Welcome to the DSDA DG Stakeholder Session!

Thank you for attending- **please introduce yourself in the chat.**

If you have any questions regarding today's presentation, please direct them to **beardenc@michigan.gov.**

The presentations will begin shortly.

DG Community Stakeholder Session

MI Power Grid Initiative: Distribution System Data Access Workgroup

Tremaine L. Phillips

Commissioner

August 16, 2022

MPSC
MICHIGAN PUBLIC SERVICE COMMISSION

DSDA Workgroup Background

- Rapid growth in DG, state-wide commitment to renewable energy
  - → 25 MW increase (+37%) in total DG program capacity from 2019-2020
  - → Michigan Healthy Climate Plan: "60% electricity from renewables by 2030"
- Commitment to EV expansion
  - → Michigan Healthy Climate Plan: "2+ million EVs on the road by 2030"

DSDA Workgroup Timeline

- April 12, 2018- Case No. U-20147 opened as repository for utility 5-year distribution investment plans
- October 17, 2019- Order in Case No. U-20645 establishes the MI Power Grid Initiative
  - → "Data Access and Privacy Work Area"
- August 20, 2020- Order in Case No. U-20147 directs DTE, CE to include first iteration of HCA in 2021 distribution plan filing; I&M to observe
- October 15, 2020- MI Power Grid Report in Case No. U-20645 bifurcates the Data Access and Privacy Work Area into "System Data Access" and "Customer Data Access"

DSDA Workgroup Timeline

- September 29, 2020- Michigan Senate passes Senate Resolution 143
  - Commission to "undertake a study on reliability, interconnection, and grid integration issues for distributed energy, including potential growth of distributed energy systems, changes to system design and operations, and system benefits, costs, and other impacts."
  - Study due 12/31/2022
- September 30, 2021- MI Power Grid Report identifies "Distribution System Data Access" work area
- December 2021- MPSC selected as part of 21-PUC cohort to receive DOE Technical Assistance on grid integration and mapping
- July 7, 2022- Order in Case No. U-21251 initiates DSDA Workgroup

Today's Agenda

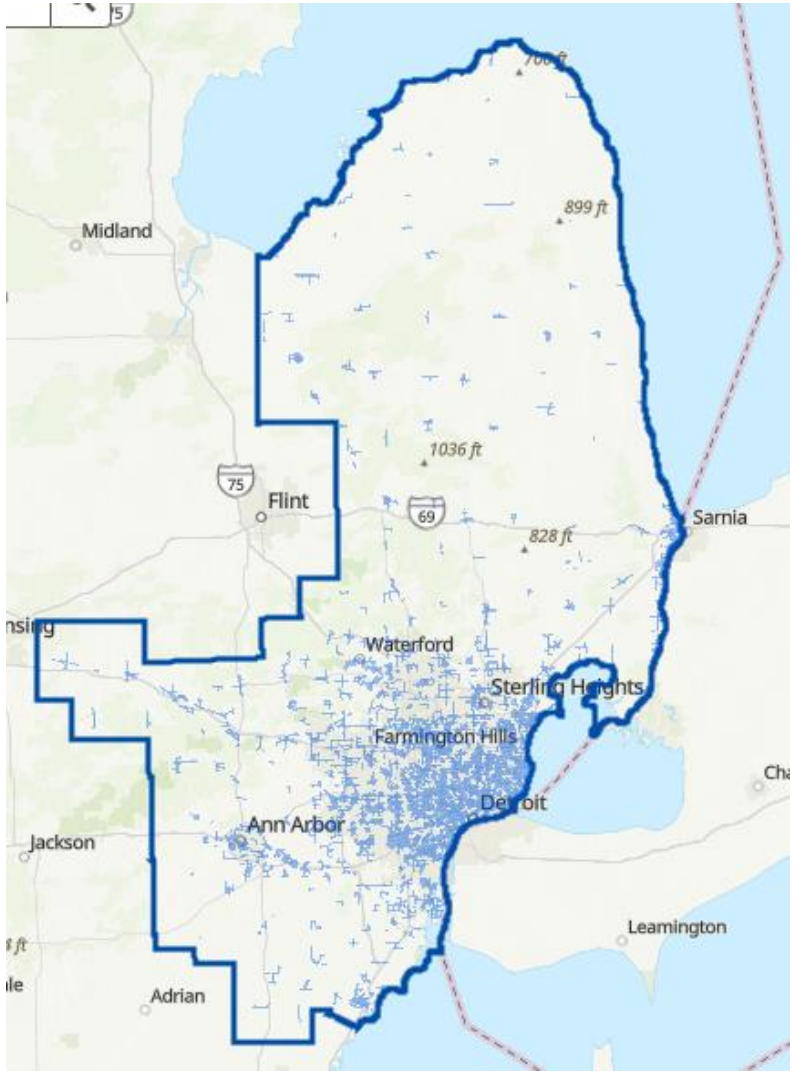
Agenda Items		
2:00	Welcome & Opening Remarks	MPSC Commissioner **Tremaine Phillips**
2:10	Utility Hosting Capacity Presentations and Q/A	**Andrew Galczyk**, DTE Electric **Kyle Desser**, Consumers Energy **Kwafo Adarkwa**, ITC **John Kopinski**, ITC
3:05	NREL Bi-Directional Hosting Capacity Presentation	**Shibani Gosh** **Michael Ingram** **David Nurang**
3:35	Break	
3:45	Panel Discussion: DER Stakeholder Data Needs	Moderator: **Laura Sherman**, Michigan EIBC Panelists: **Alex Sherman**, SunPower **Ken Zebarah**, Harvest Solar **Missy Stults**, City of Ann Arbor
4:15	Guided Discussion and Stakeholder Listening Session	All participants
4:55	Next Steps and Closing Remarks	MPSC Commissioner **Tremaine Phillips**
5:00	Adjourn	

DER Hosting Capacity

August 16th, 2022

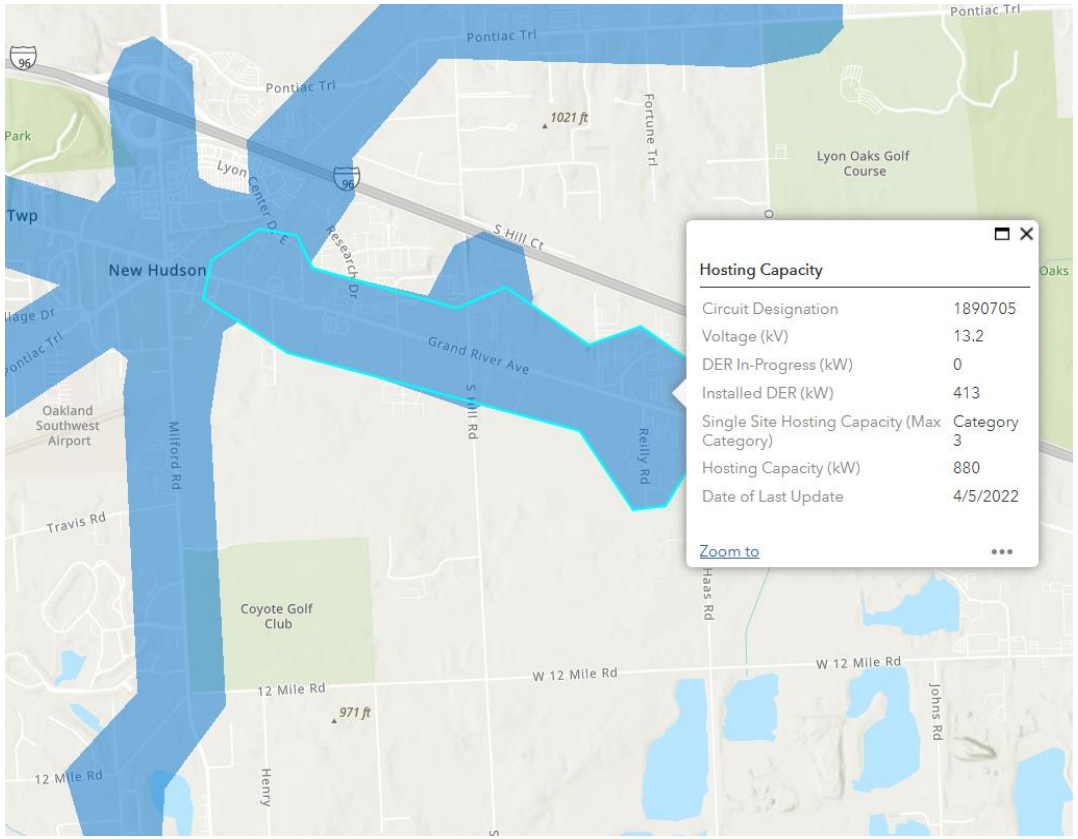
DTE provides a DER Hosting Capacity tool for customers and installers to make better decisions for renewable projects.

