Overview and Key Findings
Throughout 2019, the Massachusetts Clean Energy Center has hosted a series of energy storage microgrid stakeholder dialogues. The fourth of six such events convened on Thursday, August 15th, 2019 from 9 am - 12 pm at the Northeastern University Egan Conference Center in Boston, MA. The 63 attendees present included representatives from municipalities in Massachusetts, regional planning agencies (RPAs), utilities, project developers, consultants, and other interested stakeholders.

The objective of the event was to explore an array of considerations for microgrid project identification in the Commonwealth. Discussion highlighted opportunities for microgrid projects and shared lessons learned from a range of various stakeholder perspectives. Together, participants:

1. Developed an understanding of microgrids and their applications, including relevant technologies and configurations
2. Investigated the characteristics of strong microgrid projects from the perspectives of different stakeholders through presentations, panels, and group discussions
3. Identified outstanding questions and challenges with microgrid identification and development for stakeholders and brainstorm potential solutions

Key Takeaways and Opportunities
- The municipal, university, schools, and hospitals (MUSH) market are key applications for resiliency and storm preparedness, but may not have strong revenue generation opportunities at this time, or may not be economically viable without cost avoidance.
- It is critical to begin dialogue with various stakeholders early as they each bring different perspectives and varying levels of understanding of the technology. Stakeholder engagement may be a time-consuming process.
- Key considerations for commercial microgrids include that they are grid tied, income generating, islandable, and serve multiple buildings.
- There are opportunities to incorporate CHP and district heating into microgrid projects, especially given their favorable economics, but they must be balanced with efforts to increase electrification and reduce carbon emissions.
- Successful microgrid projects must have a clear objective (e.g., reliability, resiliency, climate change mitigation) and include a strategic selection of location, taking into consideration existing infrastructure and potential distributed energy resources.
- It is difficult to quantify the value of resiliency for microgrid applications, and the means of determining the value of resiliency varies greatly between community and commercial
applications. Commercial applications can often better quantify loss, whereas value of community applications is often not recognized until a disaster (e.g., hurricane) strikes.

- **Legal complexities may arise** as municipalities try to procure organizations to operate microgrids that support both public and private facilities. Massachusetts is looking to expand existing laws to qualify ESCOs to be able to do such work.
- When considering long-term microgrid planning, **local, distributed assets can be installed and transitioned into a microgrid** at a later time.

Panel Presentation and Discussion

Following welcoming remarks by Mike Condon, the Emerging Markets Program Manager at MassCEC, an opening panel presented on key characteristics of microgrid projects with a range of applications. Presentation slides are available as a separate attachment. Panelists included:

- **Matt Koenig, DNV GL (Principal, Business Development – DER & Energy Storage)**: Highlighted the importance of project feasibility and discerning the goal of a microgrid and distinguishing if the project will serve a stated purpose or demonstrate a concept.
- **Alex Tang, TRC (Senior Project Manager, Microgrids and DER)**: Shared key considerations for microgrid development and a case study of community-based microgrid projects, including the unique aspects of its ownership model.
- **Claire McKenna, WSP (Senior Associate, Buildings Sustainability)**: Presented on commercial microgrid opportunities, assessments, and market trends.
Small Group Discussion and Feedback

Participants were provided an opportunity to discuss challenges, best practices, key questions, and potential resources to aid in microgrid project identification in a small group setting. The results of these discussions are captured in Table 1 below, distributed between four topic areas: policy/legal, technology, siting, and other. Highlighted takeaways from the table discussions are captured in Table 2.

