MI Power Grid New Technologies and Business Models Workgroup: Electric Vehicles

Identified Barriers	Possible Solutions
1. Lack of long term-thinking on a sustainable utility business model for EV infrastructure.[i]	• Include all EV make ready in a plant asset.[ii]
2. Move out of pilots and start programs.[iii] a. EV infrastructure is not a short-term investment. Critical to being carbon neutral by 2050. b. Need to grow pilots and incorporate lessons learned to get EVs on the road.	• Regulatory flexibility
3. Demand charges pose an issue. Short term rates may not be sustainable with increased adoption. There is a need for predictable and standardized treatment of EV charging infrastructure across different utility service territories.	• Use distributed batteries to help reduce costs for small underutilized stations that are negatively impacted by demand charges.[iv]
4. Rate designs need to better leverage the technology we have.[v]	• Broader examination beyond residential charging, including public charging. [vi] • The right tariff to result in the best environment for EV and electrification programs.[vii]
5. Real coordination between transmission & distribution required[viii]	•
6. Missing holistic assessment of value of smart charging across multiple value streams.[ix]	• Studies!
7. EVs are a burden to the grid.	• Flexible EV charging can support the grid and is enabled by charging infrastructure.[x] o Vehicles parked 95% of time. • EVs provide value in multiple ways, including non-EV owners[xi] o Generation capacity & transmission/distribution planning o Resilience to extreme events o Seasonal planning o Commitment and dispatch decisions o Balancing and power quality • Support end consumers
8. Substation upgrades may be required to accommodate charging demand.	• Though majority of substations examined could supply 100 EVs at 100kW without upgrades, some substations will require upgrades unless alternative on-site solutions (like storage) are pursued.[xii]
9. Electrification of Class 8 trucking operations may stress the electricity distribution system	• Encouraging the right charging schedule may significantly reduce peak demand. o Charging at lowest possible power level reduces peak power demand by ~40-90%[xiii] • Charging at higher power levels results in increased flexibility to schedule charging[xiv]

Identified Barriers	Possible Solutions
10. Residential EV charging represents significant increase in household electricity use. Clustering effects in EV adoption and higher power charging exacerbates the issue[xv]	• Effective planning, smart EV charging, and distributed energy storage systems • Consider EVs in systems upgrades[xvi]
11. The infrastructure is not developing at the same speed as the vehicles are reaching the marketplace.[xvii]	• Include EV charging in new distribution system upgrades to help inform decisions. • State regulators should consider charging infrastructure and enabling managed charging.[xviii]
12. Utility with large number of DERs like EVs has many more controlled nodes connected with it than is traditionally seen.[xix]	• Utility may communicate constraints at substation level to 3rd parties who control DER[xx] • Clarity on interoperability while allowing multiple standards
13. Utilities need to make smart charging easier and more than just time of use rates.	•
14. Customer communication to move charging to off-peak	• Communicate when to charge based on what systems customers are using. [xxi] • Real-time, effective communication is critical to make EVs flexible[xxii]
15. The recent FERC Order 2222 on DR aggregation in energy markets requires MISO to create a tariff to allow aggregators to participate in its market. FERC wants monitoring costs low.[xxiii]	• Encourage all parties to keep infrastructure at a low cost, using AMI if possible. • Need to help monetize the process and make it easier for EV owners to participate as with an aggregator in marketplace.
16. Lack of updated standards.	• Standards need to be updated. Electrification will allow EVs to integrate into the grid as both a resource and load. There are significant storage implications as well.[xxiv]
17. DCFC interoperability has challenges.	• Invest in intelligently in chargers and open standards for EVs to ensure interoperability.[xxv] • Commission mandate independent 3rd party testing for chargers supported by ratepayer funds.[xxvi]
18. Lack of holistic, common statewide approach to EVs and electrification	• Michigan needs a holistic, common statewide approach to EVs and electrification—not a patchwork by different state agencies.[xxvii]
19. Cautious that needs are met in all communities. There exist socioeconomic barriers in adoption.	• Examine how EVs can provide paths in underserved communities through early listening and engagement to come up with tailored programs that make sense for underserved communities.[xxviii] • Offer greater incentives to the owners of multi-family housing buildings.[xxix] •

