

# **Proposed Electric Vehicle DC Fast Charger Network for Michigan**

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# Electric Vehicles – Planning for the Future

Incentivize public and private investments in a light duty electric vehicle charging infrastructure across MI.

- Develop bare-bones DC fast charging network;
- Lower emissions from light duty vehicles; and
- Provide worry-free EV travel through MI by 2030

# Electric Vehicles – Infrastructure

Michigan has limited charging infrastructure.<sup>1</sup>

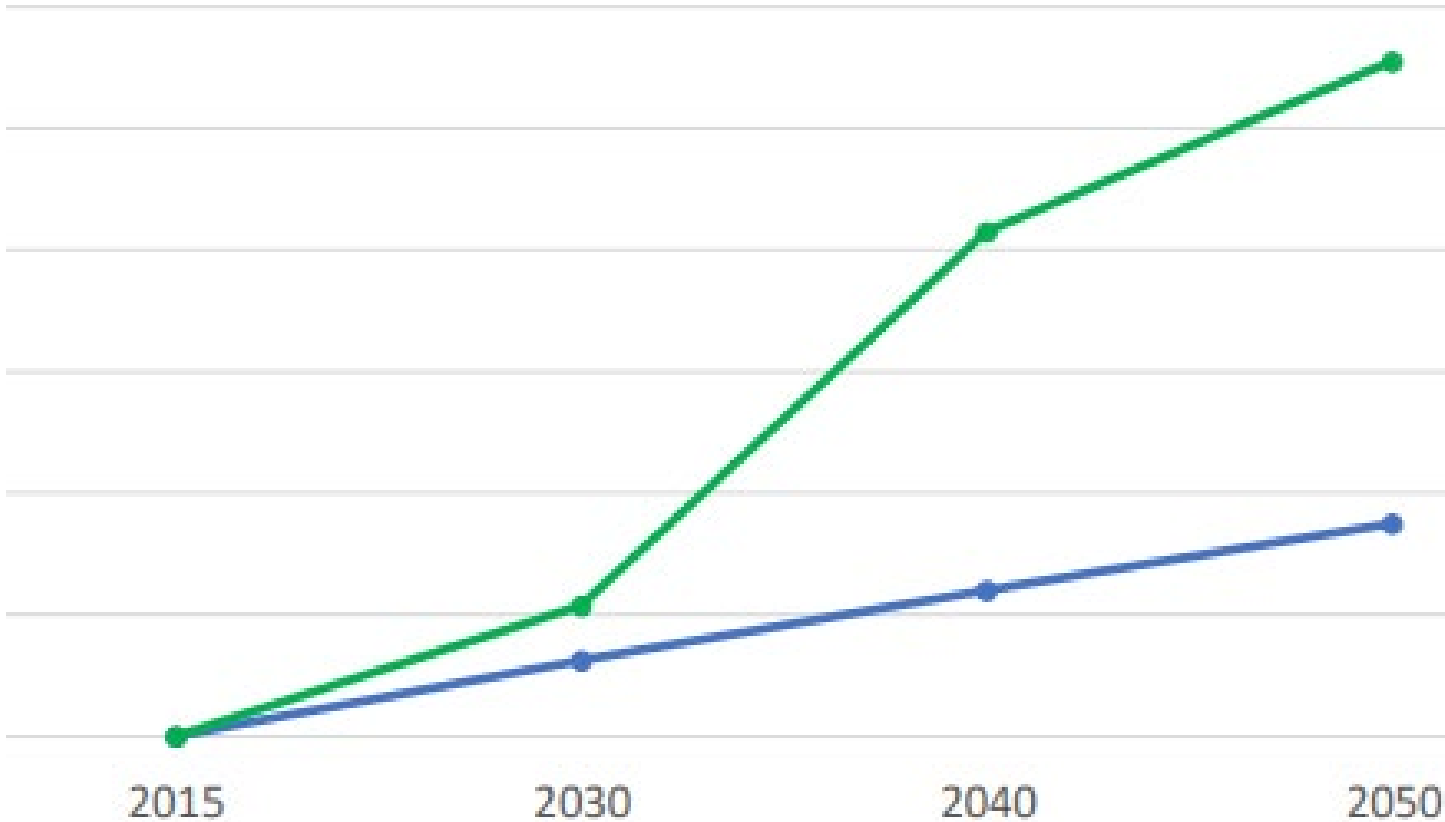
- <2% of U.S. DC fast charger ports
- 2.2% of U.S. Level 2 ports

However, Michigan has:

- Autonomous vehicle support (PA 332 of 2016)
- Investment in EVs from business sector (GM, Ford, Toyota, etc.), utilities, and others.

