STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the Application of	)	
DTE ELECTRIC COMPANY	)	
for authority to increase rates, amend	)	Case No. U-21534
its rate schedules and rules governing the	)	
distribution and supply of electric energy, and	)	
for miscellaneous accounting authority.	)	

DIRECT TESTIMONY AND EXHIBIT
OF
ROBERT RAFSON

On Behalf of

Great Lakes Renewable Energy Association

July 26, 2024

I. QUALIFICATIONS

Q. Please state your name and business address?

A. My name is Robert Rafson, and my business address is 1310 11th Street, Muskegon, MI 49441.

Q. On whose behalf are you testifying?

A. I'm testifying on behalf of the Great Lakes Renewable Energy Association ("GLREA"). I am a member of GLREA Regulatory Affairs Committee and a ratepayer of Consumers Energy. I am also the owner of Chart House Energy, LLC, a renewable energy development company.

Q. What is the GLREA?

A. The GLREA is a 501(c)(3) (non-profit) corporation based in Michigan. GLREA's Mission Statement is to "Promote the Use of Renewable Energy in Michigan and in the Great Lakes Region, By Empowering Our Members and the Public Through Advocacy, Education and Strategic Collaboration. GLREA's vision statement is: "We believe that current and emerging clean, renewable energy solutions can provide 100% of the electrical energy demand in the Great Lakes Region. Furthermore, we believe that increasing development and access to clean, renewable energy that is locally produced, operated and utilized, supports economic development, creates new good paying jobs and is essential to supporting healthier, more resilient communities that advance climate justice."

Q. What is Chart House Energy, LLC?

A. Chart House Energy ("Chart House") is a renewable energy development firm focusing on solar photovoltaic ("PV") resources and some energy efficiency measures. Chart

House built the first commercial system under Consumers' EARP program in June 2010, then the largest PV project in Michigan at the time. Chart House also built the then largest PV system in Iowa at the time as well as many larger commercial sized solar PV systems throughout Michigan and a few other places around the state and Midwest.

Chart House comes from an economically distressed community. Chart House recruits, trains and hires from low- and moderate-income ("LMI") populations throughout the state. Chart House in partnership with the City of Ypsilanti won honorable mention (4th place of 141 teams) U.S. Department of Energy ("USDOE") SunShot Solar in Your Community Challenge where we have trained LMI people in Ypsilanti, Detroit, West Bloomfield, Muskegon, and will be undertaking such training in Flint, Muskegon Heights and other communities. The training includes actual installs and pays workers a living wage. After the installation, we assist trainees to obtain permanent construction jobs, some with PV installers and the rest with other construction companies. We believe that renewable energy jobs provide the transition from under- or un-employment to good paying construction jobs for people who have traditionally been left out of the construction industry. This constitutes another important part of the transformational change created by renewable energy deployment.

Q. Please describe your educational background.

A. I received a Bachelor of Science degree in Mechanical Engineering from the University of Wisconsin-Madison and a Professional Engineering License in Wisconsin, Illinois and Michigan. I also have received North American Board of Certified Energy Practitioner ("NABCEP") certification as a certified PV designer and installer.

Q. Please describe your relevant business experience.

A. I have been a Brownfield Developer for more than 25 years and started installing renewable energy and energy efficiency measures on my buildings for roughly 15 years ago. In 2009, I started Chart House Energy and have developed more than 5 MW of solar. In addition, I participated in the MPSC value of solar, Distributed Generation, IRP, distribution and other workgroups and have become an expert witness in MPSC cases on behalf of GLREA.

