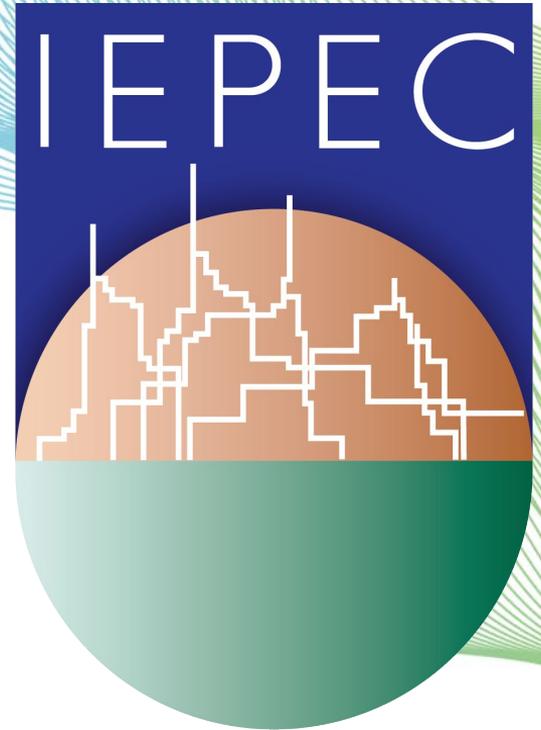




Rapid-Response M&V

Creating Feedback Loops for Improved Energy Efficiency Program Results

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Power TakeOff
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Why Should You Care?



The Challenge:

- Traditional M&V treats verification as the "end of the line"
- Detection lag between implementation and performance issues
- Missing dynamic issues when they're most correctable
- Limited feedback to maintain measure persistence

The Opportunity:

- 77% of U.S. meters are now AMI (2023)
- Granular data enables 3-5% savings detection vs. 10% with monthly data
- Real-time monitoring prevents savings degradation

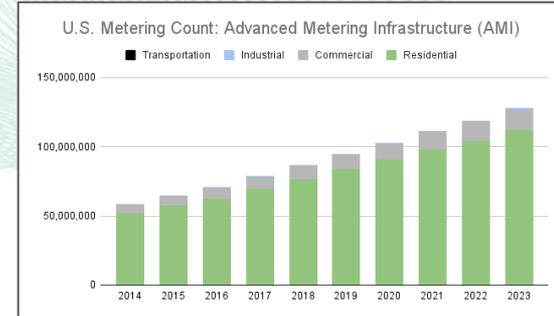


Figure 1. Growth in AMI metering count in the U.S. from 2014 – 2023. Source: U.S. EIA 2024

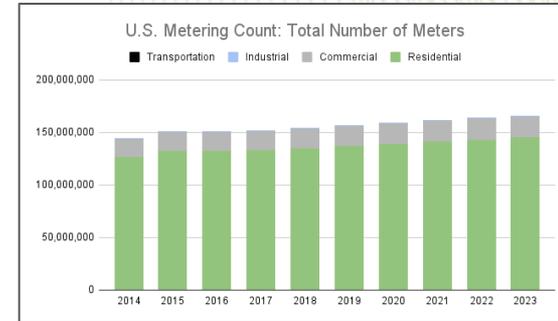


Figure 2. Growth in total utility, electrical meter count in the U.S. from 2014 - 2023
Source: U.S. EIA 2024

The Problem



Traditional M&V Limitations:

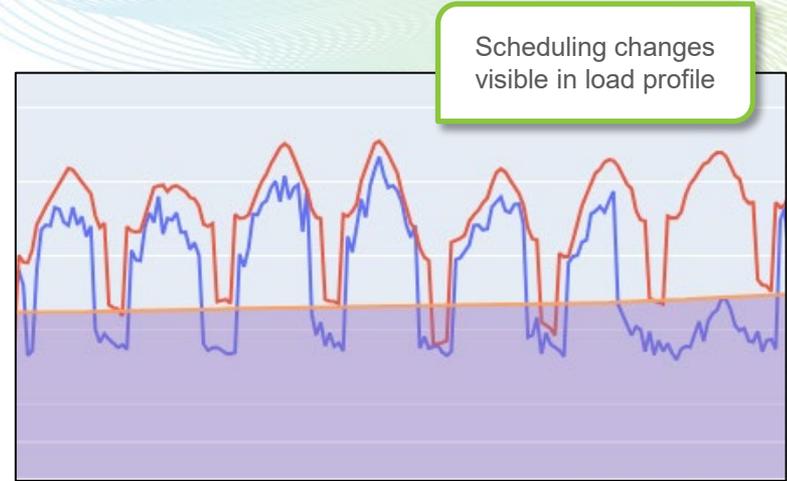
- **End-of-project focus:** Issues detected too late
- **Data constraints:** Monthly billing data masks operational patterns
- **Scale challenges:** Options A, B, D are expensive and data-intensive
- **Persistence gap:** No ongoing performance monitoring

Result: Lost savings opportunities and undetected reversions

Five Pillars of Rapid Response M&V:



1. Data Cleanup & Infrastructure
2. Regression Analysis
3. Automated Monitoring and Alerts
4. Analyst Review Cycles
5. Feedback Loop Activation



M&V is often the longest interaction with a project but typically the least leveraged!

