MICHIGAN PUBLIC SERVICE COMMISSION

Resilience & Reliability Technical Conference

Day 2- May 26, 2023
9:00 AM – 1:00 PM (EST)

The Resilience Technical Conference will begin shortly. Please stand by.

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For IT assistance, e-mail:
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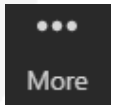
To submit a comment

Written Comments – Case No. U-21388

1. Email to:
   LARA-MPSC-commissioners2@michigan.gov

2. Mail to:
   Michigan Public Service Commission
   P.O. Box 30221
   Lansing, MI 48909

For IT assistance, e-mail: LARA-MPSC-EVENT-IT@michigan.gov

To enable closed captioning: 1.) Click the "more" button 

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MPSC Commissioners

Welcome and Introductory Remarks

9:00 am – 9:10 am

Dan Scripps
MPSC Chair

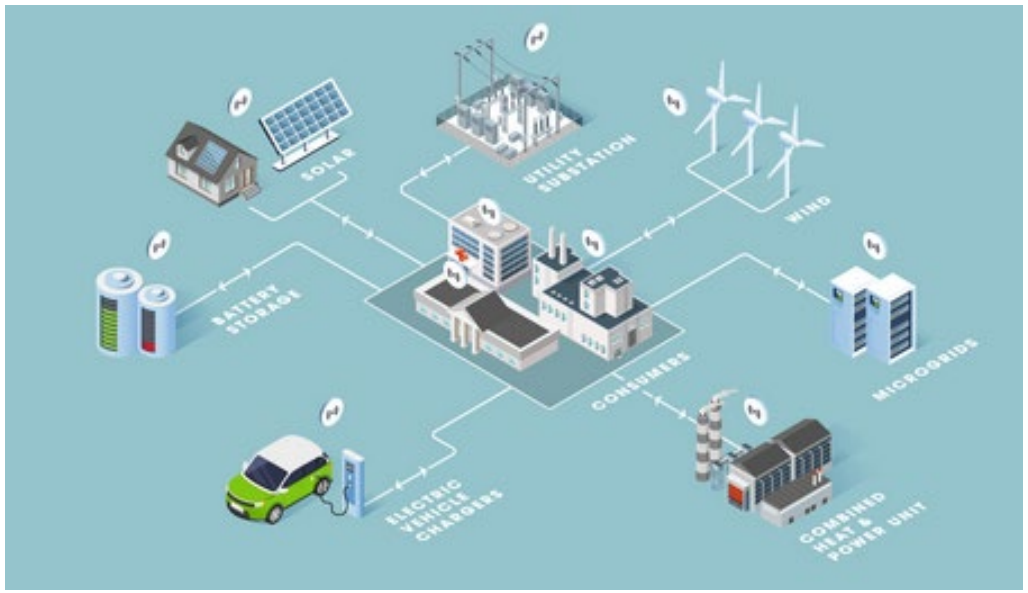
Katherine Peretick
MPSC Commissioner

MPSC
MICHIGAN PUBLIC SERVICE COMMISSION

Not Your Grandparents' Grid
DER and the Future of Resilience

9:10-9:55am

Moderator: Cody Matthews, MPSC



- Panelists
  - Donnel Baird, BlocPower
  - Ryan Barnett, Palmetto
  - Dr. Brandy Brown, Walker Miller Energy Services
  - Kevin O'Connell, Michigan CAT

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Questions from Commissioners

Up Next:

9:55 am Microgrids, Resilience Hubs, & Mobile Power/Storage

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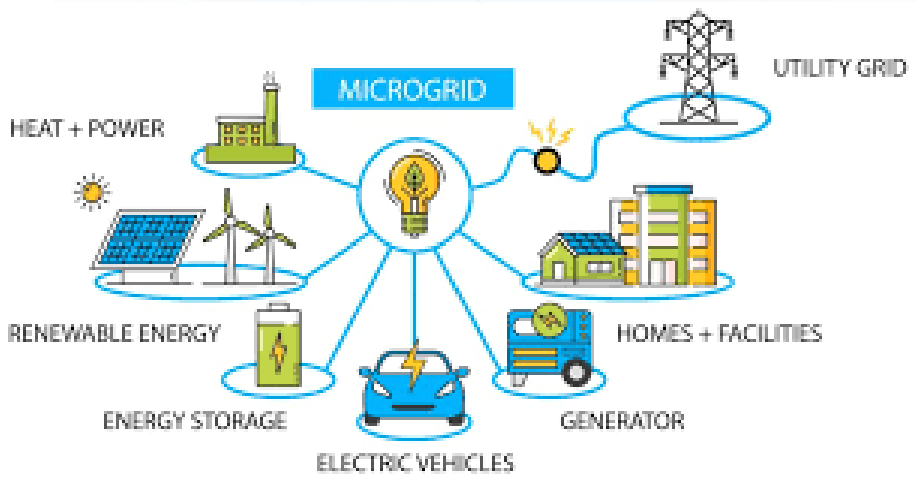
MICHIGAN PUBLIC SERVICE COMMISSION

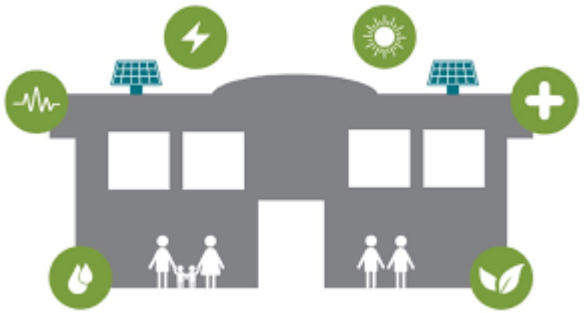
Tools & Technologies to Improve Resilience: Microgrids, Resilience Hubs & Mobile Power/Storage

9:55-10:40am

Moderator: Nick Evans, MPSC



- Panelists
  - Komal Doshi, Walker Miller Energy Services
  - Douglas Jester, 5 Lakes Energy
  - Veronica Szczerkowski, CT Department of Energy & Environmental Protection



walker-miller Energy Services

Bidirectional Charging & Grid Resiliency

EMPOWERING PEOPLE
ENRICHING COMMUNITIES

History of Intentional, Sustainable Growth

2000 — Company Founded

2009 — First Utility Energy Efficiency Contract in partnership with Franklin and DNV

2010 — City of Detroit - First Contract as Prime

2015 — DTE Energy Efficiency Contract

SBA Michigan Best Small Business

2016 — Department of Energy (DOE)Home Energy Score Partner

2018 — Ameren IL Company Contract

Implemented Diverse Procurement Strategy

Purchased Detroit HQ

2019 — ComEd Diverse Energy Efficiency Service Provider (EESP) Incubator Program.

2020 — 20 Year Anniversary

PECO Contract

Inc. 500 Inc. Magazine Top 100 Female Founders Award

2021 — ComEd Diverse EESP *Alumni* Program

Ameren Illinois Diverse Program Ally Incubator Pilot

2022 — Achieved B-Corp Certification

Equitable EV Consulting

DTE Energy Diverse Contractor Incubator Pilot

DTE Energy Efficiency Training Academy

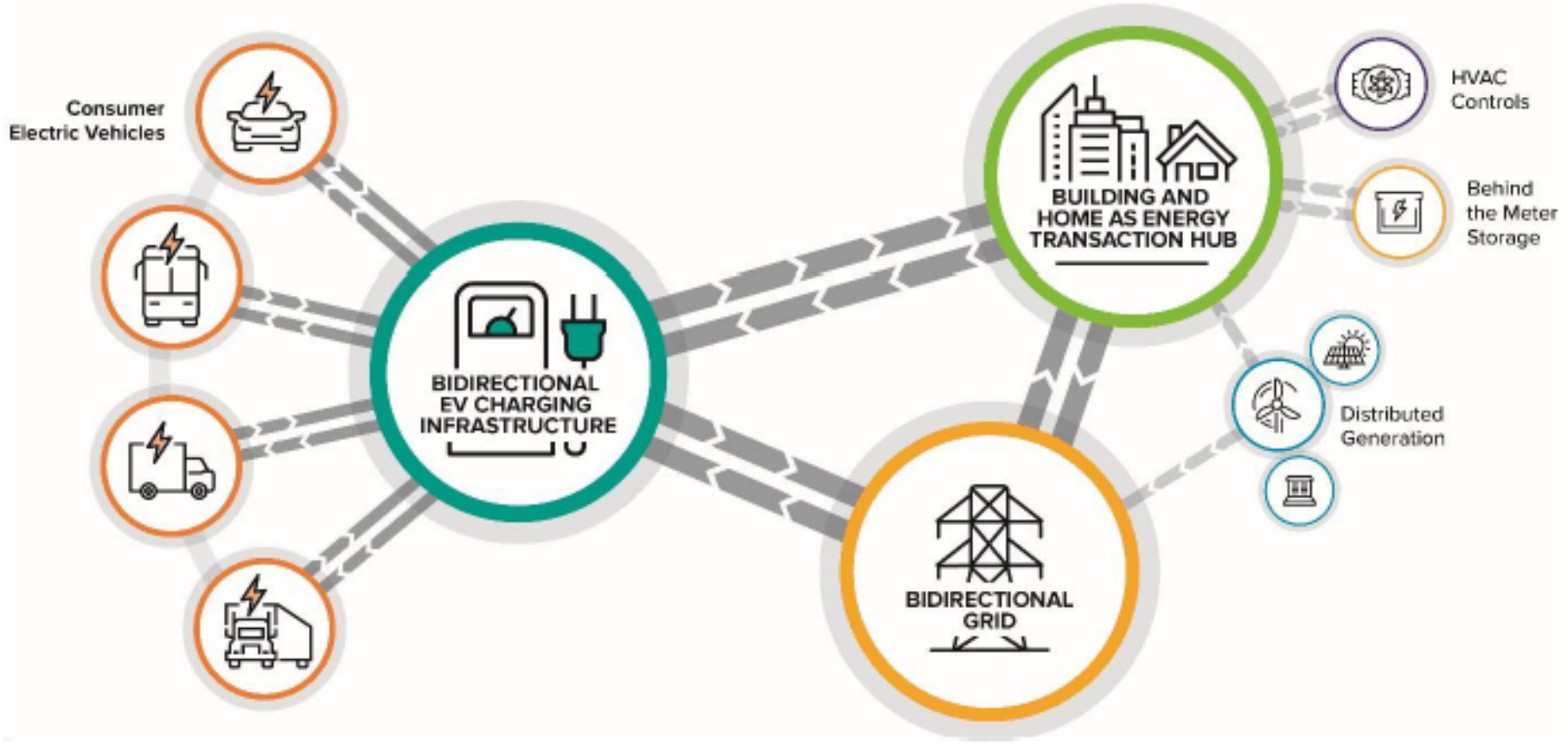
Consumers Energy BPI Certification Training

Ameren Missouri DE&I Consulting & Program Analysis

Challenges Facing the Electric Grid

Extreme weather and increasing peak loads are challenging the electric grid's resilience and ability to deliver reliable electricity across North America. Natural Disasters that have led to power outages have highlighted the vulnerability of power systems that keep essential services operational.

