

# ET Summit 2019

Presented by



# Advanced M&V Field Results and Research

Jessica Granderson

Building Technology and Urban Systems Division

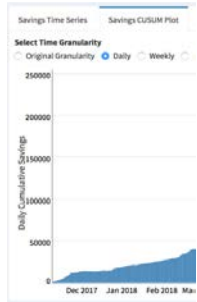
Lawrence Berkeley Lab

## Overview

- Lessons Learned From the Field - Value of Early Feedback
- Non-routine Events Research
- Application of NMEC for Grid-level Hourly Savings Shapes



## Value of early feedback on project performance



NRE?

Ability to identify  
underperforming projects  
and NREs within a few  
months

## Value of early feedback on project performance



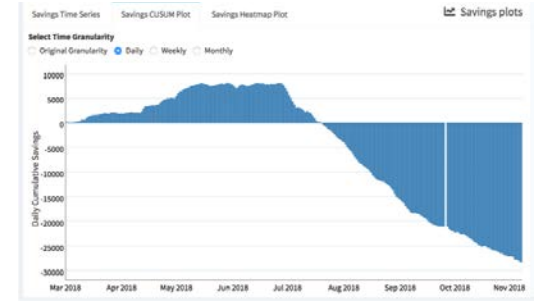
### The Good

- $\pm 20\%$  vs. ex-ante
- 84% realization rate



### The Odd

- $> 35\%$  below ex-ante
- 55% realization rate

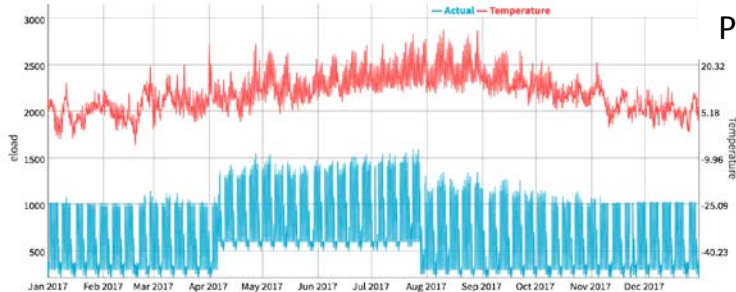
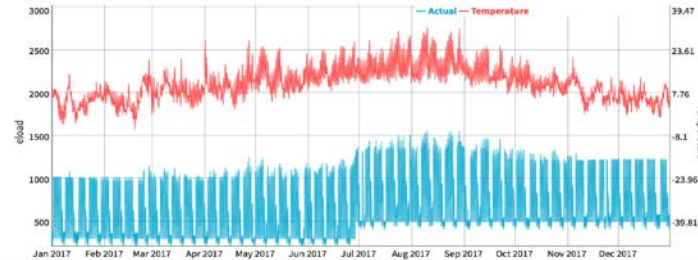


### The ??

- +253% to -184%
- 5% realization rate

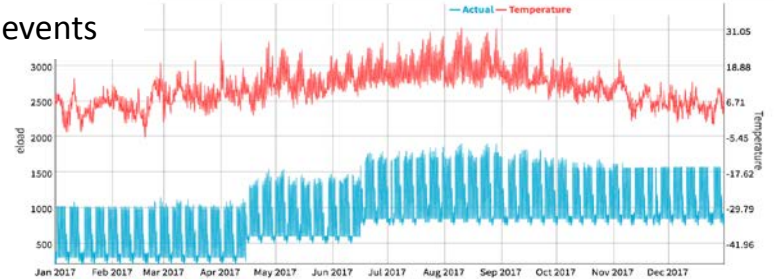
## NRE definition

- NREs cause changes in consumption that are not related to the installed measures, or variables already normalized for



Temporary event

### Permanent events



Two successive events

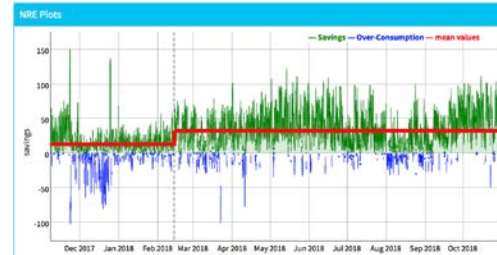
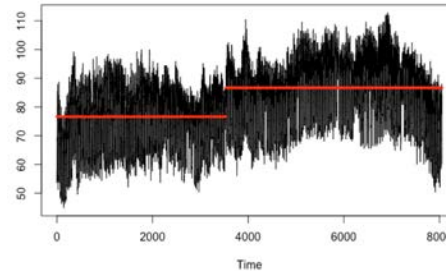
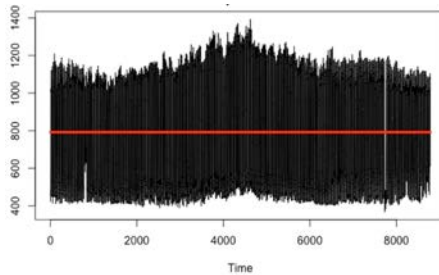
## Importance of NREs

- Present potential risk to NMEC savings claims
  - Over/under estimating savings
  - Cost and uncertainty associated with making complex adjustments
- We have collective experience, but not comprehensive data/research to assess risk
  - How frequently do NREs occur (and what types)?
  - Magnitude of impact?
  - Impact of aggregation to mitigate risks?

