



Michigan Hosting Capacity Study

ITC Michigan
2021



FOR THE GREATER GRID

HOST CAPACITY STUDY - METHODOLOGY

- For convenience and a reasonable means to present the study results, ITC's Michigan systems were assessed using 7 geographic regions (found on slide 6). For each region, a defined number of new generator resources were interconnected at existing substations to assess the capabilities of the system (also found on slide 6).
- The results, found on slides 8 – 14, represented two different system analysis. The “Top 5 highest individual capacities” represents the capability of the transmission system when power is injected at only one of the defined points of interconnection in a single region before major system upgrades are required (each point is assessed independently).
- The “Region Indicative Capacities and Costs” are reflective of the capabilities of the geographic region more holistically. The regions are tested by ramping up the prospective generation units in a region and identifying the major system upgrades required to achieve the targeted injection level (i.e. transfer).



Model Build and 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

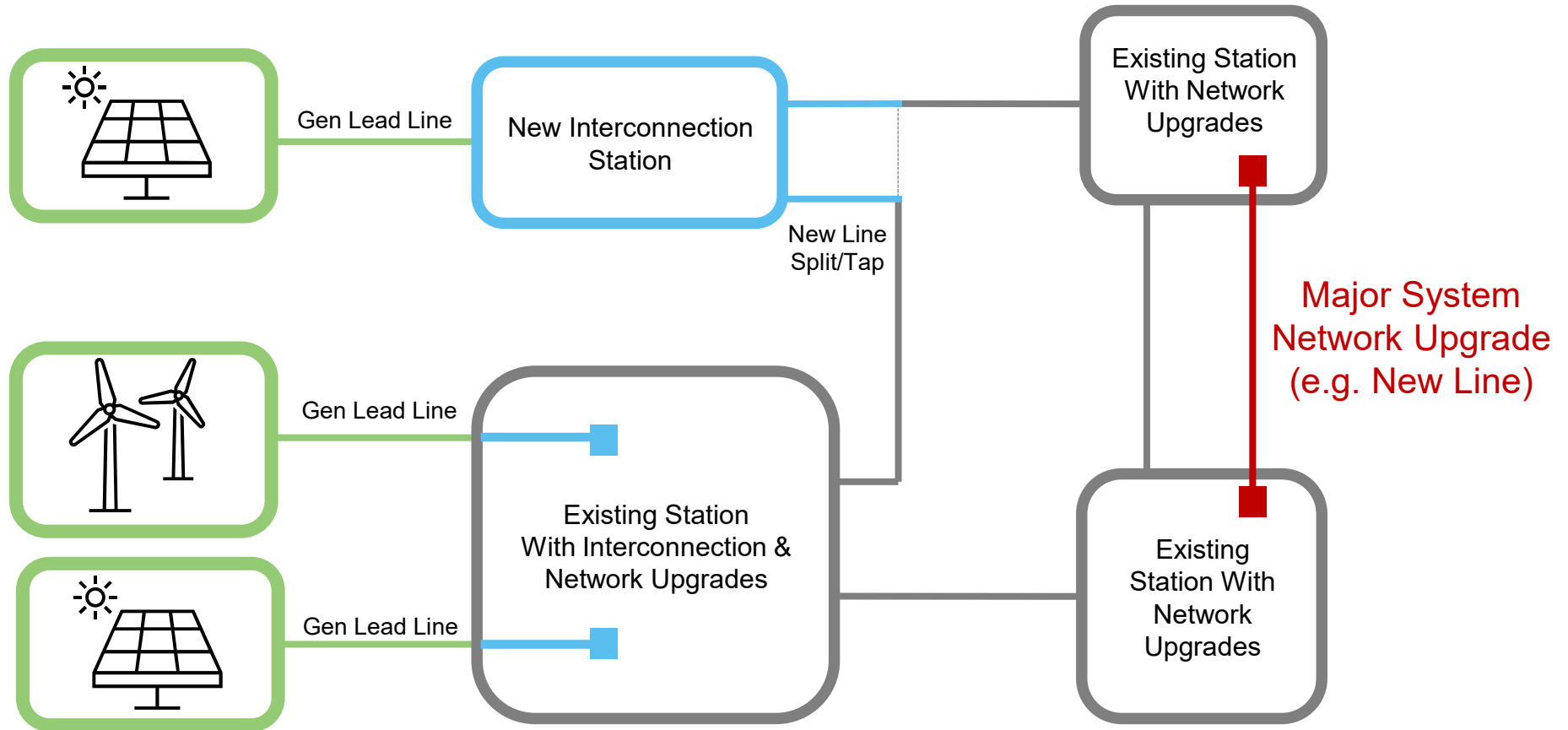
HOST CAPACITY STUDY – DISCLAIMER(S)

- The system network upgrade costs developed are indicative **estimates** for **major system-upgrades** (including conductors and/or transformers) from steady-state analysis only. The costs **do not** include any **interconnection facilities** (i.e. direct assign or network upgrades) that may be identified (The next slide provides a visual representation). Actual interconnection facilities and NRIS/ERIS network upgrade costs for new generators connected to the ITC & METC systems must be determined by completing the MISO and ITC interconnection process.
- The analysis was performed prior to recently submitted Consumers Energy Integrated Resource Plan (CE IRP). Proposals in the CE IRP, or other major system changes, could alter findings and result in different levels of expected capacity and indicative costs.

EXCLUDED VS INCLUDED INDICATIVE 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