Bidirectional Charging



Bidirectional EV chargers can refer to any product that is able to transmit electricity in two directions: into and out of an electric vehicle battery. EV owners can discharge electricity from their vehicle to **use onsite, share, or sell.**

Image: Fig. 1: Bi-directional charging of grid. Source: Argonne National Laboratory

Why Now?

Federal Funding, Improved Battery storage Technology, Improved software technology, Push from Automotive Industry and more are all reasons why now is a prime time for this technology.

Vehicle to Building

EVs to function as a backup generator that provides backup power to run lights, electronics, and appliances onsite.

Vehicle to Grid

With the proper equipment and local utility agreements, bi-directional EV chargers may be used as "vehicle-to-grid chargers" (V2G). With V2G charging, power is exported from your EV's battery reserve and sent to a third party through the electricity grid.

Vehicle to Load

Some vehicles have bi-directional charging capability built in that allows you to directly power home appliances, camping equipment, mobile workstations, large electronic devices, power tools, and more.

Vehicle to Everything

Some manufacturers are looking to adapt their bi-directional charging systems to work with anything, integrating all of the bidirectional charging types into a single vehicle as needed.

Rates and Incentives

A Spectrum of Approaches

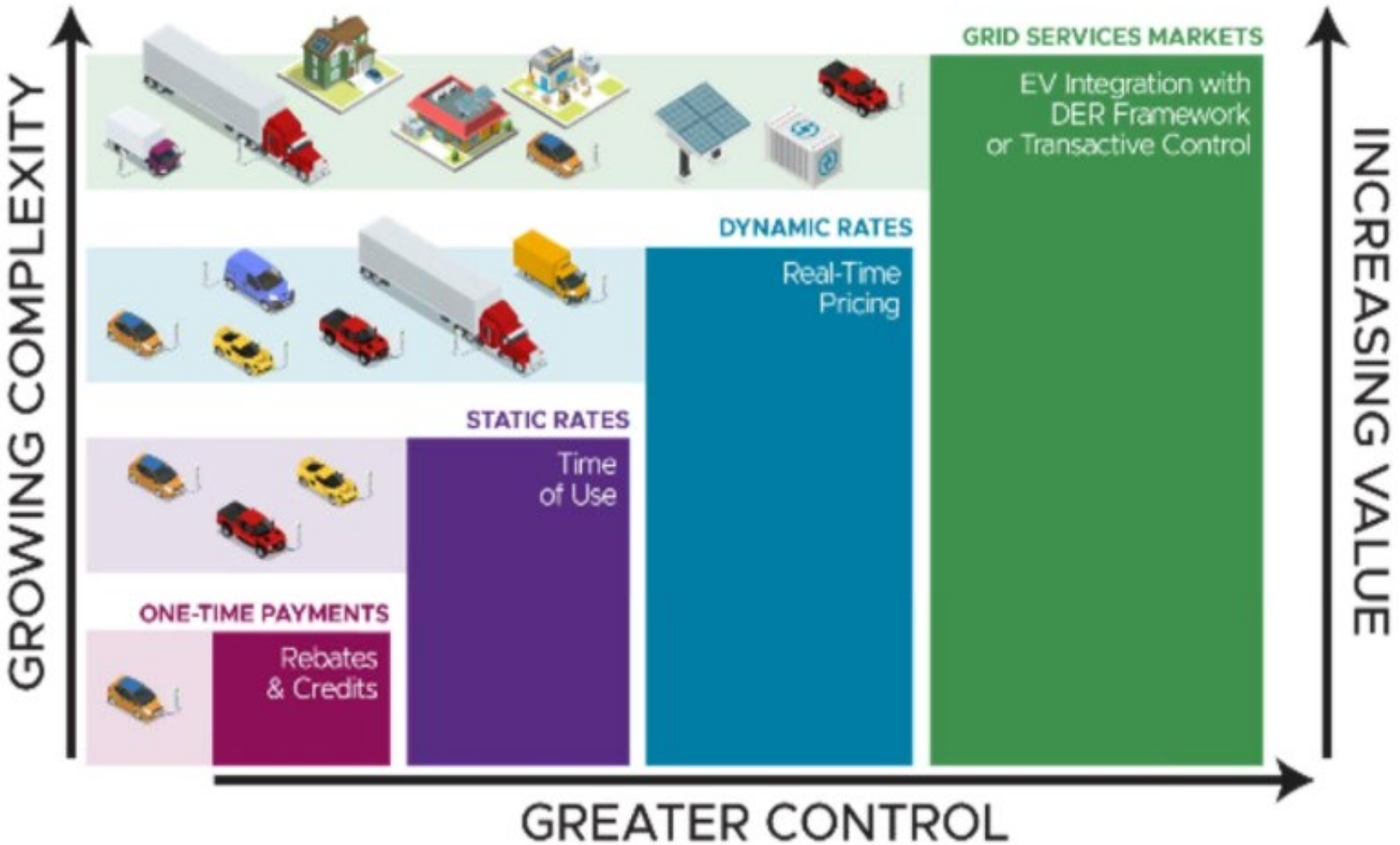


Image: Fig. 1: EVGrid Assist Webinar Slides

Grid Resiliency with Bidirectional Charging

Bidirectional charging allows EVs to provide power to the grid during peak demand periods when electricity prices are high.

By feeding stored energy back into the grid, EVs can help balance the load, reducing strain during times of increased demand and potentially preventing blackouts or brownouts.

Load Balancing

Bidirectional charging allows EVs to provide power to the grid during peak demand periods when electricity prices are high. By feeding stored energy back into the grid, EVs can help balance the load, reducing strain during times of increased demand and potentially preventing blackouts or brownouts.

There is an added benefit in this, as well. The Natural Resources Defense Council estimates that 5% of electricity in the grid is lost through transmission and distribution, at a cost of about $6 billion per year. Reducing the distance that energy needs to travel makes it particularly attractive.

Grid Stability

EVs equipped with bidirectional charging can respond to grid signals and supply power during periods of grid instability or fluctuations.

This capability can enhance grid stability by injecting electricity when needed and absorbing excess energy during surplus periods, thus contributing to a more balanced and reliable grid.

Demand Response

During peak demand events, utilities can signal EVs to reduce their charging or even discharge power to support the grid.

This flexibility helps manage electricity demand, mitigate stress on the grid, and enhance its resiliency.

Claims V2X supplier Virta, “V2X turns EV charging from electrical demand response to a battery solution. It enables the use of the battery 10x more efficiently, compared to uni-directional smart charging.”

Renewable Energy Integration

This feature enables better integration of intermittent renewable sources into the grid, improving the grid's resiliency by reducing reliance on fossil fuel-based backup power generation.

The Sono Motors Sion, an electric car with embedded solar panels with standard bi-directional charging. The Sono Wallbox is capable of vehicle-to-grid (V2G) charging at up to 11 kilowatts AC

Emergency Power Supply

EV owners can use their vehicles to power homes, critical infrastructure, or provide electricity to support relief efforts, thereby enhancing the resiliency of the grid and local communities.

Pecan Street, an energy research organization, estimates that a single plug-in EV can fully power a single-family home for up to five hours, or five homes for an hour.

Considerations for Bidirectional Charging

Requirements

- Supportive infrastructure (Hardware and Software).
- Capability in Vehicles
- Smart Grid technologies,
- Codes and Standards
- Appropriate regulations

Challenges

- Impact on Battery Life. Thermal Management Systems.
- Revenue Models
- Cybersecurity Concerns
- Environmental Impact of Recycling Batteries

V2G School Bus Project

In the summers of 2021 & 2022, Highland Electric Fleets partnered with BorgWarner, National Grid, Thomas Built Buses, Proterra, and Synop to pilot V2G (vehicle-to-grid) technology in battery storage from electric school buses.

The project sent 10.8 MWh back to the grid over 158 hours, generating $23k.

Schools as Resilient hubs

- Predictable Routes, Limited Range and Uniform Depots
- Large and Underutilized Batteries. 25 Buses have 5 MWh Energy capacity which could impact 116 Local Homes for 1 day.
- Turn fleets into revenue generating assets without disrupting the buses' normal operations
- Schools are safe spaces and community hubs where people can gather during power outages and disasters.

Duke Energy and Ford Motor Company Pilot

- Powerful F-150 Lightning™ batteries would serve as backup storage cells for electrical grid.
- Program would reduce lease payments for Duke Energy Carolinas participants.
- Utility seeks approval for demand response pilot program in North Carolina.