## PEV Penetration by Scenario

—●— MISO (McKinsey)    —●— Bloomberg



# Electric Vehicle Market Projections

Two sources for MI EV projections:<sup>2</sup>

- MISO scenario:
  - 2020: 1.49%
  - 2025: 3.74%
  - 2030: 6%
- Bloomberg scenario:
  - 2020: 2.46%
  - 2025: 6.56%
  - 2030: 12%

*where EV market share is the proportion of EVs to all vehicles on the road.*

# Electric Vehicle Charger Placement Considerations

Find the optimal DC fast charging infrastructure investment to support electric vehicle travel in Michigan to ensure travel continuity:

- **Where** to deploy charging stations?
- **How many** charging outlets must be built at each station?
- **What** is the approximate investment cost?

# Simplified Road Reference Network

## Reference road network:

Includes major cities & interstate highways.

Focuses on travel between cities.

## Simplification Process:

Travel demand around major cities aggregated to city center.

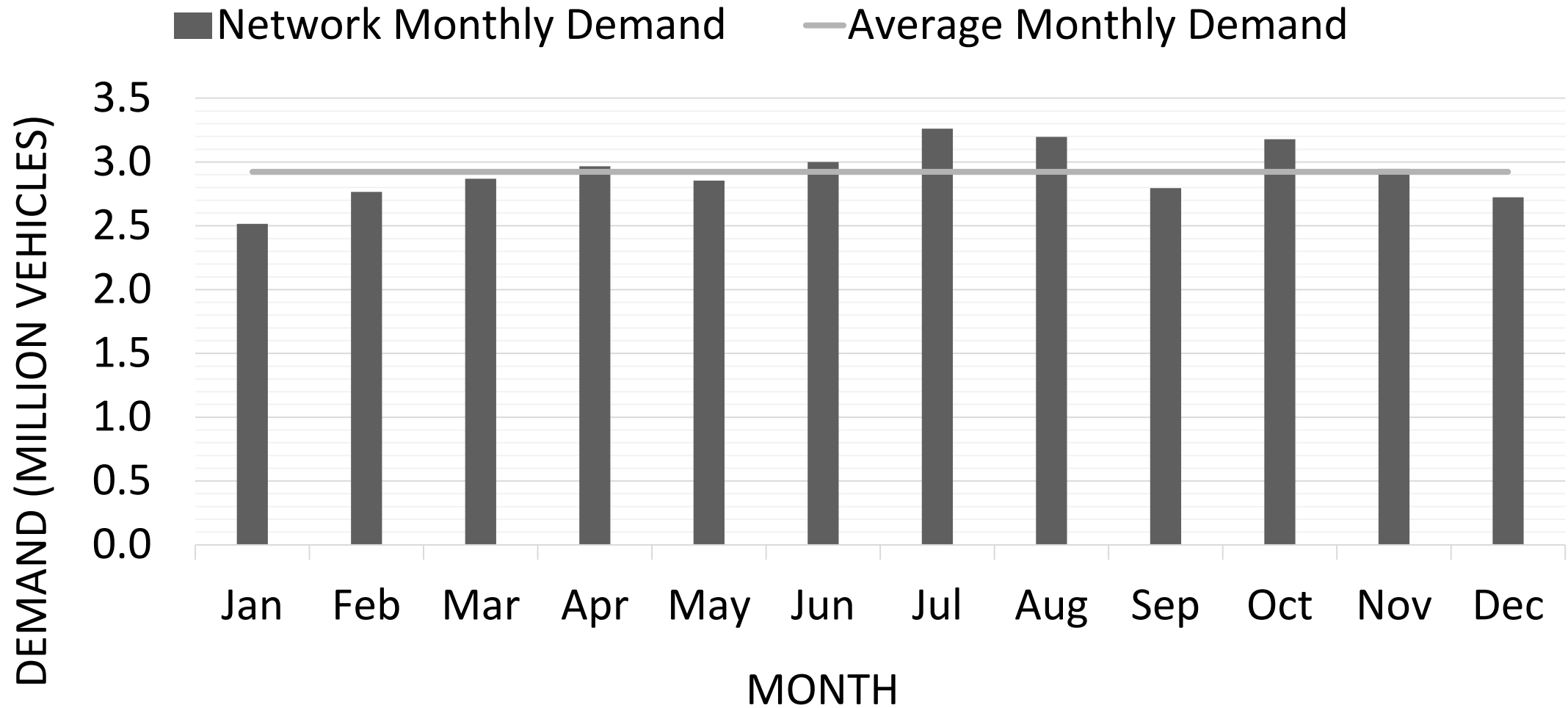
Travel demand within cities excluded.