- The DER hosting capacity map has ties to the proposed interconnection fast track criteria
- Interconnections and mapping technology developed an interactive DER hosting capacity map for 2200 + distribution circuits
  - Only interconnections less than 2 MW
  - Only overhead 3-phase sections are displayed
  - Only distribution circuits are displayed in either 4.8 kV, 8.3 kV Wye & 13.2 kV Wye
  - Only certain sections are displayed based on protection devices, voltage support equipment and primary to primary voltage transformers, etc.
- Several search methods
  - Address
  - Crossroad or intersections
  - Latitude and longitude
  - Current location
  - Scrolling throughout the map



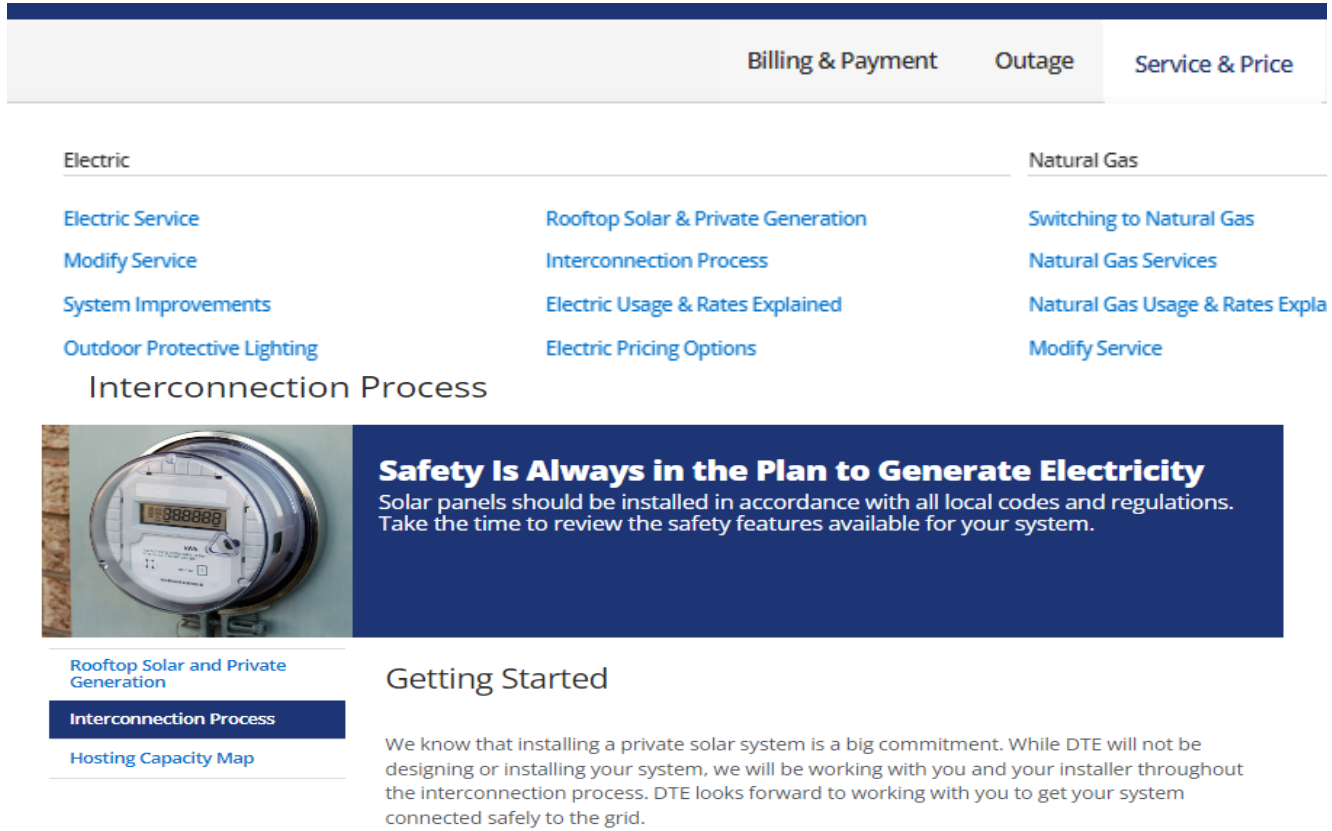
DTE provides information at a local level to help perspective Distributed Energy Resource(DER) developments with their decision-making process.

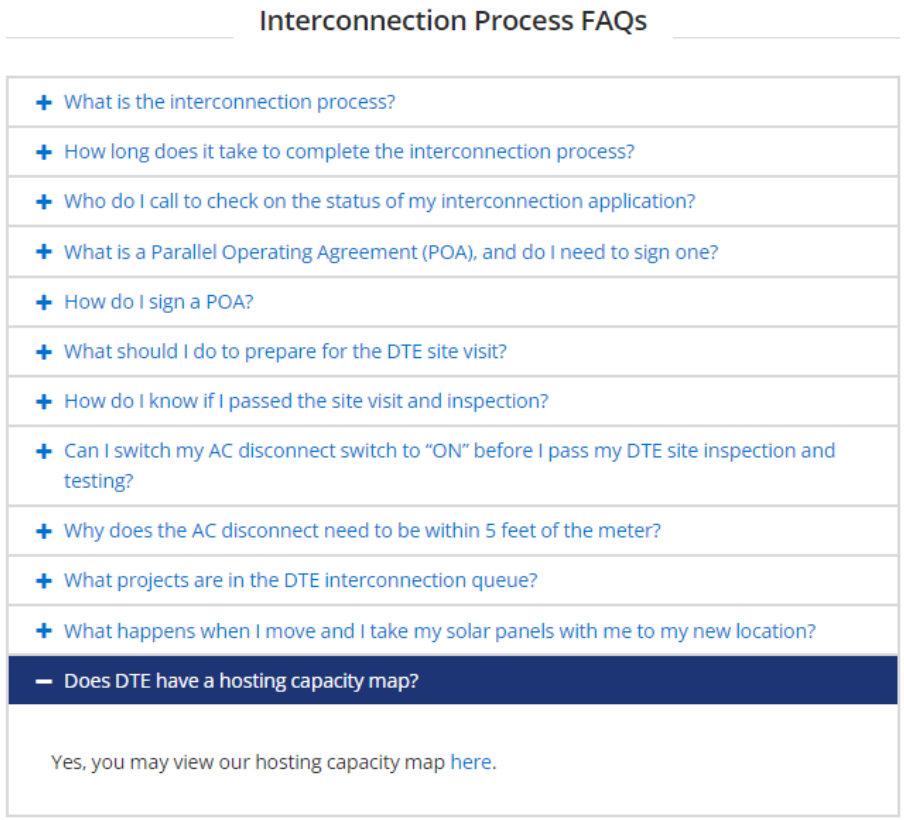
- The DER hosting capacity map was developed utilizing interconnection DER data, CYME planning software and EPRI DRIVE (Distributed Resource Integration and Value Estimation) tool
- The data is capable of being updated on a monthly, quarterly, and annual basis
- Pop-up contains
  - Circuit Designation
    - Modified distribution circuit identification
  - Voltage (kV)
    - Circuit Section Voltage
  - DER In-Progress (kW)
    - All non-completed DER on a given circuit
  - Installed DER (kW)
    - All completed DER on a given circuit
  - Single Site Hosting Capacity (Max Category)
    - Maximum hosting capacity by category at a single site
  - Hosting Capacity (kW)
    - Remaining hosting capacity on the circuit
  - Date of Last Update



DTE made the DER Hosting Capacity map available to the public in January 2022. Since the launch, the average daily view is approximately seven per day.

- Located on external DTE website
  - Go to "Service & Price" then "Interconnection Process" and click on "Hosting Capacity Map".
  - [Hosting Capacity (arcgis.com)]





DTE's existing economic development and service upgrade processes offer developers the opportunity to gather information about the electrical system that would be useful in evaluating EV related projects.

