

Rapid Building Assessment



Remote Building Analytics Platform Delivered 60–80% Cost Savings

During a 16-month nation-wide DoD assessment, FirstFuel's Remote Building Analytics platform assessed 100 buildings in 11 different DoD installations across the country.

- ▶ **REMOTE ANALYSIS USING READILY AVAILABLE INFORMATION**
FirstFuel's Remote Building Analytics (RBA) service produces building-specific performance insights and end-use recommendations based largely on readily available information, such as electrical interval data, building address, occupancy type, hourly weather and climate statistics, and data from geographical information systems (GIS). The platform can also monitor efficiency measures and quantify their effectiveness over time.
- ▶ **LESS EXPENSIVE THAN ON-SITE AUDITS, 3 TO 5 TIMES AS FAST**
Comparing its audits with ASHRAE Level II on-site audits of 16 of the 100 properties assessed during DoD's nation-wide evaluation, FirstFuel demonstrated that remote audits could be performed for one third of the cost and were three to five times faster. And while the two approaches did not always identify the same energy conservation measures (ECMs), the FirstFuel approach found 16% more savings in Type 1 buildings when compared with on-site audits. All in all, RBA identified approximately 8.6 million kWh in energy savings, representing a potential 14% reduction in energy spending.

Technology Tested

FIRSTFUEL REMOTE BUILDING ANALYTICS PLATFORM

- Complete remote energy audit.
- Results across an entire portfolio.
- Analytics outputs include load disaggregation, customized recommendations and predictions of energy savings potential.
- Continuous monitoring (optional).

Required Inputs

- Must have a minimum of one year of historical electrical interval data.
- Building type and address.

Optional

- Monthly thermal data.
- Building information, including square footage, occupancy, heating/cooling, lighting, and building automation systems.

Best suited to:

- Buildings with regular occupancy and sub-optimal building operations.
- Compatible with 90% of DoD portfolio.

ABOUT ESTCP

The Environmental Security Technology Certification Program (ESTCP) is the U.S. Department of Defense's environmental technology demonstration and validation program. The program's goal is to identify and assess innovative technologies that address DoD's high-priority environmental requirements efficiently and cost-effectively.



Demonstration Sites: Eleven Sites, 100 Buildings

The demonstration project was designed to assess the time, cost, and accuracy of FirstFuel's remote audits. Toward that end, FirstFuel assessed 100 buildings in 11 different DoD installations across the country. To evaluate the RBA platform's performance on the wide range of DoD buildings, FirstFuel categorized the buildings into five types. The most prevalent building type, Type 1, contained headquarters or administrative facilities. The other four building types were specific to DoD: barracks; warehouses; auditoriums; motor pools, hangers, and garages.

INSTALLATION'S COSTS*

50–100 buildings: \$114,000–\$579,500

AUDIT COSTS

\$50,000–\$350,000 (software)

\$14,000–\$29,500 (labor)

ANNUAL MONITORING COSTS

\$1,000 per building (software)

\$50,000–\$100,000 (support)

*Cost information is for reference only. Individual sites should do due diligence to determine local costs.

ADDITIONAL MILITARY DEPLOYMENTS

Deployed in 5.5M ft² of DoD buildings (as of January 2014).

BEST PRACTICES FOR METER DATA

- Collect and store interval meter data (5, 15, 30, 60 minutes) for at least 24 months.
- Standardize date/time/unit fields across all meters, buildings, and sites.
- Contain data in a single, flat file.
- Communication issues should signal alerts so blank values do not go undetected indefinitely.
- Meter database should allow other applications to access data.
- Applications that access the data should be easy to use so that non-technical users can monitor building consumption.

Additional Resources

▶ EW-202261 FINAL REPORTS AND TECHNOLOGY TRANSFER TOOLS

<https://serdp-estcp.org/Program-Areas/Energy-and-Water/Energy/Conservation-and-Efficiency/EW-201261>

▶ TECHNOLOGY USED AT DEMONSTRATION SITE

FirstFuel www.firstfuel.com. Contact FirstFuel for additional information on other site deployments.

NOTE: Before incorporating new technology, refer to Unified Facilities Criteria (UFCs) and other appropriate guidance to ensure compliance with current requirements. <https://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc>

Demonstration Results

IDENTIFIED SAVINGS

- Across 100 buildings, 8.6 million kWh in energy savings, or 14% total reduction.
- RBA identified 61% of measures found in on-site audits of Type 1 buildings and showed 16% more energy savings potential compared to on-site audits.
- RBA identified 65% of measures identified through on-site audits in building Types 2–5 and 37% more savings.
- RBA also identified 18 additional measures for Type 1 buildings not identified in on-site audits.

AUDIT TIME

- Type 1 building audits completed in 25% of time required by on-site audits.
- Type 2–5 building audits completed in 50% of time required by on-site audits.

MONITORING ACCURACY

- Continuous performance monitoring meets ASHRAE Guideline 14 criteria. Measure of uncertainty should be <30%; average RBA level of uncertainty was 17%. Level of bias in hourly data should be < 10%; average RBA bias was 2%.

INSTALLATION & COMMISSIONING

- Site managers spent on average 2 hours for RBA versus 8 hours for on-site audits.
- Problems with interval data resulted in delays and the need to identify alternate buildings for the demonstration.
- Lack of centralized resource for meter data made it challenging to address problems.

OPERATIONS & MAINTENANCE

- Site managers should be trained in meter data collection and storage.

USER SATISFACTION

- More than 75% of users surveyed preferred RBA over on-site audits.

COST-EFFECTIVENESS

- Average demonstration cost was \$3,000/building. ASHRAE Level II on-site audits take several weeks at a typical cost of \$5,000–\$10,000 or \$0.10 –\$0.15/ft².