Distance between candidate points < 50 miles.

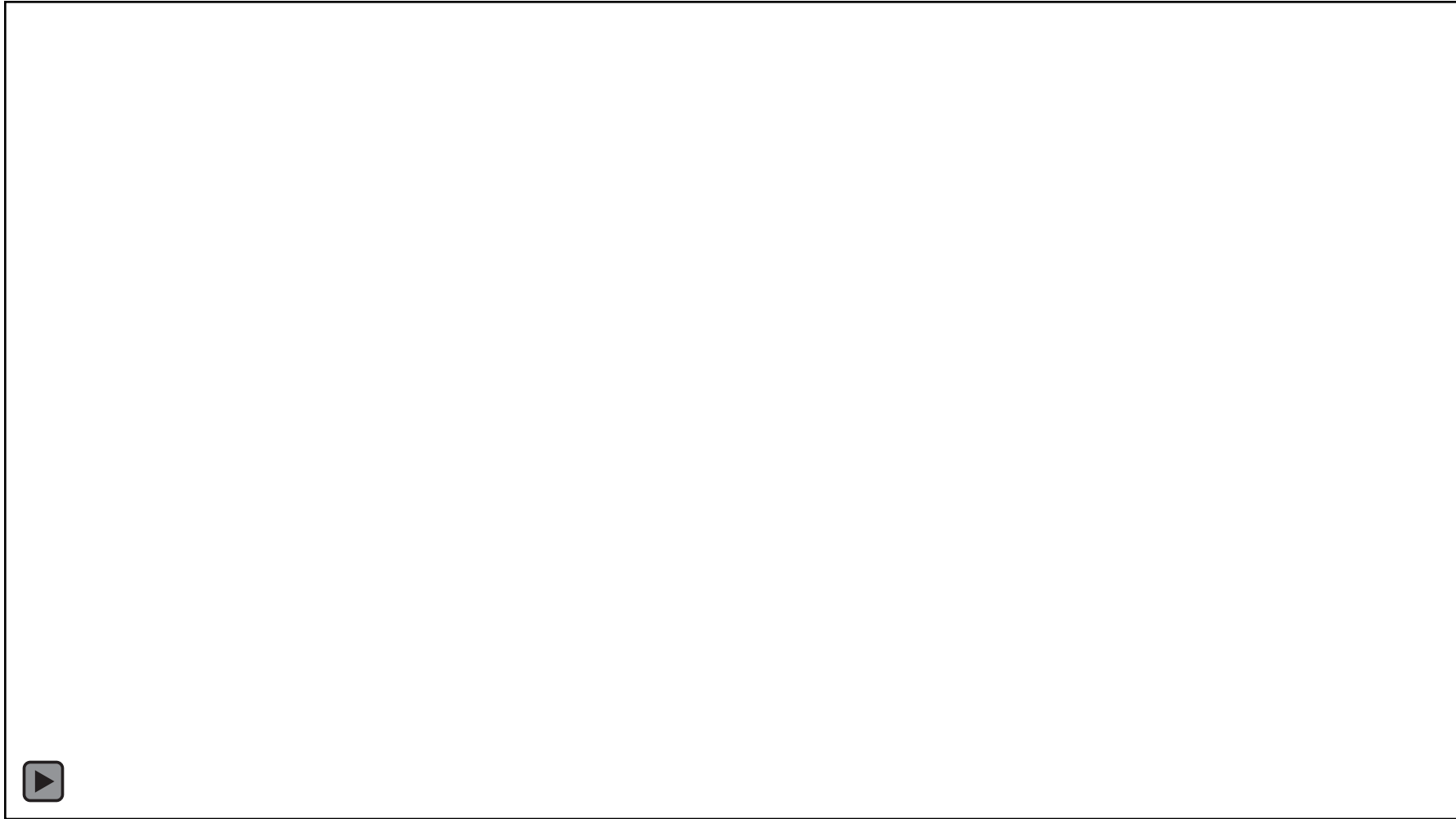
Candidate points may or may not be selected for building charging stations