- Service Upgrade Request Process
  - Helps homeowners and small business understand the capacity of their existing service and estimate upgrade costs
  - Electric Checklists & Guides | DTE Energy
- Economic Development Process
  - Get estimates of the rates, connection costs and necessary electric infrastructure upgrades for your major expansion or relocation projects on up to five sites within five business days or less.
  - Contact a DTE Energy economic development specialist today at econ_dev@dteenergy.com or call 855.367.0255
- Limitations
  - Maintaining the security of customer and critical energy infrastructure information is key to ensuring that any data sharing process or tools remain available for the long term

Consumers Energy
Hosting Capacity Analysis

August 16, 2022

Consumers Energy
Count on Us®

HCA Phased-In Approach

Adopt a phased implementation approach for HCA pilots by doing the following:

1. Perform base-level approach with a zonal go/no-go map.
2. Conduct specific, detailed analyses on areas of the distribution system with high Distributed Energy Resource (DER) penetration and incorporate this information into a more detailed map with feeder voltage level information as DER penetration continues to increase.

HCA Base-Level Approach

Part 1 of our phased-in approach, started in Fall 2020

- Focuses on large DERs, less than or equal to 2 MW
- Uses relatively simple attributes to determine if hosting capacity exists
- All attributes must be met for a circuit to be a "go"
- Not intended to be used by potential residential solar or other smaller (Category 1) interconnections

HCA Base-Level Criteria

Attributes assessed to be a "go":

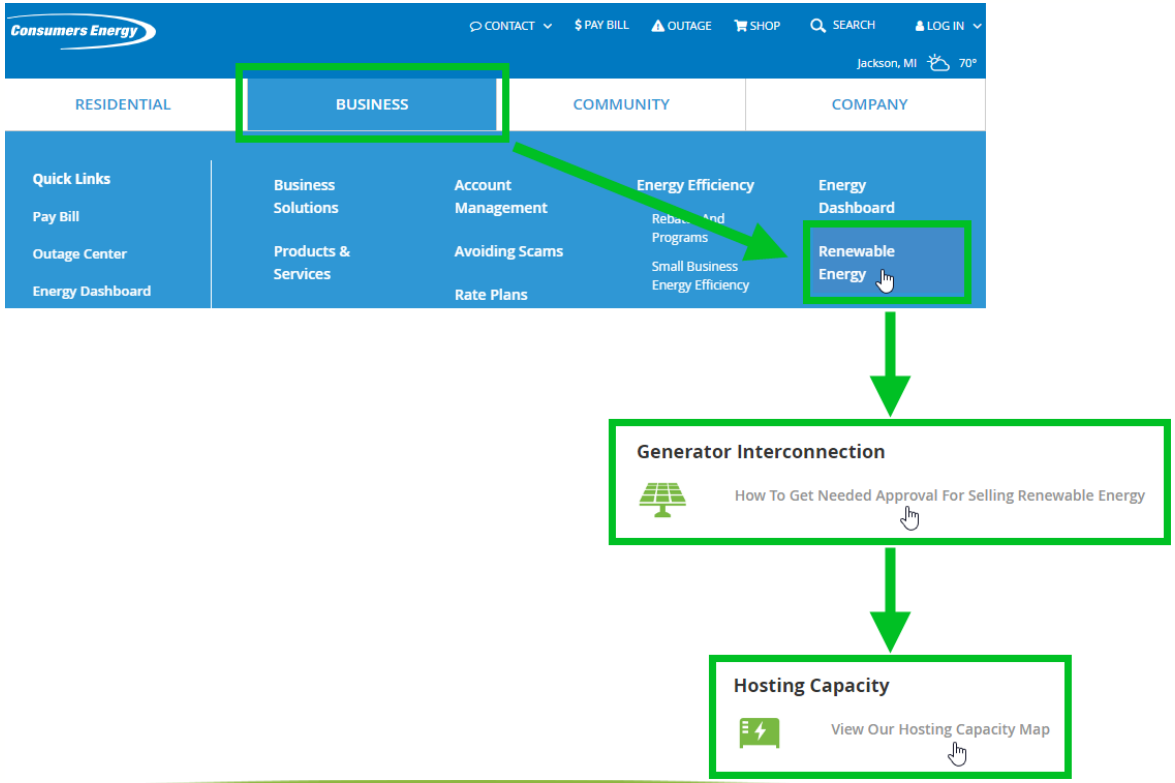
- First protective zone of the circuit
- 40% of peak load is greater than 2 MW
- Voltage is grounded wye
- General distribution circuit
- DSCADA* is present
- Meet minimum feeder short-circuit and system strength criteria
  - >= 333 kVA/Volt drop (at 0.95 power factor)

Distribution Supervisory Control and Data Acquisition

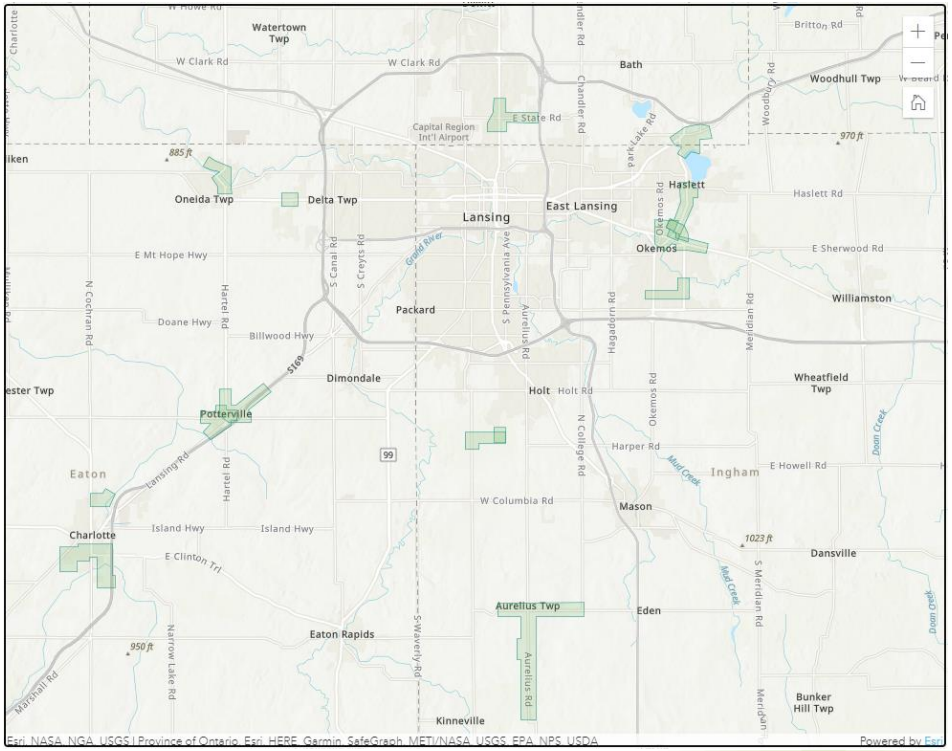
HCA Base-Level Approach

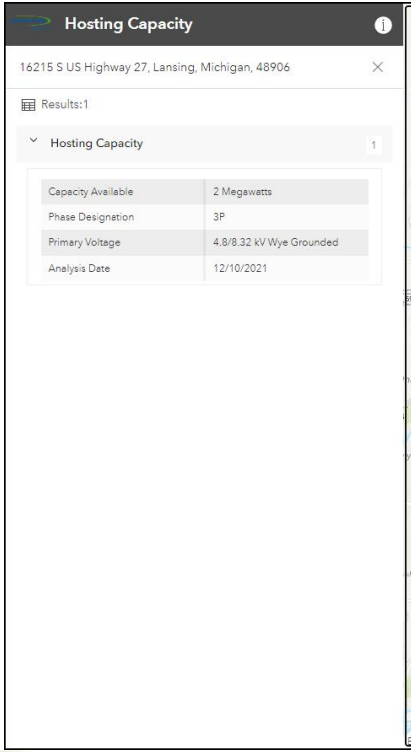
- All Low-Voltage Distribution (LVD) circuits are assessed
- Information is updated annually
- Hosting capacity map can be found here:
  - https://cms.maps.arcgis.com/apps/instant/lookup/index.html?appid=b90ff63b338043b7bcae43dd685a419d

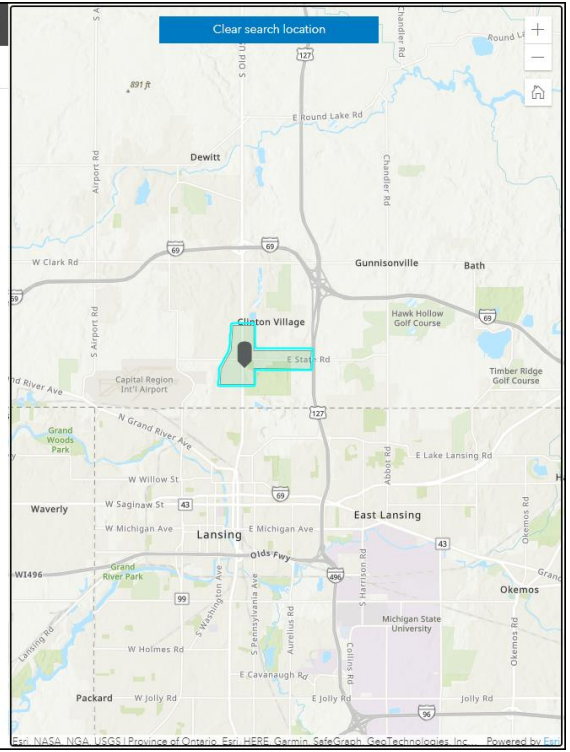
Accessing the HCA Map



Public HCA Map







HCA Next Steps

Part 2 of phased-in approach

- Use EPRI's* DRIVE tool
- Study "go" and "no-go" zones
- Better understand criteria
- Have higher resolution answers extending to all circuits & zones
  - Show the max kW of generation that can be added by zone
  - List the pending kW of generation in the queue for each zone

**Electric Power Research Institute*

Questions?

