

ET Summit 2022

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DOE Grid-Interactive Efficient Building (GEBs)

Emerging Technology Demonstration

at the Judicial Council of California (JCC) – Santa Ana Appellate Court



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GEBS Demonstration Overview

- October 2019: DOE/GSA issued Request For Proposal for GEBS emerging technology demonstrations to show Energy Efficiency, Load Shed, Load Shift, Grid Services modulation.
- March 2020: AESC proposal was selected to leverage MelRok's Touch Energy Internet of Things (IOT) gateway to test GEBS load control hypotheses:
 - Energy Efficiency/Load Shift - Remotely optimize building ops: ~10% energy savings
 - Demand Response (DR) – Enable load shed w/out solar and battery storage: ~10% of load
 - Demand Response (DR) - Enable load shed for DR, w/solar and storage: ~40% of load
 - Resiliency – Enable additional hours of emergency islanded resiliency by deploying load control strategies
- Southern California Edison (SCE) was engaged as the local utility sponsor to cover the project implementation costs.

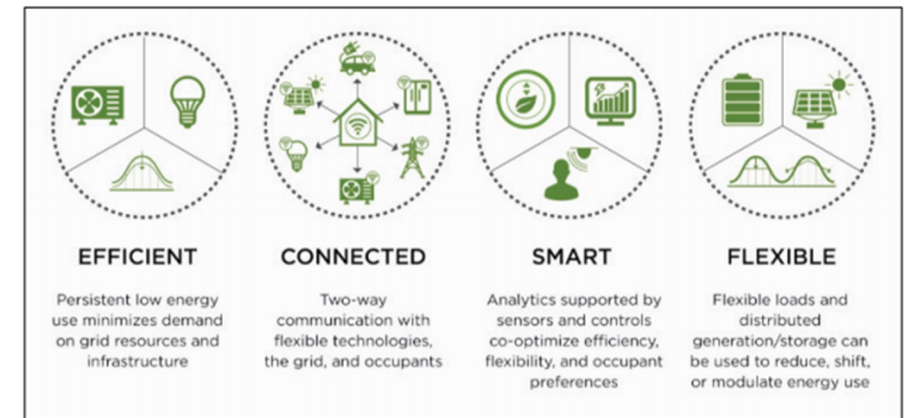
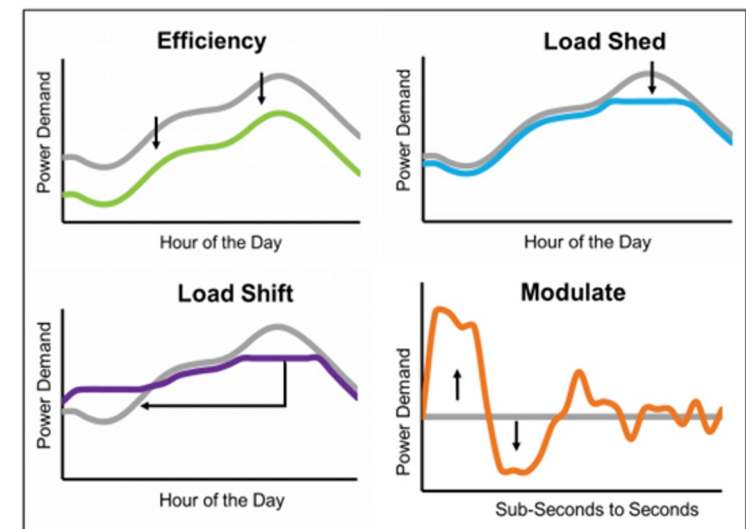


Figure III.1 Characteristics of Grid-Interactive Efficient Buildings



Project Site- JCC Appellate Court, Santa Ana

- Located in SCE territory
- 52,000 square feet, 3-story, built in 2009; Offices, Courtrooms, Library
- On SCE's TOU GS-1-E rate
- Heating Ventilation Air Conditioning (HVAC) - 2 boxcar air cooled HVAC units feeding a single duct Variable Air Volume; Johnson control BACnet Energy Management System type system.
- Solar – rooftop access, plus adjacent parking structure could offer additional solar potential



