Utility Scale Lithium-Ion Battery Storage System

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Project Overview

- BESS (battery energy storage system) are battery containers that are used to store access energy at peak time to be used later.
- Can be used to storage energy generated from renewables or from the grid for grid reliability

Figure 1: Battery Energy Storage Container

Problem Statement

- With the rise in energy needs, especially with renewable energy, there needs to be a way to storage the access energy you generate from your renewable energy during peak times, (sunny, clear day) and use that stored energy at time when peak conditions are not met (such as a cloudy, rainy day).
- Everyone needs energy, whether it be to turn on the lights, run the dish washer, or store food in a fridge. If there is some kind of widespread outage, the need for battery energy storage systems can help grid reliability during catastrophes.

Figure 2 Residential Solar Panel Usage

Users

- Jeff the Jerk
  - Over-user of energy
  - Owns many electric vehicles
  - Wants to find ways to save money on the excessive usage of electricity

Users

- Construction Conner
  - Works on the construction of BESS
  - Is an average man with a family and college degree
  - Is very focused on safety regulations
  - Hates it when equipment get damaged

Users

- Michelle From MidAmerican
  - Leads the team of engineers on the BESS project development.
  - Has passion for renewable energy
  - Needs a team of innovates who care about developing a system that can impact the world

User Needs

Jeff the Jerk

- Represents an individual who has a need for a BESS.
- Needs a way to save money and lower their electricity bill.
- Has a need to be able to charge their vehicles and go about life even during an outage.

Construction Connor

- Represents an individual who directly interacts with the products and installation the BESS.
- Needs a safe working environment.

Michelle from MidAmerican

- Represents an individual who oversees a team designing this system that can be used commercial or residentially.
- Need accurate diagrams to successfully design a product that can be reliable and useful for the general population.

Figure 3: solar farm + BESS

Conclusion

- There is a need for BESS in today's world with the rise in renewable energy. Having a system that can charge and discharge will help make the switch to renewable energy more likely as well. Not only that, it can also help with grid reliability.

Citation

- Figure 1: *Amount of energy storage systems or battery container units with solar and turbine farm*. *Https://Www.Bizjournals.Com/Portland/News/2023/05/31/Pge-Battery-Hillsboro.Html*. Accessed 3 Mar. 2024.
- Figure 2: *Innovative storage solutions will be critical to ensuring effective integration of renewables into the grid. Https://Www.Pv-Magazine.Com/2021/04/07/Innovations-in-Battery-Storage-Key-to-a-Solar-Powered-Future/*. Accessed 3 Mar. 2024.
- *Figure 3: The Clark Road project, one of two solar + storage projects that Nexamp has activated in Massachusetts. Image: Nexamp.* Accessed 4 Mar. 2024.