UNIQUE INSIGHTS FROM USAGE DATA

LEVERAGING SAVINGS MEASUREMENT SOFTWARE

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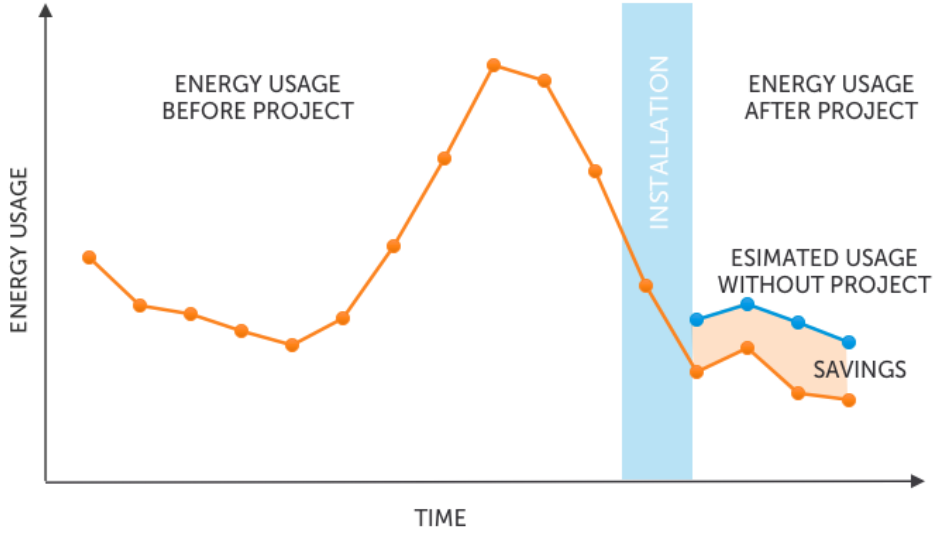
Why Look to Usage Data for Insights?

What is this savings information used for?

Historically, billing analysis has been manual, expensive, & selectively applied

- Key insights remain hidden
  - Who is a good fit for specific programs?
  - How are measures performing?
  - How do various factors impact results?
- What if you could see program impacts at each meter, continuously?
  - Strengthen QA/QC
  - Continuously improve programs
  - Trumpet success to customers