# Travel Demand Per Monthly Average



# Michigan Network Simulation

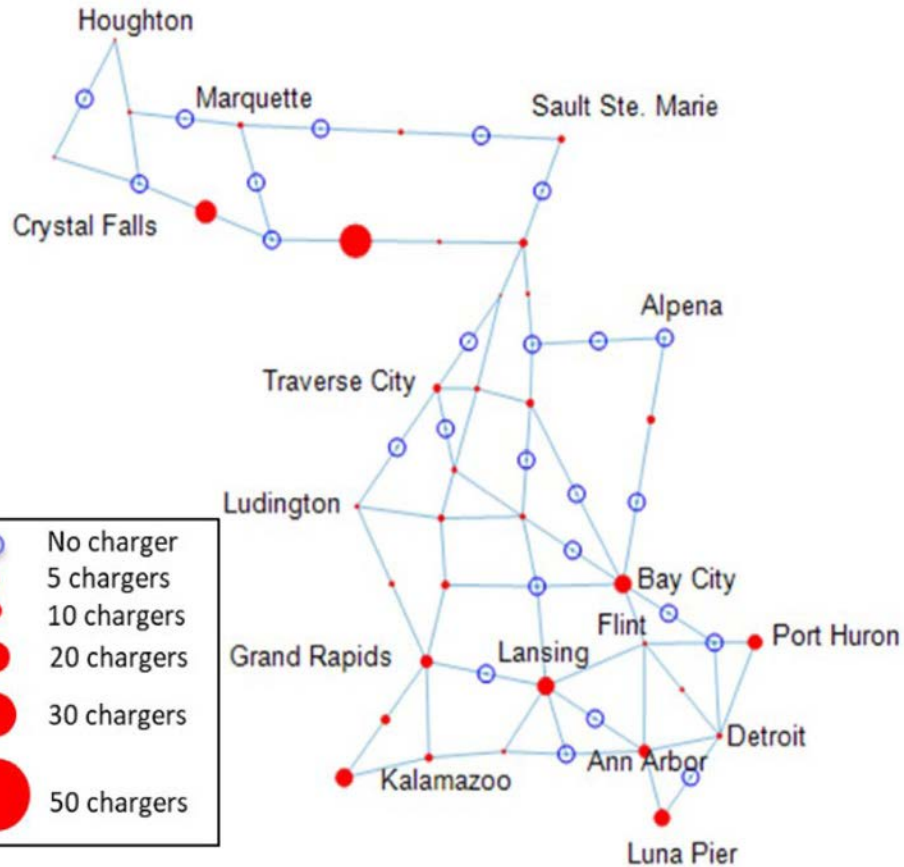




# Recommended EVCS Network – Highway & Tourism

Mixed scenario considered: 70 kWh battery, 150 kW charger

- Vehicles with smaller batteries or degraded batteries will be on road.