HCA Definitions

HCA: Amount of distributed energy resources (DER) that can be accommodated without adversely impacting operational criteria, such as power quality, reliability, and safety, under existing grid control and operations and without requiring infrastructure upgrades.

DER: A source of electric power and its associated facilities that is connected to a distribution system. DER includes both generators and energy storage technologies capable of exporting active power to a distribution system.

HCA Definitions

Zone: A section of the distribution system delineated by protective devices such as fuses or circuit breakers.

ITC ELECTRIFICATION

MI POWER GRID DISTRIBUTION
System Data Access Workgroup
August 16, 2022

ITC AGENDA

- **ITC 2021 Hosting Capacity Study Review – John Kopinski**
- **ITC Electrification – Kwafo Adarkwa**

ITC HOSTING CAPACITY: READY FOR CHANGE

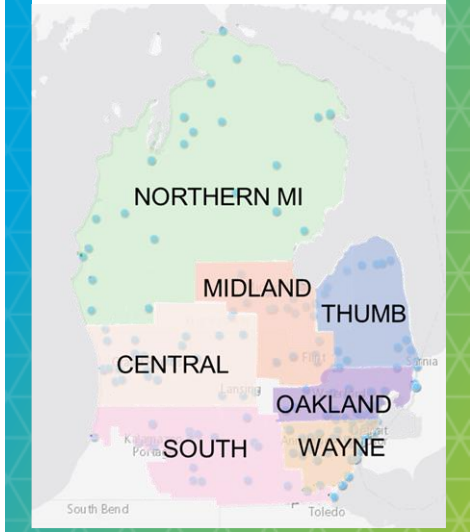
2021 ITC MI Hosting Capacity Study

- Indicative Evaluation of Transmission Grid Capability in MI
- Focused on Generation Interconnection (e.g. Solar)
- Identified *High* and *Low* Capability Interconnection Regions in MI

Model Build & Approach

- Analysis for 2025 Summer Peak
- All MTEP20 approved projects
- 225 points of interconnections examined
- Existing >100kV stations with 3 or more transmission line connections
- Transfers studied at selected stations up to:
  - 1,000 MW for 120kV, 138kV and 230kV
  - 3,500 MW for 345kV

Results

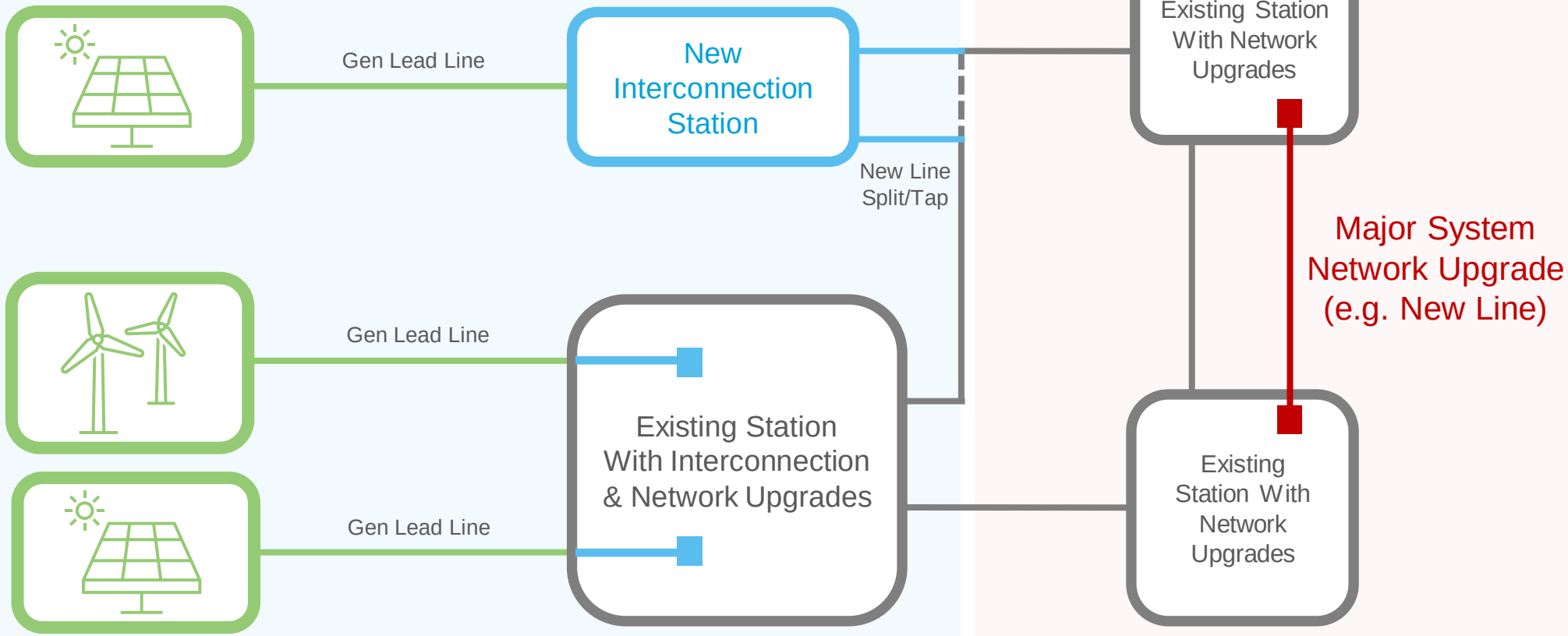


ITC ELECTRIFICATION

EXCLUDED VS INCLUDED COSTS

These Types of Interconnection Facility (Direct Assign and Network Upgrade) Costs are EXCLUDED in Analysis Indicative Costs

These Types of Network Upgrade (NRIS/ERIS) Costs are INCLUDED in Analysis Indicative Costs



HOST CAPACITY: COMMON POOL RESOURCE

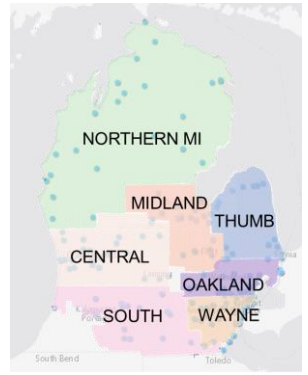
Available capacity in the system is shared…

- within each region and…
- across each of the Michigan regions.