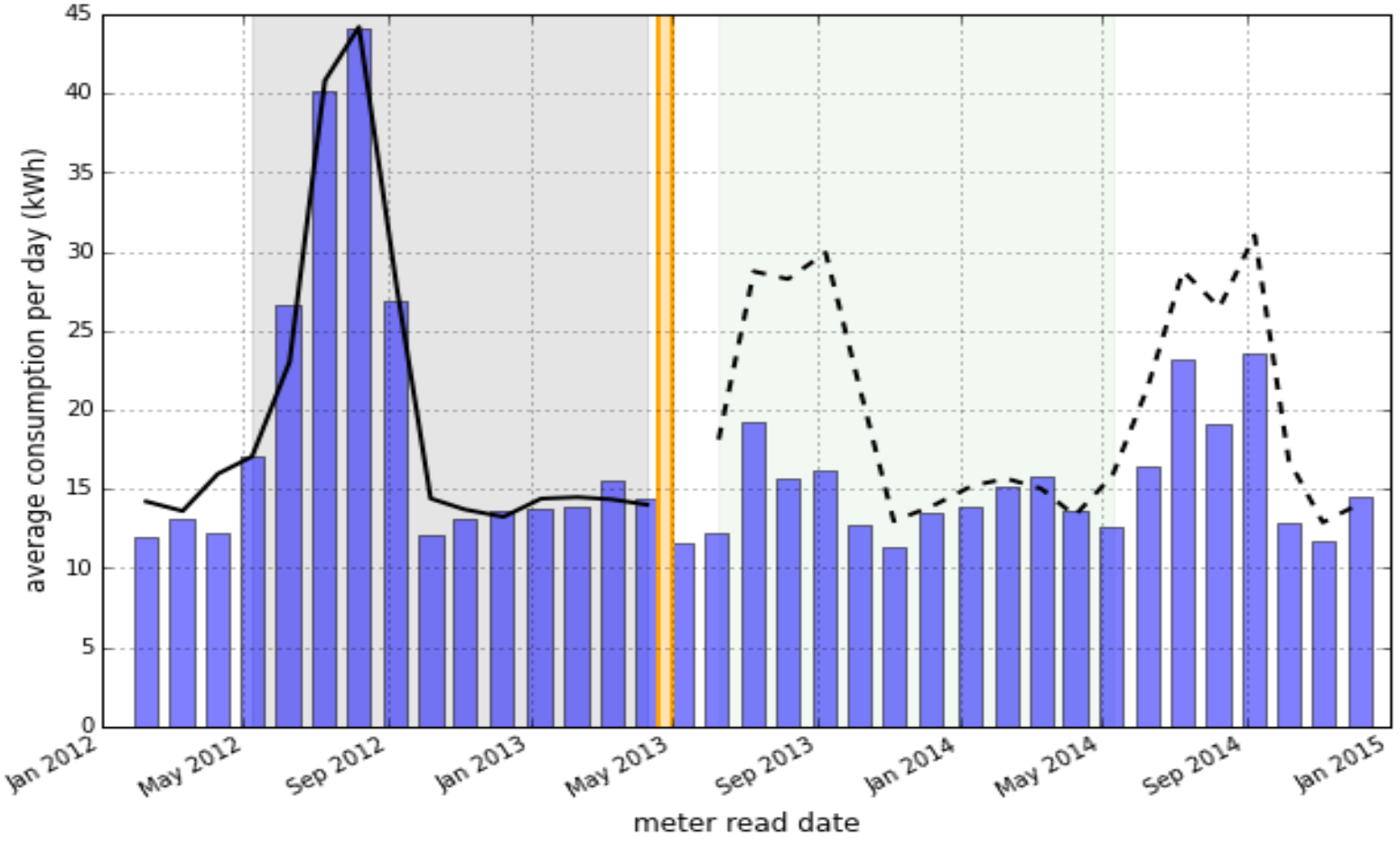


This is now possible. **Ameren Missouri** and **EnergySavvy** ran a historical study using **EnergySavvy's** Optix Quantify savings measurement software.

HOW IT WORKS

Basic Steps of a Billing Analysis

Calculating savings based on energy usage



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Analyze a Comparison Group

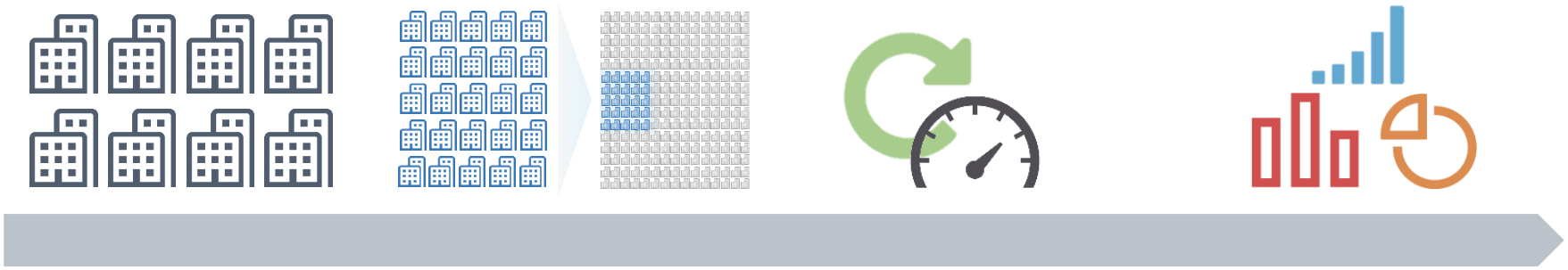
- Weather and projects aren't the only things that can affect energy usage
  - e.g. In an economic downturn or natural disaster, everyone uses less energy
  - Realization Rate, Free Ridership, Spill Over
- Apply the same models to entire population of non-participants

- Do this automatically and continuously for every projects in a given program.

