, Transmission, and Distribution infrastructure investments?

a. Please provide examples of any Generation, Transmission, and Distribution projects that have been deferred or replaced by EE, DR, DER, or VPP projects.

Response:

a. When the Company performs modeling for capacity sufficiency it includes known Demand Response (DR) and Energy Waste Reduction (EWR) resources and plans future such resources based upon that model. No specific generation resources have been avoided using that methodology; however, additional capacity resources (either owned or contracted) would have been required without the inclusion of DR and EWR.

Witness: RICHARD T. BLUMENSTOCK

Date: August 28, 2025

U21870-GLREA-CE-0290 (Partial)

Page 1 of 1

Question:

21. How is the company evaluating VPPs and other EE, DR, and DERs as potential non-wires alternatives to traditional Generation, Transmission, and Distribution infrastructure investments?

- a. Please provide examples of any Generation, Transmission, and Distribution projects that have been deferred or replaced by EE, DR, DER, or VPP projects.

Response:

The Company's view on non-wires alternatives (also called non-wires solutions, or "NWS") for distribution investments are discussed on page 47, line 19, through page 48, line 22, of my direct testimony. Further details on this were provided in discovery response 21870-MEIU-CE-0049. As stated therein, the Company is planning a new NWS pilot to be presented in a separate filing.

Because the Company does not own or operate transmission assets, the Company does not have a view regarding the use of NWS for transmission investments.

- a. The Company does not have any such examples to date related to distribution. As stated in my direct testimony, the Company conducted two pilots in 2017-2018 and 2019-2021, but neither pilot resulted in the deferral of needed distribution investments.

Witness: Michael P. Kelly

Date: August 27, 2025



August 28, 2025

Via Electronic Mail

Don L. Keskey, Esq.
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823

RE: Case No. U-21870 – In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief.

Dear Mr. Keskey:

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- Consumers Energy Company's response to 21870-GLREA-CE-0279 and 0290.

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Sincerely,

Gary A. Gensch, Jr.

CC Parties Per Attachment 1 to the Proof of Service

ConsumersEnergy
One Energy Plaza
Jackson, MI 49201-2357

www.consumersenergy.com

U21870-GLREA-CE-0279 (Partial)

Page 1 of 1

Question:

10. How is the company incorporating VPPs into its load forecasting and long-term resource planning models?

a. How are VPPs considered as an alternative to traditional generation or transmission and distribution (T&D) infrastructure? Why?

b. What level of cost and cost deferment has been assessed for VPP delivery?

Response:

See also the response of Company witness Mike Kelly.

For purposes of responding to this question, the Company is providing context to its Demand Response ("DR") program. The Company does not forecast DR in its real-time load forecasts. The Company registers DR in the annual MISO Planning Resource Auction and it includes DR in its Integrated Resource Plan ("IRP").

a. DR is considered as an alternative to traditional generation in IRP modeling for purposes of obtaining Commission approval of DR program costs.

b. The levelized cost of DR is compared to the Cost of New Entry since the primary benefit is provision of capacity.

Witness: RICHARD T. BLUMENSTOCK

Date: August 28, 2025

U21870-GLREA-CE-0279 (Partial)

Page 1 of 1

Question:

10. How is the company incorporating VPPs into its load forecasting and long-term resource planning models?

- a. How are VPPs considered as an alternative to traditional generation or transmission and distribution (T&D) infrastructure? Why?
- b. What level of cost and cost deferment has been assessed for VPP delivery?

Response:

Please also refer to the response of Company witness Blumenstock.

- a. The Company is not currently considering VPPs as alternatives to traditional distribution infrastructure.
- b. No such assessments have been made regarding electric distribution.

Witness: Michael P. Kelly

Date: August 27, 2025

U21870-GLREA-CE-0290 (Partial)
Page 1 of 1

Question:

21. How is the company evaluating VPPs and other EE, DR, and DERs as potential non-wires alternatives to traditional Generation, Transmission, and Distribution infrastructure investments?

a. Please provide examples of any Generation, Transmission, and Distribution projects that have been deferred or replaced by EE, DR, DER, or VPP projects.

