Action-oriented Benchmarking: 
EnergyIQ and Building Performance Database

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Action-oriented benchmarking extends whole-building benchmarking

Whole Building Energy Benchmarking
- Screen facilities for overall potential
- Minimal data requirements (utility bills, building features)

Action-Oriented Energy Benchmarking
- Identifies and prioritizes specific opportunities
- Uses system features and end-use data; may require additional data logging
- Can be part of RCx and CCx

Investment-Grade Energy Audit
- Estimates savings and cost for specific opportunities
- Requires detailed data collection, cost estimation, financial analysis
- Necessary for retrofits with capital investments

We have also found that many use it as a design-stage tool to inform potential performance targets, etc.
What is it?

• A low-effort bridge between whole-building benchmark and investment-grade audits
  – Quick energy+cost+carbon analysis, with multiple metrics
  – Not a simulation tool...
• Refined comparisons to customizable peer groups
  – Currently CEUS – California (N=2,800 bldgs); US – CBECS 2003 (N=5,215 bldgs)
• “Action-oriented”: Estimated savings of potential actions ... light-touch; not investment-grade audit
• APIs enable integration with other tools, devices
  – e.g. benchmark analysis can complement EIS reports
• Developed by LBL for CEC - supports AB 1103 & 758

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Action-Oriented Benchmarking with EnergyIQ

✓ Rapidly benchmarks utility bills against user-defined peer groups => low-cost opportunity assessment
✓ Non-residential buildings: Peers drawn from CEC’s CEUS for California and DOE’s CBECS for rest of US
✓ Many choices of metrics and data visualizations
✓ Can import data from EPA’s Portfolio Manager

Example: CEC Headquarters
A building that is average when looked at coarsely, but among the best-in-class when benchmarked using progressively appropriate peer groups

Compared to... all California buildings:

http://energyiq.lbl.gov

Contact: emills@lbl.gov

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1st percentile: 2.1 w/sf

[Energy cost] [Carbon] [Peak electricity]

Other metrics

Dashboard
Savings opportunities

Multiple data visualizations

N=2549
N=480
N=187
N=54
N=11
N=11
N=11
N=11

Marketed uptake:
✓ 900 registered users
✓ 550 buildings benchmarked, representing 86 million sq. ft. floor area
✓ 14,000 unique visitors to website as of mid-2013
Peer Group Information

SUMMARY: The Site Energy for typical buildings of the type(s) you’ve specified is 4.6 kWh/ft²yr (median value), with a range of 2.5 to 4.9 kWh/ft²yr. 75th to 95th percentile for the population. Select “Add a Building” button to see how your companies. Try other Views for graphical and tabular detail. This analysis includes population weights for each building.

DATA SET: California only (CEUR)

LOCATION: California - Central Coast, Central Valley, North Coast, South Coast, South Island

SIZE: 8,25,000 sf; 150,000 sf

VINTAGE: 1979 through 2000, 1991 through Present

TYPE: Administration & Management, Assisted/Multi-Res, Financial/Legal, Government Services, Institutional/Tele, Medical/Healthcare, Other Office, Software Development
The Buildings Performance Database

- The BPD statistically analyzes trends in the energy performance and physical & operational characteristics of real commercial and residential buildings.
BPD unlocks the power of building energy performance data.

**Inputs: The BPD**
- Large dataset of real buildings

**Outputs: Activities**
- Assess opportunities
- Forecast project performance
- Quantify performance risk

**Outcomes**
- More energy efficiency projects undertaken
- More data on EE project performance

**Design Principles**
- The BPD contains actual data on existing buildings - not modeled data or anecdotal evidence.
- The BPD enables statistical analysis without revealing information about individual buildings.
- The BPD cleanses and validates data from many sources and translates it into a standard format.
- In addition to the BPD’s analysis tools, third parties will be able to create applications using the database.

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The BPD aggregates data from many other tools

**Data Sources**
- Basic Building info
- Energy Consumption
- Audits
- Commissioning studies
- Operating characteristics
- Equipment & asset info
- Public records

**Software Tools**
*Collect data and conduct diagnostic analysis about individual buildings*

**Aggregation Platform**
*Combine and analyze data from many sources*

**Portfolio Manager**
An energy management tool that tracks & assesses energy & water consumption in user’s buildings.

**DOE’s Building Rating Tools**
Includes the Home Energy Score & Commercial Building Energy Asset Score

**DOE BUILDINGS PERFORMANCE DATABASE**
One publicly-accessible database of anonymous, empirical records.
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