Technology Overview - Proposed Load Control

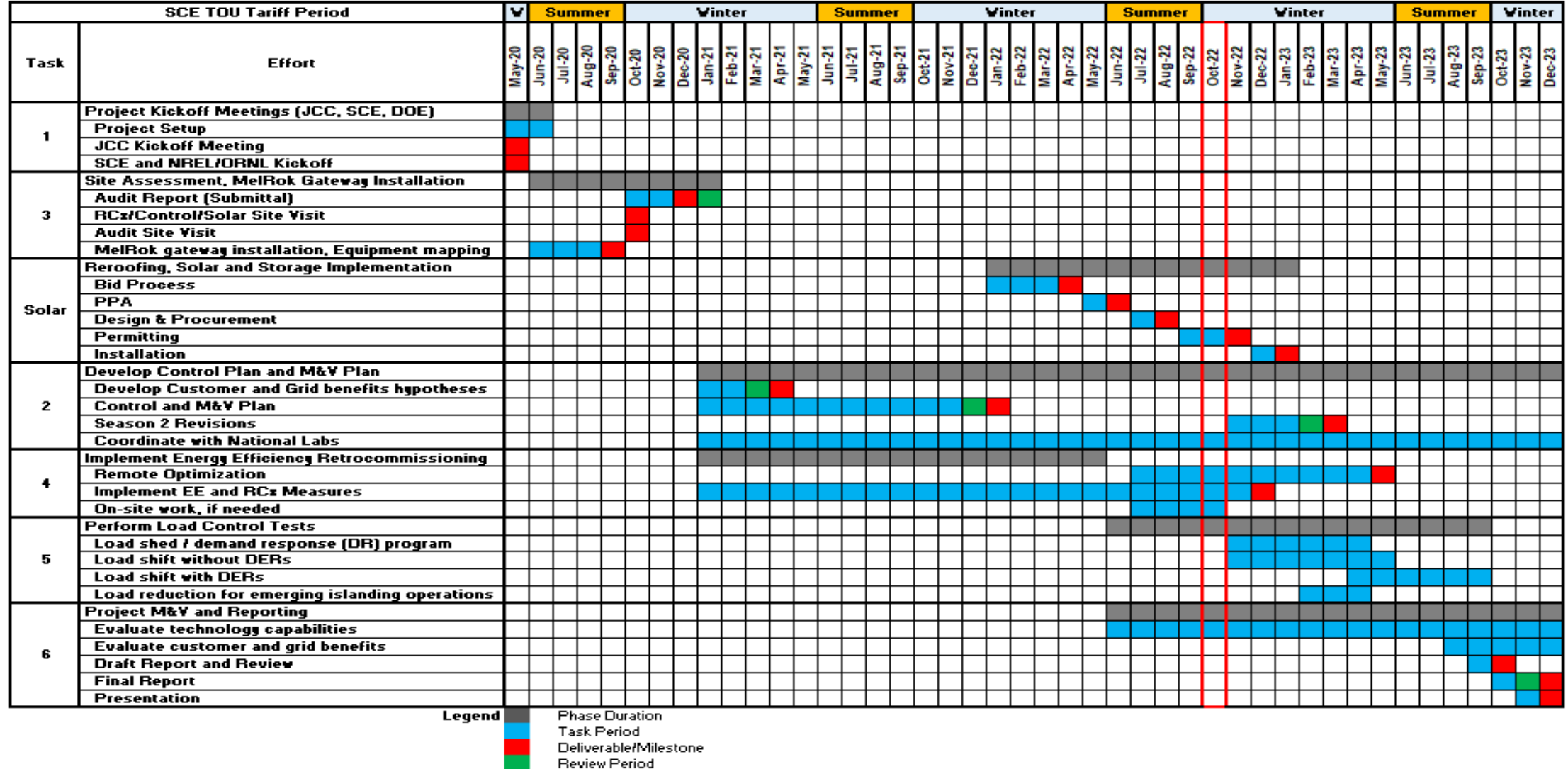
Setup

- Install solar, battery energy storage and potentially EV charging
- Install and configure MelRok Touch gateway to integrate DERs, HVAC, Lighting.
- Leverage MelRok SaaS to optimize building operation
- Define additional load shift strategies for deeper savings through forecasting building loads and solar generation w/ storage.

Optimization and Control Strategy Phases

1. Institute efficiency
 - via Energy Efficiency Audit, Retrocommissioning (RCx), and Monitor Based Commissioning (MBCx).
2. Test cost and GHG optimization
 - Static – based on Time of Use (TOU)
 - Exercise load shift strategies w/o DERs
3. Test dynamic/grid responsiveness
 - Dynamic - based on Day Ahead Hourly rate (SCE Real Time Pricing)
 - Implement load shift/shed strategies with and w/o DER
4. Implement DR program enrollment and assess demand response (Shed)
 - Auto DR
5. Deploy and test low-power building operating mode to extend resiliency operations

Current Status



Innovations & Barriers

Technology Innovation

- Low-cost gateway integrates and controls legacy building loads & DERs without full cost of a building automation system
- Enables automated control strategies via SaaS
- Predictive and grid interactive - OpenADR 2.0B
- Universal/Expandable/ 3P Compatible - Supports 3P APIs and applications to enable innovative control and operational strategies and applications.

Project Approach Innovation

- Targets medium commercial market customer and utility grid value propositions
- Comprehensive approach to value stacking - supports higher ROI and GEBS market scale.

Barriers to Date

- Covid-19
- Site Approvals
- Supply Chain issues for Solar and Battery
- NMEC plan approval

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