Thank you

Contact

Komal Doshi
Director of Mobility
Walker-Miller Energy Services

Utility Regulatory Support for Community Resilience

Presented by Douglas Jester
to MPSC Reliability and Resilience Technical Conference
26 May 2023

5lakes energy
www.5lakesenergy.com

What is the Problem?

- Michigan investor-owned utilities are comparatively unreliable and particularly expose their customers to long power outages on a regular basis. This has been so for at least 30 years, with little material improvement.
- Current utility proposals do not warrant reliance on rapid improvements.
- Customers need and want a way to protect themselves from hardships resulting from long power outages.

What is the Problem?

- Hardship due to power outages is greater
  - For people who are cash-flow constrained from mitigating harm
  - When outages are ubiquitous
  - When weather is extreme
  - When outages are longer
- Customer resilience measures are costly and take time to implement at scale

Proposed Solution Strategy

- Focus on Community Resilience – the ability of the community to mitigate harm to its members
- Michigan utilities have lost social license to stand in the way of solutions – ignore their objections and demand their assistance

Proposed Solution Strategy

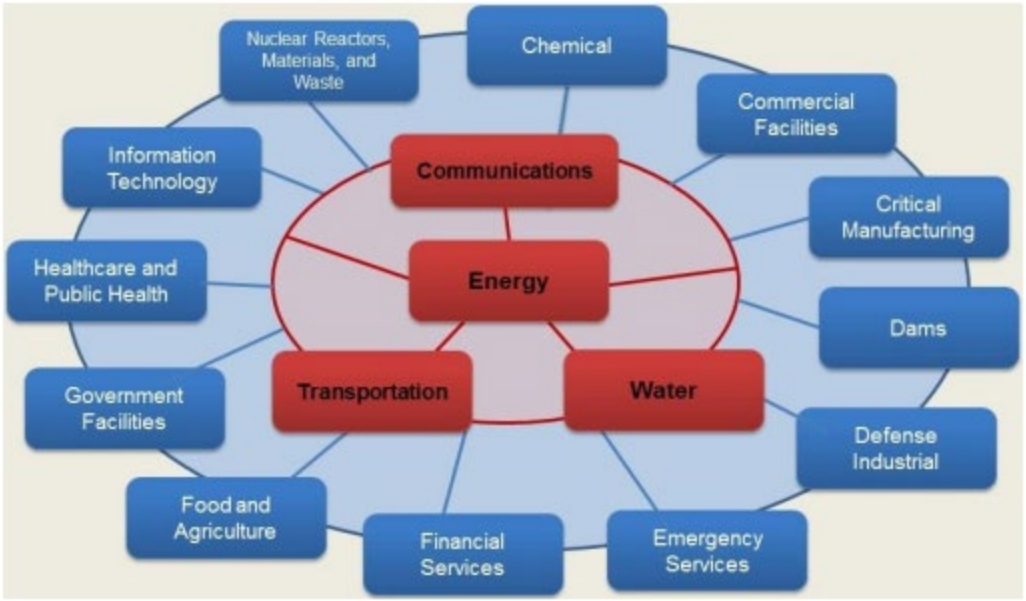
- The only way to provide electricity to mitigate ubiquitous long-lasting outages is widespread islandable distributed generation or long-duration storage
  - Fossil-fueled generators
    - Emergency generators
    - Fuel cells
    - Combined heat and power
  - Solar
  - Batteries
  - Stored hydrogen fuel cells

Proposed Solution Strategy

- Distributed generation and storage provides most resilience value if
  - Electricity usage is efficient
  - Critical loads can be prioritized
- Distributed generation + storage + load management = microgrid
  - Storage can be V2x
- Microgrid can be customer-provided or utility-provided
  - Customer-provided would have point of separation and storage behind the meter
  - Utility-provided would have point of separation and storage front of meter, and can encompass multiple accounts

Proposed Solution Strategy

- Prioritize critical facilities



Proposed Solution Strategy

- Prioritize vulnerable communities and community members
  - Rely on communities to identify critical facilities

Regulatory Recommendations

- Eliminate stand-by rates for primary and secondary distribution customers
- Require utilities to offer microgrid as a utility service, with only front-of-meter assets
- Develop utility-funded rebates for behind-the-meter assets at critical facilities in vulnerable communities
  - Assets should belong to the facility
  - Funding should be non-capital

www.5lakesenergy.com

MICROGRIDS – CONNECTICUT'S EXPERIENCE

Presented by: Veronica Szczerkowski
Bureau of Energy and Technology Policy

/ BACKGROUND
HOW WE BEGAN

- Multiple long duration outages in 2011 and 2012
- Critical facilities could not provide services to the public
- Mayors and First Selectmen contacted the Governor to provide assistance
- Report from the Two Storm Panel

/ BACKGROUND
KEY LEGISLATION

- Public Act 12-148 (C.G.S. Section 16-243y)
  - Microgrid definition
  - Provided funding for design, engineering and electrical interconnection infrastructure capital costs
- Public Act 13-298
  - Expanded virtual net metering for microgrid facilities
  - Authorized municipality to distribute electricity across a street
- Public Act 16-196
  - Provided funding for Class I and Class III generation and energy storage
- Public Act 20-5
  - Expanded to other resiliency projects
  - Provided funding for feasibility studies
  - Prioritized vulnerable communities

/ CONNECTICUT'S CHALLENGES
CUSTOMER OWNED MICROGRIDS

- Electric Distribution Companies can not own generation
- Infrastructure in the right of way
  - Utility franchise
  - Municipal owned infrastructure
- Project Financing
  - Private financing
  - Fees to microgrid participants
  - Grants
  - Loans
- Municipalities are not microgrid/utility grid experts
  - Facilities managers
  - Public works employees

/ PROGRAM SUCCESS
COMPLETED MICROGRIDS

- Cleaner generation
- Integration of energy storage
- 24/7 operation for 19 days
- Examples

Name of Project	Projected/Actual Date of Completion	Facilities	Generation	Program Award
Milford	Sep-21	Parsons Complex, middle school, senior center, senior apts, city hall	(2) 148kW natural gas CHP units, 120KW PV, 100kW battery storage	$2,909,341
Daughters of Mary of the Immaculate Conception	May-22	Marian Heights, St. Lucian's Residence, Prudence Crandall Hall, and Hospital for Special Care	(4) new 100kW / 255kWh battery energy storage systems, (4) existing solar PV systems (249kW, 216kW, and two 120kW arrays), 225kW natural gas generator	$3,872,538

/ BUILDING A SUCCESSFUL PROGRAM

KEY TASKS FOR MICROGRID PROPONENTS

- Establish a good working relationship between electric utilities and municipalities
- Identify and assemble a team of experts
  - Electrical engineers
  - Financing
  - Knowledge of town loads and resources
- Get buyin from microgrid participants
  - Municipal entities
  - Private entities
- Explore funding sources
  - Rates
  - Fees
  - Federal or State grants for infrastructure or generation
  - Utility rate base (utility owned microgrid)

/ UTILITY OWNED MICROGRIDS
WHERE TO BEGIN

- Microgrid Definition
  - Wastewater treatment plant
- What services would you like to microgrid to provide
- Can microgrids help you achieve other state energy goals
- Are the electric utilities best suited to provide this service

/ UTILITY OWNED MICROGRIDS

MICROGRIDS AS A SERVICE

- Establish a good working relationship between electric utilities and municipalities
- Identify and assemble a team of experts
  - Electrical engineers
  - Financing
  - Knowledge of town loads and resources
- Get buyin from microgrid participants
  - Municipal entities
  - Private entities
- Explore funding sources
  - Rates
  - Fees
  - Federal or State grants for infrastructure or generation
  - Utility rate base (utility owned microgrid)
- Account managers have relationships with municipal officials and employees
- Team of Experts
  - Microgrid/utility grid experts
  - Know which circuits/substations are prone to an outage
  - Know where critical facilities are located
  - Know where backup or distributed generation is located
  - Know how to operate grid infrastructure
- Electric Utilities own generation
- Utility franchise – right of way
- Funding Sources
  - Rate base
  - Microgrid Tariff
  - Need approval from PSC

Thank you!
Questions?

Contact

Veronica Szczerkowski (veronica.szczerkowski@ct.gov)
Microgrid Program Coordinator
860.827.2890

Questions from Commissioners

Up Next:

10:40 am Program Design for Resilience

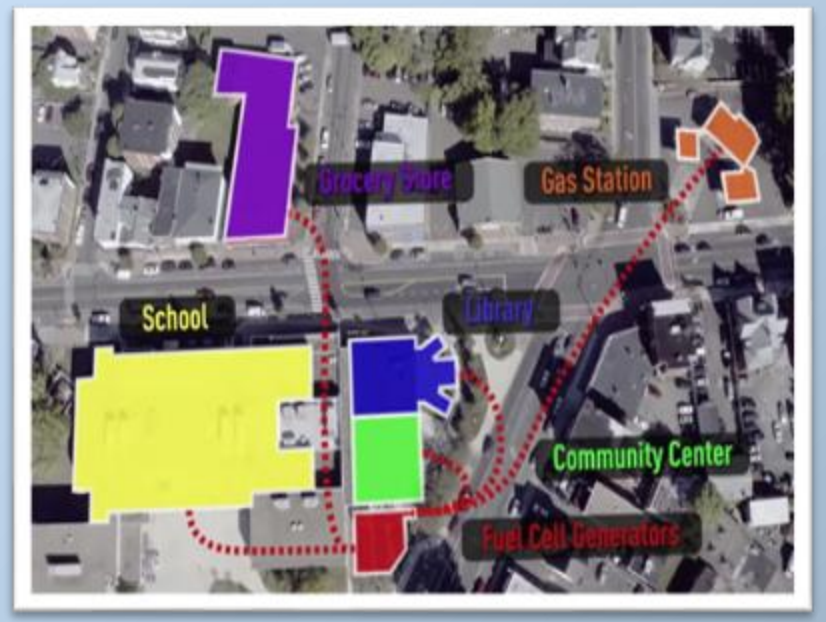
Panel: Program Design for Grid Resilience

10:40-11:10 am.

