MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Stakeholder Engagement Meeting Notes
National Electric Vehicle Infrastructure Grant Program Modeling – Internal Meeting
Monday, June 13, 2022 9:30 – 10:00 via Teams

Attendees

- Mehrnaz Ghamami, MSU
- Ali Zockaie, MSU
- Amirali Soltanpourkhazaei, MSU
- Mohammad Kavianipour, MSU
- Hamid Mozafari, MSU
- Alireza Darzian Rostami, MSU
- Robert Jackson, EGLE
- Jessie Crawford, EGLE
- Al Freeman, MPSC
- Jeff Feeney, HNTB
- Arif Cekic, HNTB
- Katie Ott Zehnder, HNTB

Meeting Notes

Introduction
Robert Jackson, Michigan Department of Environment, Great Lakes, and Energy (EGLE), welcomed everyone and stated that the purpose of the meeting was to share the most recent National Electric Vehicle Infrastructure (NEVI) modeling work performed by Michigan State University (MSU) with HNTB, the consulting firm that is writing the State of Michigan's Electric Vehicle Infrastructure Deployment Plan (the Plan).

Project Background
Dr. Mehrnaz Ghamami, MSU, presented on the NEVI Charger Placement Program. MSU developed an optimization model for both statewide and NEVI charging requirements using a 3-step approach.

Step 1 – Basic Feasibility

- Map existing DCFCs
- Find optimal location of >150 kW chargers to support all travel in the state
- Overlay existing DCFCs with optimal locations to identify where upgrades are required

Step 2 – NEVI Plan

- Map existing DCFCs
- Find locations for DCFCs based on NEVI requirements (e.g., 4x 150 kW chargers along AFCs)
- Overlay existing DCFCs with optimal locations to identify where upgrades are required

Step 3 – Future Upgrades

- Explore possibility of future upgrades for >350 kW chargers

With current input data (e.g., locations of DCFCs, road network, traffic analysis zones, traffic demand matrix, electricity provision cost, charging station/charger cost, and vehicle specs), MSU ran several analyses.

One was for the barebone statewide infrastructure needs with existing infrastructure. This analysis used a market share of electric vehicles at 6%, electric vehicles with 70 kWh batteries starting at 100% state of charge, chargers with 150 kW capacity, and demand during February (this month was used because the lower battery performance due to the cold results in higher charging demand than in the summer months when travel peaks). The results showed a total need for 29 charging stations (of which 15 exist), 188 chargers (of which 55 exist), and $20.29 million investment (of which $7.23 has already been invested).

Another analysis, dubbed as Scenario 1, included barebone statewide infrastructure needs, existing infrastructure, and NEVI infrastructure needs (e.g., 4x 150 kW chargers located no more than 1 mile from Alternative Fuel Corridors). This analysis used a market share of electric vehicles at 6%, electric vehicles with 70 kWh batteries starting at 100% state of charge, chargers with 150 kW capacity, and demand during February. The results showed a total need for 47 charging stations (of which 15 exist), 270 chargers (of which 55 exist), and $30.01 million investment (of which $7.27 has already been invested).

Scenario 2 also included barebone statewide infrastructure needs, existing infrastructure, and NEVI infrastructure needs, but with different input values. This analysis used a market share of electric vehicles at 25%, electric vehicles with 70 kWh batteries starting at 100% state of charge, chargers with 150 kW capacity, and demand during February. The results showed a total need for 47 charging stations (of which 15 exist), 657 chargers (of which 55 exist), and $60.27 million investment (of which $7.27 has already been invested).

Scenario 3 also included barebone statewide infrastructure needs, existing infrastructure, and NEVI infrastructure needs, again with different input values. The analysis used a market share of electric vehicles at 25%, electric vehicles with 70 kWh batteries starting at 60% state of charge, chargers with 150 kW capacity, and demand during February. The results showed a total need for 51 charging stations (of which 15 exist), 822 chargers (of which 55 exist), and $73.8 million investment (of which $7.27 has already been invested).

The final analysis looked at upgrading chargers to a higher capacity in the future. The inputs included a market share of electric vehicles at 25%, electric vehicles with 70 kWh batteries starting at 100% state of charge, chargers with 300 kW capacity, and demand during February. The goal is to use 350 kW chargers rather than 300 kW chargers, but due to data limitations, 300 kW chargers were used. The data for the 350 kW chargers has since been acquired and future scenarios will be run. The group also discussed that the state of charge should be lowered to 60% for these future scenarios.