Table 1. Combined Small Group Discussion Feedback

<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Challenges</th>
<th>Best Practices</th>
<th>Questions</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy/Legal</td>
<td>• Regulatory barriers to unlock value stack</td>
<td>• Consumer of power clearly defines the problem to be solved with the microgrid</td>
<td>• What is the process to procure for public/private partnerships?</td>
<td>• Adopt or recommend an outage duration to help facilities plan for back-up power</td>
</tr>
<tr>
<td></td>
<td>• No standardized process for interconnection when crossing the public right of way</td>
<td>• Integrate stakeholder engagement into standard microgrid design practices</td>
<td>• How can feasibility assessments become more prescriptive or help establish a baseline?</td>
<td>• Develop value of resiliency guidance</td>
</tr>
<tr>
<td></td>
<td>• Challenges with public-private procurement authority</td>
<td>• DPU microgrid docket to define microgrid, role of utility, and role of communities, and contemplate cost recovery mechanisms</td>
<td>• How can we expand feasibility studies beyond technical analysis to include stakeholder engagement or political feasibility?</td>
<td>• Convene working groups to resolve DER value stack issues</td>
</tr>
<tr>
<td></td>
<td>• ESCOs do not have clear direction on how to initialize project due to lack of regulatory guidance</td>
<td></td>
<td>• How will projects be funded and what monetary sources are available or could be available (e.g., the GreenWorks bill)?</td>
<td>• Have the DPU direct utilities to be more friendly with microgrids through interconnection and incentives</td>
</tr>
<tr>
<td></td>
<td>• Stakeholder engagement is expensive and time consuming, but necessary</td>
<td></td>
<td></td>
<td>• Provide grants for new buildings (e.g., schools) to be energy resilient</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Develop a resilient building code</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Incorporate flexibility for GreenWorks bill to accommodate for public-private projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Establish a clear vehicle or forum for community-utility</td>
</tr>
<tr>
<td>Topic Area</td>
<td>Challenges</td>
<td>Best Practices</td>
<td>Questions</td>
<td>Resources</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>----------------</td>
<td>-----------</td>
<td>-----------</td>
</tr>
</tbody>
</table>
| Technology | • Difficult to reconcile the favorable economics of fossil fuel resources with need for electrification and GHG reduction  
• Lack of technical understanding by communities regarding microgrids  
• Difficulty assessing building load and critical load  
• Security and cybersecurity concerns  
• Integration with the distribution system  
• Can be challenging to understand existing and proposed energy resources and planning for future interoperability among microgrid components | • Municipalities are responsive to DOER incentives (e.g., Green Communities)  
• Integration of combined cooling, heat, and power (CCHP) to further increase energy efficiency and backup power capabilities  
• Assignment of one entity with primary control of development process and operation  
• Employ scalable technologies, like solar + storage | • How do we determine a path forward for a clean mix of assets?  
• Will CHP become a stranded asset in the long-term?  
• What practices are replicable from the ACES and other demonstrations?  
• How can systems be sized to take advantage of multiple use cases that have competing interests?  
• What constitutes “feasibility”? | • Case studies for successful utility or public/private partnerships and instances of successful optimization for different applications (e.g., resilience, ROI, climate)  
• Help define a pathway for data collection and sharing to set standards and establish a value of resiliency  
• Define flexible interconnection pathways and studies for microgrids  
• Create incentives for pre-disaster planning  
• Create TA teams to help scope microgrid projects  
• Develop integrated program with aspects of META, Green Communities, and MVP  
• Guidance on critical load assumptions for MA building types |
<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Challenges</th>
<th>Best Practices</th>
<th>Questions</th>
<th>Resources</th>
</tr>
</thead>
</table>
| Siting     | • Location affects technology that can be applied  
            • Safety of systems at the location in question  
            • Communication between energy planners and emergency power departments to serve critical loads or vulnerable populations  
            • Crossing public way challenges  
            • Projects in low load zones may require an upgrade to the substation, which adds project costs | • Single campus and MUSH market tend to produce successful projects  
            • Get the utility on board with project to increase success | • None presented | • Work to map hazards and prioritize loads and populations  
            • Develop pathways to foster utility collaboration |
Other

- Projects with **multiple owners are complex**, as each party has different needs, perspectives, and authority
- Determining if a project should be **approached collectively or individually**
- Consideration of **future loads and demands**, in light of building electrification and other electric demands (e.g., EV charging)
- **Including a lawyer** or someone experienced with energy law/regulation in project development
- Approach projects with an **open mind** and broad brainstorming at the outset
- Who is responsible for **operation and maintenance** of microgrids?
- How can microgrid development be guided in a way that **does not exclude** stakeholders or the broader community?

- Creation of an “**equity adder**” incentive for resilience applications
- **Introduction of incentives for private projects** that will deliver public benefits
- Develop a database of information to assign a **value of resiliency**
<table>
<thead>
<tr>
<th>Challenges</th>
<th>Success Factors</th>
<th>Questions</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>- High costs inhibit or discourage customers from investing in microgrids</td>
<td>- Developing a clear, narrowly scoped problem to address with a microgrid</td>
<td>- How do we help microgrid proponents estimate future loads?</td>
<td>- Urge the DPU to launch a microgrid investigation and act upon components of the existing utility grid modernization plans</td>
</tr>
<tr>
<td>- Interconnection of systems</td>
<td>- Actively engaging stakeholders at the outset of the process</td>
<td>- How should microgrid contracts be written?</td>
<td>- Develop state-level guidance on value of resiliency and other core principles (e.g., efficiency first)</td>
</tr>
<tr>
<td>- High level of interest in microgrids without defining a problem to be addressed</td>
<td>- Streamlined permitting process</td>
<td>- How should we continue to educate people about the potential and future of microgrids?</td>
<td>- Create pathways for identifying existing resources that can be utilized</td>
</tr>
<tr>
<td>- Difficulties with public-private partnerships and legal considerations</td>
<td>- Clear construction and implementation timelines</td>
<td>- Does there need to be a universal definition of “microgrid”? If so, what?</td>
<td>- Implement pilots and test cases on the ground</td>
</tr>
<tr>
<td>- No quantifiable model to account for resiliency</td>
<td>- Involving experts in an “on-call” capacity from start to finish to assist with complex issues that may arise</td>
<td>- How should the costs of microgrid infrastructure (e.g. distribution infrastructure) be allocated between utilities and users? Should the infrastructure construction be supported with public funding?</td>
<td>- Establish energy storage incentives to improve value proposition</td>
</tr>
<tr>
<td>- Deciphering the best way to balance between short-term urgency and long-term goals (e.g., resiliency, emission reduction)</td>
<td>- Identifying and leveraging local resources</td>
<td></td>
<td>- Provide outage duration guidance and value-stack clarification</td>
</tr>
<tr>
<td>- Lack of consistency in nomenclature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Need for legal templates for billing and ascribing responsibilities for outages</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

The combination of panelist presentations, moderated panel discussion, and facilitated table discussions surfaced a series of key criteria for microgrid project identification and implementation. Participants
agreed that establishing a clear goal for projects is an essential first step for ensuring the microgrid is designed to serve the appropriate functions, and that site selection, generation resources, and value proposition are be aligned with the stated objective. Early stakeholder engagement, especially for more complex community microgrid projects, was also highlighted as an important aspect. As resiliency is a key driver for microgrid projects, participants expressed the need for guidance on quantifying the value of resiliency to aid the economic viability of these projects.