Putting It All Together

Producing accurate and unique insights

EnergySavvy's Optix Quantify: savings measurement software



Billing analysis on **each** project in the program

Comparison group adjustment to account for population-wide trends

Automatically, **continuously** update calculations as new data become available

Slice and analyze results to identify factors impacting performance

Potential Outputs

What is this savings information used for?

Continuous monitoring and program improvement, e.g.:

- Identify factors – measures, trade allies, usage, locations, etc. – that are contributing to over- or under-performing projects
- Catch issues before they are identified in third-party evaluations
- Remotely monitor thousands of projects
- Target on-site QA/QC inspections, internal auditing, implementer/trade ally management
- Improve the TRM through strategically-directed research
- Notify customers proactively of their savings progress (on the roadmap)

Objectives of Ameren Missouri Optix Quantify Historical Study

- Streamline EM&V processes and reduce overall costs for future programs
- Identify likely drivers of variance in the program and measure-level realization rates.
- Demonstrate the ability to rapidly evaluate new programs/measures.
- Automatically and continuously calculate metered savings.
- Identify and diagnose program performance issues during the program year.
- Reduce low-value manual work associated with EM&V.
- Provide EnergySavvy with objective product feedback.

Ameren Missouri / EnergySavvy Study Timeline

- **May 8** Data review & analysis begun
- **Aug 3** Shared initial results
- **Aug 17** Shared trial web app, received feedback
- **Sept 3** Deep-dive into methodology details
- **Sept 16** Quantify use cases – tool for program improvement
- **Oct 5** Final deep-dive analysis

Ameren Missouri / EnergySavvy Study Results

From the 2013 Ameren Missouri CoolSavers Program

Directly Analyzed

7,263 homes **22,526 comparison homes**

Measure Findings

- ASHP deemed savings can be higher than a home's typical usage (!)
- Single measure projects seem to be outperforming multiple measure projects

Contractor Findings

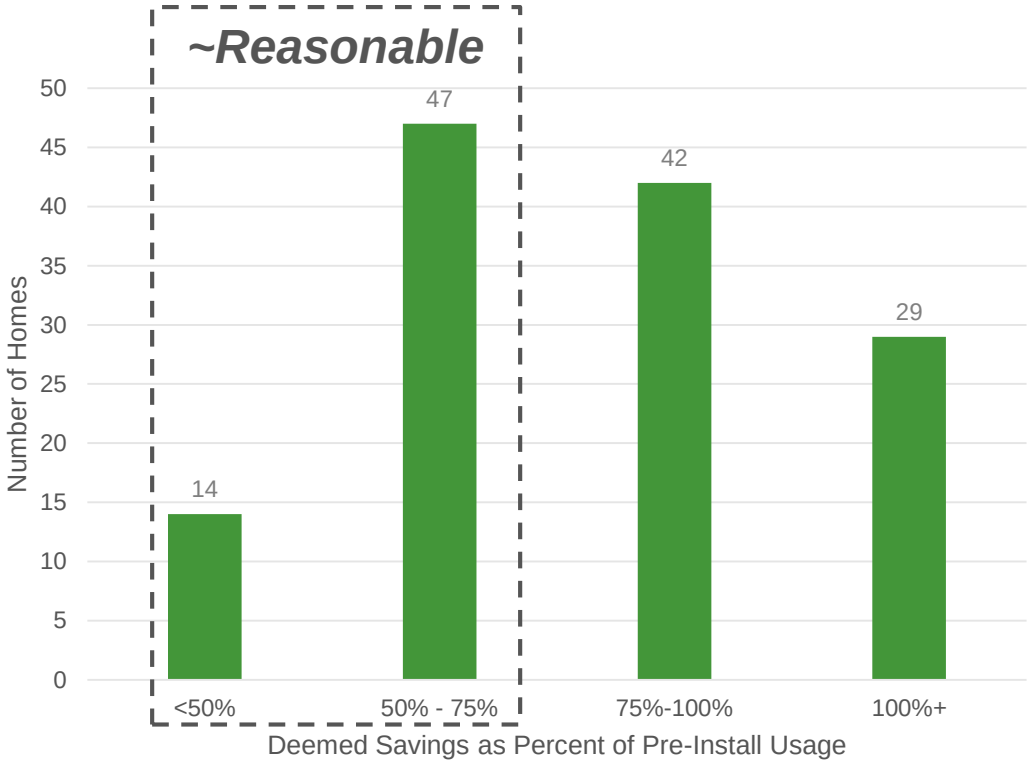
- One contractor's savings performance far exceeds others
- Largest contractor getting very poor savings performance