Q. Are you sponsoring an exhibit with your direct testimony?

A. Yes. I have prepared and am sponsoring **Exhibit GLREA-2 (RR-1)**, Resume of Robert Rafson.

Q. Was this exhibit prepared by you or at your direction?

A. Yes.

Q. Have you previously presented testimony before the Michigan Public Service Commission ("MPSC" or the "Commission")?

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

U-18091	DTE PURPA
U-20162	DTE rate case
U-20165	Consumers Energy IRP
U-20471	DTE's IRP.
U-20359	I&M rate case
U-20591	I&M IRP

U-20836	DTE rate case
U-21090	Consumers Energy IRP
U-21172	DTE VGP case
U-21224	Consumers Energy rate case

II. DIRECT TESTIMONY

A. THE COMMISSION SHOULD ADDRESS DTE'S DEFICIENT OUTAGES RECORD

Q. How is DTE ranked for outages in the CUB 2023 Utility Performance Report?

A. DTE is ranked as the #1 worse investor-owned utility in the country in outage length.[1]

Q. According to the CUB, what is the average time DTE takes to restore outages and how does that compare with other states in Midwest and US average?

A. CAIDI with Major Event days (minutes):

527	DTE
140	Illinois
211	Indiana
185	Ohio
116	Minnesota
307	Wisconsin
315	US average

DTE takes 2.75 times longer to restore power than the other Midwest utilities and nearly twice the national average.

[1] CUB Utility performance report page 6, https://drive.google.com/file/d/1aNPXl1nvrlZPyxo70cWNKFi_-TsOpmQF/view

Q. How does the American Society of Civil Engineers (ASCE) rank Michigan's Grid?

A. They rank Michigan's grid a "D", indicating "poor, at risk"[2]. The national average is not much better at "C-".

Q. Do we expect to have more outages?

A. According to Climate Central, between 1958 and 2016 precipitation has increased by 42% and experts project that these numbers will increase 40% more by the end of the century.

Q. Do outages last longer in low-income communities?

A. According to the Center for Disease Control, a 1% drop in socioeconomic status results in waiting 170 minutes longer on average to restore power.[3]

Electricity is essential to just about everyone – rich or poor, old or young. Failure by DTE to provide this essential is dramatically obvious. In 2023, there were three major outages that lasted 3, 5 and 10 days. Not all of these outages relate to weather. As the ASCE indicated, Michigan's electrical grid is "poor" and "at risk". This puts people at risk for this essential service.

Q. What regulatory actions can be undertaken to address outages in electric service?

A. Several options exist to protect customers and their property from DTE's failure to provide stable reliable power and all of them require producing power during the outage, such as:

Backup generators
Battery backups

---

[2] https://planetdetroit.org/2024/01/michigan-ranks-2-among-states-for-power-outages/
[3] https://www.governing.com/infrastructure/power-outages-leave-poor-communities-in-the-dark-longer#:~:text=A%201%2Ddecile%20drop%20in,restored%2C%20and%20sometimes%20much%20longer.

Bi-directional EV (V2H) options

According to DOE, there are over 12 million backup generators installed in the United States with over 200 GW and growing at 5 GW/yr.[4] If we divide this by 50 states, we can estimate 240,000 in Michigan and about 5 GW of generation capacity, with about one-half in DTE territory. DTE has 2.3 million customers and 120,000 backup generators, which means that only 5% of customers have backup generators as protection against outages.

Q. How much do backup generators cost?

A. According to Forbes,[5] on average $9,000 including installation. This is too expensive for most low-income customers.

Q. How much does battery backup cost?

A. NREL in 2022 report indicated that typical battery storage systems cost $16,000[6] (based on 5 kW / 12.5 kWh) This is even more expensive and out of reach for low-income customers.

Q. Is V2H (Bi-directional EV charging) available?

A. Yes, but just recently. Many if not most 2026 or 2027 EV models will be able to provide backup power to residential homes. For now, we can count this out as only a few makes and models allow for whole home back up. Also, few if any low-income persons can afford a Ford Lightening EV truck ($57,000 to $95,000) or GMC Hummer EV (about $100,000).

---

[4] https://netl.doe.gov/sites/default/files/Smartgrid/Value-of-Standby-Generation-08-29-08-AZ--2-_APPROVED_2008_09.pdf

[5] https://www.forbes.com/home-improvement/electrical/generator-cost-guide/

[6] https://atb.nrel.gov/electricity/2023/residential_battery_storage

Q. Why is this important to low-income communities?

A. Other than the obvious essential need for reliable power for all customers, critical services require reliable power. Hospitals and emergency services have long had backup generators. But in low-income communities, these services along with food pantries and soup kitchens provide many critical services. If CUB's reported outages averaging 527 minutes in DTE territory and the CDC numbers are correct, low income customers are likely to experience an average of 697 minutes (11.6 hours) in outages.