MICHIGAN STUDY REGIONS

Northern Michigan

- 345 kV: 4 stations
- 138 kV: 23 stations

Midland

- 345 kV: 6 stations
- 138 kV: 23 stations

Central

- 345 kV: 10 stations
- 138 kV: 21 stations

South

- 345 kV: 6 stations
- 138 kV: 21 stations

Thumb

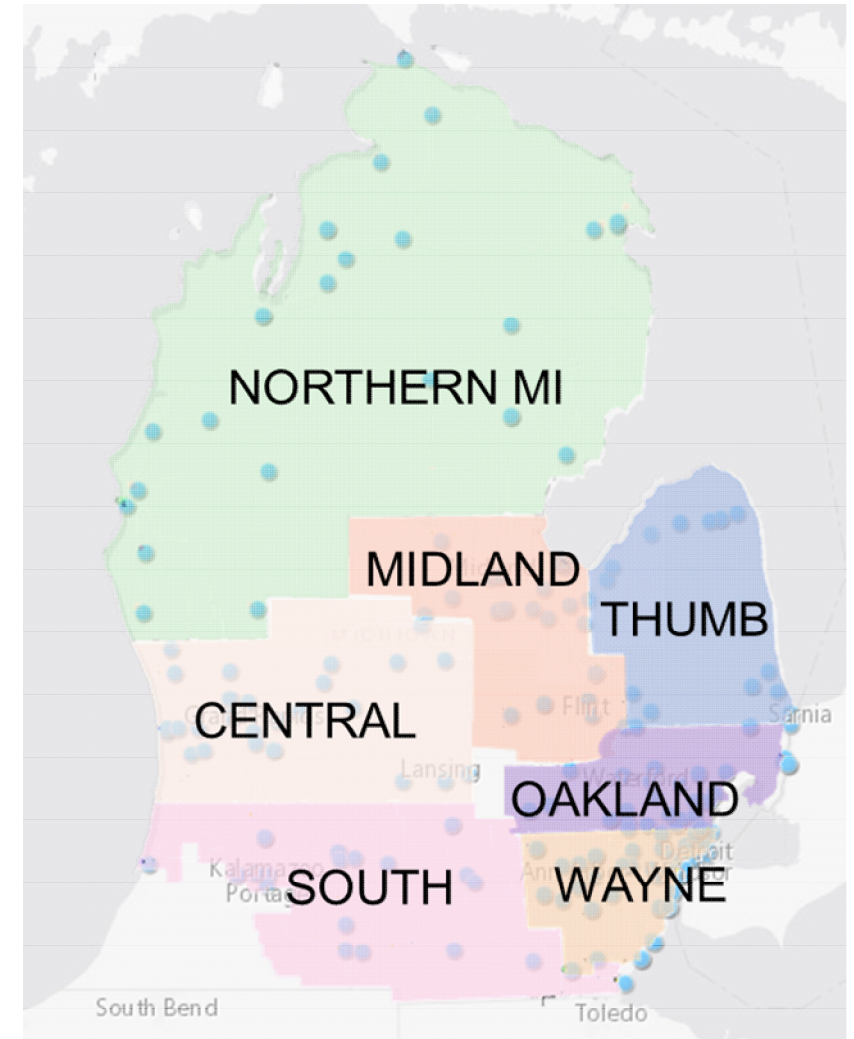
- 345 kV: 8 stations
- 120 kV: 11 stations

Oakland

- 345 kV: 14 stations
- 230 kV: 1 station
- 138 kV: 18 stations

Wayne

- 345 kV: 10 stations
- 230 kV: 5 stations
- 138 kV: 44 stations



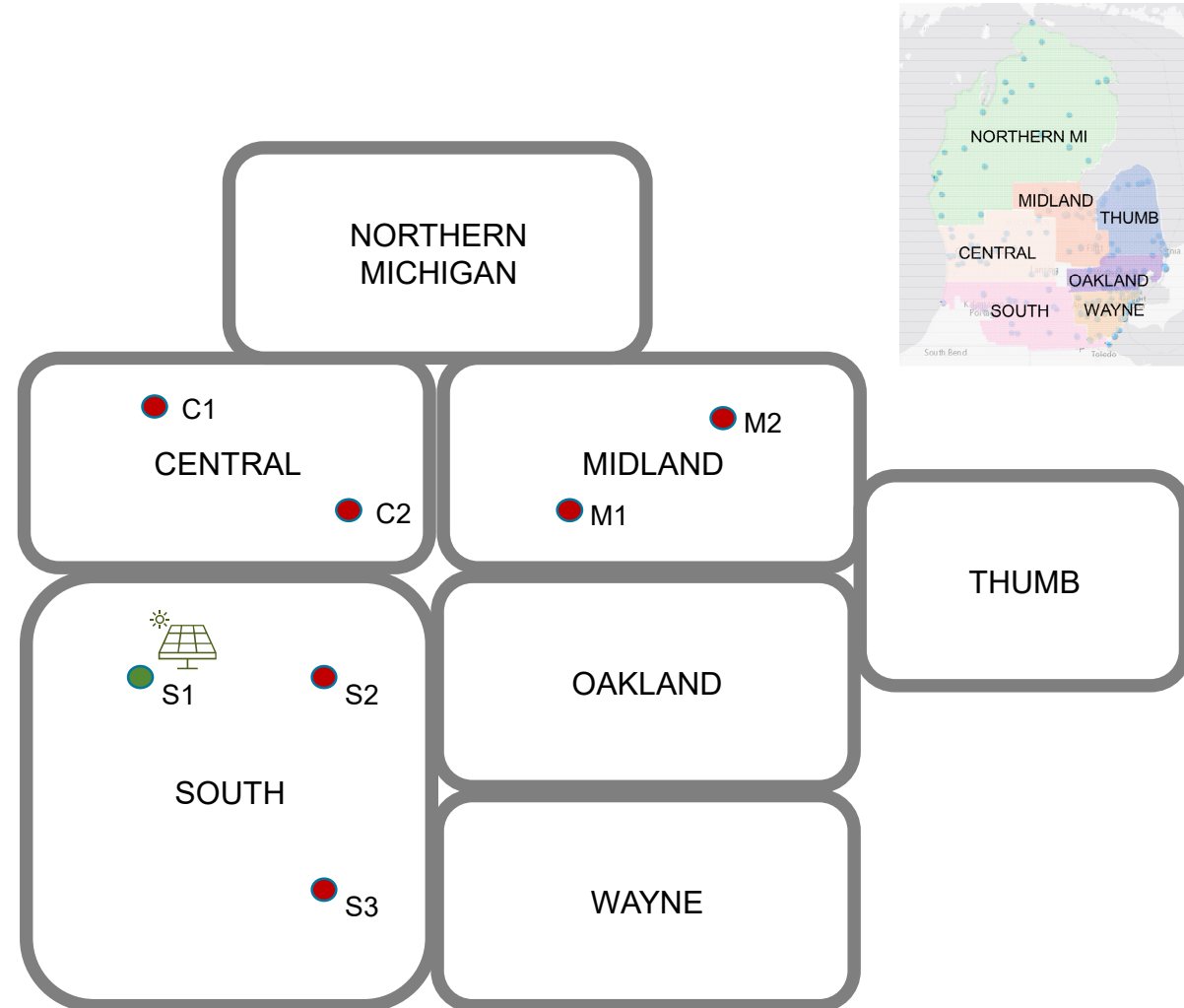
MICHIGAN REGION INTERACTIONS ON CAPABILITY

Available capacity in the system is shared...

- within each region and...
- across each of the Michigan regions.
...therefore, indicative capacity is not cumulative

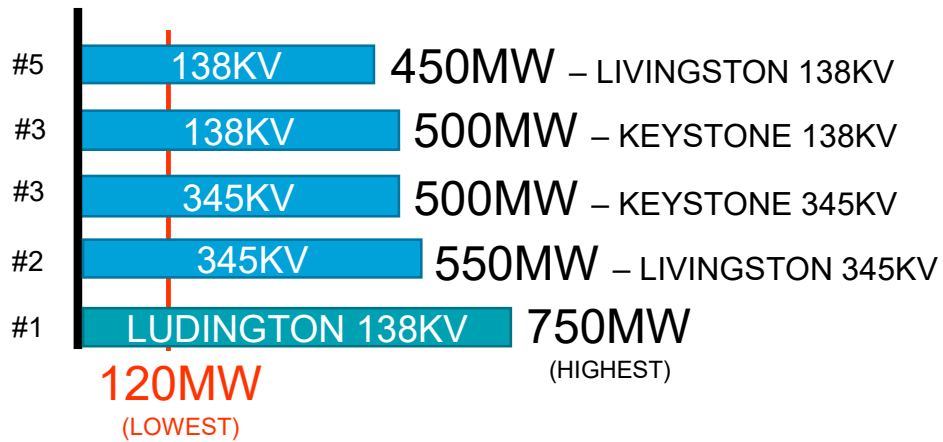
EXAMPLE (Hypothetical): 500MW new generation interconnects at South location S1 resulting in...