Response:

a. When the Company performs modeling for capacity sufficiency it includes known Demand Response (DR) and Energy Waste Reduction (EWR) resources and plans future such resources based upon that model. No specific generation resources have been avoided using that methodology; however, additional capacity resources (either owned or contracted) would have been required without the inclusion of DR and EWR.

Witness: RICHARD T. BLUMENSTOCK

Date: August 28, 2025

U21870-GLREA-CE-0290 (Partial)

Page 1 of 1

Question:

21. How is the company evaluating VPPs and other EE, DR, and DERs as potential non-wires alternatives to traditional Generation, Transmission, and Distribution infrastructure investments?

- a. Please provide examples of any Generation, Transmission, and Distribution projects that have been deferred or replaced by EE, DR, DER, or VPP projects.

Response:

The Company's view on non-wires alternatives (also called non-wires solutions, or "NWS") for distribution investments are discussed on page 47, line 19, through page 48, line 22, of my direct testimony. Further details on this were provided in discovery response 21870-MEIU-CE-0049. As stated therein, the Company is planning a new NWS pilot to be presented in a separate filing.

Because the Company does not own or operate transmission assets, the Company does not have a view regarding the use of NWS for transmission investments.

- a. The Company does not have any such examples to date related to distribution. As stated in my direct testimony, the Company conducted two pilots in 2017-2018 and 2019-2021, but neither pilot resulted in the deferral of needed distribution investments.

Witness: Michael P. Kelly

Date: August 27, 2025

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

EXHIBIT GLREA-3

**TO TESTIMONY OF
RICHARD BOEHNKE**

On Behalf of
Great Lakes Renewable Energy Association

September 30, 2025



September 24, 2025

Via Electronic Mail

Don L. Keskey, Esq.
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823

RE: Case No. U-21870 – In the matter of the application of Consumers Energy Company for authority to increase its rates for the generation and distribution of electricity and for other relief.

Dear Mr. Keskey:

Attached to this letter are copies of the following documents:

- A copy of your September 11, 2025 interrogatories with our internal numbering system annotated in the margins; and
- Consumers Energy Company's responses to 21870-GLREA-CE-0719-0727.

A Proof of service has been electronically filed in this docket. Please contact me if you have any questions regarding this matter.

Sincerely,

Digitally signed by Gary A.
Gensch, Jr.
Date: 2025.09.24 10:35:56
-04'00'

Gary A. Gensch Jr.
Phone: 517-788-0698
Email: gary.genschjr@cmsenergy.com

CC Parties Per Attachment 1 to the Proof of Service

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 the generation
and distribution of electricity and for other relief

Case No. **U-21870**

**SECOND DISCOVERY REQUEST OF
THE GREAT LAKES RENEWABLE ENERGY ASSOCIATION
TO CONSUMERS ENERGY COMPANY**

TO: mpsc.filings@cmsenergy.com
Gary A. Gensch, Jr. (garygenschjr@cmsenergy.com)
Anne M. Uitvlugt (anne.uitvlugt@cmsenergy.com)
Bret A. Totoraitis (bret.totoraitis@cmsenergy.com)
Evan B. Keimach (evan.keimach@cmsenergy.com)
Spencer A. Sattler (spencer.sattler@cmsenergy.com)
Mark R. Ruskewicz (mark.ruskewicz@cmsenergy.com)

The Great Lakes Renewable Energy Association (GLREA) serves this Second Discovery Request upon Consumers Energy Company. Please serve copies of all responses, attachments, and documents to GLREA counsel Don L. Keskey at **donkeskey@publiclawresourcecenter.com** and to GLREA Experts Richard Boehnke at **rick.boehnke@gmail.com**, John Richter at **johnarichter@pm.me** and Robert Rafson at **rob@charthouseenergy.com**.

INTERROGATORIES AND REQUESTS FOR DOCUMENTS

21870-GLREA-CE-0719

34. Why are “Non-wire alternatives are not mature enough to adequately address the specific reliability issues” regarding the LVD Substations Reliability sub-program?

- a. What data, publications, conferences, and/or experts are supporting this claim?

- b. What would be required to show non-wire alternatives are mature enough?