…therefore, indicative capacity is not cumulative

Example (Hypothetical): 500MW new generation interconnects at South location S1 resulting in…

- S2 and S3 *future capacity* decreasing
- C1, C2, M1 and M2 *future capacity* decreasing



ITC ELECTRIFICATION

CONCLUSIONS & TAKEAWAYS

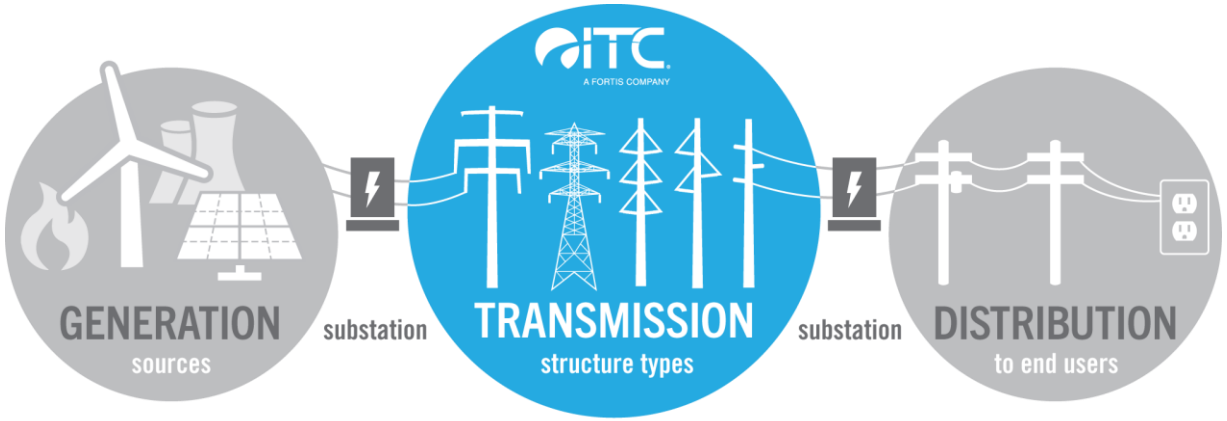
1. Hosting Capacity (i.e. capability) analyses can identify lower cost interconnection regions & locations to guide developers considering generation development

2. Applicability of results is diminished as resources are deployed – changing…not static

3. Tracking cost assumptions is critical for applying results - included vs excluded

4. Transmission systems compared to Distribution systems *may* mean different analysis approach(es) and different application(s) of results

HERE AND NOW
Transmission is key to unlocking our electric vehicle future



ITC ELECTRIFICATION

FORWARD LOOKING

Ensuring charging infrastructure is available to support the consumer and commercial adoption of EVs is key to the global development of the electric vehicle market.

As the EV market continues to grow, and new technology enables faster charging personal and commercial vehicles, the availability of high-capacity fast charging infrastructure will grow in importance.

As an owner and operator of Michigan's transmission system ITC is well positioned, through existing state and federal regulatory structures, to invest in the necessary grid infrastructure to support the installation of necessary infrastructure.

ITC'S ROLE IN ELECTRIFICATION

ITC WILL OFFER VALUE-BASED TRANSMISSION SOLUTIONS

- The market is rapidly advancing, and large-scale transmission infrastructure is needed
- An electrified future helps increase load and smoothens out the company's rates
- This incremental investment can grow and scale across the footprint benefitting rate payers

GOALS

- Break ground, by Q4 2024, on forward-looking projects (i.e., MISO Long-Range Transmission Plan) that build out the transmission system to enable reliable renewable deployment and support growing consumer demand for electric vehicle charging
- By partnering with local utilities:
  - Break ground on multiple EV charging hubs in Michigan – 2023
- Explore ITC company-wide involvement in EVs
  - Charging infrastructure at ITC offices
- Be an industry leader in the movement towards electrification

ITC ELECTRIFICATION

DEMONSTRATING LEADERSHIP

- ITC in conjunction with Crain's hosted a successful webinar on Electrification in MI.
  - Representatives from DTE, the State of MI and GM took part.
- ITC is a member of the National Highway Electric Coalition.
- ITC filed Comments at the MPSC concerning the use of IIJA funding and electrification.
- ITC also filed testimony in the DTE Rate Case supporting their charging hub concept and highlighting the need for transmission.
- ITC is a member of Clean Fuels MI which has advancing Electrification in MI as one of its core principles for 2022.
  - ITC has a Board Seat with this group.

NEXT STEPS

- Working with our partners, secure an agreement for a charging hub by YE 2023.
- Get MPSC Approval for DTE's Charging Hub Concept in 2022.
- Apply for IIJA Grant monies to advance EV Charging.
- Continue to be a thought leader in electrification space in our footprint and nationally.

ITC ELECTRIFICATION

APPENDIX – 2021 HOSTING CAPACITY RESULTS

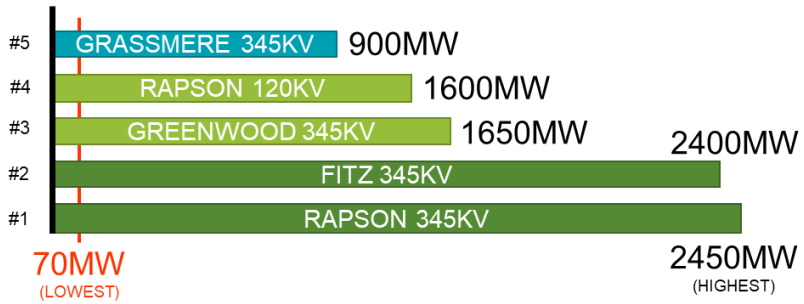
Public Posting of 2021 Hosting Capacity Results Presentation:

https://www.itc-holdings.com/docs/default-source/partners-in-business/michigan-events/pib_itc_mi_10-2021_final.pdf?sfvrsn=77a6c5f6_2

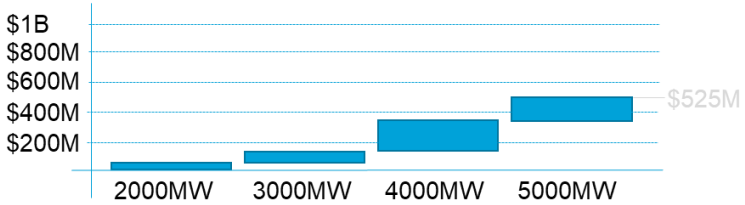
RESULTS (ITCT)

THUMB REGION

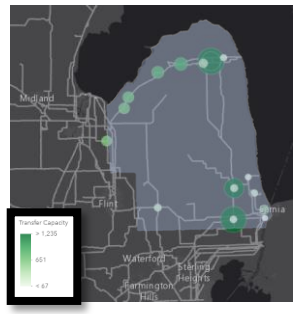
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

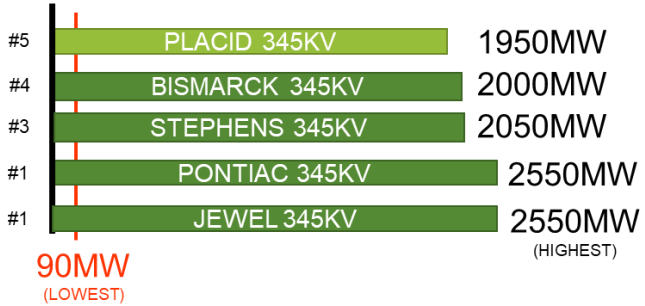


*Costs are subject to previous disclaimer

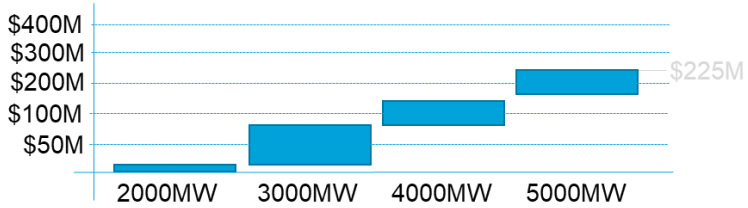


OAKLAND REGION

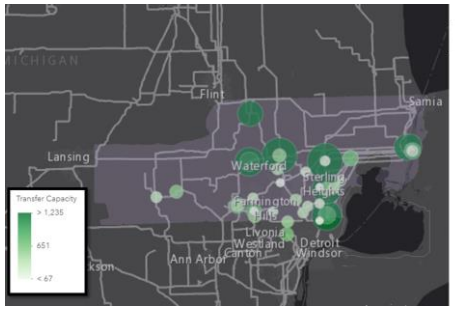
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

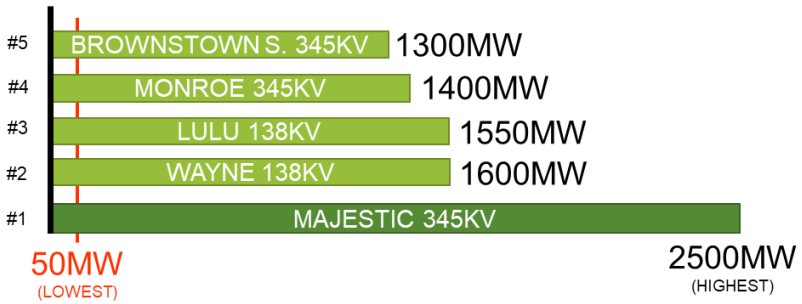


*Costs are subject to previous disclaimer

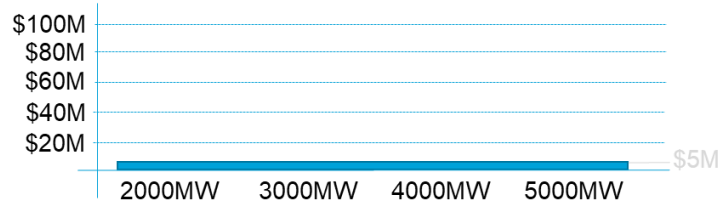


WAYNE REGION

Top 5 highest individual capacities



Region Indicative Capacities & Costs*



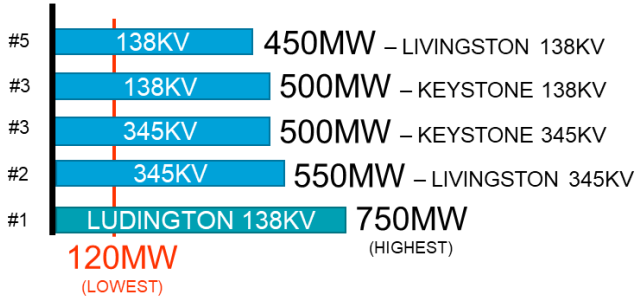
*Costs are subject to previous disclaimer