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

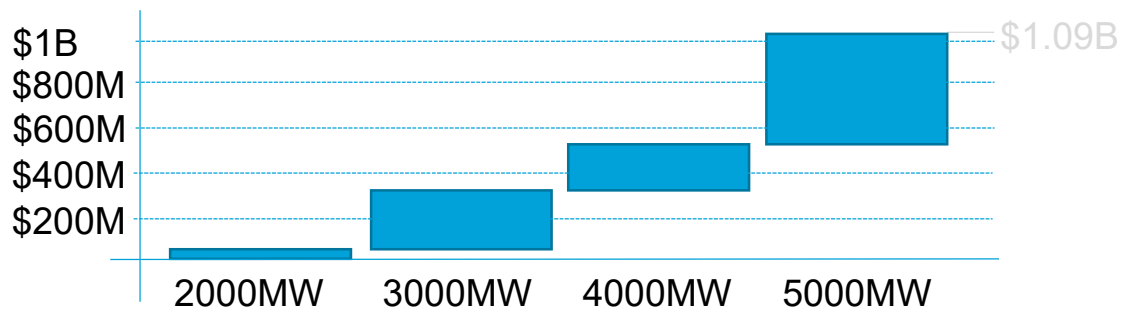


NORTHERN MICHIGAN REGION

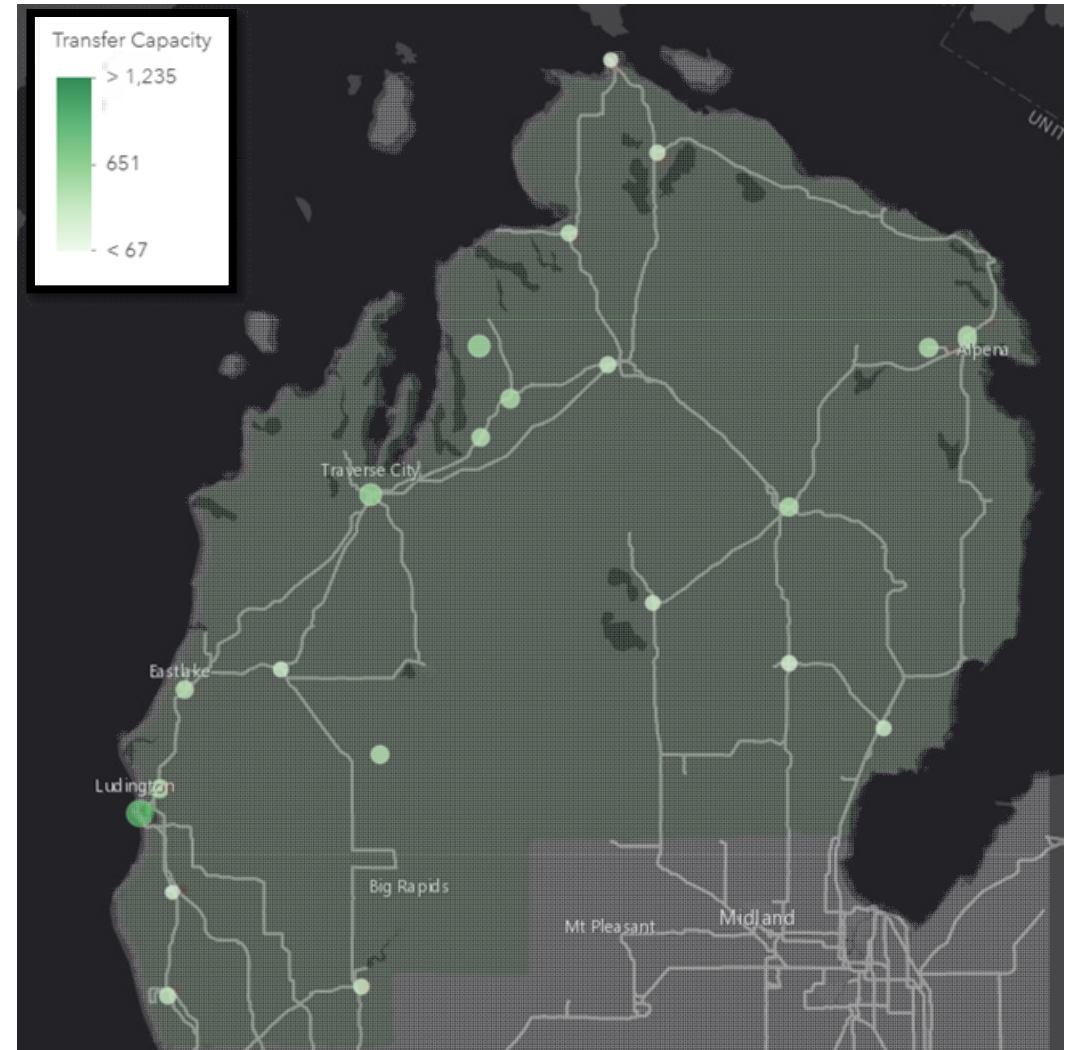
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