What is Energy-as-a-Service?

Where a utility (or a third party) makes the initial investment and then customers pay for a service to pay down the initial investment

Examples



Panel: Program Design for Grid Resilience

10:40-11:10 am.

Moderator:

Sarah Mullkoff
Executive Advisor,
Commission Office

Kim Weaver
Client Solutions Specialist,
Duke Energy
Sustainable Solutions

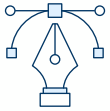
Sangeeta Ranade
Vice President of Development
AlphaStruxure

Will Heegaard
Founder, Operations Director
The Footprint Project

AlphaStruxure

AlphaStruxure enables organizations to achieve ambitious, tailored energy transformations — without the CapEx or complexity.

Design



We design and engineer tailored energy infrastructure to achieve your goals for greenhouse gas reduction, resilience, reliability, and cost stability.

Finance

Direct access to strategic capital from Carlyle removes funding roadblocks and reduces financial risk to accelerate your energy transformation.

Build

Partnering with industry experts, we manage the construction of your energy infrastructure to ensure an efficient, safe, and streamlined build process.

Own

We are accountable for the energy infrastructure across its lifecycle, and therefore hold a long-term interest in your success

Operate

Operation of assets through the **Integrate** digital platform and Microgrid Network Operating Center (NOC) to deliver long-term outcomes.

Maintain

As experts in the evolving technology landscape, we deliver zero CapEx asset optimization and upgrades.

Unique joint-venture combines Carlyle's capital backing and investing experience with Schneider Electric's 185+ year legacy and its track record as the #1 microgrid technology provider, with over 350 successful projects across North America.

CARLYLE

Schneider Electric


footprintproject.org™

Core Programs

DISASTER RESPONSE

We rapidly deploy mobile solar generators to power up responders and survivors.

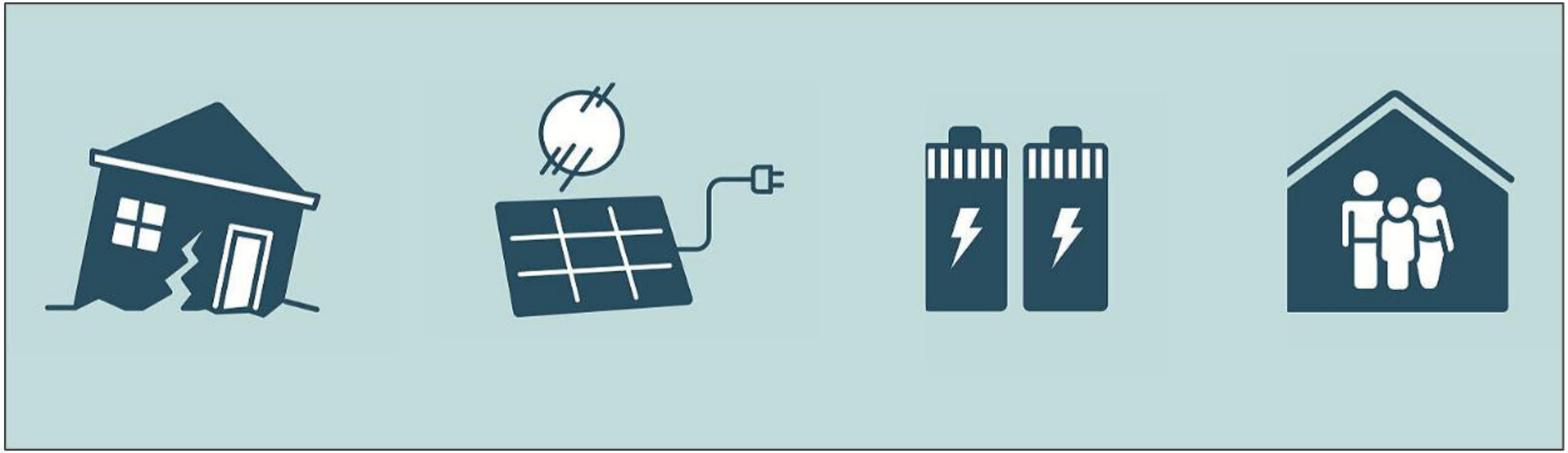
BUILD POWER

We develop fleets of community mobile solar generators and train local partners to plug-in.

UPCYCLE ENERGY

We reuse second-life solar electric components to keep them out of landfills.

Our mission is to
build back greener after disasters,



by mobilizing
cleaner energy to communities in crisis.

Our Vision through 2030

Decarbonize Disaster Relief

by

1) Developing national networks of sustainable, deployable energy infrastructure;

2) Training a 21st century workforce of volunteer and professional responders;

3) Piloting new models of community resilience.

Energy-as-a-Service Case studies

Integrated, Resilient Energy System powering a mixed fleet

EMTOC Microgrid Solution Overview:

- County study demonstrated the need for a transit solution with **advanced range capabilities**. **Hydrogen Fuel Cell buses** have a range of operational characteristics that fulfill county transit requirements.
- By embracing hydrogen fuel technology, the County **will enhance its equitable Bus Rapid Transit (BRT) network** and create new career and training opportunities for underserved communities.
- With an on-site electrolyzer, solar, and battery energy storage, EMTOC will be **the first transit bus depot on the East Coast to feature green hydrogen production.**
- The microgrid will be capable of **powering a mixed fleet** of battery, and fuel cell electric buses, as well as EMTOC's five buildings.
- In the event of an extended grid or power outage, EMTOC will **be able to run indefinitely in "island mode"** using solar power and battery storage
- Reduces emissions by **4,000 metric tons of CO2 per year** while delivering resilience during climate events and power outages.
- The microgrid is delivered **without capital expenditures** through **an Energy as a Service agreement** ensuring predictable operating expenses and guaranteed performance

AlphaStruxure

NORTH CAROLINA SUBSTATION ATTACK

Resilience in Action

footprintproject.org™

DUKE ENERGY®

Global Ministries
The United Methodist Church

AUGUST 2021
Solar trailer built with Duke Energy

OCTOBER 2022
United Methodist Build Power Workshop

DECEMBER 2022
North Carolina Substation Attack

Duke Energy solar trailer deployed by United Methodist team


VANGUARD
877.GET.VNBS
Delta Health Center, Inc.
662-741-8800
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662-741-8800


NUE
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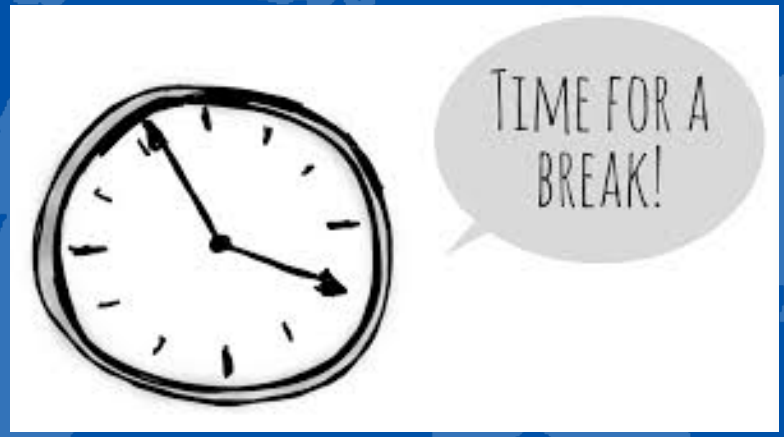
Questions from Commissioners

Up Next: 11:10 am BREAK



11:20 am Empowered – Restoring the Most Vulnerable

Panel: Empowered— Restoring the Most Vulnerable

Moderator:

Olivia Li Szilagyi
Departmental Analyst
Distribution Planning
Michigan Public Service Commission

Ken Coleman
Author
Michigan Advance

Derrell Slaughter
Michigan Clean Energy Advocate
NRDC

Justin Schott
Project Manager
Energy Equity Project

MPSC
MICHIGAN PUBLIC SERVICE COMMISSION

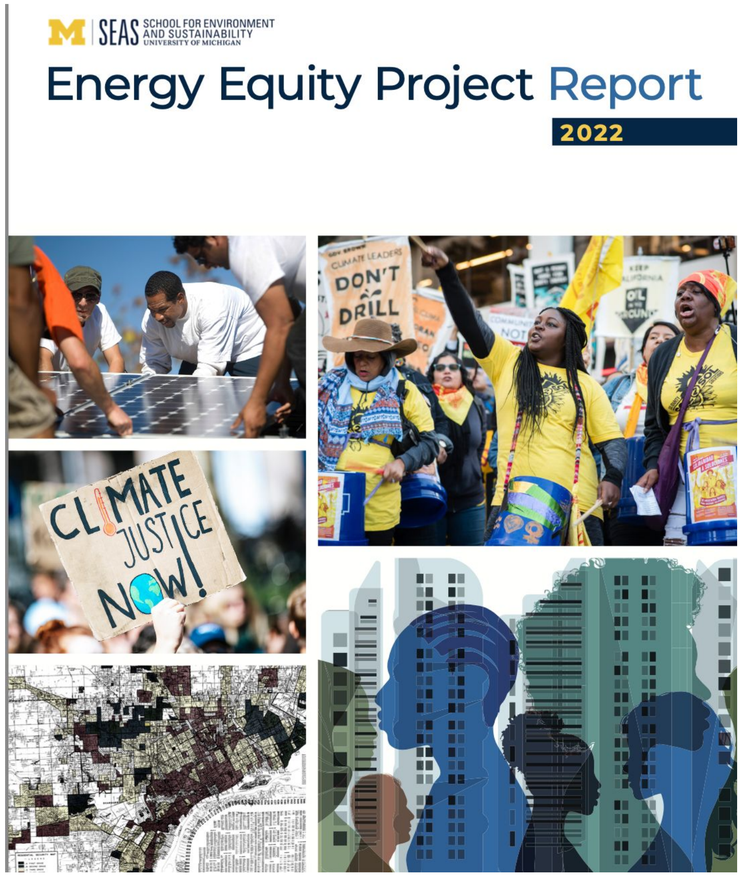
MPSC Resilience Technical Conference - Equity Panel

