Accuracy of Existing Use Baselines, AKA Normalized Metered Energy Use

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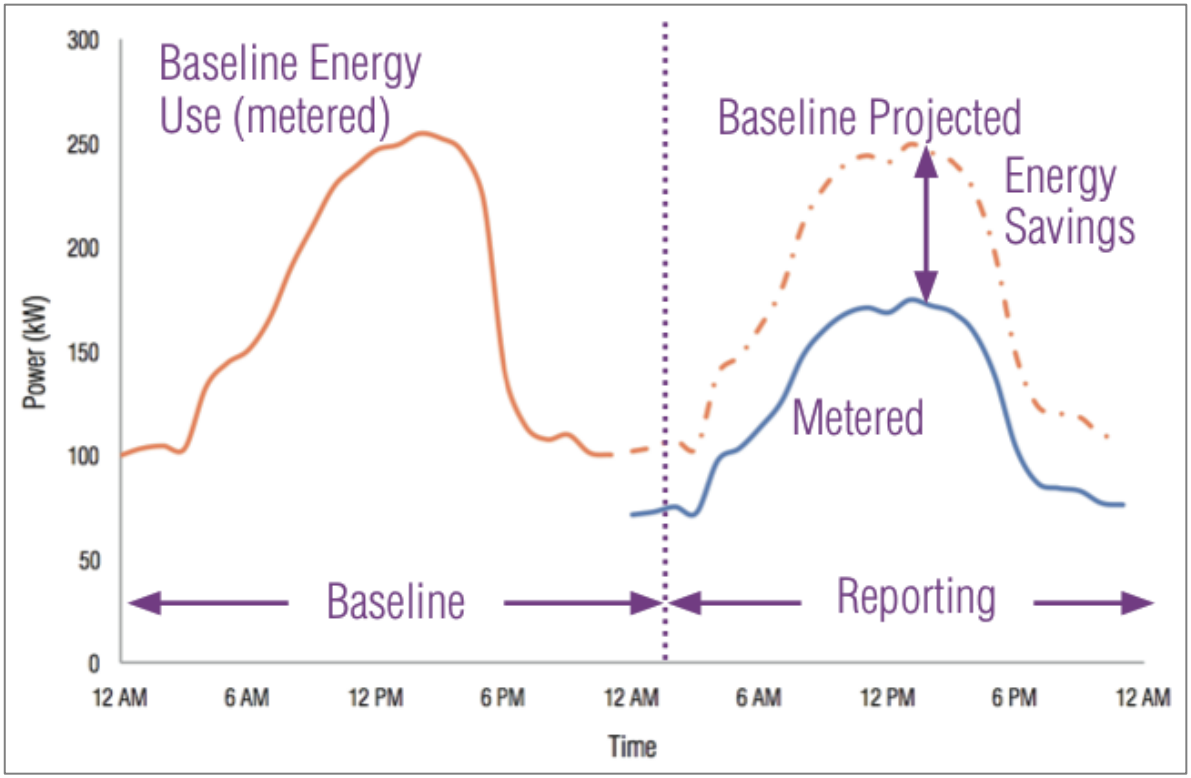
Savings Based on Normalized Metered Energy Use

Savings = (Baseline Projected Use) – (Metered Use) +/- (Non-Routine Adjustments)

Baseline Projected Use is the normalized metered use, and taken as the 'counterfactual'

Accuracy in savings driven by accuracy of baseline projection and NR Adjustments



Where is Existing Use Appropriate, Desirable?

- Complex, difficult to deem/calculate: operational, behavioral, SEM, commissioning
- Projects with multiple-measures, interactive effects, targeting deep whole-building savings
- Where we want to track gross savings: pay-for-performance, GHG reductions, customer-level savings, ongoing feedback vs. expected savings

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Accuracy of Baseline Projection

- Tested accuracy of baselines in proprietary tools and open standard baselines against data set from 500-600 untreated buildings
  - Tools used **to ID measures and quantify savings**

- Given 12mo whole building interval data, predicted 12mo of energy use
  - Within {-1, 5}% error for a full half of the buildings, CV(RMSE) <u>well</u> within ASHRAE Guidelines, errors smaller when aggregating buildings into portfolio

- No attempts to refine models based on expertise, knowledge of buildings, additional explanatory variables
  - Floor of accuracy

Research Contributions, Implications

- Documented and applied transparent methodology to test accuracy of existing use baselines
  - Used by PG&E to pre-vet tools and M&V approaches, replicated by NEEA for residential
- Demonstrated errors on order of few percent for *many buildings*, even without expert customization or tailoring
- Methodology can be replicated to evaluate M&V plans, target/screen buildings that are a good fit

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Research Next Steps

- Partner w utility/implementer/evaluator combos to apply meter-based savings methods to *past program data*
  - What uncertainties do we get?
  - How do we practically handle (non-routine) adjustments?
  - What are time/cost savings vs. more engineering intensive approaches

- Requirements for uncertainty and confidence – how good is good enough, given and with respect to, other uncertainties in evaluation?

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