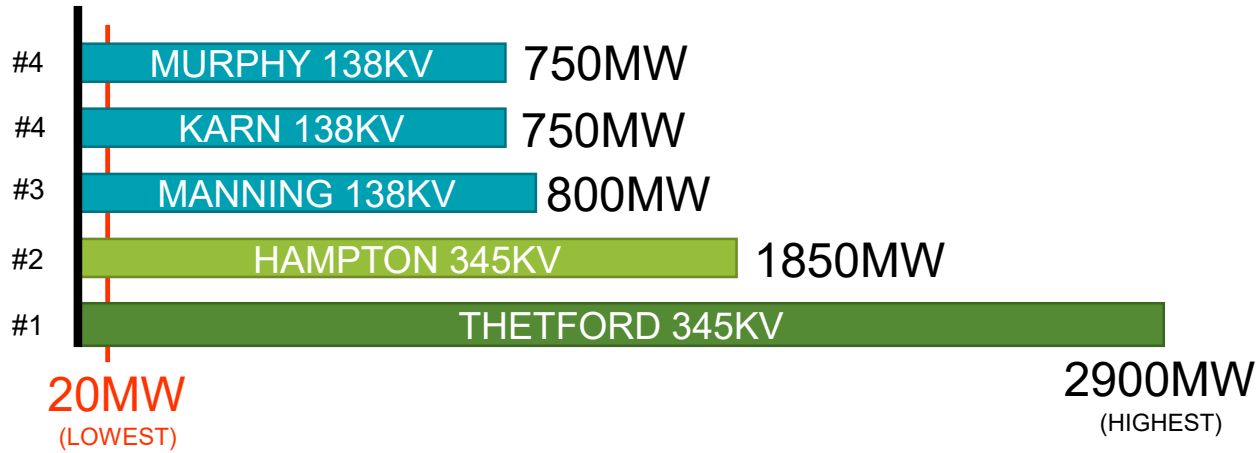


*Costs are subject to previous disclaimer

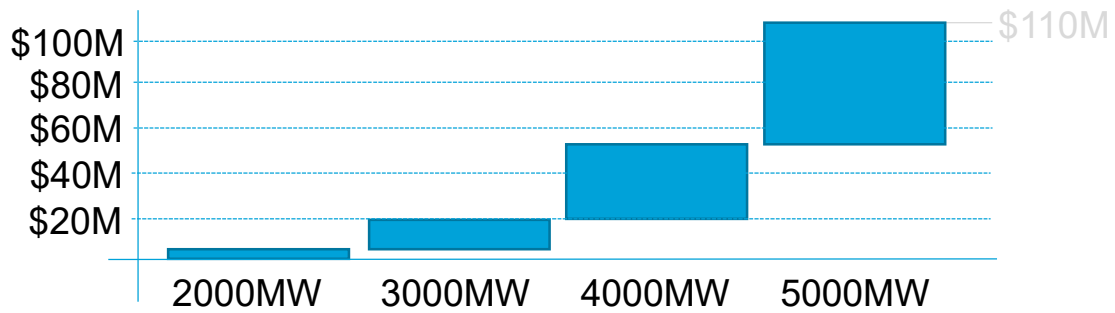


MIDLAND REGION

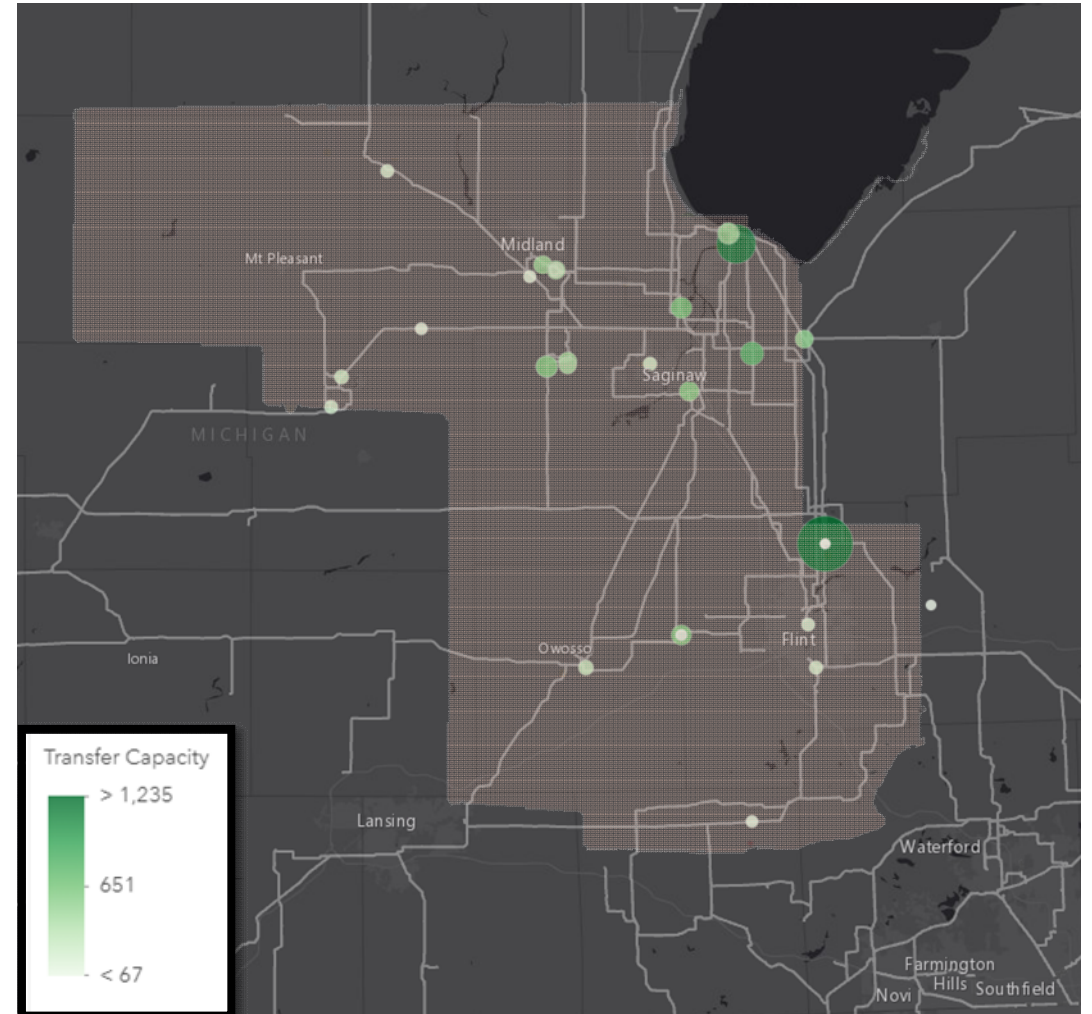
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

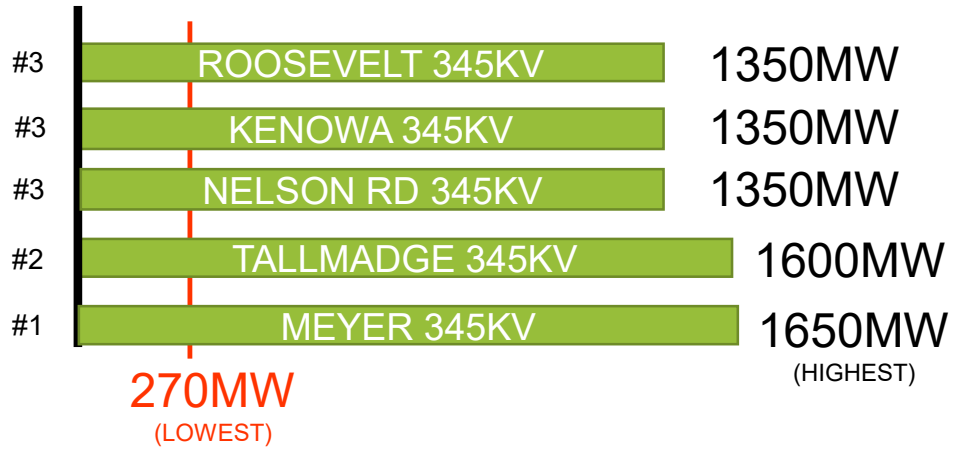


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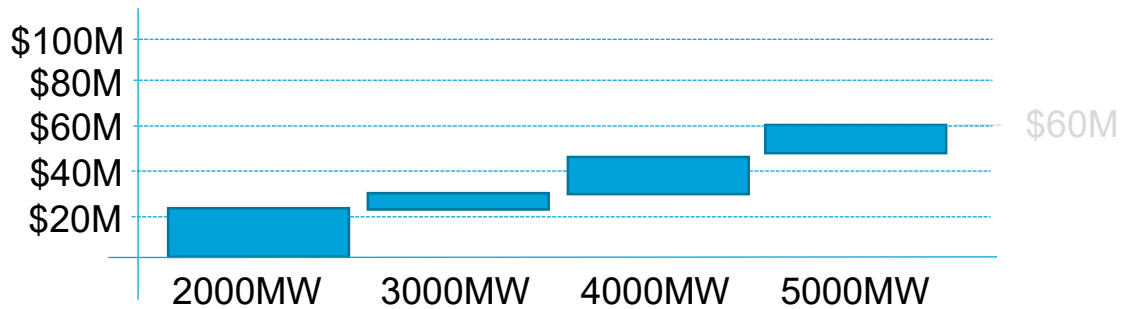