20. Lack of more financial resources through policy.	• Make sure the investments remain stable in the longer term.[xxx]
	  ○ Paying 5-7 dollars per kWh for EV energy. Short-term rates may not be sustainable with increased adoption.
	• Funding from outside of utility rates would help.
	  ○ Electricity customers should not be responsible for the bulk of the cost to rebuild the vehicle transportation system.[xxxi]

Identified Barriers	Possible Solutions
21. High cost of charging infrastructure, especially in rural locales	• For small, underutilized stations, distributed batteries can help reduce costs.

22. High cost of EV charging connection	• Mobility hubs[xxxii]
	  ○ Allow leasing & new ownership models.
	  ○ Change utility relationship.
	  ○ Move electrification beyond pace of incentives.

23. 3rd parties cannot resell energy to customers[xxxiii]	•
24. Integration with home energy backup system	• Standards and model development for backflow to home in event of power outage, F150 Lightning model
25. Integration with rooftop solar	• Model and framework development for integration

Applicable and Emerging Business Models

- Inclusive financing to capitalize on grid edge solutions, like EVs, through tariffed on-bill financing.[xxxiv]
- Business models for EV buses[xxxv]
  - Bus leasing model
  - Utility capitalizes charging equipment.
  - Utility capitalizes charging equipment and on-board storage.
- Combine mobility/transportation as service with energy as service.
- Combine with home energy backup and self-generation

[i] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[ii] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[iii] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[iv] Muratori. 02/10/2021 workgroup chat.
[v] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[vi] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[vii] Panel: Transportation Electrification in Michigan & Opportunities for Vehicle-to-Grid Integration. 02/10/2021 workgroup meeting.
[viii] Piero. 05/19/2021 workgroup PPT, p. 10
[ix] Muratori. 02/10/2021 workgroup PPT., p. 31
[x] Muratori. 02/10/2021 workgroup PPT., p. 27
[xi] Muratori. 02/10/2021 workgroup PPT., p. 28
[xii] Muratori. 02/10/2021 workgroup PPT., p. 23.
[xiii] Muratori. 02/10/2021 workgroup PPT.
[xiv] Muratori. 02/10/2021 workgroup PPT, p. 21.
[xv] Muratori. 02/10/2021 workgroup PPT., p. 15.

[xvi] Muratori. 02/10/2021 workgroup PPT., p. 15.
[xvii] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[xviii] Muratori. 02/10/2021 workgroup presentation Q&A.
[xix] Piero. 05/19/2021 workgroup PPT, p. 6.
[xx] Piero. 05/19/2021 workgroup PPT, p. 7.
[xxi] Muratori. 02/10/2021 workgroup presentation Q&A.
[xxii] Muratori. 02/10/2021 workgroup presentation Q&A.
[xxiii] Panel: Transportation Electrification in Michigan & Opportunities for Vehicle-to-Grid Integration. 02/10/2021 workgroup meeting.
[xxiv] Panel: Transportation Electrification in Michigan & Opportunities for Vehicle-to-Grid Integration. 02/10/2021 workgroup meeting.
[xxv] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[xxvi] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[xxvii] Panel: Transportation Electrification in Michigan & Opportunities for Vehicle-to-Grid Integration. 02/10/2021 workgroup meeting.
[xxviii] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[xxix] Panel: Utility EV Pilot Updates and Challenges in MI. 02/10/2021 workgroup meeting.
[xxx] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting.
[xxxi] Panel: EV Regulatory Barriers and Solutions – A National Perspective. 02/10/2021 workgroup meeting. Q&A/chat.
[xxxii] Piero. 05/19/2021 workgroup PPT, p. 8.
[xxxiii] Piero. 05/19/2021 workgroup PPT, p. 10
[xxxiv] Hummel. 05/19/2021 workgroup PPT, slide 10.
[xxxv] Hummel. 05/19/2021 workgroup PPT, slide 12.