According to the Food and Drug Administration, commercial kitchens must dispose of food once food is above 40º F for more than 4 hours. With DTE outages averaging more than 8 hours and likely closer to 12 hours, food pantries and soup kitchens have had to dispose of all of their refrigerated and frozen food multiple times each year because of these outages.

B. THE COMMISSION SH OULD ENCOURAGE THE DEVELOPMENT OF MICRO-GRIDS TO INCREASE THE RELIABILITY AND RESILIENCE OF DTE'S SYSTEM

Q. Are there solutions to provide backup power to small areas?

A. Microgrids could mitigate damage caused by outages by providing power to small areas from distributed generation and/or battery storage during broader outages. A microgrid for a single property is called a nanogrid. Nanogrids are increasingly popular amongst customers installing distributed generation (especially solar). According to Wood Mackenzie[7], in 2022 nationally 11% of residential distributed generation installations

[7] https://www.woodmac.com/news/opinion/distributed-solar-plus-storage-holds-potential/#:~:text=Solar%2Dplus%2Dstorage%20is%20growing,paired%20with%20batteries%20in%202022.

(solar) and 5.3% non-residential installs included batteries . They also report that the numbers of batteries being installed is rapidly increasing, doubling from 2019 to 2022 as battery prices continue to fall.

Nanogrids can become the hub of micro-grids allowing neighbors to share in stable power. With the growing number and severity of outages, this becomes even more important.

Q. Are customers with nanogrids already supporting their neighbors?

A. Yes. Service providers that have backup power are able to service people in need. But also I know of nanogrid owners that have run extension cords to their neighbors to keep their homes lighted, and their refrigerators and heaters running in winter outages.

Q. What recommendation do you offer the Commission on this issue?

A. The Commission should formally allow nanogrid customers to connect to their neighbors. With DTE being worst in the country at restoring after an outage, some action needs to be taken to allow people to help their neighbors.

Q. What could be the advantages on the grid by allowing customers to expand their nanogrids?

A. 1) Localized generation:

a) decrease demand on distribution thus delaying or eliminating infrastructure investment thus decreasing all customer costs.

b) increasing renewable energy resources to achieve state and federal targets which will decrease the investments required by the utilities thus decreasing all customer costs.

2) Energy storage:

a) localized energy storage allows more of the power generated to be consumed in the microgrid area, further decreasing demand on the distribution grid, thus decreasing all customer costs by delaying or eliminating infrastructure investments.

b) provision of grid services

i) firming the grid during high demand periods thus creating high qualify power for all customers

ii) improving localized power quality in and outside of the microgrid locally.

c) provision and maintenance of power supply to serve essential loads even when the main grid is down.

i) by decreasing load on the local distribution network during brownouts or other outages, the microgrid generation can help to avoid or mitigate brownouts, especially during peak load events. This would improve service for all customers and help improve the utilities service record which is the worst in the nation. Every solution to improve DTE's outage performance should be implemented.

d) better matching of DTE generation with load on the distribution network.

i) helping DTE to match load and local generation will assist responses to ever changing generation mixes.

ii) by matching load with generation in and outside of the microgrid, DTE will need to invest less in battery storage to meet the needs of all customers, thus resulting in decreased costs for DTE and in lower rates for all customers.

3) Islanding capabilities:

a) both DTE and Consumers have programs with customers that have back up generation to "island" customers to enable them to take their load off the grid during peak periods. This non-wired alternative has been successful for both DTE and Consumers to decrease peak capacity demands, thus decreasing capacity requirements and deferring or eliminating generation purchases, thus decreasing all customers costs.

b) islanding the microgrid will decrease the load on the local grid during an outage, thus decreasing the restart load requirement so as to increase resiliency and decrease outage time.

c) islanding microgrid resources can help the connected customers to maintain power essential to their lives when DTE fails to provide reliable, resilient, stable power.

d) islanding microgrid resources can allow customers to provide critical service facilities to provide shelter and critical services to their communities when DTE fails to provide stable power, not just during weather emergencies but also when DTE's frail and failing infrastructure gives out.