CENTRAL REGION

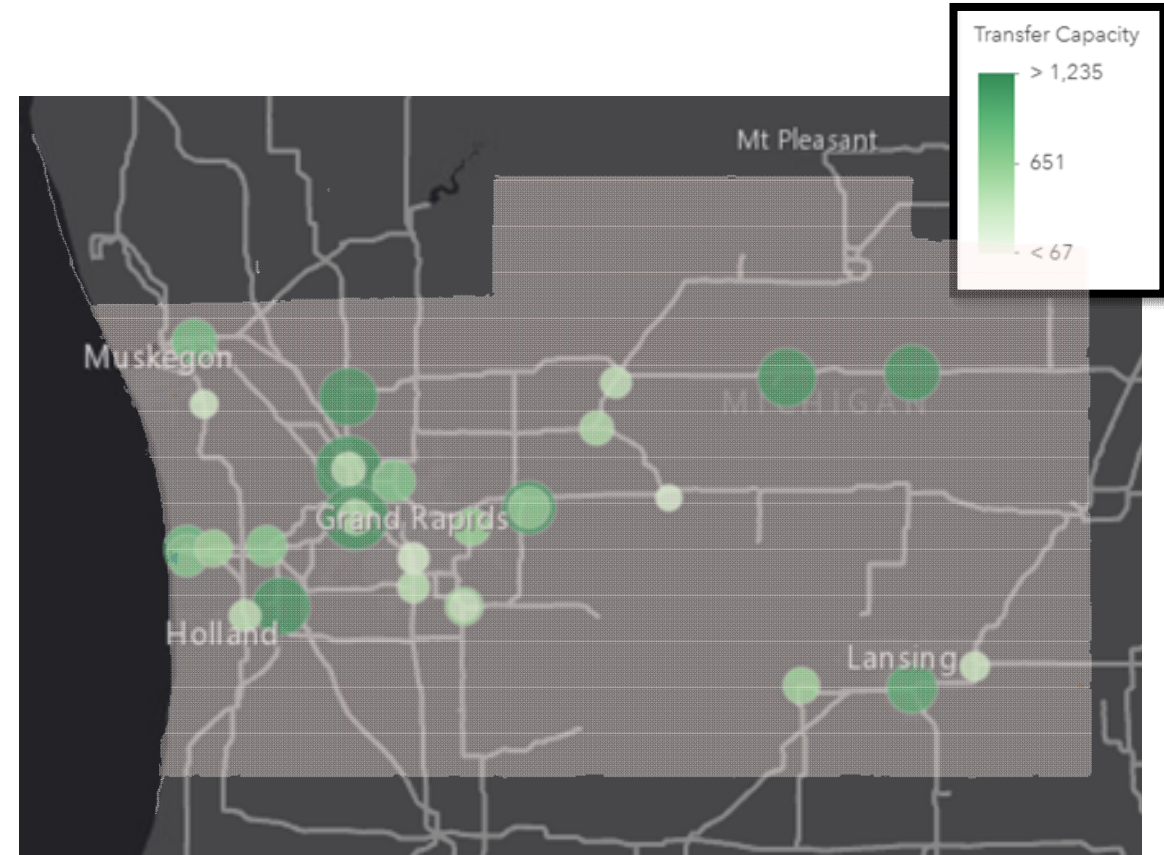
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

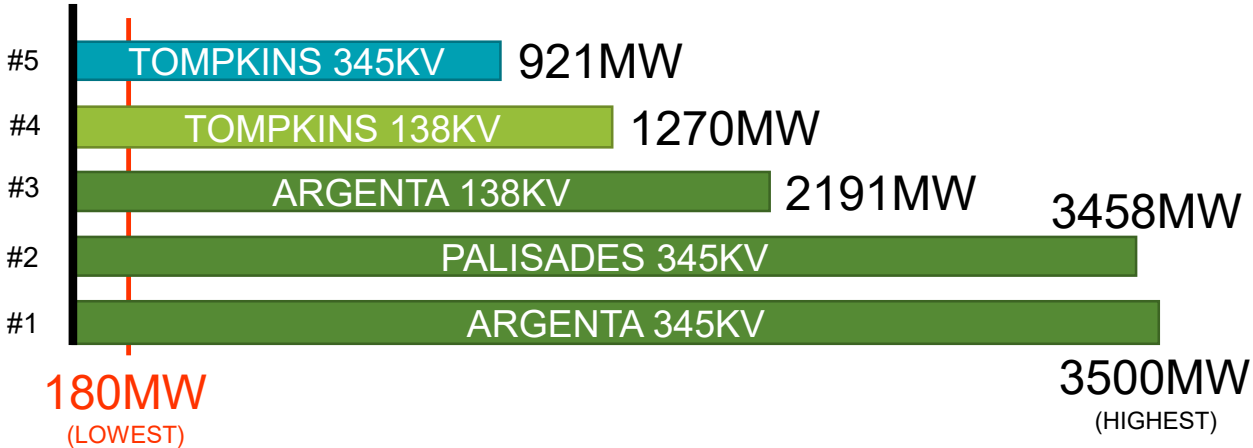


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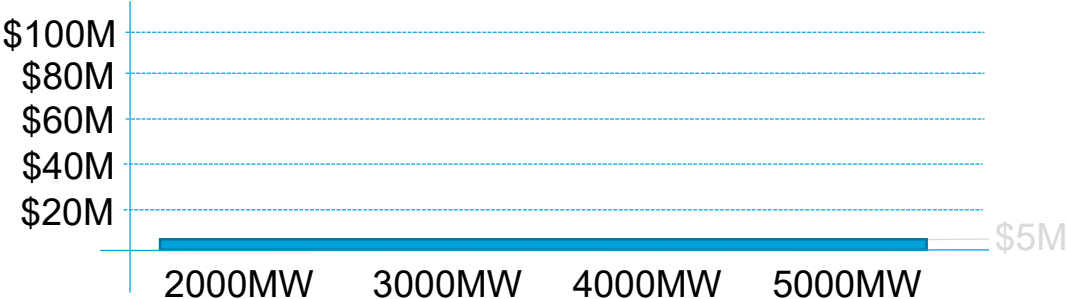


