IMPLEMENTATION OF A MOBILE BATTERY by COMMONWEALTH ASSOCIATES

Commonwealth
ENGINEERING + CONSULTING

Jack McCormick
Commonwealth Associates, Inc.
jack.mccormick@cai-engr.com

Consumers Energy

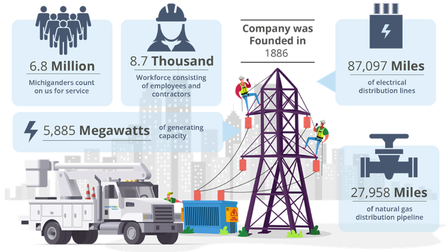
Andre Kostromsky
Consumers Energy
Andrey.Kostromskoy@cmsenergy.com

WHAT IS A BESS?

BESS - Battery Energy Storage System. From a utility perspective, this is a large battery, often 1 MW or larger. On a smaller scale, a BESS is also the TESLA Power Wall or Generac PWRCELL that we find in our homes. A BESS is a way to store energy when it is not needed and then utilize the energy at opportune times.

WHO IS CONSUMERS ENERGY?

Consumers Energy has been working for Michigan families and businesses for more than a century. In 1886, they established in Jackson, Michigan where they are currently headquartered. They are the principal subsidiary of CMS Energy.



BESS DEFINED - NFPA 855

Mobile Energy Storage - Energy storage system capable of being moved and utilized as a temporary source of power.

Portable Energy Storage - Energy storage system suitable to be lifted and moved by a single person without mechanical aids and not permanently connected to an electrical system.

Stationary Energy Storage - Energy storage system that is permanently installed as fixed equipment.

BENEFITS OF BATTERIES INCLUDING MOBILE & STATIONARY

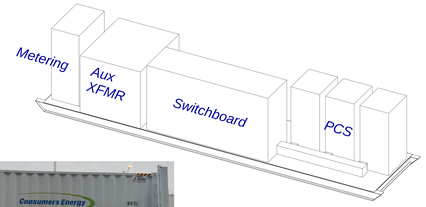
- Educational & Research
- Energy Arbitrage
- Peak Shaving
- Grid Stability
- Asset Deferment

WHY DID CONSUMERS ENERGY INVEST IN A MOBILE BATTERY?

Asset Deferment. A substation in Consumers Energy's network was tracking to experience an overloaded condition a couple hours per day. Rather than rebuilding the substation, Consumers Energy was able to implement a BESS quicker with an EPC contract. The goal is to plan for a substation rebuild that has the capacity for current and future load. At that time, the BESS can then be relocated to aid the Consumers Energy network elsewhere.

WHAT MAKES A BESS MOBILE?

AC System - The AC system was built on a steel skid that can be picked as a single unit. Wiring component to component on the skid can remain intact, which reduces the time needed to relocate the BESS.



DC System - The DC system was built into a 20' shipping container, which included racking, modules, BMS, safety systems, and lighting. The entirety can be picked as a single piece of equipment and is under road weight restrictions.

HOW LARGE IS THEIR MOBILE BATTERY?

2 MEGAWATT / 8 MEGAWATT-HR

8 each 20-ft Containers Batteries

1 Integrated Power Conversion System Skid
- Power Conversion system coupled to transformer
- Aux power distribution gear

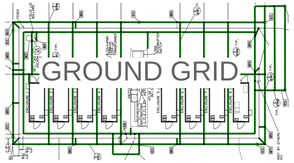
ARE ANY COMPONENTS NOT MOBILE?

Underground, three components are not likely to make the move when it is time to move the batteries and integrated skid:

1. **Underground conduit and cable system** - connections from battery to skid are from the bottom of each container and skid. To make these connections, underground conduits were used for a site that could be maintained.

2. **Foundations** - concrete foundations were most desirable to achieve the project goals.

3. **Ground Grid** - a grounding study was completed to ensure the site was safe from step and touch potential. The grid extends throughout the site and beyond the fence. All pieces of equipment and fence are connected to the grounding grid.



DRONE OVERVIEW

HOW DID COMMONWEALTH ASSOCIATES ACCOMPLISH THE MOBILE BATTERY?

Battery modules were shipped within containers that were outfitted with battery management systems, lighting, fire detection, and fire suppression. The modules were factory wired to a DC combining disconnect. The battery containers were picked from delivery trucks and placed onto foundations.

The remainder of the equipment was shipped to a skid integrator to mount and wire the equipment that was on the skid. The completed skid was shipped to the site, picked, and placed on the foundation system. The battery containers were then connected to the PCS skid and the PCS skid connected to a local distribution network.