May 26th 2023

Justin Schott
Director - Energy Equity Project
Lecturer - Energy Justice
jbschott@umich.edu


Flint Youth
ENERGY
SQUAD
Team Leader
RYOBI
STANLEY

The Energy Equity Project Framework



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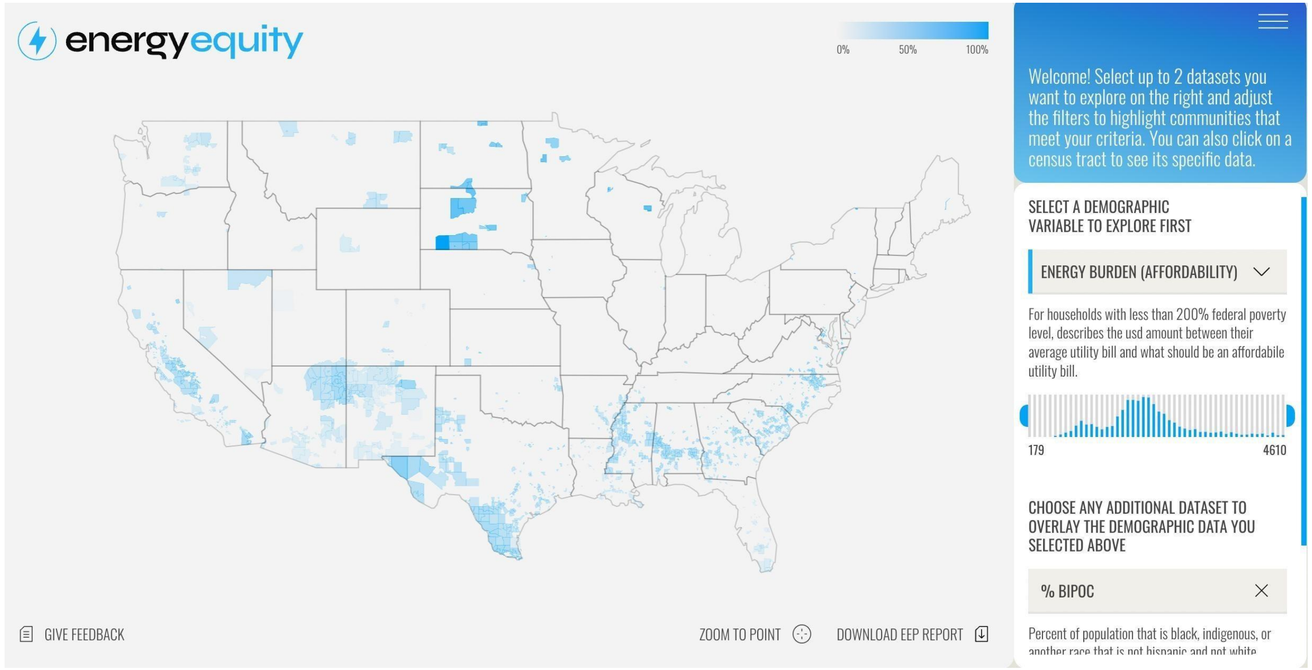


ENERGY FOUNDATION
building a new energy future

The Joyce Foundation

CROWN FAMILY PHILANTHROPIES

Vision: The presence of an equity measurement framework for clean energy programs will improve outcomes for BIPOC, lower-income and frontline environmental justice communities

Founders & Staff

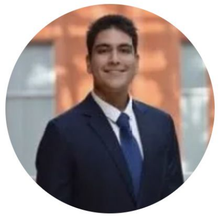
SCHOOL FOR ENVIRONMENT & SUSTAINABILITY
UNIVERSITY OF MICHIGAN

Project Team

Kyle Whyte
Principal Investigator
Bio

Toyosi Dickson
Community Engagement Lead
Bio

Justin Schott
Project Manager
Bio



Rahul Agrawal Bejarano
Lead Data Scientist
Bio

Advisory Team

Marti Frank
Efficiency for Everyone
Bio

Jamal Lewis
Green & Healthy Homes Initiative
Bio

Carlos Martin
Urban Institute
Bio

Elizabeth Palchak
University of Vermont
Bio

Emily Levin
VEIC
Bio

Michael Colgrove
Energy Trust of Oregon
Bio

Defining energy equity

RECOGNITION

Who is vulnerable, who is privileged, and how?

PROCEDURAL

Who is at the table? What voice and power do they have in influencing planning, decision-making, and implementation?

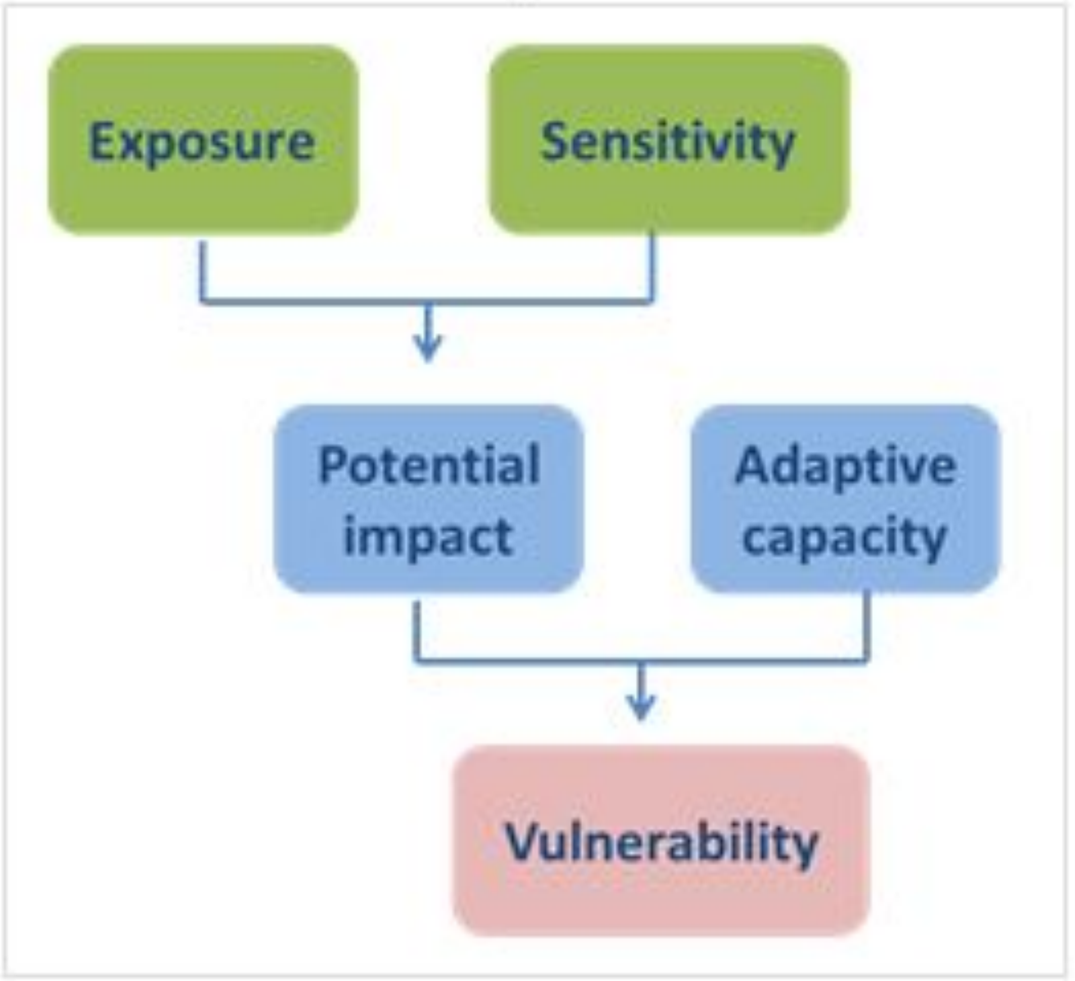
DISTRIBUTIVE

Who bears the brunt of the burdens? who benefits and how?

RESTORATIVE

How can we rectify past injustices caused by the energy system and prevent future harms?

Climate Change Vulnerability Assessments



RECOGNITION

- **Who is most vulnerable?**
  - Community demographics
  - Climate risks
  - Adaptive capacity

PROCEDURAL

- **How do we partner with impacted communities** to design resilience solutions?
  - Where should resilience hubs be located?
  - What features do we need?
  - What are our investment priorities?