4) Energy management and control:

a) advanced energy management and control would optimize generation, storage and consumption on the local network to provide optimal matching of load to generation within the microgrid to provide lower costs to microgrid customers.

b) advanced microgrid controls can provide both distribution and transmission level services to the utility.

c) advanced microgrid controls are adaptable to ever changing grid dynamics and future grid loads and generation mixes thus helping the utility to adapt to future changes

d) microgrids and energy management and controls can help utilities with future generation and distribution planning as the microgrids can provide dispatchable capacity to help the utility to match load and generation in ever more variable generation mixes. The grid of the future may have critical need for this support.

5) Grid interaction and flexibility: Microgrids can interact and exchange power with the main grid, leveraging two-way communication and smart grid technologies. They can import or export electricity based on pricing signals, grid conditions, or specific operational strategies. This interaction enhances grid flexibility, enables demand response capabilities, and allows microgrids to contribute to grid stability and support overall grid management.

6) Resilience and reliability: Microgrids enhance resilience and reliability by diversifying energy sources and reducing dependence on a single central power plant.

Their localized nature and ability to operate independently during grid disruptions ensure a more secure power supply for critical facilities like hospitals, military bases, or remote communities.

7) Energy efficiency and sustainability: Microgrids often prioritize energy efficiency, by using combined heat and power (CHP) systems, waste heat recovery, and advanced energy management techniques. By optimizing energy consumption, and reducing transmission losses associated with long-distance power delivery, microgrids contribute to overall energy efficiency and sustainability goals.

8) Integration of electric vehicles: Microgrids can integrate electric vehicle charging infrastructure and smart charging capabilities. This allows for the efficient charging of EVs, the utilization of EV batteries for grid services or energy storage, and the potential for vehicle-to-grid interactions, where EVs can feed electricity back into the microgrid or main grid during peak demand periods.

Microgrids offer a range of benefits, including improved reliability, increased resilience, enhanced energy efficiency, integration of renewable energy sources, and the ability to operate autonomously. They are particularly relevant in remote areas, campuses, industrial complexes, or areas prone to grid outages or limited grid access, where they provide reliable and sustainable energy solutions tailored to specific local needs."[8]

Ultimately, Microgrids can help DTE to provide a lower cost, more resilient and reliable grid, and better power quality. Microgrids and nanogrids allow customers to provide their

[8] https://www.edisonenergy.com/blog/the-advantages-of-microgrids/

own essential power when DTE fails to provide power for thousands of minutes a year.

Q. Are there other benefits that microgrids can provide to DTE's distribution network?

A. Beyond the services and support that renewable energy, batteries, and back up generation can provide, microgrids and nanogrids can decrease the number of meters, drops and transformers that are needed. If microgrid owners submeter with neighbors (as utilities presently allow for large industrial customers) then DTE may have fewer customers. This will decrease the number of customers DTE needs to bill and in low-income areas will also reduce the burden of collections.

Q. What recommendations and requests to you have for the Commission?

A. The Commission should specifically allow nanogrids and microgrids. Nanogrid (behind the meter) installations of any combination of backup generators, solar and energy storage facilities, EV charging (including bi-directional EV charging) technology, and other demand response controls allow customers to provide for themselves reliable, potentially renewable, energy and can help to ensure that they have the essential power they need. GLREA requests the Commission to allow neighbors to expand and share their nanogrids. This can result in resilient hubs that can assure that customers have the essential power they need, and can potentially provide grid services to DTE and the transmission company if the scale is large enough.

This regulatory step is particularly justified as a response to DTE's failure to serve essential power to their customers and most critically to low-income community customers, whose services are the last to be restored after outages and reside in areas that receive the least maintenance and upgrades, often making them the first to have power outages. In short, the Commission should allow customers to help themselves and their neighbors.