## Active research

- Statistical analytics to flag/account for NREs using meter data
- Visualization methods also being explored
- Analysis of load profiles to bound frequency of occurrence

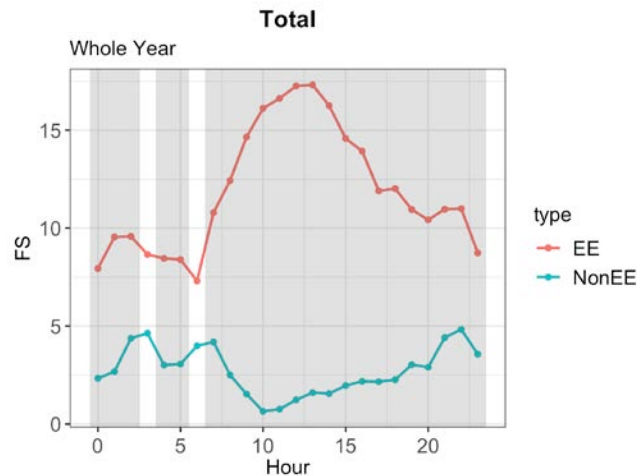
Looking for partners!



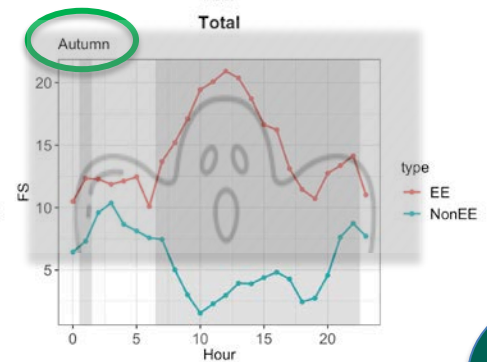
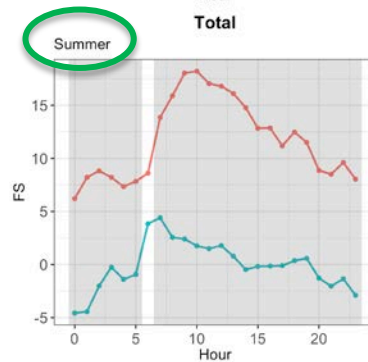
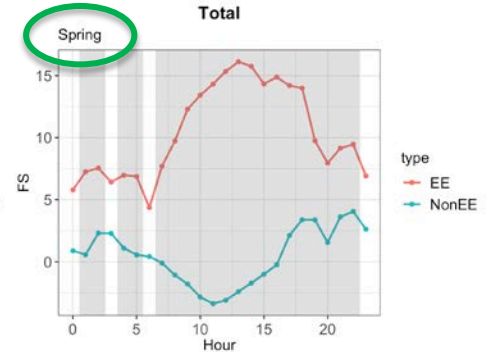
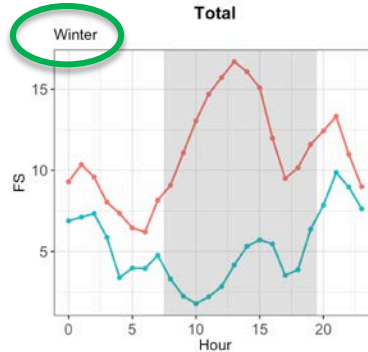
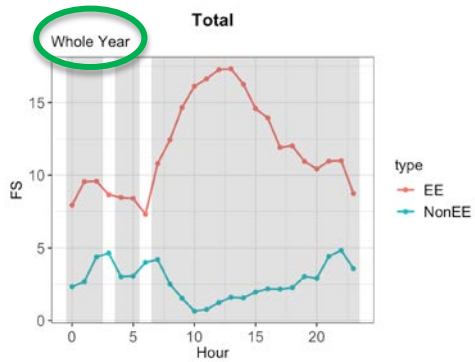


## Hourly grid-level DSM savings shapes

- Large utility data comparison:
  - Program participants (“EE”)
  - Non-program participants (“NonEE”)
- Hourly baseline model for EE and for NonEE
- Baseline 2015, analysis period 2018
- Plotted % savings for each hour of day
- Gray shaded portions indicate hours for which EE svgs “above noise of NonEE” comparison
- Portfolio savings peak at 1PM, range ~7-17%



## Hourly grid-level DSM savings shapes by season



Plots shows impact by season;  
also looking at impacts at feeder  
and substation level



## Summary

- NMEC methods provide new ability for early EE performance feedback
- Broad suite of tools and guidance exists, body of documented examples is increasing
- NRE not new to NMEC, best practice and research solutions exist, implementation questions remain, e.g., when are they big enough to investigate and adjust?
- NMEC providing additional insight to grid-level considerations of time- and location-based savings, implications for NWA, 'duck curve' challenges

# THANK YOU!

---

**Jessica Granderson**

Deputy Division Director, Building Technology and Urban Systems

Lawrence Berkeley National Laboratory

[jgranderson@lbl.gov](mailto:jgranderson@lbl.gov)

<https://buildings.lbl.gov/emis/assessment-automated-mv-methods>