DISTRIBUTIVE

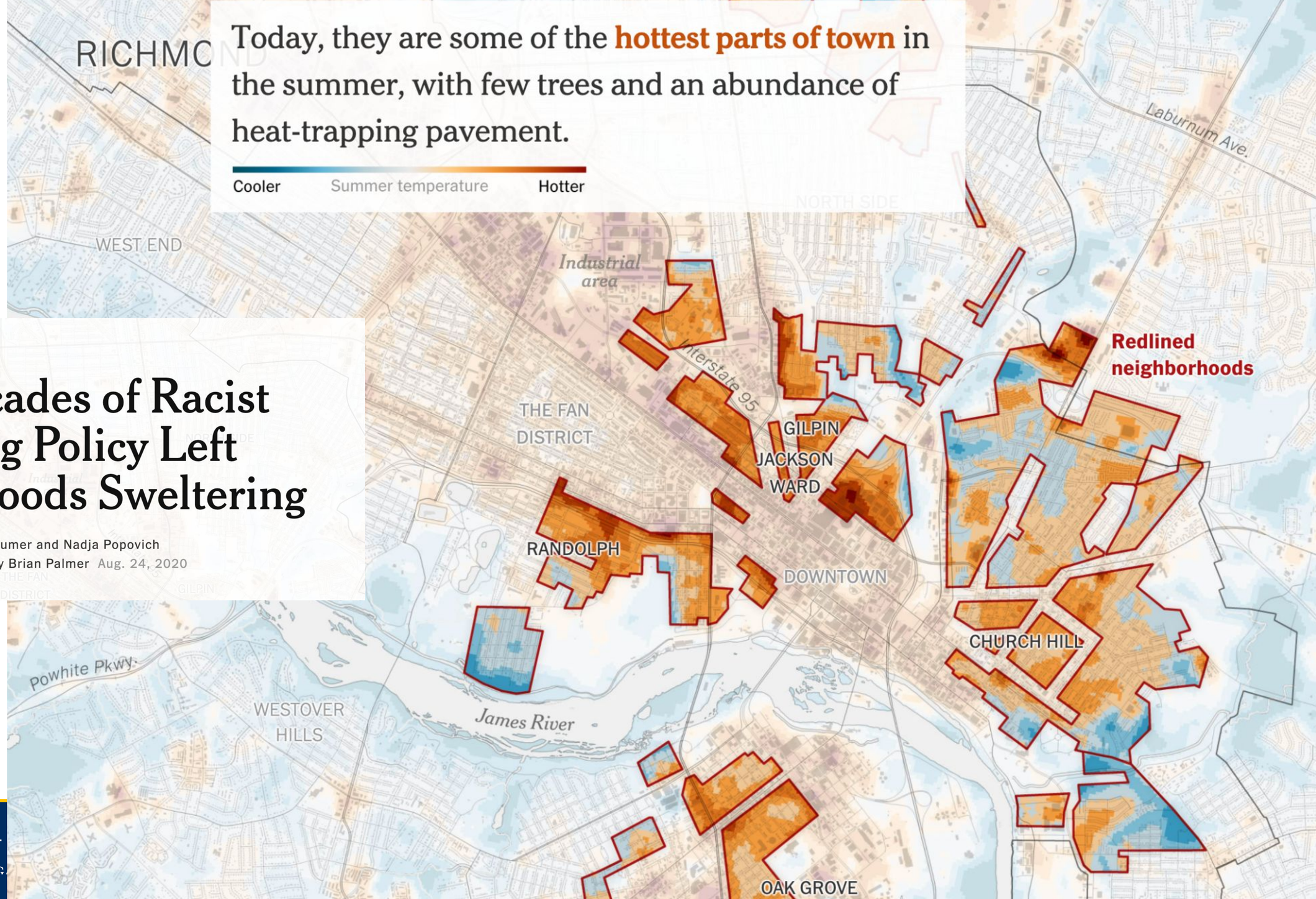
- **How are benefits and risks distributed?**
  - Mitigating the most severe climate risks for the most vulnerable people
  - Ensuring economic and environmental benefits flow to impacted communities

RESTORATIVE

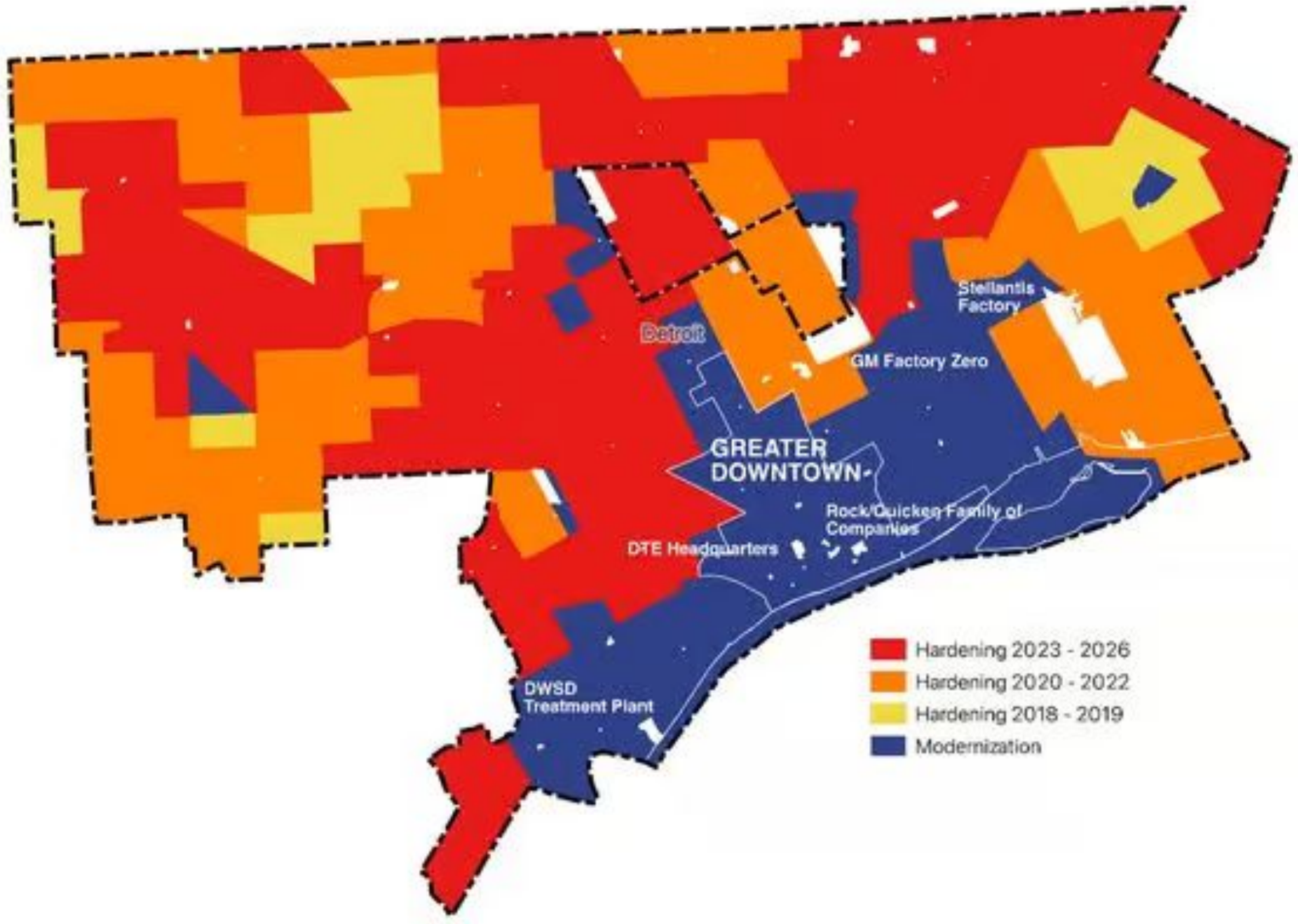
- How do we remedy systemic racism, classism and discrimination that have caused disparities in climate vulnerability?
- How do we ensure disparities do not continue in the future?