21870-GLREA-CE-0720

- 35. For which company initiatives are non-wire alternatives considered mature enough to deliver impacts?

21870-GLREA-CE-0721

- 36. How has the company developed programs to implement NWS beyond the two pilot programs of 2017-2018 and 2019-2021?

- a. How have current programs impacted and/or supported utility planning and delivered benefits to the distribution or transmission grids?
- b. What does the company intend to demonstrate with the new NWS pilot of 2025?

21870-GLREA-CE-0722^c

- c. How does the company plan to scale the impacts from the 2025 pilot?
- 37. What methodology does the company use to measure impacts from DR programs?

- a. In discovery, it was said that for the “Smart Thermostat Demand Response program, usage data is collected from the meter during demand response events to evaluate load reduction.” What is the M&V process used to evaluate load reduction?

21870-GLREA-CE-0723

- 38. How does the company use its DR portfolio comprising both business and residential programs to impact peak demand?

- a. What are the impacts of this portfolio that have been used to direct infrastructure planning, utility procurement, or other capital expenditures?

21870-GLREA-CE-0724

39. How are demand reductions, as those that could be delivered through energy efficiency measures, considered as resources for utility planning for affordability, reliability, and resilience when focusing on:

- a. Capacity?
- b. Peak Reductions?
- c. Infrastructure Planning/Budgets or Upgrades?
- d. Other Grid Benefits?
- e. Capital Expenditures

21870-GLREA-CE-0725

40. How does the company intend to use the BCA tool to support assessments, planning, and delivery of affordable, reliable, and resilient services?

21870-GLREA-CE-0726

41. Why is the company focused on DERMS as opposed to 3rd-party aggregation of systems?

- a. Has the company considered licensing Kraken software from Octopus Energy to provide customers with great transparency and control over their energy?

21870-GLREA-CE-0727

42. How has the company engaged with the Mercury Consortium (<https://msites.epri.com/mercury-consortium>) or used insights or guidelines to build programs?

Respectfully submitted,

Don L. Keskey

Don L. Keskey (P23003)

Public Law Resource Center PLLC

University Office Place

333 Albert Avenue, Suite 425

East Lansing, MI 48823

Telephone: (517) 999-7572

E-mail: donkeskey@publiclawresourcecenter.com

Dated: September 11, 2025

U21870-GLREA-CE-0719

Page 1 of 1

Question:

34. Why are “Non-wire alternatives are not mature enough to adequately address the specific reliability issues” regarding the LVD Substations Reliability sub-program?

- a. What data, publications, conferences, and/or experts are supporting this claim?
- b. What would be required to show non-wire alternatives are mature enough?

Response:

- a. As Company witness Kelly discusses on page 47, line 19, through page 48, line 11, of his direct testimony, the Company’s own experience with NWS pilots has shown that deploying NWS and generating benefits would prove difficult. Because of this, there are not, as this time, any off-the-shelf NWS options available to improve reliability, whether on LVD substations or another part of the distribution system.
- b. As Company witness Kelly explains on page 48 of his direct testimony, the Company plans to develop a new NWS pilot that may explore how NWS can improve reliability. The results of this pilot, when complete, will provide a gauge of NWS maturity.

Note that, as described on page 131 of my direct testimony, NWS are considered in LVD Substation capacity planning. Potential NWS currently include Demand Response, Battery Systems, and Solar Systems. For substation capacity projects evaluated over the last few years, the Company has found that NWS could not meet the project schedule needs, could not meet system capacity needs, and/or were significantly more expensive than traditional utility substation solutions.

Witness: Megan L. Hayward

Date: September 24, 2025

U21870-GLREA-CE-0720
Page 1 of 1

Question:

35. For which company initiatives are non-wire alternatives considered mature enough to deliver impacts?

Response:

As Company witness Hayward discusses on page 131 of her direct testimony, the Company does evaluate NWS when considering LVD Substations Capacity projects. Otherwise, the purpose of the NWS pilot discussed on page 48 of my direct testimony will be to identify if there are any other use cases where NWS can deliver benefits.