SOUTH REGION

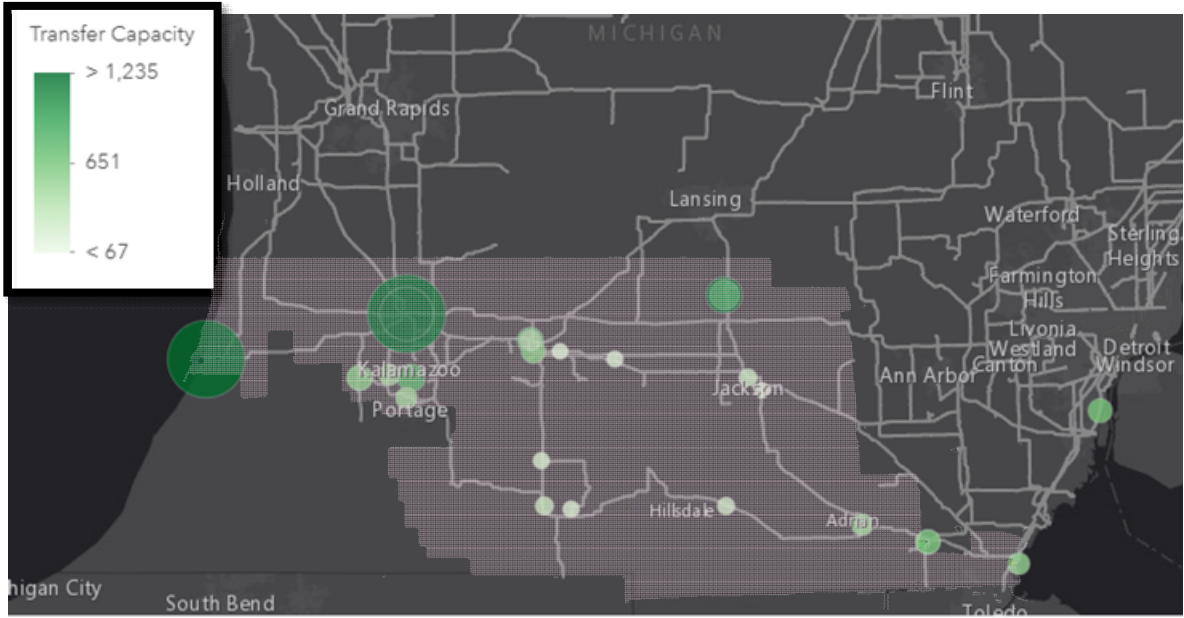
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

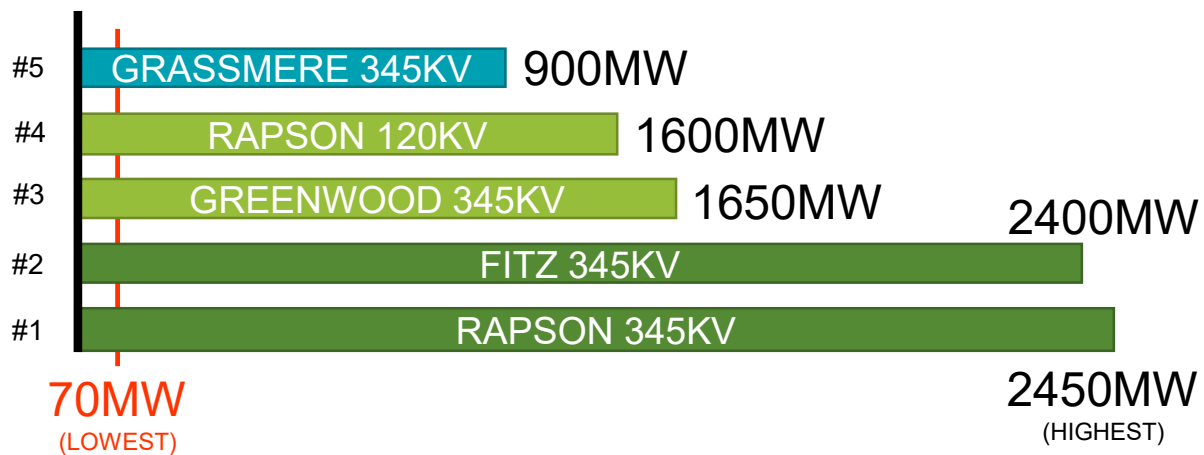


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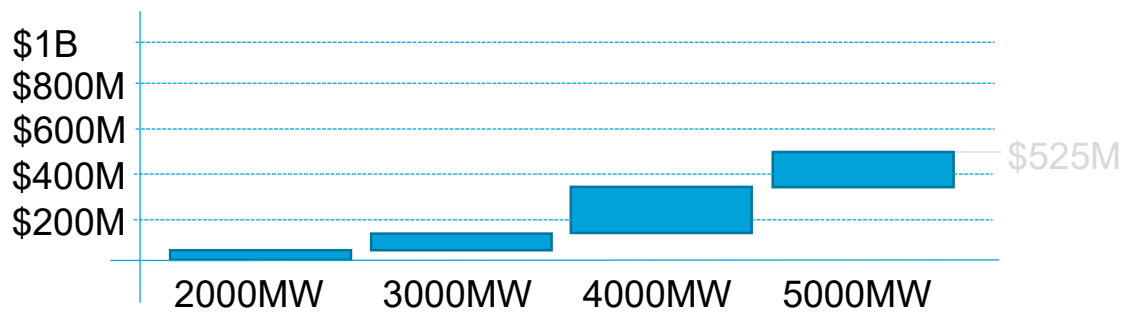


