Energy Baselines and Cost Avoidance for UESC Projects

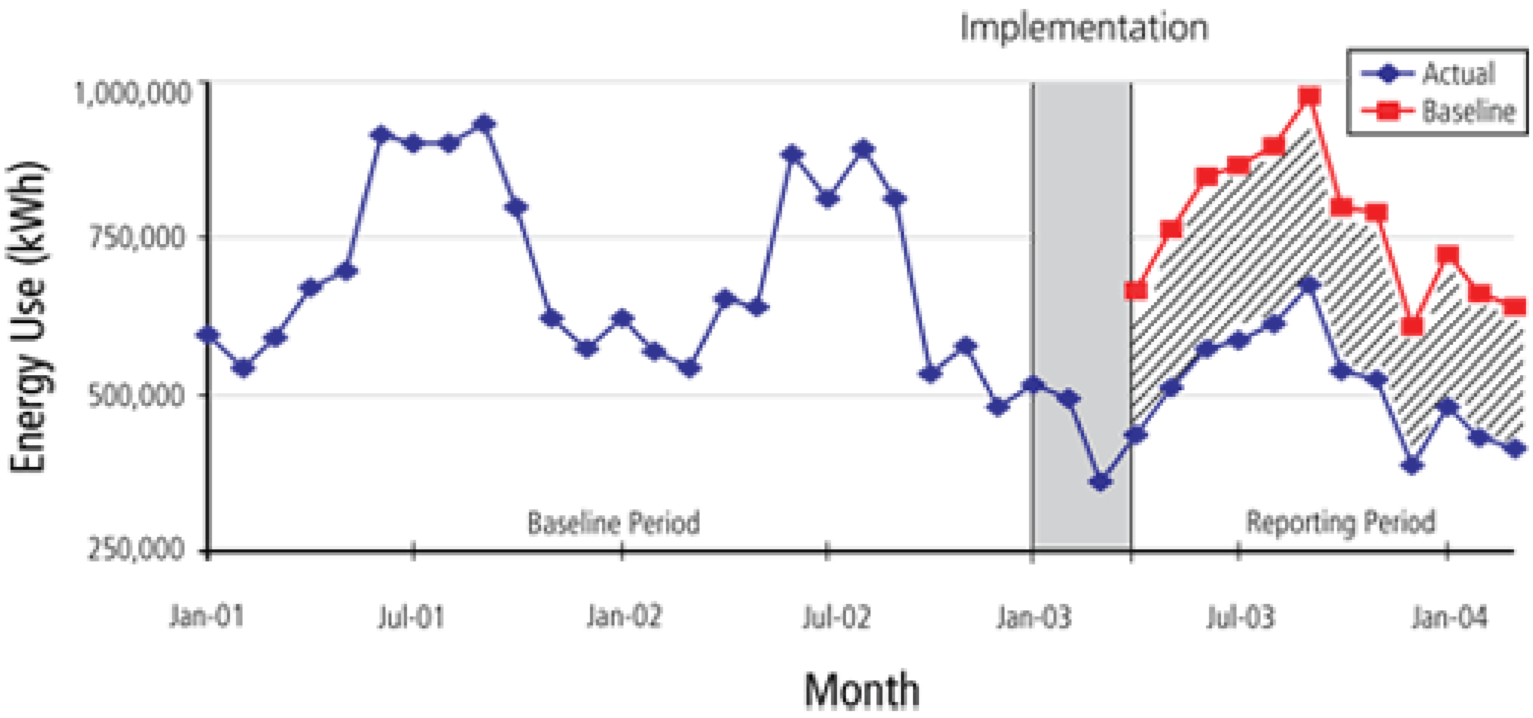
Leila Comer
Engineering Manager,
AGL Resources

Energy Baseline - definition

Energy consumption prior to efficiency upgrades

- Historical consumption adjusted for “normal” weather, hours of operation, occupancy, etc.
- From recent years’ utility data (building level) or sub-metered utility consumption (system level)
- Base for savings calculations representing energy consumption a building or system would have in the future if the program had not been implemented

Energy Baseline - definition



Source: National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide (PDF)