Timeliness of Insights

- Each of the above insights would have been available mid-way through the PY

ASHP–Electric Furnace Early Replacement

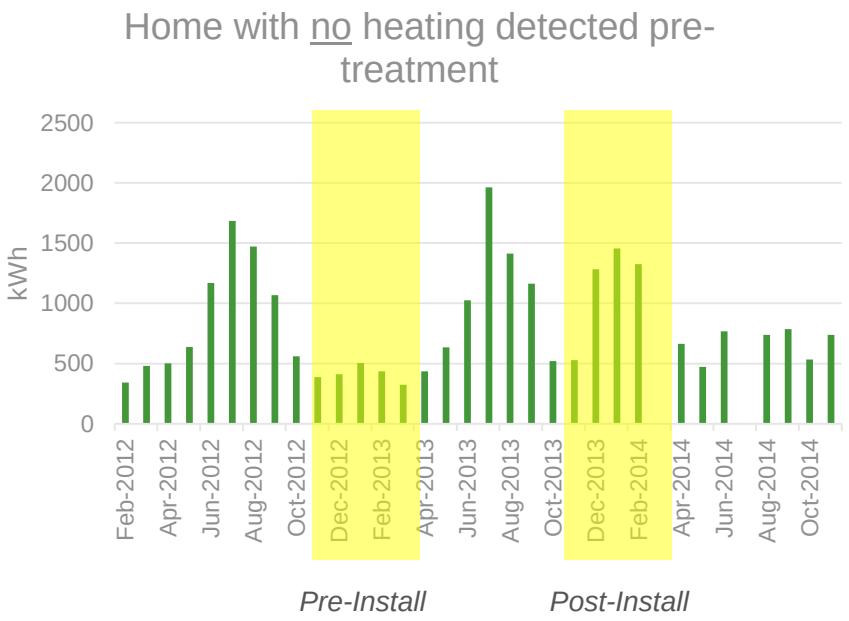
- Deemed savings values very high compared to typical annual usage

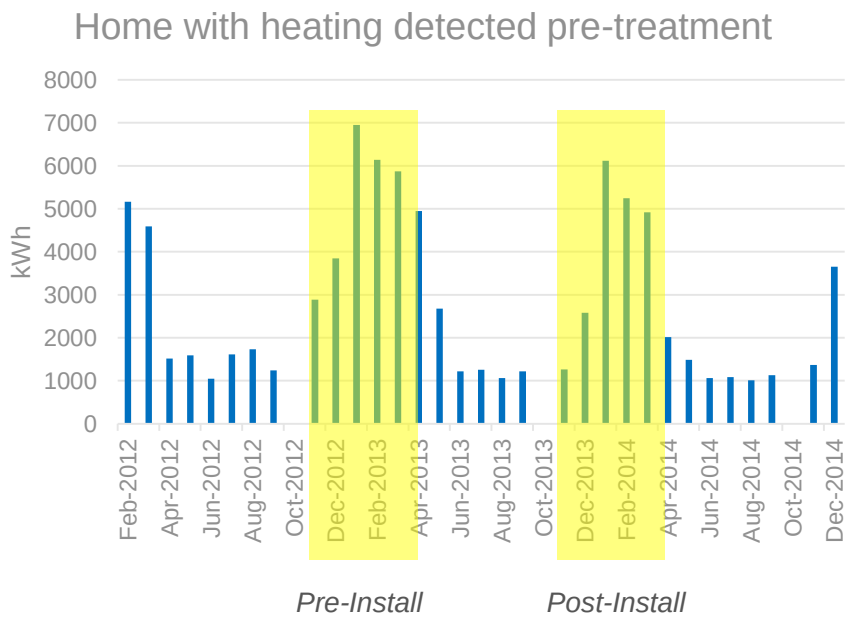


- **Take-away**: The deemed values for this measure are too high, and the evaluated results are not accounting for real-world feasibility
- 29 (of 132) homes (**22%**) had deemed savings **higher** than the home's typical annual usage
- 42 **(32%)** of homes would have to save more than 75% of their annual usage.
- **6%** of the total deemed savings for homes with this measure were **impossible, greater than 100%**