How Decades of Racist Housing Policy Left Neighborhoods Sweltering

By Brad Plumer and Nadja Popovich
Photographs by Brian Palmer Aug. 24, 2020

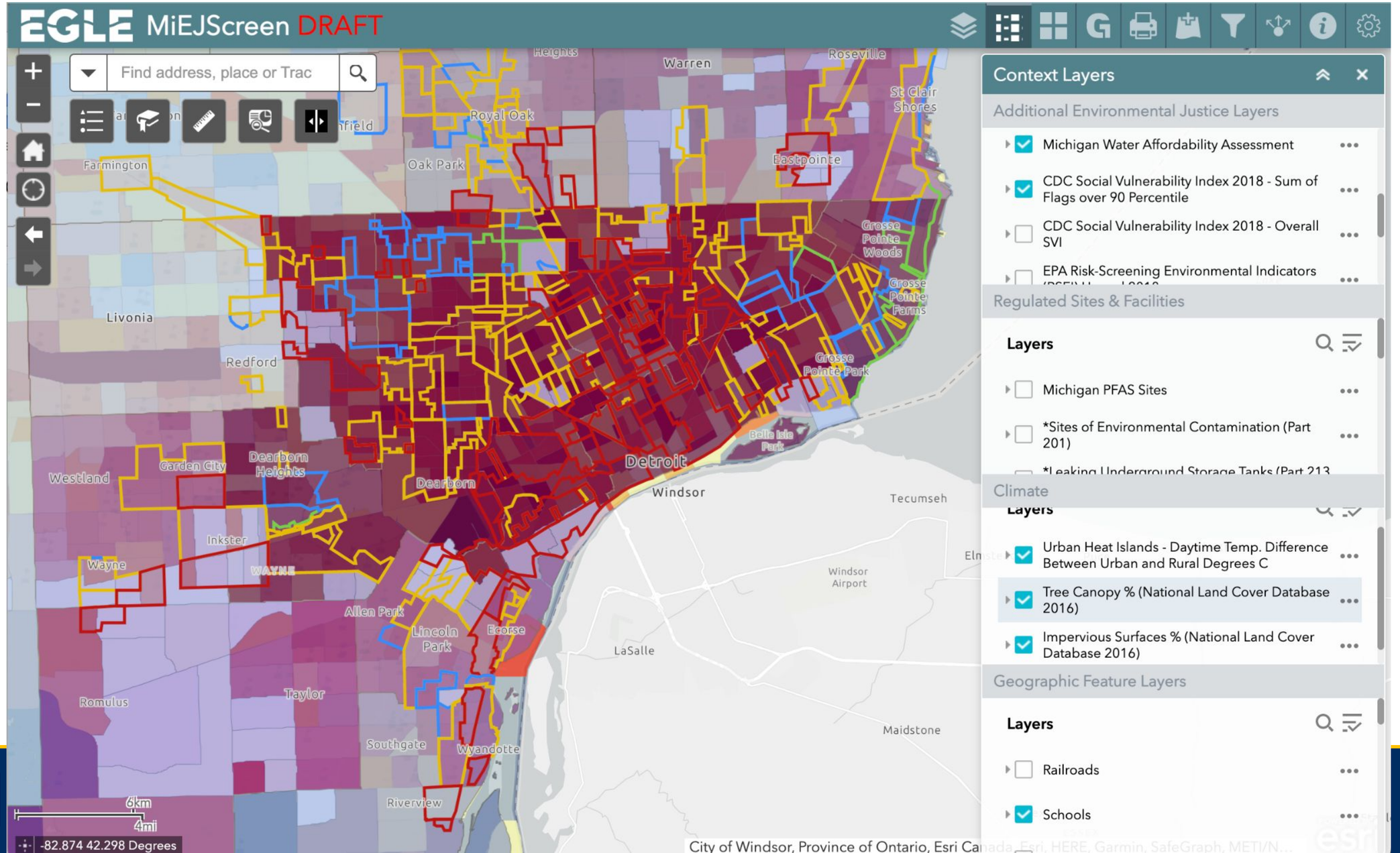


Utility redlining

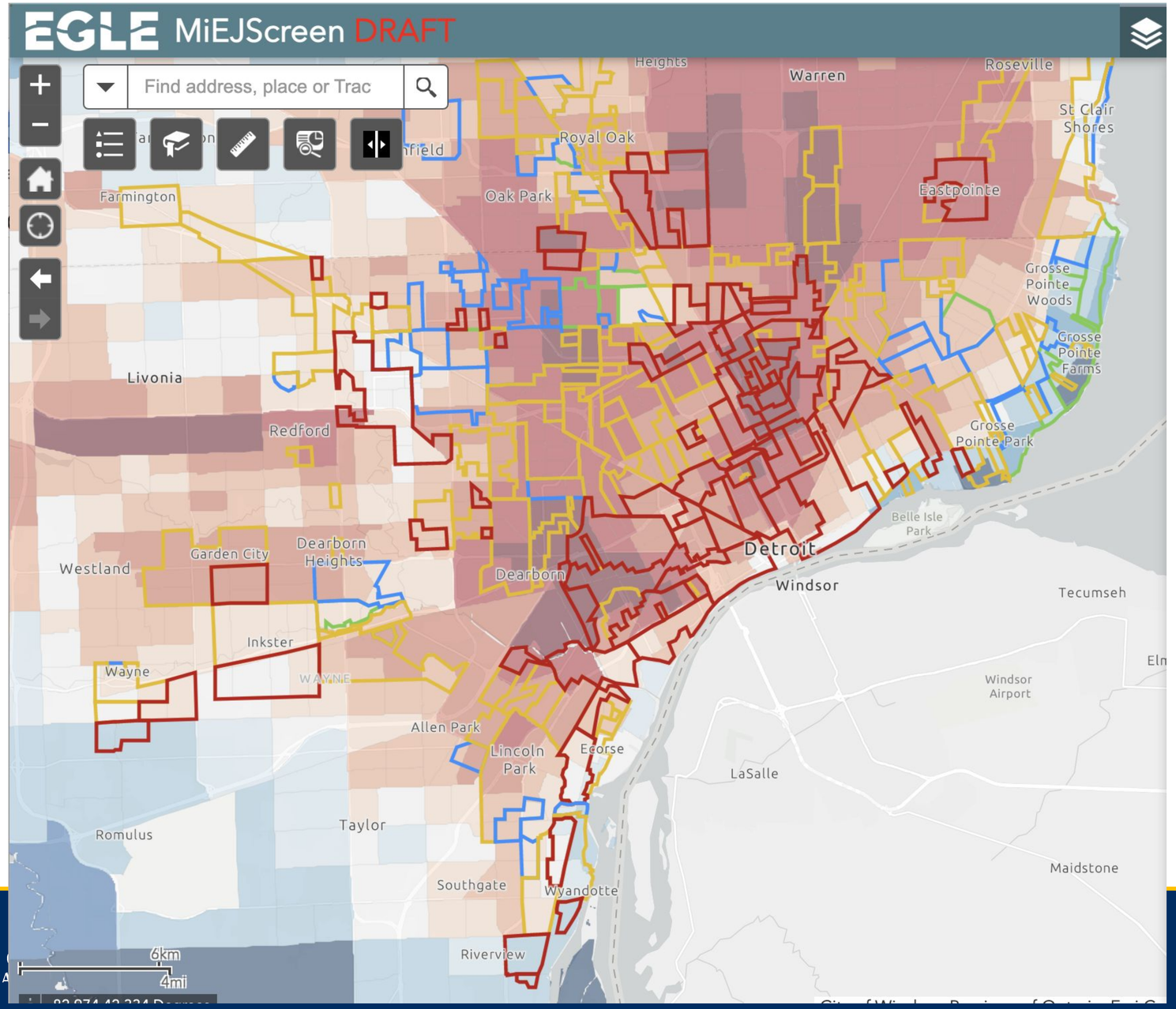


Using data to assess vulnerability

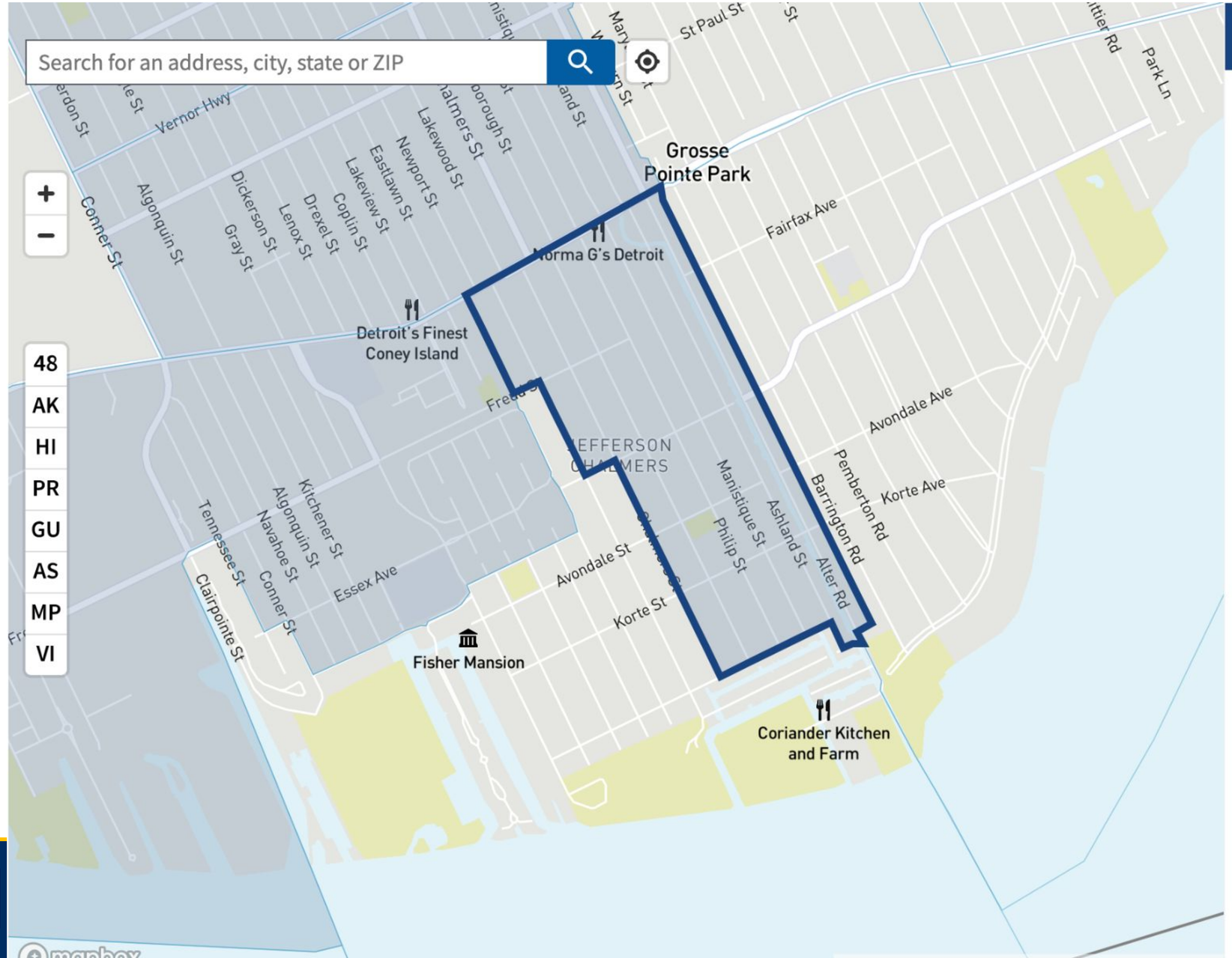
Data can be overwhelming



We can filter for priorities - heat island x redlining



Census tract data *should* improve decision-making



Climate change

Expected agriculture loss rate
Economic loss to agricultural value resulting from natural hazards each year
-- missing data

