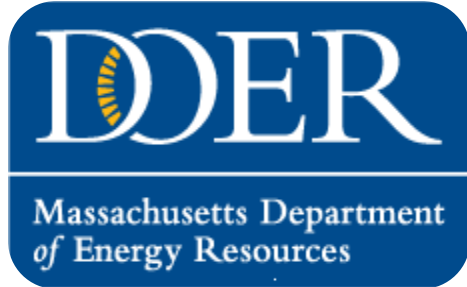


Creating A Cleaner Energy Future For the Commonwealth



Commercial Office Building Asset Rating Spring 2012 update

Mar 16, 2012

**Northeast Energy Efficiency Partnerships
&
Massachusetts Department of Energy Resources**

NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS

"Accelerating Energy Efficiency"

MISSION

Accelerate the efficient use of energy in the Northeast and Mid-Atlantic Regions

APPROACH

Overcome barriers to efficiency through
Collaboration, Education & Advocacy

VISION

Transform the way we think about and use energy in the world around us.



Creating A Cleaner Energy Future For the Commonwealth

DDER

Massachusetts Department
of Energy Resources

Overview

- Thank you!
 - The Barr Foundation
 - The DOE
- Partnership
 - NEEP/ DOER
- Regional Project
 - Informing stakeholders



Phase 1 - Baseline audit and modeling

2 Engineering teams selected

Team leaders: ARUP & The Green Engineer

Scope of work

- Review of building plans, schedules and meter data
- 1-2 day on-site audit to collect and verify building data
- Energy modeling using eQUEST software with COMNET MGP for default values
- Will generate building EUI's and evaluation of major building systems



Phase 1 - DOE / PNNL 'BAR' pilot

- The MA phase 1 pilot buildings will also be part of a larger national pilot of the DOE/PNNL building asset rating 'BAR' tool.
- The Green Engineer and ARUP providing data collection to PNNL
- Expect to hear results in the Summer



Phase 1 – Innovative methodologies: Three firms selected

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GROUP, INC.

FIRST FUEL
BUILDING ENERGY ANALYTICS



Retroficiency
Enabling building efficiency and sustainability



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Research Approach

Utilize a web-based procedural energy simulation modeling approach:

- As operated models
- Asset rating models
- Benchmark models
- Run sensitivity analysis



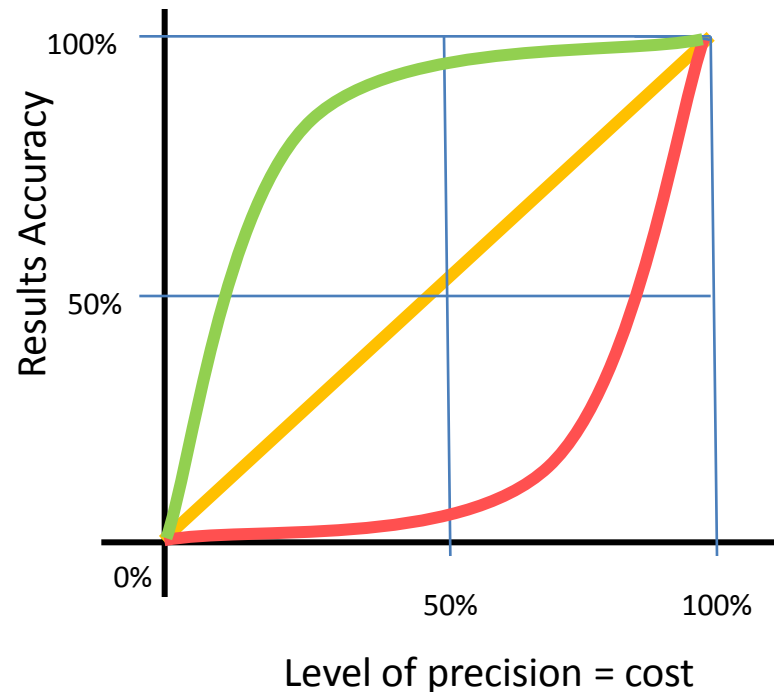


Research Approach

- **Sensitivity Analysis**

Purpose:

- Data gathering and entry takes time
- There is a diminishing margin of accuracy per data collection precision



Interval data-based analysis

The screenshot displays a dashboard with several energy usage metrics: Cooling, Lighting, Plug Load, Electric Heating, Pumps, Gas Heating, Heat/Electric Heating, Ventilation, Miscellaneous - Electric, and Gas - Other. Each metric is represented by a horizontal bar chart with a green-to-red gradient and a numerical value.

Rapid onsite inventory

A woman with blonde hair, wearing a dark business suit, is shown in profile, holding a clipboard and a pen, ready to take notes during an onsite inventory.

Combine and normalize to create building asset label

The bar chart shows three bars representing different energy usage metrics. The y-axis is labeled 'kwh or kBtu per square foot'. The bars are: Total Building EUI (tallest, green), Weather/Climate Normalized (middle, green), and As-Built EUI (shortest, yellow). A box labeled 'Asset Rating' is positioned to the right of the bars.