ITC ELECTRIFICATION

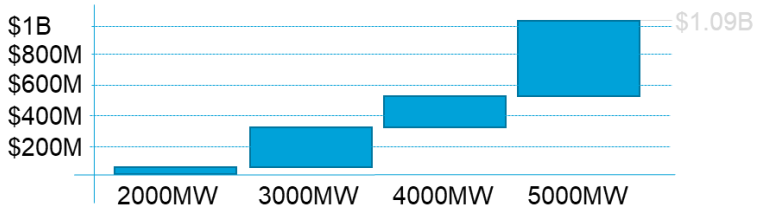
RESULTS (METC 1 of 2)

NORTHERN MICHIGAN REGION

Top 5 highest individual capacities



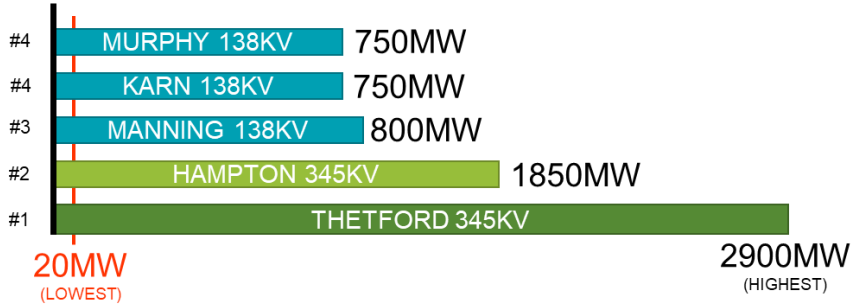
Region Indicative Capacities & Costs*



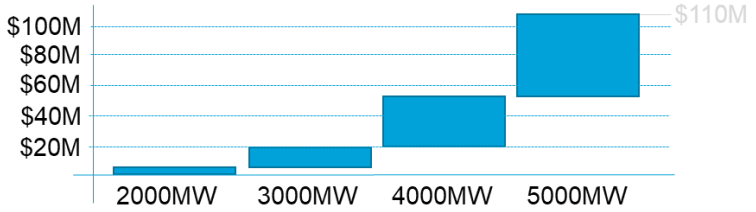
*Costs are subject to previous disclaimer

MIDLAND REGION

Top 5 highest individual capacities



Region Indicative Capacities & Costs*

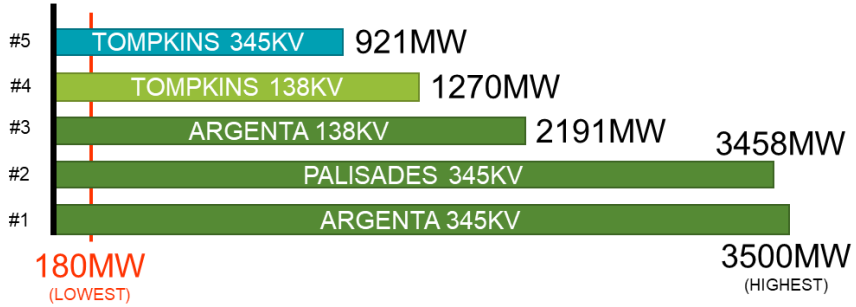


*Costs are subject to previous disclaimer

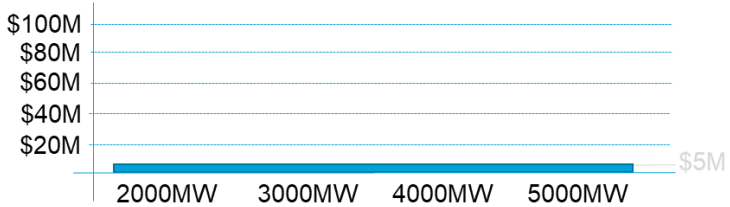
RESULTS (METC 2 of 2)

SOUTHERN REGION

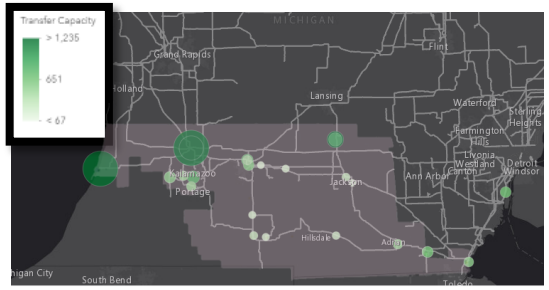
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

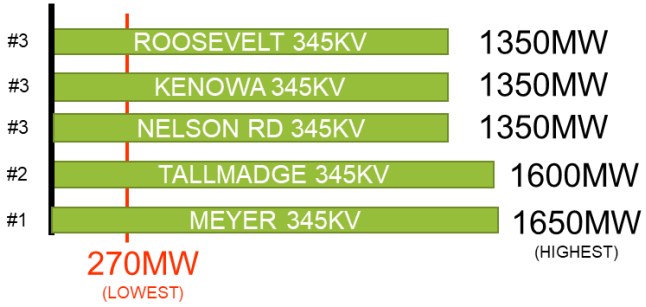


*Costs are subject to previous disclaimer

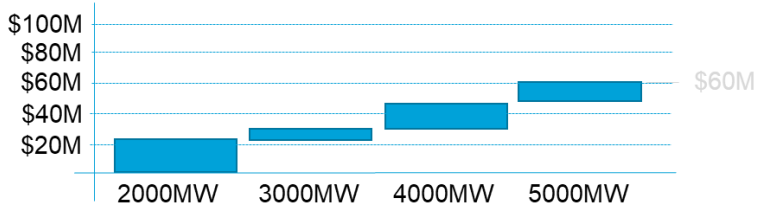


CENTRAL REGION

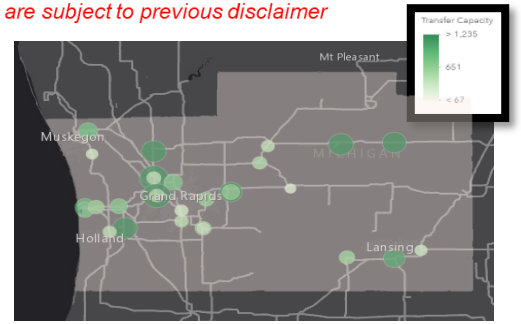
Top 5 highest individual capacities



Region Indicative Capacities & Costs*



*Costs are subject to previous disclaimer



Technical Assistance to State Public Utility Commissions – Michigan

DER Stakeholder Session

Hosting capacity maps for distribution network

Michael Ingram, David Narang, Shibani Ghosh

Topics

- NREL and what we do
- NREL's role in this effort
- Hosting capacity analysis – previous work by NREL
  - PV
  - EV
- Initial thoughts on developing a bi-directional hosting capacity map

NREL at-a-Glance

2,974

Workforce, including

employees, postdoctoral researchers, interns, visiting professionals, and subcontractors

World-class

facilities, renowned technology experts

More than 1000

Partnerships

with industry, academia, and government

Campus

operates as a living laboratory

Renewable Power

Solar

Wind

Water

Geothermal

Sustainable Transportation

Bioenergy

Vehicle Technologies

Hydrogen

Energy Efficiency

Buildings

Advanced Manufacturing

Government Energy Management

Energy Systems Integration

Grid Integration

Hybrid Systems

Security and Resilience

GMLC: Technical Assistance to State Public Utility Commissions

GRID MODERNIZATION LABORATORY CONSORTIUM
U.S. Department of Energy

- **Purpose**: Provide customized support on issues specific to state's needs and unique situation
- **Approach**: Work with a state on content and deliver method to maximize the efficacy of the TA
- **Budget/Scope:** $2.25M across 37 different technical engagements, in over 20 states.