MSU will also be running another analysis for these scenarios using updated origin-destination travel demand factors to consider the latest spatial-temporal changes in demand. This analysis will be done by computer servers and will take approximately 1 week to complete. The network is not expected to change drastically but may have some slight adjustments to the numbers.

QUESTIONS

Q. Robert Jackson, EGLE, asked if there should be any other % market share that should be analyzed considering that Consumers Energy suggested to run the model using 33% market share.

A. Arif Cekic, HNTB, stated that there are approximately 9 million vehicles registered on the road in Michigan. Using the goal of 2 million electric vehicles on the road by 2030, as suggested by the MI Healthy Climate Plan, there would only need to be a 22% market share of electric vehicles. Thus, it was thought that the 25% market share would be sufficient and there is no need to increase.

Q. Robert Jackson, EGLE, asked if there should be any other % state of charge considered.
Q. Arif Cekic, HNTB, followed up by asking if there was an industry standard being used for state of charge.

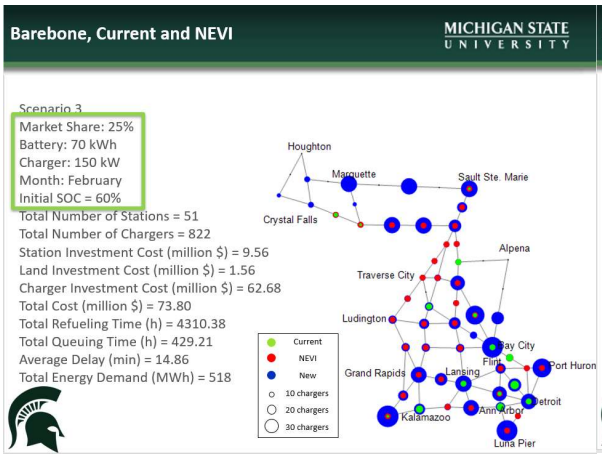
A. Mehrnaz Ghamami, MSU, answered that there is no standard at the moment. The previous standard was 100% state of charge, but people are now starting to move away from that. At this point, scholars are just testing various scenarios. MSU went with 60% because it was believed to at least cover one leg of the trip, meaning it can help inform the model where to place chargers to account for round trips.

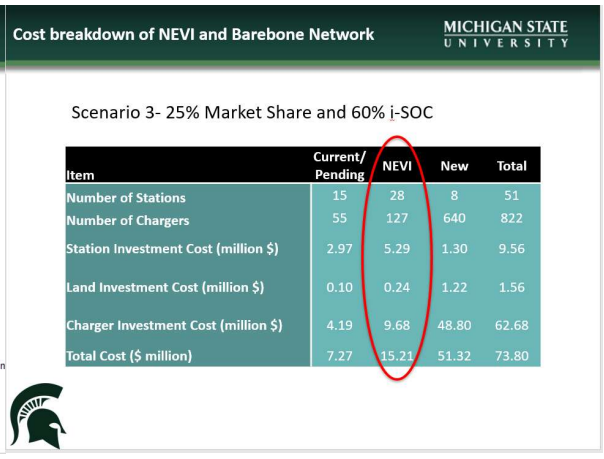
Q. Katie Ott Zehnder, HNTB, asked for clarification on which scenario needed to be used in the Plan.

A. Mehrnaz Ghamami, MSU, answered that Scenario 3 was the model that should be used in the plan, but reiterated that the final version will not be done until later in the week.

Q. Jeff Feeney, HNTB, asked for clarification on what parts of the model should be used in the Plan considering there are both statewide and NEVI analyses.

A. Robert Jackson, EGLE, confirmed that HNTB will only want to include the NEVI portion in the Plan, as shown in the red values below.





Item	Current/ Pending	NEVI	New	Total
Number of Stations	15	28	8	51
Number of Chargers	55	127	640	822
Station Investment Cost (million $)	2.97	5.29	1.30	9.56
Land Investment Cost (million $)	0.10	0.24	1.22	1.56
Charger Investment Cost (million $)	4.19	9.68	48.80	62.68
Total Cost ($ million)	7.27	15.21	51.32	73.80

NEXT STEPS

Future Meeting

MSU will share the final results of Scenario 3 with HNTB once the analysis is complete. MSU will also work on updating the analysis for the future upgrade scenario. From there, EGLE will coordinate additional meetings to share this work with both internal and external stakeholders.