Key Findings - Case Study



Medical Office Building HVAC Optimization:

- **Initial savings:** 50,000 kWh projected
- **Issue detected:** Cooling season adjustments not visible (May 2023)
- **Rapid intervention:** Controls issue identified and fixed
- **Final result:** 100,000 kWh annual savings (100% increase)

Without rapid M&V, 50% of savings would not have been realized

Key Findings - Case Study



Figure 4. HVAC schedule adjustments clear in AMI data after controls issues were resolved

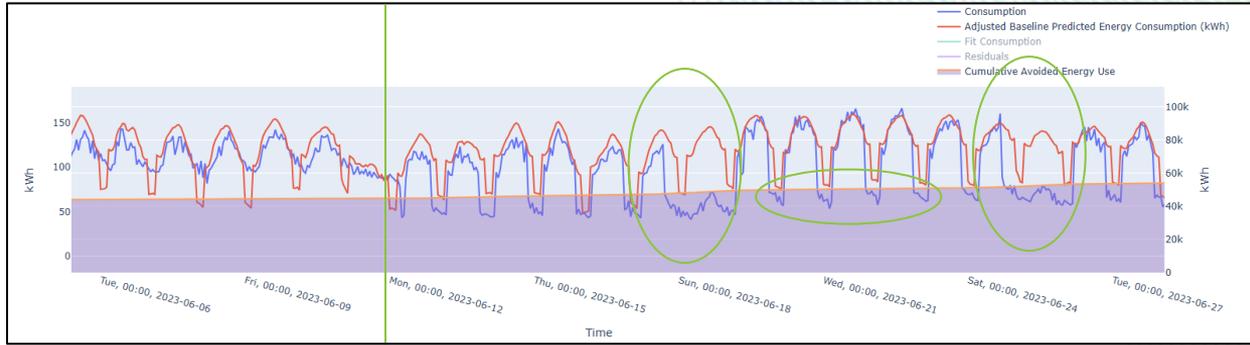
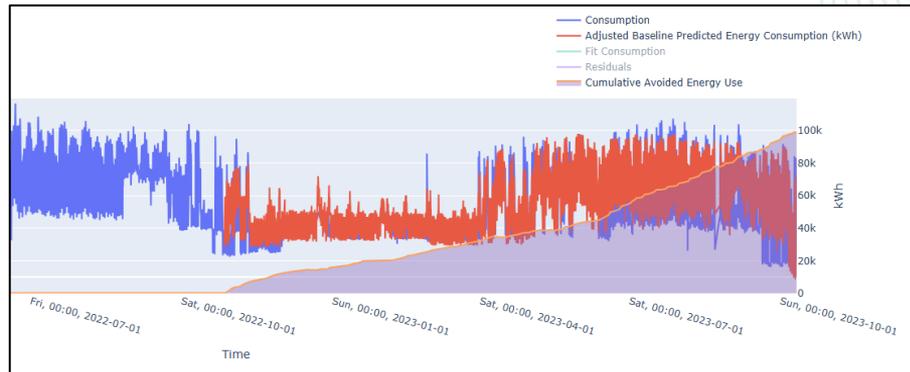


Figure 5. Increase in CUSUM slope after controls issues were resolved



The Learning- What Makes This Work



Critical Success Factors:

1. **Granular data + frequent updates** = early detection
2. **Automated processing + human expertise** = scalable quality
3. **Timely engagement** = actionable insights while details are fresh
4. **Continuous monitoring** = persistence assurance

Key Insight: M&V as an active tool, not just verification

Value to the Industry



Scalable Benefits:

- **For Implementers:** Deeper savings, better persistence
- **For Evaluators:** More accurate, defensible calculations
- **For Utilities:** Maximized portfolio performance
- **For Customers:** Sustained savings, operational insights

Call to Action



Transform M&V from End-Point to Enabler

- Leverage existing AMI investments
- Create feedback loops, not just reports
- Protect and enhance program savings

Resources:

- Full paper available in proceedings
- Contact: Lucas.Born@powertakeoff.com

Let's discuss: How can rapid-response M&V enhance your programs?