Q. Does this complete your testimony?

A. Yes, it does.

Rob Rafson - Bio

Founder of Chart House Energy and President, Rob Rafson has 27 years experience in environmental engineering, design, construction and operation of over 150 environmental improvement projects in the United States and abroad.

Mr. Rafson has achieved recognition in energy efficiency, patented innovative soil remediation technology, gaseous emission controls and Brownfield redevelopment. He has redevelopment of 17 contaminated properties including four SuperFund projects in the Chicago area and as part of those redevelopments installed energy efficiency measures and renewable energy systems, including the largest solar thermal system in Illinois.

Author
Mr. Rafson has authored the authoritative text "Brownfields - Redeveloping environmentally contaminated properties", published June 1999 with McGraw-Hill and contributing author "Odor and VOC Control Handbook", published 1998.

Education
Rob graduated form University of Wisconsin/Madison 1983 with a Mechanical Engineering degree. He is also a licensed Professional Engineer.

Chart House Company History
Chart House Energy was founded in 2009 as a renewable energy independent power production company. His goal is to grow a portfolio of owned Renewable Energy and Energy Efficiency property.

The company has completed over 5 MW of Solar PV projects, including the largest photovoltaic project in Michigan, largest photovoltaic project in Iowa, and second largest in Illinois. Chart House Energy owns 465kW and expects to double that while building 1 MW of solar this year.

The company offers clean energy, energy efficiency and energy storage solutions. By integrating Combined Heat and Power with renewable energy, energy efficiency measures and storage, these systems can operate on or off grid, have uninterruptable power and rapidly move towards sustainable operations.

Expert Witness
Rob uses his extensive experience in the solar industry to examine energy and proposals and evaluates them based upon his extensive experience with developing projects and understanding the real life effects of high-energy bills on residential ratepayers. Because of his professional experience he can see through rhetoric that is on paper and how it may not match with reality.

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the Application of DTE ELECTRIC COMPANY for authority to increase its rates, amend its rate schedules and rules governing the distribution and supply of electric energy, and for miscellaneous accounting authority.	Case No. **U-21534**

______________________________________/

ELECTRONIC SERVICE LIST

On **July 26, 2024** an electronic copy of the **Direct Testimony and Exhibit of Robert Rafson on behalf of the Great Lakes Renewable Energy Association** was served on the following:

Name/Party	E-mail Address
Administrative Law Judge Sally L. Wallace	Wallaces2@michigan.gov
DTE ENERGY COMPANY Jon P. Christinidis Andrea E. Hayden Paula Johnson-Bacon John Janiszewski Breanne K. Reitzel	mpscfilings@dteenergy.com jon.christinidis@dteenergy.com andrea.hayden@dteenergy.com paula.bacon@dteenergy.com john.janiszewski@dteenergy.com breanne.reitzel@dteenergy.com
Attorney General Dana Nessel Joel B. King Seb Coppola, AG Consultant	ag-enra-spec-lit@michigan.gov Kingj38@michigan.gov sebcoppola@corplytics.com
MPSC Staff Amit T. Singh Heather M.S. Durian Monica M. Stephens Michael J. Orris Lori Mayabb, Case Coordinator	Singha9@michigan.gov durianh@michigan.gov stephensm11@michigan.gov orrism@michigan.gov mayabbl@michigan.gov