Equity & Justice

- Grid Planning
- Utility Ratemaking

DER Adoption & Integration

- DER Adoption
- Interconnection Process
- Hosting Capacity
- Utility Regulation

Grid Planning

- Integrated Resource
- Comprehensive System
- Load Forecasting

Resilience

- Microgrids
- Regulation & Policy

Utility Regulation

- Performance Based Ratemaking

NREL/MPSC Collaboration

- NREL is collaborating with MPSC to provide technical assistance in continuing discussions with grid stakeholders (utilities and DER and EV charging advocates) on data collection, as well as designing use cases for hosting capacity and grid impact studies
- Develop a methodology that merges PV and EV hosting capacity in a form of bi-directional hosting capacity and socialize with utilities for future adoption
  - The methodology will contain list of necessary data inputs, process flows, alternate paths when some data are not available and expected outcomes

Hosting capacity

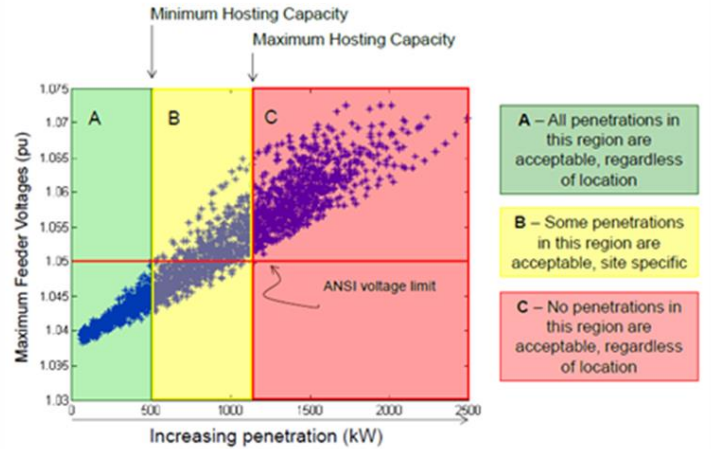
Proposed methodology

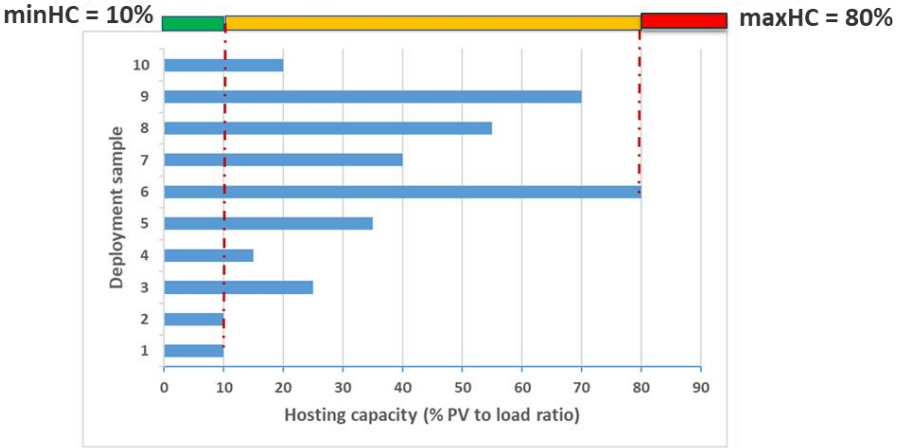
Definition – PV Hosting Capacity

- What's hosting capacity?
  - PV
    - Identify PV deployment scenarios/levels that are likely to negatively affect grid operation
    - Determine the range of PV capacities that can be accommodated on an existing feeder
  - EV
    - Calculates power-flow based solutions about loads that can be accommodated
    - Nodal/feeder section hosting capacity
  - Violations
    - Snapshot – Instantaneous voltage and thermal loading
    - Timeseries
      - Moving averages voltages
      - Maximum number of customers affected
      - Maximum duration for which any customer is affected

Definition – PV Hosting Capacity

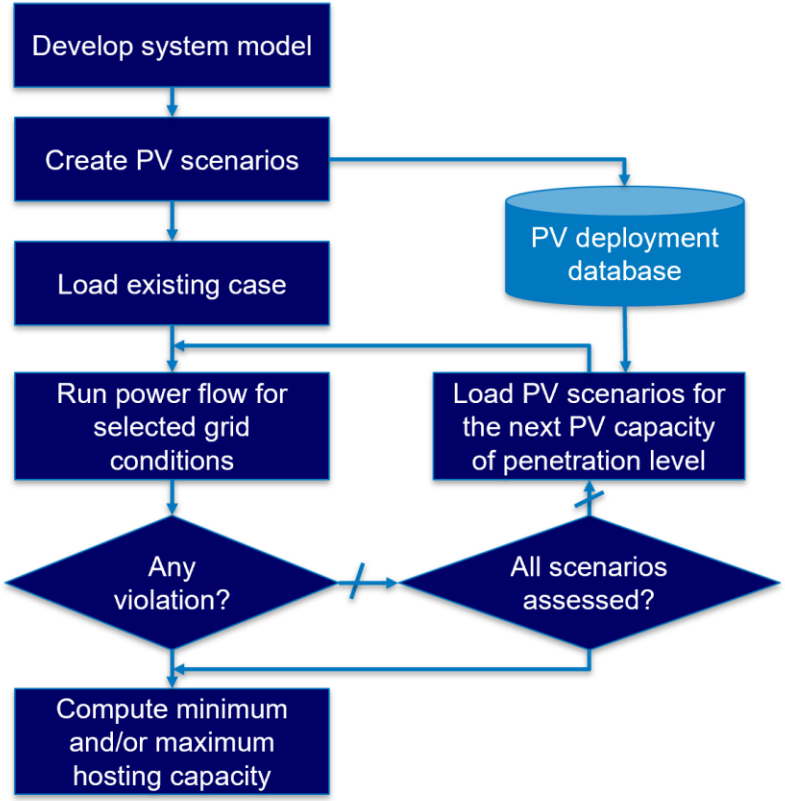
- Key terms
  - ***Minimum Hosting Capacity***: PV capacity or penetration level below which no deployment scenario incurs violations
  - ***Maximum Hosting Capacity***: PV capacity or penetration level above which all deployment scenarios incur violations
  - ***Snapshot Hosting Capacity***: PV hosting capacity analysis performed on power system state(s) corresponding to one or several non-consecutive time points
  - ***Dynamic Hosting Capacity***: PV hosting capacity analysis performed in a time-series simulation framework generally covering a year-long system conditions where every time point is assessed





PV Hosting Capacity

- Hosting capacity analysis evaluates extensive PV deployment scenarios, diverse by the size and location of individual PV units, for a set of penetration levels
- Operating metrics considered are voltages and thermal loading of lines and transformers (includes line regulation equipment and tap changing controls)
- For snapshot hosting capacity analysis, selected system level bounding conditions are analyzed – ANSI ranges A and B and thermal limits, depending on model availability secondaries included



Background – EV Hosting Capacity

- Increasing EV adoption poses challenges for traditional electric grid operations
- Importance of impact study before EV adoption in large scale
- EV hosting capacity tool developed to assess the existing feeder capacity for increasing EV adoption
- Features of hosting capacity tool:

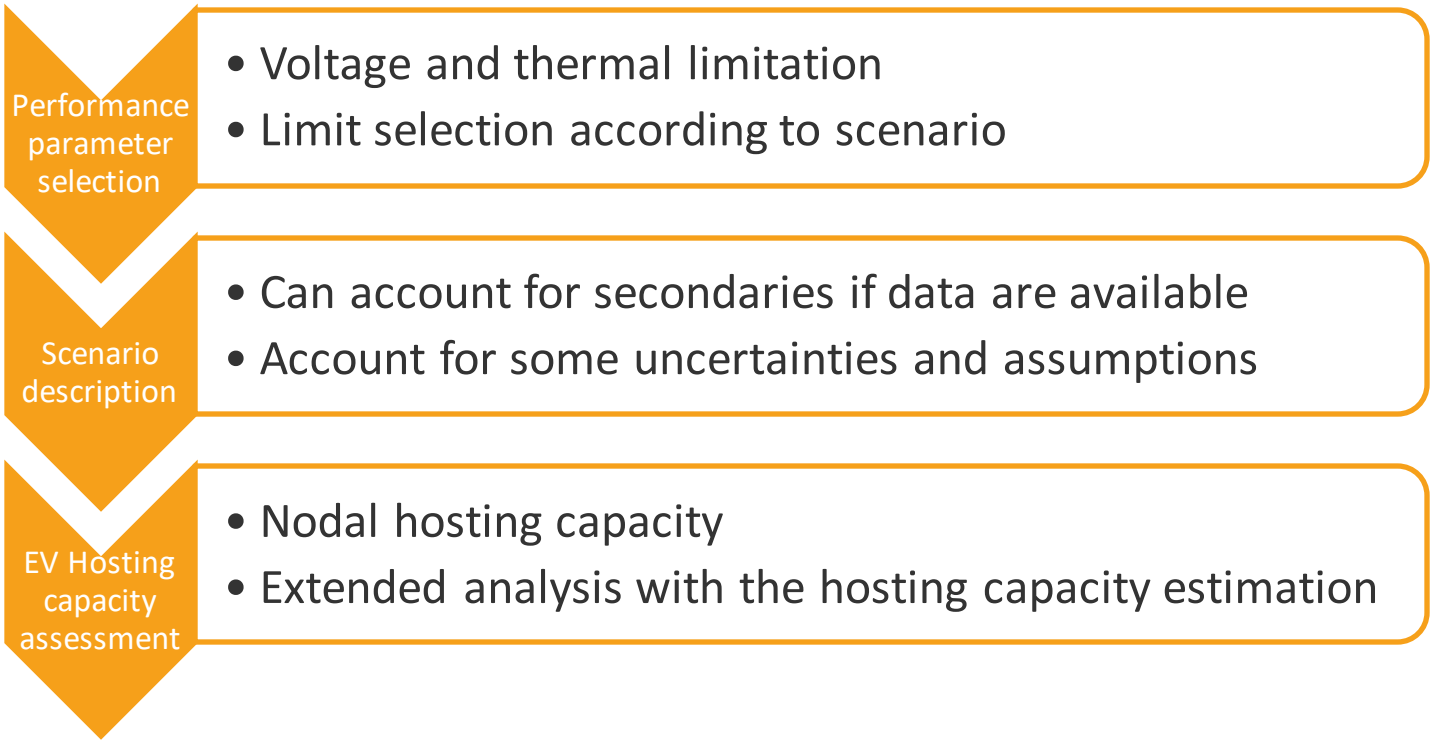
High-level insights for EV adoption

Actual network consideration

Different charging levels including extreme fast charging (XFC)

EV Hosting Capacity Approach

EV charging capacity (in MW) that a distribution feeder can host without risking reliability or voltage quality at a given feeder node

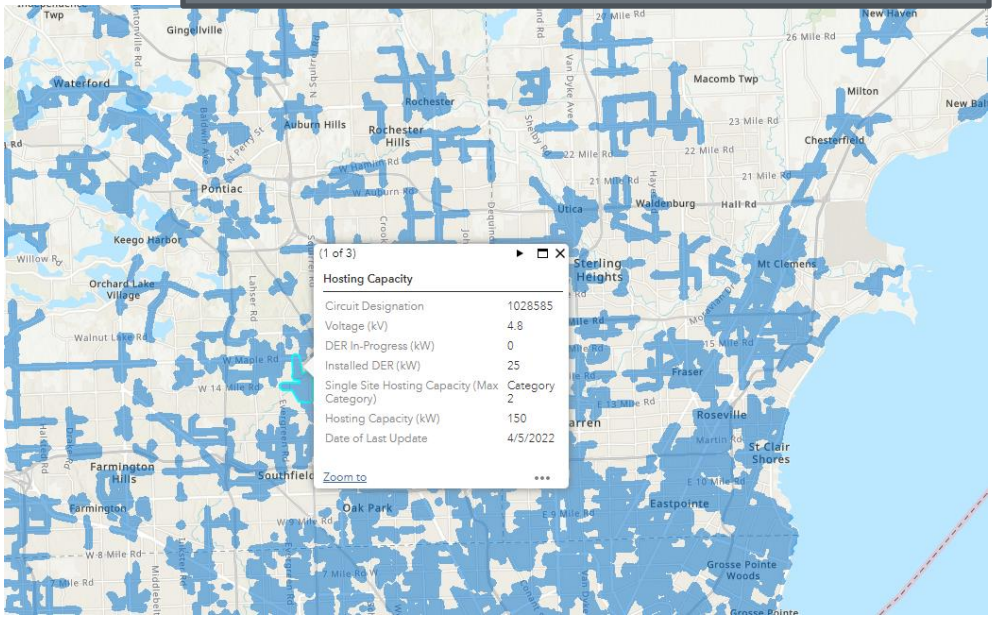


Path Forward – Merging PV and EV Hosting Capacity

Initial thoughts on a **bi-directional** hosting capacity map

- Leverage existing hosting capacity map
- Run another iterative power flow to calculate EV hosting capacity
- Publish two hosting capacity attributes: **generation and load**
- Consider worst-case scenarios for base loading level

Example of DTE's hosting capacity map



Backup

Tentative Questions for utility audience

1. How can bi-directional hosting capacity map help reduce utility interconnection costs and achieve renewable goals?
2. What data would you (utilities) be comfortable to provide to DER and EV developers? What data you will be flexible with (depending on developers' asks)? What data should be out of bounds?
    a) In what format and at what level of granularity can you provide data to these stakeholders?
3. How can the hosting capacity map potentially *interact* with the existing pre-application interconnection request processing application?
4. Are there specific DER and EV growth/projection curves that the utilities can share for impact studies? Is there value in comparing projections from utilities and non-utilities stakeholders?
5. NREL's proposed bi-directional hosting capacity methodology can benefit from transformer level data. Will it be useful to show aggregated data on the map while the hosting capacity calculation uses more granular consumer data?
6. Specific questions about DTE's hosting capacity map.

Tentative Questions for developer audience

1. How can bi-directional hosting capacity map help reduce project planning/development costs?
2. What data would you need as DER and EV developers from utilities as far as hosting capacity maps are concerned? In what format and at what level of granularity ?
3. Are there specific DER and EV growth/projection curves that are relevant for your project(s)? Is there value in comparing projections from utilities and non-utilities stakeholders?
4. NREL's proposed bi-directional hosting capacity methodology can benefit from transformer level data. Will such aggregated data on the hosting capacity map provide more value while the hosting capacity calculation uses more granular consumer data?

Break

We will resume with a panel discussion at
~3:45pm EST.

If you have any questions regarding today's presentation, please direct them to **beardenc@michigan.gov.**

The presentations will resume shortly.

DG Panel Discussion

MI Power Grid Initiative: Distribution System Data Access Workgroup

Alex Sherman

Ken Zebarah

Missy Stults

Laura Sherman
Moderator

President, Michigan EIBC

August 16, 2022

MPSC
MICHIGAN PUBLIC SERVICE COMMISSION

Stakeholder Question #1

- How can access to bi-directional hosting capacity maps reduce customer acquisition, project siting, or other administrative costs that limit increased adoption and deployment of DG systems and EV infrastructure in Michigan?

Stakeholder Question #2

- What data would be helpful for DG and EV stakeholders to have access to, and what are the nuanced differences between the data requested to site DG projects and the data requested to site EV charging infrastructure?

Stakeholder Question #3

- What data would you need as DER and EV developers from utilities as far as hosting capacity maps are concerned? In what format and at what level of granularity is this data of use to these stakeholders? In what frequency should this information be refreshed and updated?

Stakeholder Question #4

- How might customer-owned energy storage resources augment both DG and EV hosting capacity?

Stakeholder Question #5

- How can a bi-directional hosting capacity map help reduce project planning/development costs?

Stakeholder Question #6

- Are there examples of utilities nationally that have an ideal platform and process for making hosting capacity data publicly available to third-parties?

Stakeholder Question #7

- Are there specific improvements that you would suggest to the hosting capacity maps currently available and presented by DTE, Consumers, and ITC earlier today? Are there specific areas that are beneficial or should be replicated in further iterations of these tools?

Stakeholder Question #8

- What other features/consideration would stakeholders like to see included in a bidirectional hosting capacity map?

Stakeholder Question #9

- NREL's proposed bi-directional hosting capacity methodology can benefit from transformer level data. Will such aggregated data on the hosting capacity map provide more value while the hosting capacity calculation uses more granular consumer data?

MI Power Grid Distribution System Data Access

Thank you once again for attending!

If you have further questions or additional comments following the discussion today, please contact Cole Bearden at **beardenc@michigan.gov**.

The next discussion will be the DSDA EV Stakeholder Session, which will take place virtually via Teams from

2-5pm on Monday, August 22nd.