ASHP–Electric Furnace Early Replacement

- Usage data shows some homes weren't using much electricity to heat





- The one with electric heating has the highest usage in winter.
- The one without actually increases usage in winter after the ASHP.

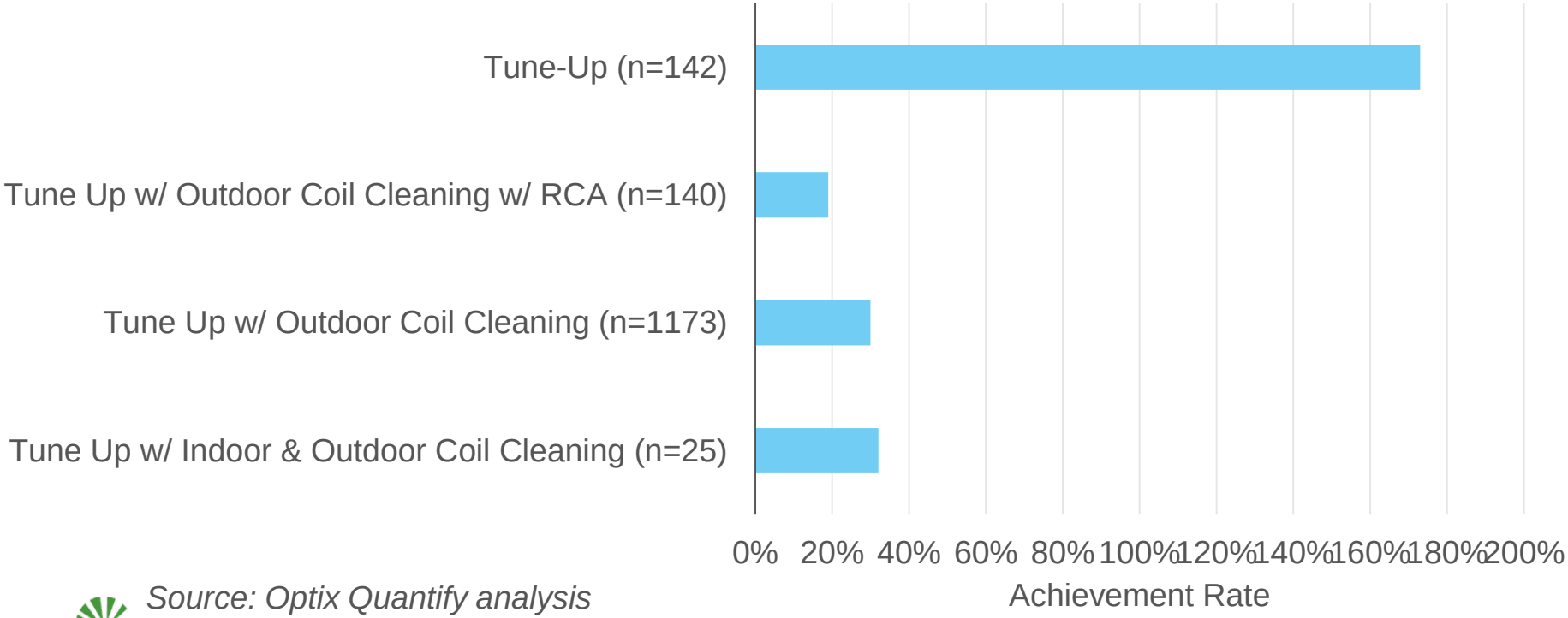
Interactive Effects: CAC 14 SEER

- Optix Quantify found examples of measures that may behave differently when installed together. This is something Ameren MO could use to further TRM research.
- For example, CAC 14 Early Replacements perform better on their own than when combined with other measures.

