MI Power Grid New Technologies and Business Models Workgroup: Storage

Identified Barriers	Possible Solutions
1. Rate design for demand and standby charges is very complex, making it difficult to calculate payback of a storage investment.	• We need clear demand and standby charge structures.
2. Storage not incorporated well into current planning processes (IRP, reliability, etc.)	• More studies and time.
3. Storage not enabled to compete in all grid planning and procurements.	• Long-term resource planning[i] • Distribution planning • Transmission planning • Renewables/clean energy standards • Wholesale market rules • Resource adequacy rules
4. Additional analytic needs required for utilities and stakeholders to consider optimal least-cost portfolios[ii]	•
5. Lack of options for utility to use utility owned/subscribed software to aggregate customer owned storage	• Allow a software solution with a PSC approved customer enrollment program where the customer gives the utility the device control.[iii]
6. Pilot framework for facilitating learnings about energy storage.	• Set up something that is repeatable. • Increase speed of introducing a pilot to quickly gather information.
7. Current utility pilots are focused only on lithium-ion storage solutions and not the full array of storage technologies.	• Properly value the benefits and characteristics of storage from a technology-agnostic standpoint • Educate on values of other forms of energy storage, like thermal energy storage.[iv]
8. Storage integration with DCFC charging stations for electric vehicles	• Encourage utility pilots to explore new business models and technology solutions
9. R- Storage unable to access grid and markets	• Interconnection processes[v] • Multiple use frameworks • Ownership rules • Codes & Standards.
10. Lack of utility knowledge about how to properly use and value storage slows down storage deployment. Lack of a true value analysis of the technology	• Improve/accelerate the deployment process.
11. R - Storage not valued or compensated for flexibility	• Deployment targets[vi] • Incentive programs • Tariff/rate design • Wholesale market products • Cost benefit studies
12. Energy arbitrage value needed to realize optimal deployment.[vii]	• Framework for accounting for full value stack
13. Balance customer and grid needs for customer sited solutions	• Quality data and algorithms to help manage both.[viii]
14. Cybersecurity concerns with highly connected grid and devices.	• Strong cybersecurity countermeasures[ix]
15. Lack of statewide target/vision for storage as well as incentives	• Statewide target broken out by user type or storage form.

Identified Barriers	Possible Solutions
	• More incentives at the state level
16. Thermal storage undefined.	• Define under FERC Distribution Plant, Distribution Station Equipment or Software definitions for accounting purposes[x]
17. Storage functionality not separated from energy efficiency.	• Thermal storage uses through HVAC, water heaters, etc. are different from energy efficiency.[xi]
18. Lack of customer understanding of the technology and how to properly use it.	• Educate more people to have storage be more public
19. Use of rare minerals.	• Support "green" storage that's 100% reusable/recyclable, domestically sourced, safe in and around communities[xii]

Applicable and Emerging Business Models

- FTM or BTM installations[xiii]
- Ownership by utilities, customers, 3rd parties, or some mix [xiv]
    - BTM Utility Owned[xv]
    - BTM Utility/Customer Hybrid
    - FTM Utility/3rd party hosting
    - Virtual Power Plants[xvi]
- Bring your own device[xvii] program/tariff[xviii]
- Energy storage tariff[xix]
- Household electric vehicles can be used as storage for households and the grid.

[i] Boggs, 03/24/2021 workgroup PPT slide 9.
[ii] Blair. 03/24/2021 workgroup PPT, slide 17.
[iii] Rehberg. 03/24/2021 workgroup PPT slide 12.
[iv] Rehberg. 03/24/2021 workgroup PPT slide 3.
[v] Boggs, 03/24/2021 workgroup PPT slide 9.
[vi] Boggs, 03/24/2021 workgroup PPT slide 9.
[vii] Blair. 03/24/2021 workgroup PPT, slide 27.
[viii] Rehberg. 003/24/2021 workgroup PPT slide 13.
[ix] Rehberg. O3/24/2021 workgroup PPT slide 11.
[x] Rehberg. 03/24/2021 workgroup PPT.
[xi] Rehberg. 03/24/2021 workgroup PPT slide 12.
[xii] Shick. 03/24/2021 workgroup PPT slide.
[xiii] Twitchell. 05/18/2021 workgroup PPT, slide 9.
[xiv] Twitchell. 05/18/2021 workgroup PPT, slide 9.

[xv] Twitchell. 05/18/2021 workgroup PPT, slide 10.
[xvi] Twitchell. 05/18/2021 workgroup PPT, slide 11.
[xvii] Heart. 05192021 workgroup PPT, slide 6.
[xviii] Ferreira. 03/24/2019 workgroup PPT, slide 6.
[xix] Ferreira. 03/24/2019 workgroup PPT, slide 8.