Witness: Michael P. Kelly
Date: September 24, 2025

U21870-GLREA-CE-0721

Page 1 of 1

Question:

36. How has the company developed programs to implement NWS beyond the two pilot programs of 2017-2018 and 2019-2021?

- a. How have current programs impacted and/or supported utility planning and delivered benefits to the distribution or transmission grids?
- b. What does the company intend to demonstrate with the new NWS pilot of 2025?
- c. How does the company plan to scale the impacts from the 2025 pilot?

Response:

The Company has not explicitly developed NWS beyond the two pilots referenced. The Company does continue to develop programs such as demand response, energy efficiency, etc. that could provide NWS applications, in theory, although the earlier pilots demonstrated that doing so would be difficult to do.

- a. The Company's current distribution investment programs all impact the distribution grid and deliver grid benefits. Each investment program impacts the grid and provides benefits in different ways, all of which may be summarized by the description of the Company's distribution system objectives on page 8, line 11, through page 9, line 7 of my direct testimony.
- b. The Company's NWS pilot design is still in development. The pilot will be consistent with the Company's approved workplan in U-21500 under Focus Area 2: Grid Reliability and Resiliency.
- c. The Company will determine how, and if, to scale its pilot once the pilot results have been obtained and analyzed.

Witness: Michael P. Kelly

Date: September 24, 2025

U21870-GLREA-CE-0722

Page 1 of 2

Question:

37. What methodology does the company use to measure impacts from DR programs?

- a. In discovery, it was said that for the “Smart Thermostat Demand Response program, usage data is collected from the meter during demand response events to evaluate load reduction.” What is the M&V process used to evaluate load reduction?

Response:

The M&V process, conducted by the Company’s third-party evaluator, Cadmus, assesses meter data to determine load reduction during Smart Thermostat Program demand response events by comparing treated customers’ actual energy usage during the event to that of a randomized control group using a difference-in-differences model to estimate what usage would have been in the absence of the event. See below for detailed methodological descriptions excerpted from the Residential Smart Thermostat Program Summer 2022 Evaluation Results (pages 13-14) included with the Company’s 2022 DR Reconciliation filing.

Methodology

To estimate the impact of the thermostat demand response treatment during program events, the Cadmus team compared event participants’ energy consumption with that of a randomized participant control group using a regression analysis designed to identify peak demand reduction.

Event Implementation

To estimate program impacts, the Cadmus team worked with Consumers Energy and the implementation contractor to execute a randomized controlled trial, which involved randomly assigning participants to a treatment or control group prior to each event. Treatment group customers were called for a given event, while control group customers were not. The implementation contractor re-randomized customers prior to each event, so participants were not necessarily assigned to the same group throughout the season. The Cadmus team reviewed the implementer’s randomization process before the start of the event season and concluded that it adhered to the randomized controlled trial design and would produce an unbiased estimate of the program’s impacts on peak demand and energy consumption.

Regression Model Specification

The Cadmus team used the following model specification to determine event-specific demand reduction. We clustered standard errors by customer account to control for within-customer correlations in electricity consumption.

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$$kW_{it} = \sum_{t=0}^T \beta_t Datetime_t + \sum_{k=0}^{23} \mu_k Hour_{kt} * I(Treat = 1)_i + \sum_{m=1}^M \sum_{k=0}^{23} \theta_{mk} Hour_{mkt} * I(Treat = 1)_i * I(Event = 1)_{mkt} + \sum_{j=1}^2 \sum_{k=0}^{23} \gamma_{jk} CDH_{it} + \varepsilon_{it}$$

Where:

- kW_{it} = Electricity consumption in kilowatts of customer i during date-hour t
- β_t = Datetime fixed effect or average load impact (kilowatt-hours per hour) of date-hour t on consumption per customer
- $Datetime_t$ = Indicator variable for date-hour (= 1 if date-hour t is the t th hour of the sample, $t=0, 1, 2, \dots, T$; = 0 otherwise)
- μ_k = Average effect per treatment group customer during non-event hour k
- $Hour_{kt}$ = Indicator variable for hour of the day (= 1 if date-hour t is the k th hour of the day, $k=0, 1, 2, \dots, 23$; = 0 otherwise)
- $I(Treat=1)_i$ = Indicator variable for assignment to treatment group (= 0 otherwise)
- θ_{mk} = Average load impact (kilowatt-hours per hour) per treatment customer during hour k of demand response event m
- $I(Event=1)_{mkt}$ = Indicator variable for program event hour (= 1 if date-hour t is the k th hour, $k=1,2,\dots,J$, of event m , $m=1, 2, \dots, M$; = 0 otherwise)
- γ_{jk} = Average effect of a cooling degree hour on consumption for a customer in group j (1=treatment, 2=control) in hour k
- CDH_{it} = Cooling degree hour for customer i in date-hour t for a base temperature of 65°F
- ε_{it} = The error term for customer i in date-hour t