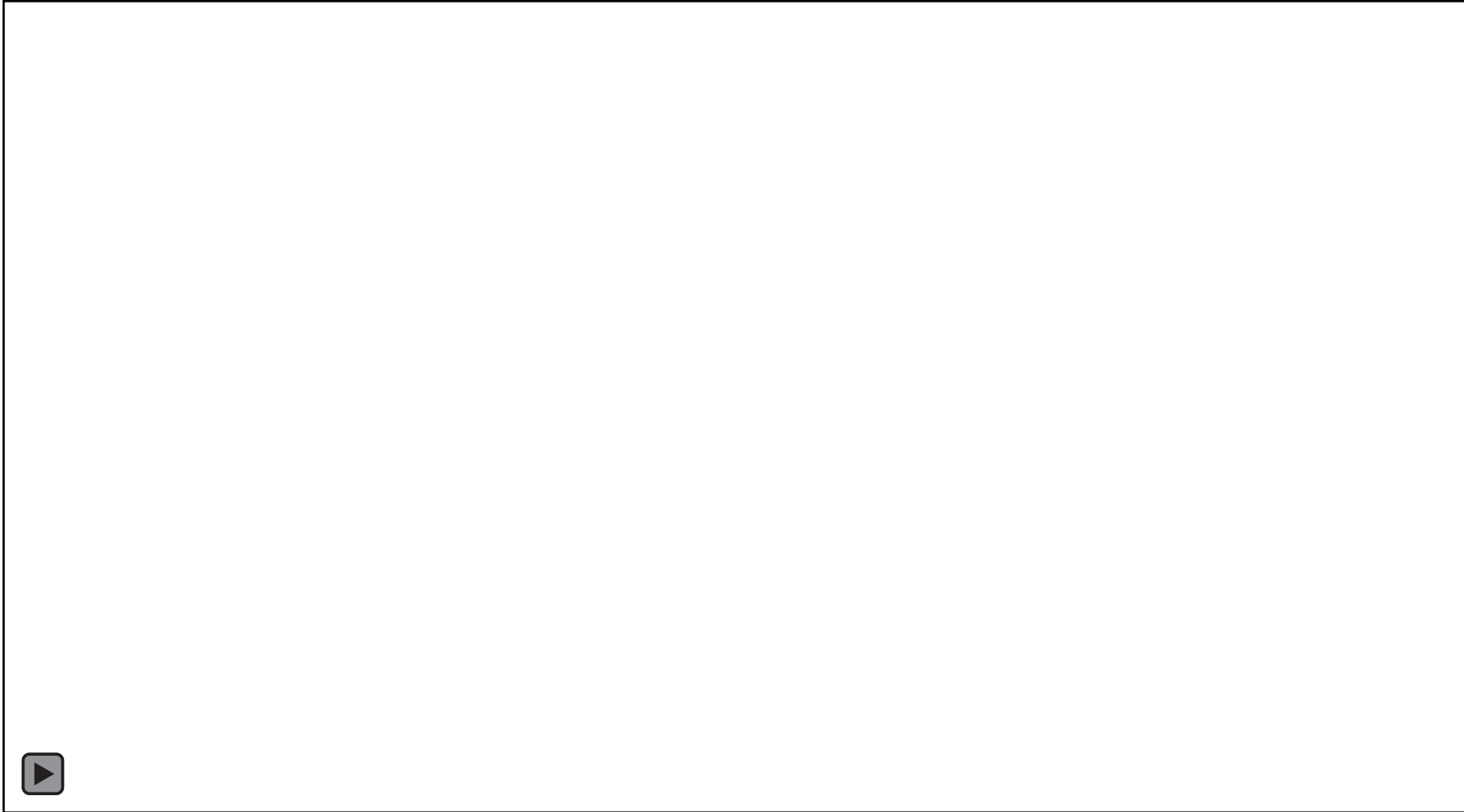


	Low-tech	High-tech	Mixed
<b>Scenario Specification</b>			
EV market share (%)	6	6	6
Charging power (kW)	50	150	150
Battery energy (kWh)	70	100	70
<b>Optimum Charger Placement</b>			
Number of charging stations	68	64	67
Number of charging outlets	760	255	296
<b>Investment Cost</b>			
Charging station cost (million dollars)	10.42	11.83	12.39
Land cost (million dollars)	1.44	0.48	0.56
Charging outlet cost (million dollars)	25.65	19.44	22.57
Total cost (million dollars)	37.51	31.76	33.52

## Next Steps

- Post EV Charger Placement Optimization Report (Highway and Tourism) - January 2019;
- Kick-Off ChargeUp MI;
- EV readiness meetings with local government and economic development groups in April;

# Detroit Traffic Simulation



## Con't Next Steps

- Continue EV readiness meetings with local government and economic development groups
- Post RFP for Round 1 VW funding for DC EV charging infrastructure in Summer 2019;
- Complete Urban EVCS Study Fall 2019; and
- For further information, please see our website.

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