THUMB REGION

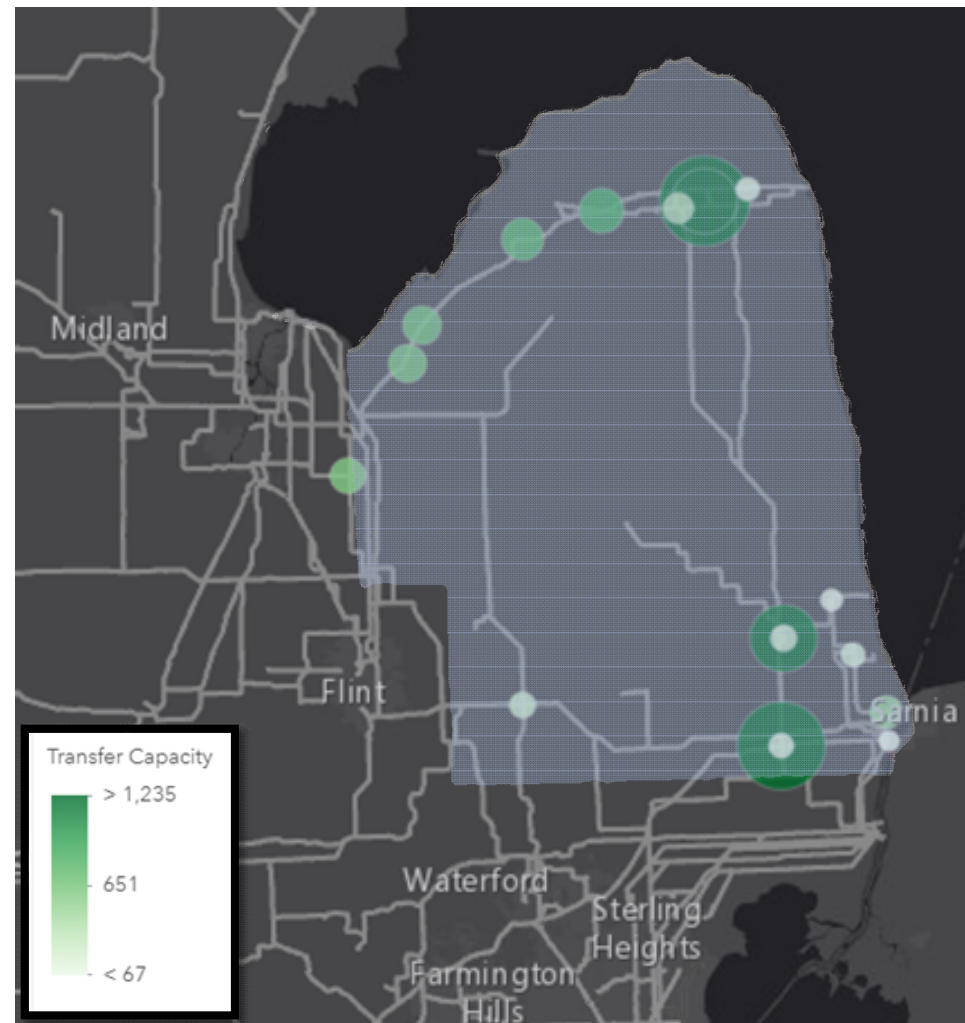
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

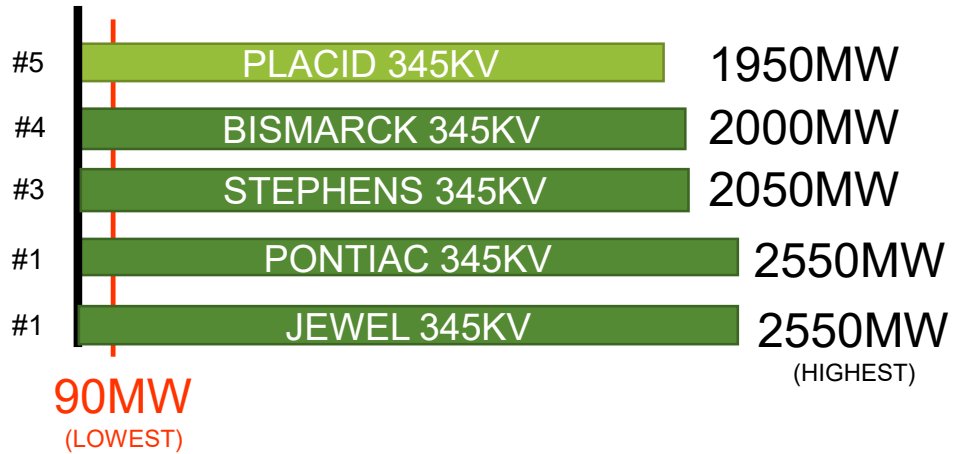


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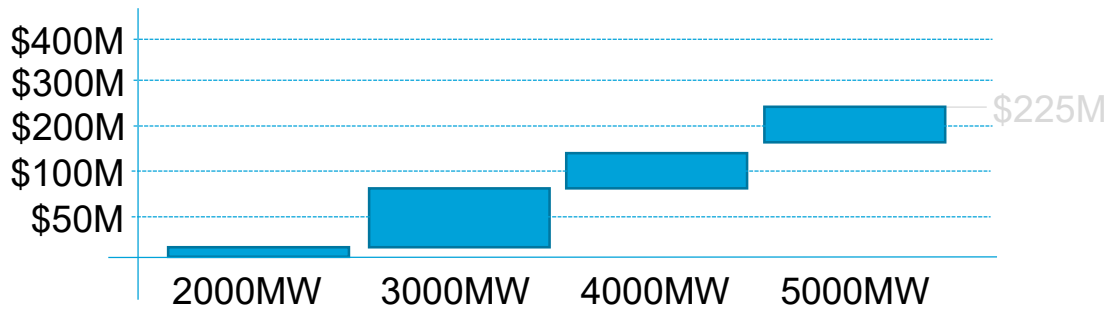