Witness: Alex M. Gast
Date: September 23, 2025

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Question:

38. How does the company use its DR portfolio comprising both business and residential programs to impact peak demand?

a. What are the impacts of this portfolio that have been used to direct infrastructure planning, utility procurement, or other capital expenditures?

Response:

The Company's DR portfolio provides significant peak demand impacts by enrolling customers who can curtail or shift load during system peak conditions. These resources deliver concentrated, predictable load reductions that directly support system reliability and capacity needs.

- a. DR reduces the Company's reliance on additional capacity purchases by contributing accredited demand response resources into the MISO market. This helps manage procurement costs and improves alignment with the Company's resource adequacy obligations.

By mitigating peak demand growth, C&I DR contributes to deferring major capital investments in infrastructure, lowering long-term costs for customers.

Witness: Alex M. Gast

Date: September 19, 2025

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Question:

39. How are demand reductions, as those that could be delivered through energy efficiency measures, considered as resources for utility planning for affordability, reliability, and resilience when focusing on:
- a. Capacity?
 - b. Peak Reductions?
 - c. Infrastructure Planning/Budgets or Upgrades?
 - d. Other Grid Benefits?
 - e. Capital Expenditures

Response:

Energy efficiency measures contribute to demand reduction and the Company's plans for affordability, reliability, and resilience by reducing the overall load of participating customers. The Company includes projected energy efficiency impacts in Integrated Resource Planning ("IRP") and State Reliability Mechanism ("SRM") capacity demonstration, reducing the total need for incremental energy and capacity resources. For more details on the impact of the Company's energy efficiency program, please see the Company's IRP, SRM, DR, and Energy Waste Reduction Plan filings.

Witness: Alex M. Gast

Date: September 23, 2025

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Question:

40. How does the company intend to use the BCA tool to support assessments, planning, and delivery of affordable, reliable, and resilient services?

Response:

This response assumes that the “BCA tool” refers to the ongoing Michigan Public Service Commission sponsored Benefit-Cost Analysis Tool Collaborative¹. The Company is actively participating in the MPSC led BCA Tool Collaborative working group and intends to use the resulting BCA Tool framework in accordance with MPSC requirements following completion of the remaining development, testing, refinement, documentation, and release phases of the project.

Witness: Scott A. Mcphail

Date: September 24, 2025

¹ <https://www.michigan.gov/mpsc/commission/workgroups/benefit-cost-analysis-tool-collaborative>

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Question:

41. Why is the company focused on DERMS as opposed to 3rd-party aggregation of systems?
- a. Has the company considered licensing Kraken software from Octopus Energy to provide customers with great transparency and control over their energy?

Response:

Objection of Counsel: Consumers Energy Company objects to this discovery request because it requires the adoption of an assumption related to licensing the Kraken software. Without waiving this objection, Consumers Energy responds as follows:

As noted on page 72 lines 10-12 of my direct testimony, edge DERMS and fleet DERMS are planned to be considered in the DER Optimization initiative. The Company intends to include an evaluation of third-party aggregation.

The Company has not performed an evaluation of the Kraken software.

Witness: Scott A. Mcphail

Date: September 24, 2025

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Question:

42. How has the company engaged with the Mercury Consortium(<https://msites.epri.com/mercury-consortium>) or used insights or guidelines to build programs?

Response:

The Company has not engaged with this specific effort. However, the Company is involved with the overall EPRI Program 174: DER Integration.

Witness: Scott A. Mcphail

Date: September 24, 2025