- “Zero-touch” analysis – fast, low-cost
- Validated technology from FirstFuel

- Accelerated by zero-touch analysis
- Verify key building assets for labeling

- Automated to low cost, high scalability



Retroficiency Overview



Retroficiency
Enabling building efficiency and sustainability

Problem

- Buildings consume billions in energy
- Process to reduce it is expensive, time-consuming, and un-scalable

Products

- Automated Energy Audit (AEA): Streamline traditional audit
- Virtual Energy Assessment (VEA): Identify savings with no on-site visit

Technology

- Sophisticated data analytics and rapid energy modeling
- Solutions for asset (AEA) and interval (VEA) data

Team

- Real estate, energy, and software experts
- Over 100 years of combined experience in energy efficiency

Example Customers



JONES LANG
LASALLE®

SAIC®



IBERDROLA
USA

Schneider
Electric

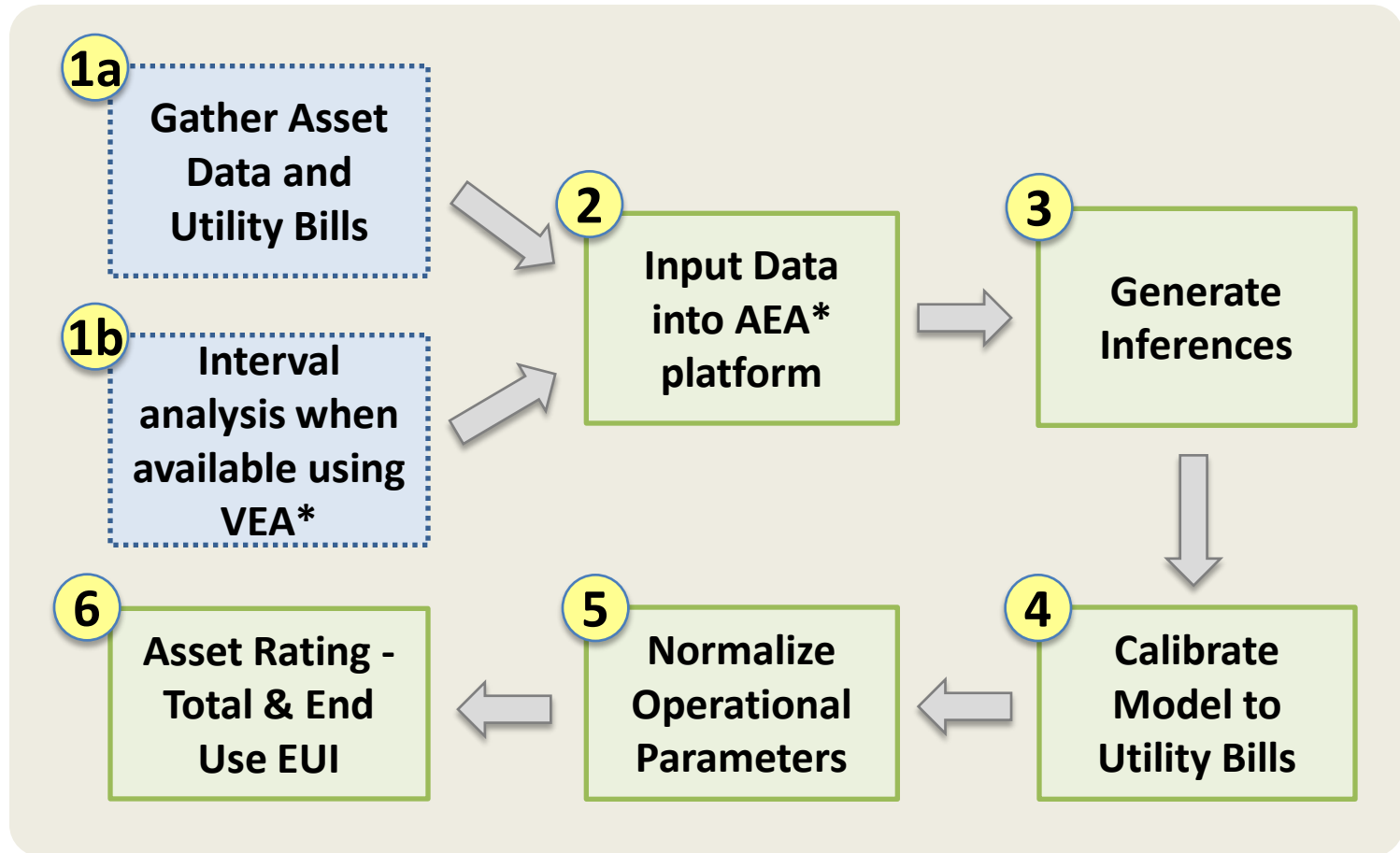
Evaluated more than 80 million square feet in the past year



Asset Rating Approach



Retroficiency
Enabling building efficiency and sustainability



* AEA = Automated Energy Audit

* VEA = Virtual Energy Assessment



Phase 1 -Buildings

- All predominantly office use – but a diverse set of buildings:
 - Age range from 1871 to 2010
 - Size range from 32,000 to 1,025,000 sq ft
 - Height 4 floors to 38 floors
 - 4 Downtown towers,
 - 3 midrise blocks,
 - 3 masonry/historic renovations,
 - 1 Suburban campus



Project Implementation Timeline

- Building site visits/meter data : March – April
- Building modeling: May – June
- Initial results expected in July
- Update/initial results webinar this Summer
- Start recruiting buildings for Phase II in the Fall



Questions? Comments ?

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