

EPIC

SYMPOSIUM

Broadening Storage Technologies Beyond Lithium-Ion

Moderator: **Edward Randolph**

Presenters: **Laurence Abcede, Richard Wirz, Philippe Bouchard, Rick Winter,
Byron Washom**



2019 EPIC Symposium Broadening Storage Technologies Beyond Lithium Ion



A  Sempra Energy utility[®]

Vanadium Redox Flow Battery Demonstration at San Diego Gas & Electric Company



Laurence Abcede
Distributed Energy Resources

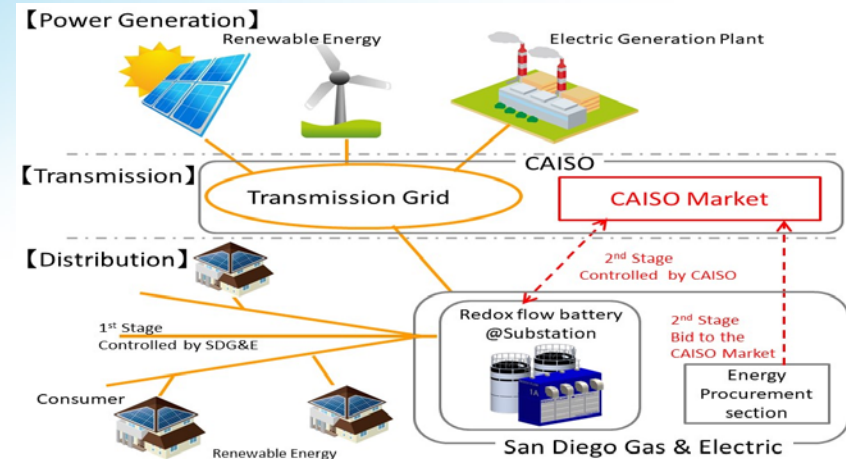
February 19, 2019

SDG&E / SEI VRF History



A Sempra Energy utility®

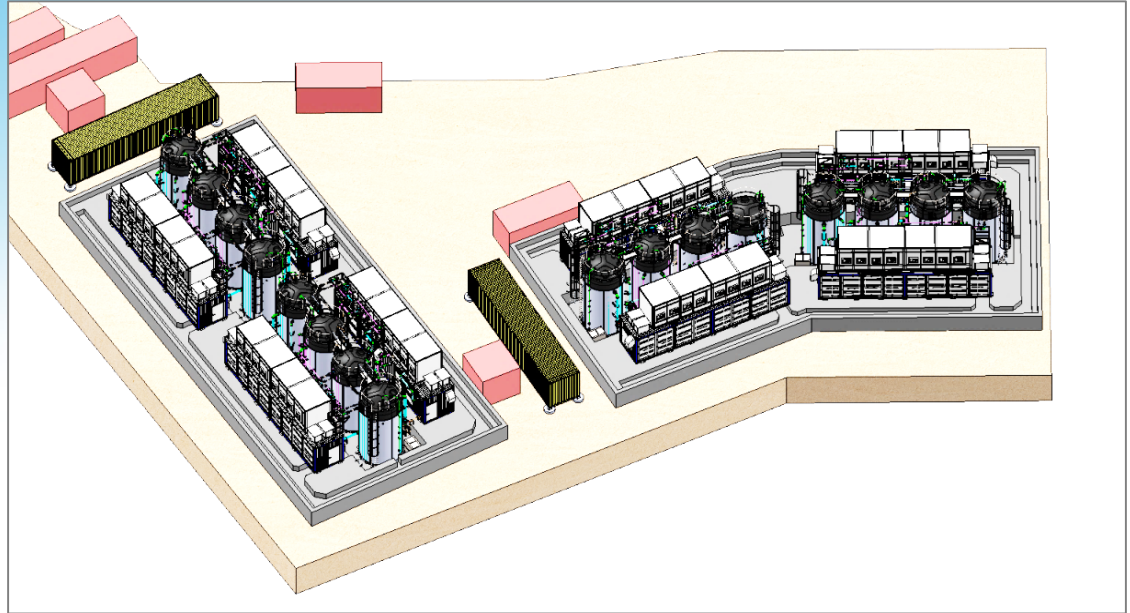
- The New Energy and Industrial Technology Development Organization (NEDO) and Sumitomo Electric (SEI), sought a California IOU partner for a United States demonstration project
- Provide a full-scale system, between 2-8 MW, to support any use case determined by the IOU
- SDG&E was chosen as the IOU member to partner with SEI.
- Miguel Substation in Bonita, CA was chosen as the most suitable location
- SEI and SDG&E signed an agreement on April 2016
- The VRF Battery was commissioned and fully operational on June 2017
- The VRF Battery is participating in the CAISO marketplace as of December 2018