AGL Resources®

Energy Baseline - importance

Energy management tool

- Benchmarking and EUI (BTU/sqft) are metrics of building performance

Savings calculation accuracy

- *Energy savings = (Baseline energy use) ± (Adjustments) - (Post-installation energy use)*

Savings validation (Performance Assurance)

- Once new system is installed baseline conditions can no longer be inspected

Energy Baseline - steps

Determine system boundary (campus, building, or equipment level)

↓

Gather energy use data (12 - 36 months by fuel type)

↓

Choose baseline year (best representation of current conditions)

↓

Adjust baseline, as needed (next slide)

↓

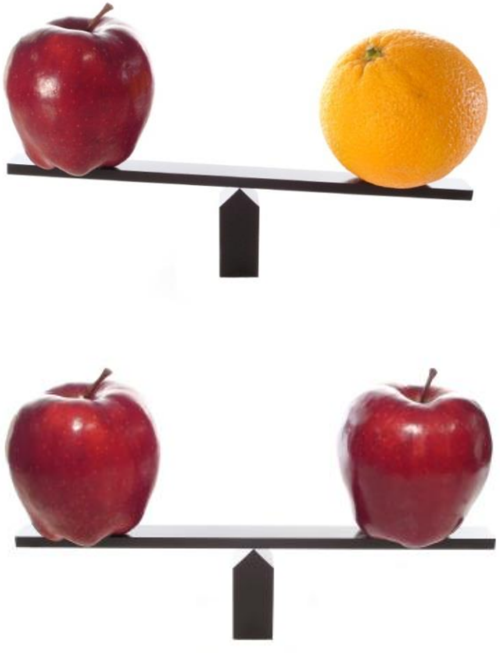
Validate reasonableness (benchmark, EUI, etc.) and use for savings calcs

↓

Track future energy consumption against baseline (Performance Assurance)

Energy Baseline - adjustments

Baseline and post retrofit energy use should be compared using a common set of conditions (i.e., weather, operating hours, building occupancy) so that only variances within the project itself are included in savings.



Not needed if:

- ➢ differences are outside consumption boundary
- ➢ stipulated variable in Performance Assurance plan

AGL Resources®

Routine and Non- Routine Adjustments

Feasibility study phase:

- corrects historical utility data for atypical conditions
- may include adjustments for code issues
- accounts for ECM interactions

Performance assurance phase:

- baseline is set, unless new changes occur
- Routine adjustments: expected changes (i.e. weather)
- Non-routine adjustments: unexpected changes with significant impact on energy consumption (i.e. amount of space being heated/ cooled, use of equipment, lighting levels, set-point temperatures, changes in occupancy, schedule or throughput)

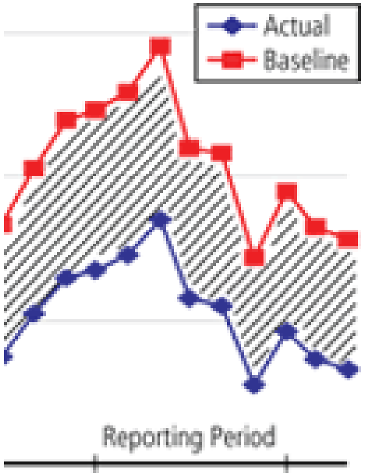
Energy Baseline - Challenges

- Lack of building utility meters
- Allocated energy use by square footage of other metric differs from calculated values
- Large energy users such as Energy Plants and Data Centers are not individually metered/sub-metered
- Central chilled water/steam provided to each building may not be metered and calibrated periodically
- Aged control systems may not track operating conditions
- No time and funding available for installing sub-meters as part of the Investment Grade Audit

Energy Baseline – Best Practices

- Baseline data must be accurate
- Baseline conditions must be well documented
- Documentation should be presented in a format that allows reviewer to understand levels and sources of risk
- Establish a method of tracking and reporting changes to these conditions.

Inaccuracies in baseline value can impact savings as much as new equipment performance



AGL Resources®

Cost Savings and Cost Avoidance

Cost savings: actual dollar difference between current year costs and baseline year costs (simple arithmetic).

Cost avoidance: amount of money you avoid spending when comparing "apples to apples." It includes adjustments for dissimilar weather conditions, more/less square footage, utility rate changes, and changes in operating hours.