OAKLAND REGION

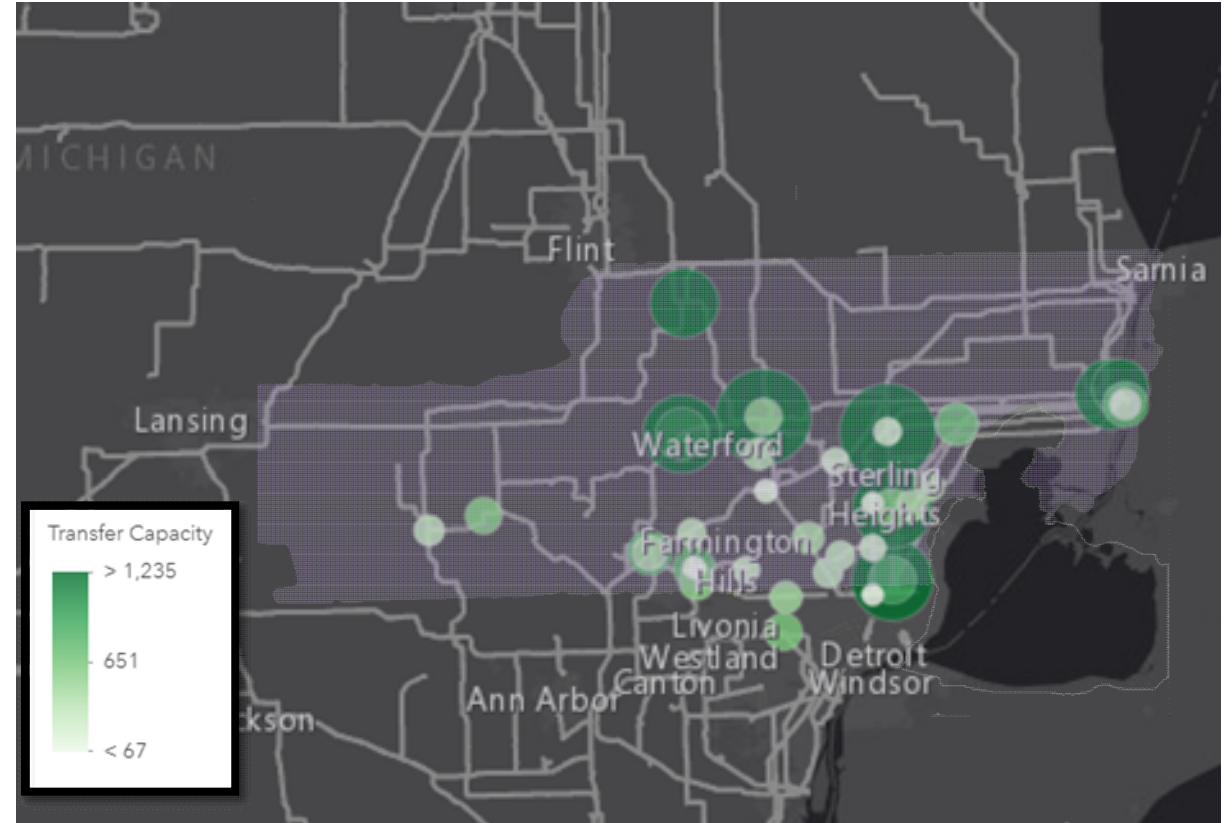
Top 5 highest individual capacities



Region Indicative Capacities & Costs*

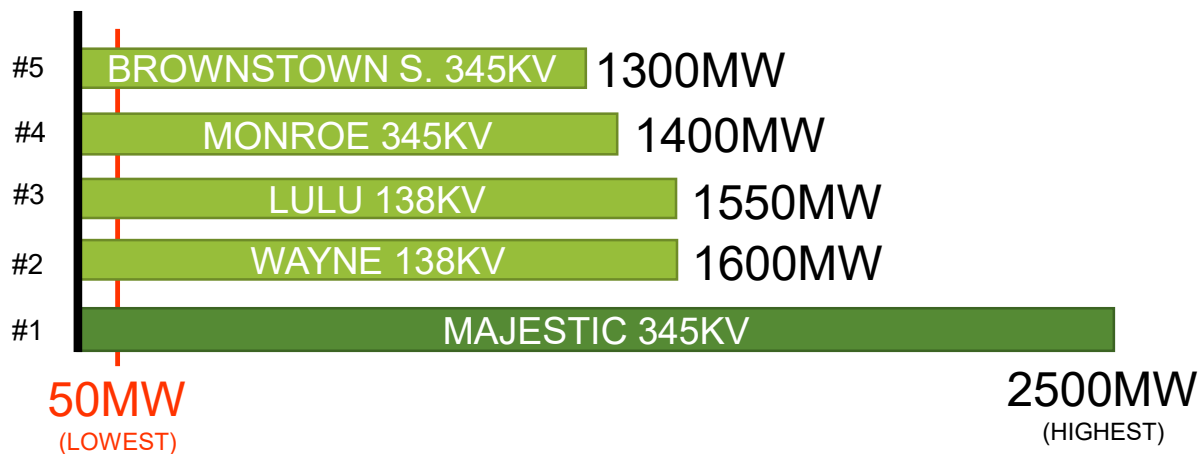


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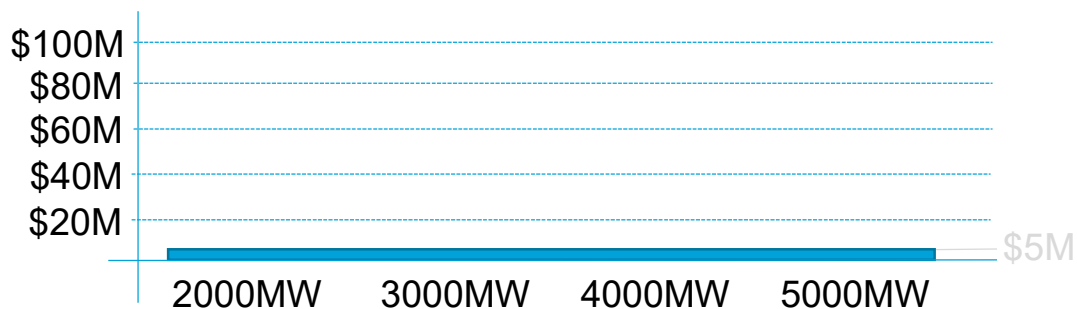


WAYNE REGION

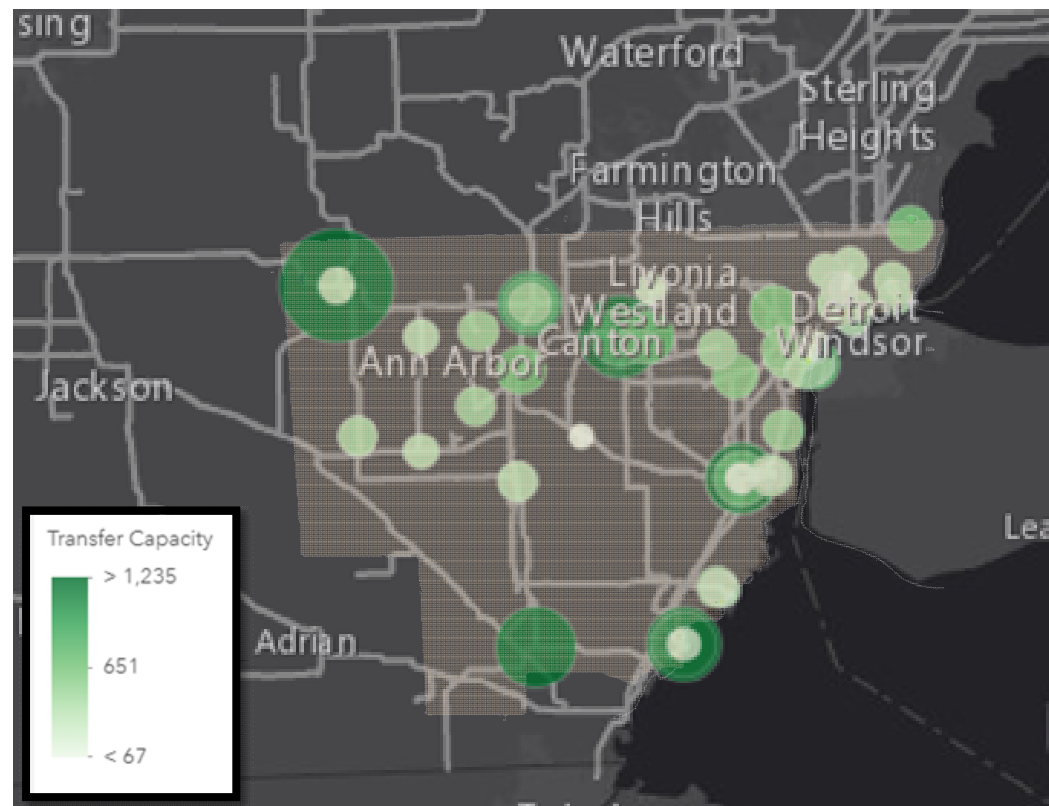
Top 5 highest individual capacities



Region Indicative Capacities & Costs*



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Partners in Business

The Host Capacity Study will be presented at the partners in business meeting on October 19, 2021.

<https://www.itc-holdings.com/op/itc-michigan/michigan-partners-in-business>