Michigan Environmental Council, Citizens Utility Board of Michigan (CUB), Natural Resources Defense Council, Sierra Club Christopher M. Bzdok Tracy Jane Andrews Breanna Thomas, Legal Assistant	 chris@tropospherelegal.com tjandrews@tropospherelegal.com breanna@tropospherelegal.com
Soulardarity, We Want Green Too Mark N. Templeton Amanda Urban Jacob Schuhardt Sam Heppell Boris Lukanov Joseph Amdur Claire Black Michelle David Jason Frey Andrew Kieffer Ellis Maltby Andrew Obeso Ivy Truong Jesse Bernes-Zieve Josh Bretthauer Sara Macedo Serendipity Welsh Adriel Ghadoushi Justin Schott Madison E. Wilson, Legal Assistant	 templeton@uchicago.edu t-9aurba@lawclinic.uchicago.edu jschuhardt@uchicago.edu heppell@uchicago.edu blukanov@psehealthyenergy.org aelc_mpsc@lawclinic.uchicago.edu jbschott@umich.edu madisonswilson@uchicago.edu
Advanced Energy United; Energy Michigan, Inc, Foundry Association of Michigan, Institute for Energy Innovation, Michigan Energy Innovation Business Council (MIEIBC) Laura A. Chappelle Timothy J. Lundgren Justin K. Ooms Justin Barnes David Gard Douglas Jester Matt Bandyk Paul Alvarez Dennis Stephens	 lchappelle@potomaclaw.com tlundgren@potomaclaw.com jooms@potomaclaw.com jbarnes@eq-research.com dgard@5lakesenergy.com djester@5lakesenergy.com mbandyk@5lakesenergy.com palvarez@wiredgroup.net dennis.stephens@hotmail.com

Laura Sherman	laura@mieibc.org
Environmental Law & Policy Center; Ecology Center; Union of Concerned Scientists; Vote Solar Nicholas N. Wallace Daniel H. B. Abrams James Gignac Will Kenworthy Brad Klein Lee Shaver Boratha Tan Curt Volkman SydneyWhite, Legal Intern Carolyn Boyce, ELPC Paralegal Alondra Estrada, ELPC Legal Assistant	MPSCDocket@elpc.org nwallace@elpc.org dabrams@elpc.org jgignac@uscusa.org will@votesolar.org bklein@elpc.org lshaver@uscusa.org btan@votesolar.org curt@newenergy-advisors.com swhite@elpc.org cboyce@elpc.org aestrada@elpc.org
City of Ann Arbor, Michigan Municipal Association for Utility Issues Valerie R. Jackson Valerie J. M. Brader Richard J. Bunch, Consultant	Vjackson@a2gov.org valerie@rivenoaklaw.com ecf@rivenoaklaw.com rick@mi-maui.org
THE KROGER COMPANY Michael L. Kurtz Kurt J. Boehm Jody Kyler Cohn	mkurtz@BKLlawfirm.com kboehm@BKLlawfirm.com jkylercohn@BKLlawfirm.com
UTILITY WORKERS LOCAL 223 Ben King	bking@michworkerlaw.com
Walmart, Inc. Melissa M. Horne	mhorne@hcc-law.com
Association of Businesses Advocating Tariff Equity Michael J. Pattwell Stephen A. Campbell Jessica York, ABATE Consultant	mpattwell@clarkhill.com scampbell@clarkhill.com jyork@consultbai.com
EVgo Services, LLC Nikhil Vijaykar Michael G. Oliva	nvijaykar@keyesfox.com moliva@fosterswift.com

Alicia Zaloga, Paralegal Lindsey Stegall	azaloga@keyesfox.com Lindsey.Stegall@evgo.com
International Transmission Company Richard J. Aaron Courtney F. Kissel Olivia R.C.A. Flower Hannah E. Buzolits	 RAaron@dykema.com CKissel@dykema.com OFlower@dykema.com HBuzolits@dykema.com
Michigan Cable Telecommunications Association (MCTA) Sean P. Gallagher Justin Mann, Legal Assistant	 sgallagher@fraserlawfirm.com jmann@fraserlawfirm.com
PROTEC (The Michigan Coalition to Protect the Public Rights of Way) Michael J. Watza	 Mike.watza@kitch.com
Electrify America, LLC Stephen Bright Jennifer A. Morante Jigar Shah	 Steve.Bright@electrifyamerica.com jmorante@grsm.com Jigar.Shah@electrifyamerica.com

The statements above are true to the best of my knowledge, information and belief.

PUBLIC LAW RESOURCE CENTER PLLC

Carol A. Dane

Carol A. Dane
Public Law Resource Center PLLC
University Office Place
333 Albert Avenue, Suite 425
East Lansing, MI 48823
Telephone: (517) 999-3782
E-mail: adminasst@publiclawresourcecenter.com

Dated: July 26, 2024