Measure	Achievement Rate
CAC 14 Early Replacement	**48%** ± 6%
CAC 14 ER *with* Programmable Thermostat	35% ± 5%
CAC 14 ER *with* Fan Replacement	35% ± 11%
CAC 14 ER *with* Fan and Programmable Thermostat Replacement	34% ± 6%

Interactive Effects: Tune-Ups

- Tune-ups alone outperformed combination measures
  - All tune-ups saved on average ~270 kWh per home.
  - Low achievement rates for measures where ex ante values are high
    - E.g., Expected savings for Tune-up w/ outdoor (condenser) coil cleaning is 833 kWh/home. Quantify identified 254 kWh/home.



Source: Optix Quantify analysis

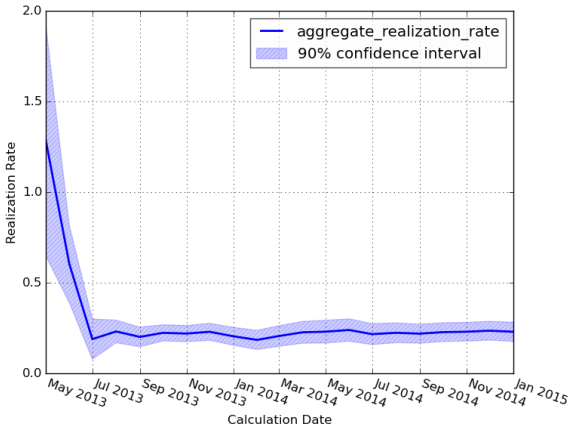
Contractor Performance

- Most prolific among worst performers, looking at usage data

Contractor A

581 analyzed projects

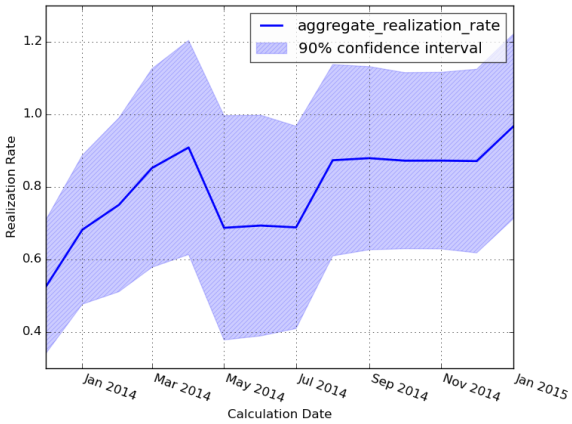
Performance: 19% ± 11%



Contractor B

28 analyzed projects

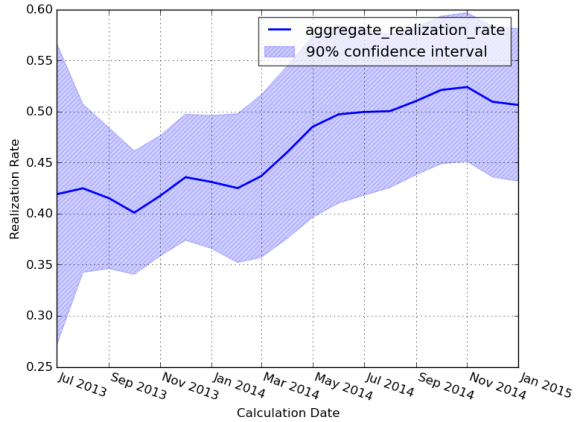
Performance: 91% ± 30%



Contractor C

39 analyzed projects

Performance: 42% ± 15%



Example: Contractor Performance

Looking from a measure mix perspective

Contractor D

1057 analyzed projects

Performance: 23% ± 5%

Contractor E

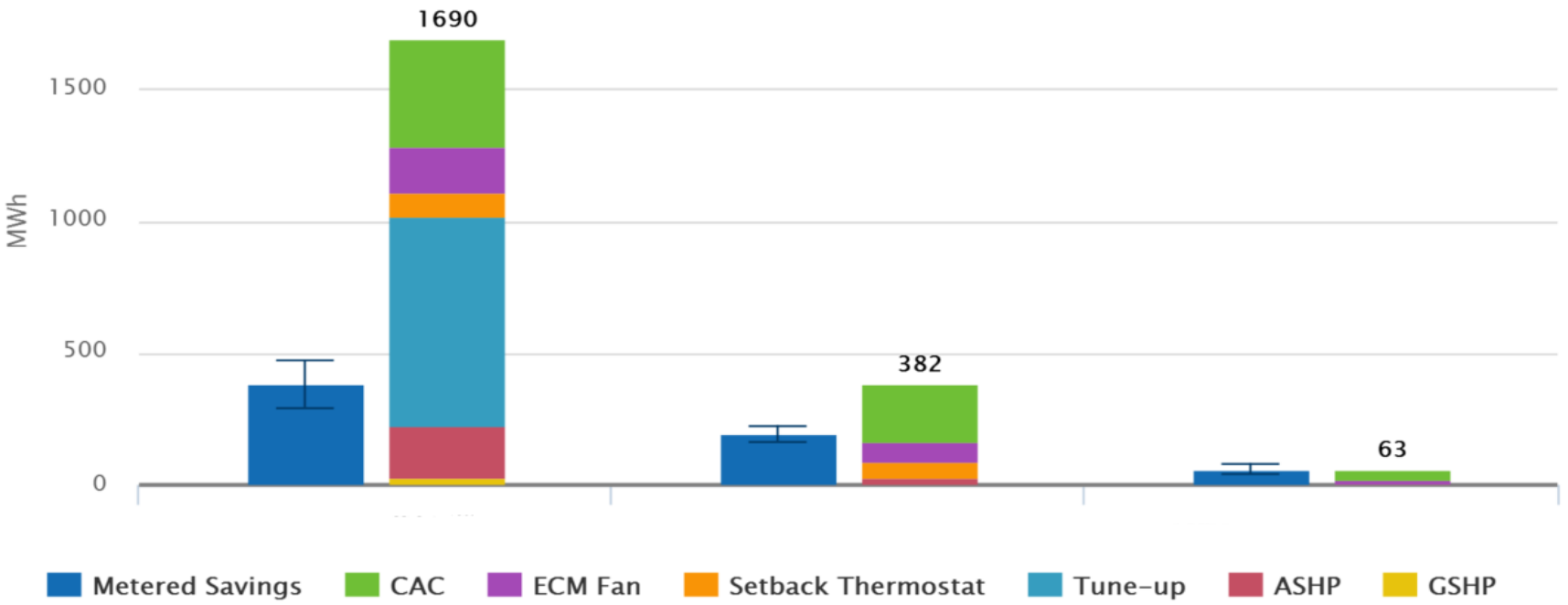
112 analyzed projects

Performance: 51% ± 7%

Contractor F

26 analyzed projects

Performance: 97% ± 25%



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3 of 184 contractors shown

Timely Insights

Supporting continuous improvement

If software had been running during the program year, when would each of these key insights have been identified?

- ASHP-EF Early Replacement: August 2013
- CAC SEER 14: August 2013*
- Tune-Ups w/ Coil Cleaning: August 2013
- Contractor performance: July 2013*

**Some combinations took longer*

Summary / Recap

- **Using this software during the program year will:**
  - Perform remote QA/QC on every project
  - Identify problems to keep programs cost effective
  - Identify poorly performing contractors before they impact program savings and customer satisfaction
    - Provide targeted contractor training
  - Recognize top performing contractors and encourage them to complete more projects
  - Use data to update the TRM deemed values
  - Support targeted evaluation research and analysis
- **Future opportunities for savings measurement software:**
  - Communicate project results with customers
  - Allow EE to serve as a trusted resource for our grid operations team

Overall Results

- Improve program energy savings
- Reduce program costs
- Improve customer satisfaction

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