One of the most persistent barriers in the innovation lifecycle occurs during the transition from lab-scale prototyping to commercial scale manufacturing. For this reason, prior to launching operations, further research was performed to begin to define the critical technology challenges impeding the development of US advanced manufacturing in energy storage.

In late 2013, over 20 senior energy storage company executives and other stakeholders gathered at Berkeley Lab to identify their shared pre-commercial technical challenges in six broad topic areas.

A common user facility to test ideas and standardize processes
The technical requirements, financial resources, and time required to develop individual steps in a pilot line is a significant hurdle for small and medium size emerging companies developing new batteries. In particular, participants advocated for a commonly accessible facility that could leverage the SEMATECH experience of the semiconductor industry. Examples of the types of equipment and services desired include:

- Shared process, analytical, and testing equipment to reduce capital equipment investment costs,
- A library of testing protocols, and
- Standard components and formulations for non-core process steps

New modeling techniques
Currently available models are generally a poor predictor of manufacturing costs and product performance. New modeling techniques that better bridge between the "art" and science of manufacturing would:

- Enable the modeling of process flow and costs,
- Create and validate accelerated life testing protocols,
- Reduce prototype development costs by developing credible applications for computer based battery designs, and
- Better link design to ultimate performance earlier in the product development cycle

New cell designs and associated standardized processes
In particular, participants identified the need for:

- Module level innovation to increase safety of batteries,
- Enhanced internal sensing capability in individual cells,
- Standardized pouch packaging forming equipment and processes,
- Alternative techniques to stamping of battery plates, and
- Less expensive and short-free high power large format batteries.

Refined metrology to ensure quality and high yield
Current battery manufacturing metrology fails to ensure consistency between inputs and outputs. This has resulted in unacceptably low yields in the manufacturing line. Participants advocated for new metrology standards that would better link source materials to the quality of the final product.

Application of modern manufacturing techniques from other industries
Battery manufacturing is still largely based on 60-year-old process that is labor and time intensive, resource inefficient, and requires large plant footprints. Participants advocated for further exploration of:

- Standardized six sigma and lean manufacturing processes leveraged from the experience of other industries,
- Three dimensional uses of space in manufacturing processes that could dramatically reduce manufacturing plant footprints, and
- Modular manufacturing design that could drive toward a goal of one MWh/year plan inside a 40 foot container".

Reduction in manufacturing process steps
A large number of individual steps are still required in the standard battery production process. If not addressed, it limits the potential impact of the most efficient modern manufacturing standards. While a detailed analysis of each process step is required to develop solutions, participants prioritized several areas of inquiry:

- Identifying and increasing the yield of bottleneck process steps,
- Formation of a battery is a particularly slow and expensive process,
- Need to move away from slot die coating to make electrodes, and
- More efficient use and re-use of the energy required for formation.

While the discussion at this meeting was focused on technical issues, a repeated theme during the discussion was the importance of creating a framework to enable more effective collaboration and to help secure resources to address them. Participants also repeatedly identified workforce training and standards and certification issues as critical to ensuring the development of US advanced manufacturing capacity. The consistent interweaving of technical, workforce, and ecosystem issues also occurred throughout the two-year market analysis process. As a result, it is clear that any solution to address the issues surfaced require the creation of an institutional framework that engages the entire value chain across the entire product development cycle from "innovation to installation."