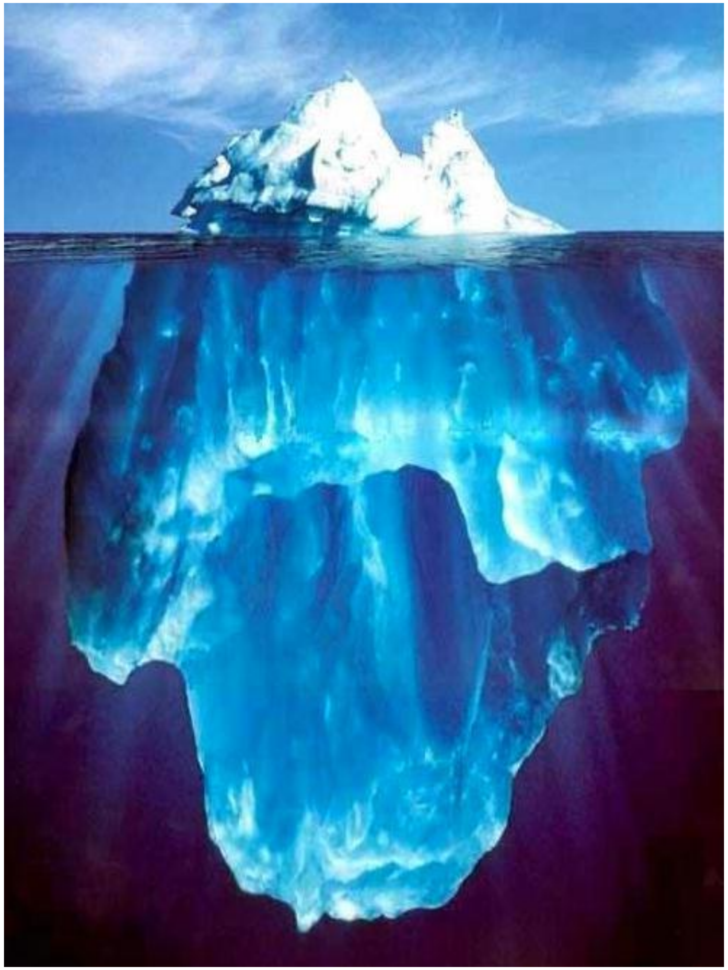
- *Energy savings is an avoided cost*

Capital Cost avoidance: capital cost reduction that results from a spend that is lower then the spend that would have otherwise been required if the project had not been undertaken.

- *i.e. proactively replacing equipment at end of useful life*

AGL Resources®

Non-Energy Cost Avoidance



Non - energy benefits resulting from Energy Savings Program, are often not easily monetized, such as:

- Capital improvements
- Operations and maintenance savings
- Reduced emissions
- Improved reliability of new equipment
- Productivity improvement

AGL Resources®

Non- Energy Cost Avoidance Dilemma

Non-energy benefits are real and valued by customers, but difficulty to monetize.

These benefits prevent agencies from:

- Pro-actively replacing equipment at end of life before it fails
- Leveraging incremental savings to pay for more efficient systems
- Low cost financing
- Including capital needs with bigger project (economies of scale)

Customers demand comprehensive projects and capital-intensive technologies but Utilities are constrained by limited savings and quick payback requirements.

AGL Resources®

Capital Cost Avoidance - Challenges

Some Agencies require a 10 year payback on UESC projects

- LCCA was designed to compare *total* lifecycle costs between existing equipment and proposed equipment including: installation, financing, energy, operating & maintenance, disposal and replacement costs.
- However, agencies do not allow for savings that cannot be committed as repayment funds on financed projects.

Capital replacement dollars are not part of the energy budget

- annually appropriated funds
- decision authority
- communication/coordination with other departments

Moving Forward - Discussion Points

- Is there value for agencies to include comprehensive upgrades and deep retrofits in UESC projects?
- What non-energy benefits should be included in the LCCA?
- How can these non-energy benefits be monetized for loan repayment?
- Is this an agency decision or does it require federal guidance?
- How can energy managers and contracting officers be empowered to make cost avoidance decisions on UESC projects?

AGL Resources®

Thank You!

AGL Resources®