Miguel Vanadium Redox Flow Battery Installation



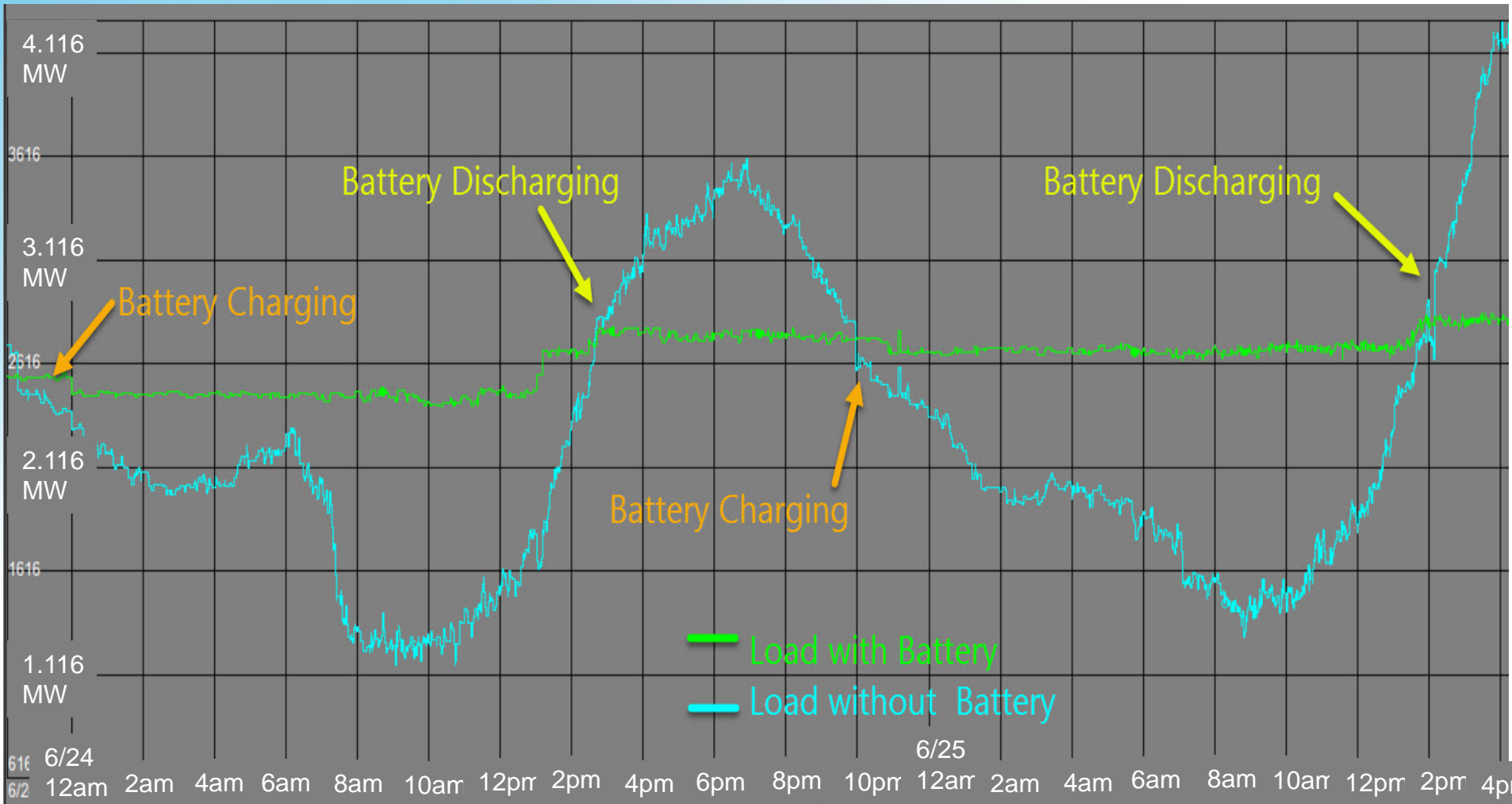
A Sempra Energy utility®



Example of Operation



A Sempra Energy utility®



Summary of Lessons Learned

Needs

- Multi-Purpose Asset
- Mitigate intermittency of PV
- Store excess renewables
- Ramp support

Demonstrate

- Limitless Cycles
- Long Lifetime
- Use of High Power PCS
- Efficiency Enhancement

Use Case Drives Technology Choice

- Power vs. energy
- Technology cost
- Technology safety



Questions?



A Sempra Energy utility®



Thank You

Laurence Abcede
SDG&E DER Manager

labcede@semprautilities.com