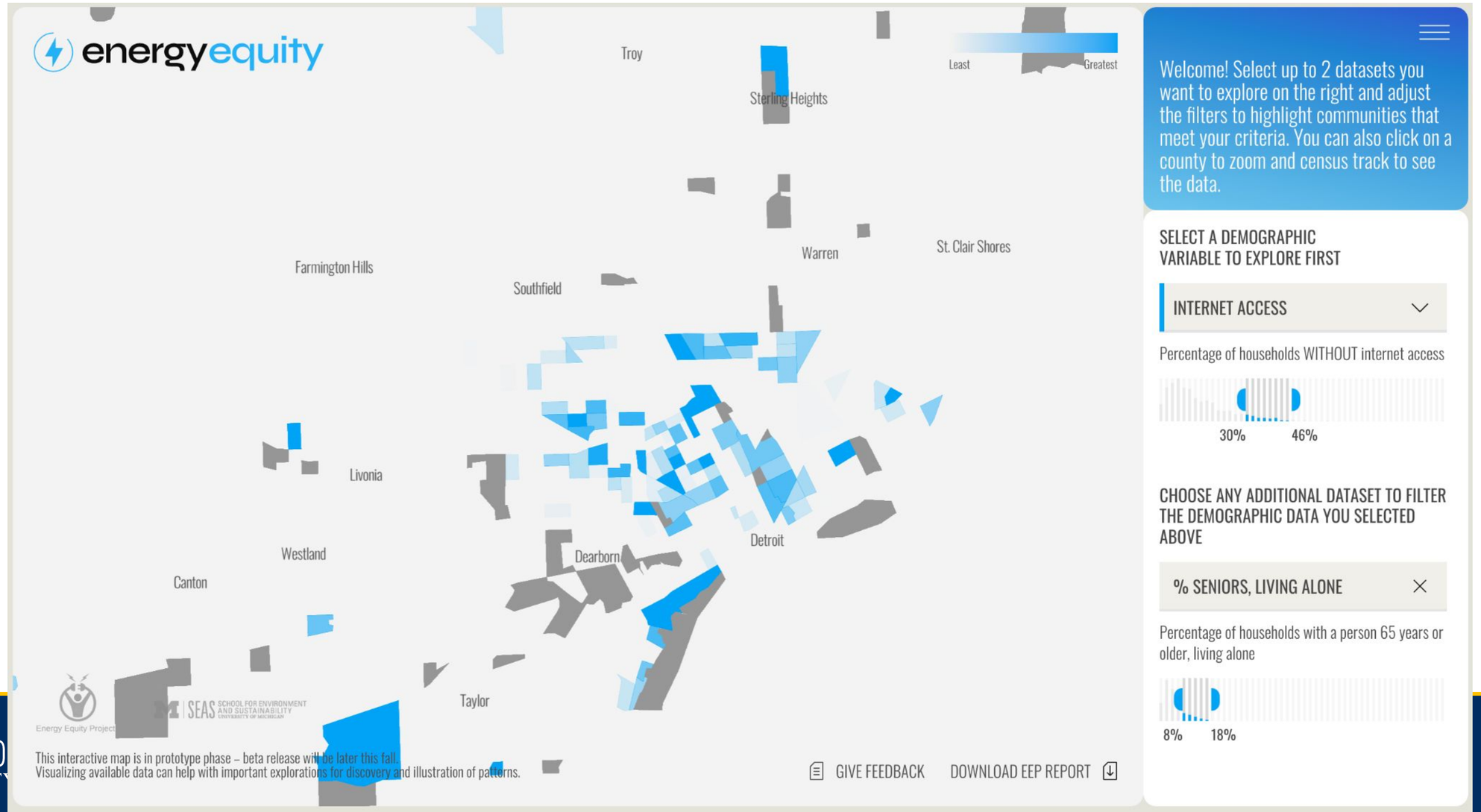
Expected building loss rate
Economic loss to building value resulting from natural hazards each year
97th above 90th percentile

Expected population loss rate
Fatalities and injuries resulting from natural hazards each year
92nd above 90th percentile

Projected flood risk
Projected risk to properties from projected floods, from tides, rain, riverine and storm surges within 30 years
98th above 90th percentile

Projected wildfire risk
Projected risk to properties from wildfire from fire fuels, weather, humans, and fire movement in 30 years
33rd not above 90th percentile

Filtering for 2 variables:
% without internet x % seniors living alone

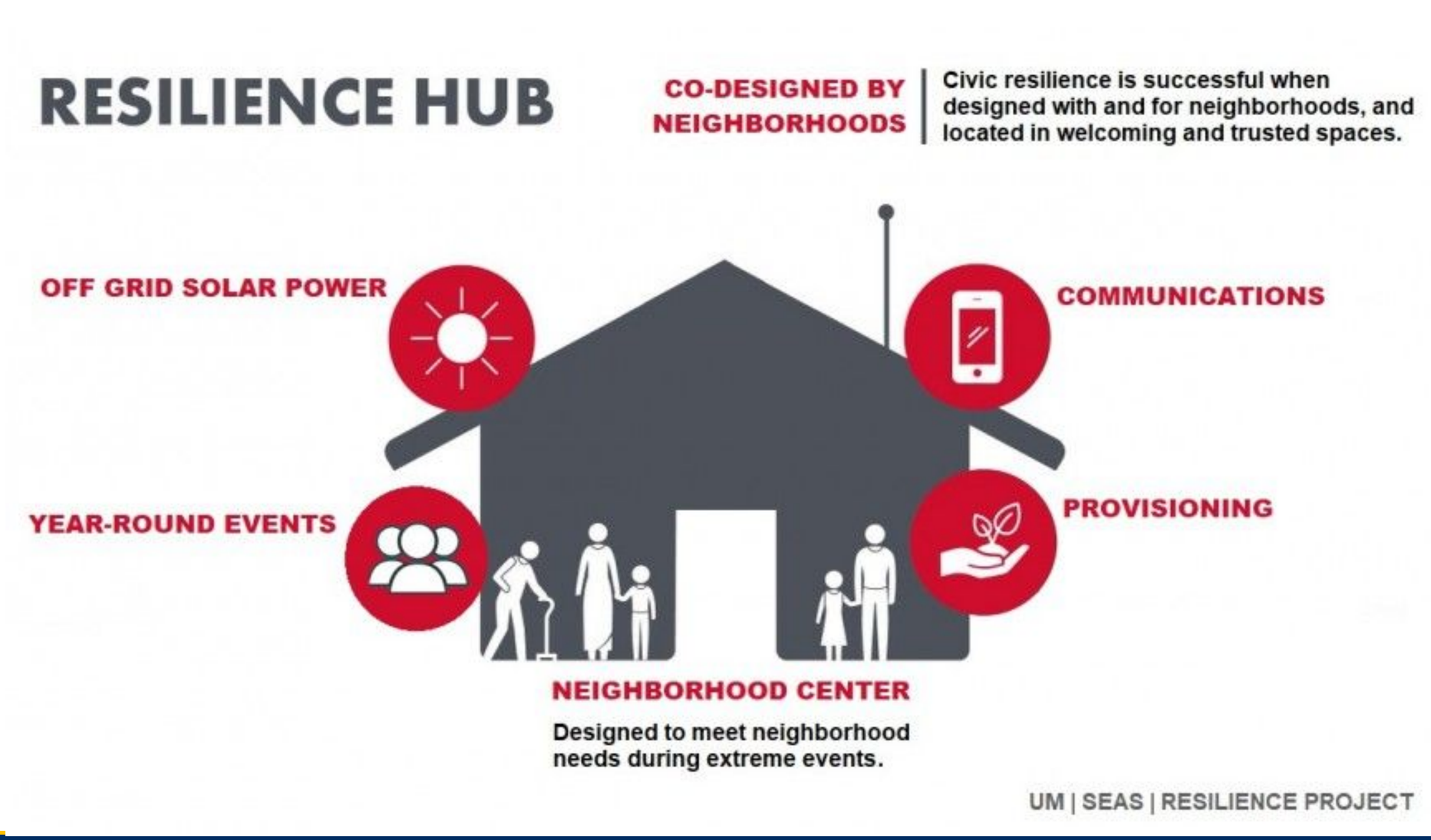


Designing for resilience

Beyond cooling centers

- Only 1 out of 11 Detroit cooling centers have access to back up power
- Cooling centers can only accommodate 1-2% of Detroiters
- Reasons for low usage:
  - not aware of them
  - hard to get to
  - nothing to do
  - not consistently open
  - don’t believe I’m personally vulnerable to heat
  - “not for me”

Resilience hub elements



Resilience hub elements

Stoudamire Wellness Hub
Eastside Community Network, Detroit

Thank you!

jbschott@umich.edu

Questions from Commissioners

Up Next:

11:50 am Funding for Resilience Improvements

Funding for Grid Resilience Improvements
11:50-12:20pm

Moderator: Nate Burnand, MPSC

- Panelist
  - Hope Allen, DTE
  - Cory Connolly, EGLE
  - Russell Mendell, RMI

Questions from Commissioners

Up Next:

12:20 pm Enhancing Coordination with Local Government

MPSC
MICHIGAN PUBLIC SERVICE COMMISSION

Enhancing Coordination with Local Government
12:20-12:50pm

Moderator: Brian Sheldon, MPSC

- Panelists
  - Rick Bunch, MIMIAUI
  - James Krizan, City of Lincoln Park
  - Ross Pogats, DTE

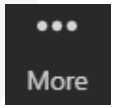
To submit a comment

Written Comments – Case No. U-21388

1. Email to:
   LARA-MPSC-commissioners2@michigan.gov

2. Mail to:
   Michigan Public Service Commission
   P.O. Box 30221
   Lansing, MI 48909

For IT assistance, e-mail: LARA-MPSC-EVENT-IT@michigan.gov

To enable closed captioning: 1.) Click the "more" button 

at the top of your screen
2.) Click on "Language and speech" 3.) Click on "Turn on live captions"

MPSC Commissioners

Closing Remarks

12:50 pm – 1:00 pm

Dan Scripps
MPSC Chair

Katherine Peretick
MPSC Commissioner

MPSC
MICHIGAN PUBLIC SERVICE COMMISSION