



California Commissioning Collaborative

Building Energy Asset Rating (BEARS)

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Agenda

- Background
- Current progress
- Field Assessment approach
- Discussion

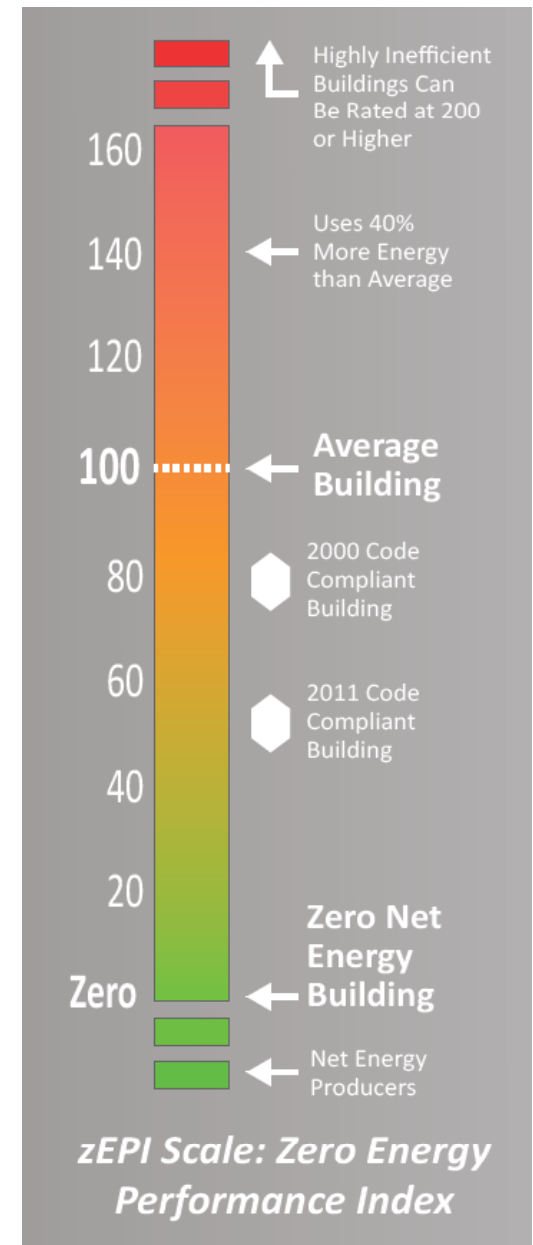
Background



- What is the Building Energy Asset Rating System (BEARS) all about
 - Asset rating vs. operational rating
 - Ability to compare performance across similar properties
 - Better identify energy efficiency improvement opportunities
- Related systems and efforts

Rating Scale

- zEPI: Zero Energy Performance Index
 - 100 = Average Performing Building
 - 50 = Uses $\frac{1}{2}$ as much energy as an average performing building
 - 0 = Zero Net Energy



Current Progress

- Rating Methods
 - Real-time Simulation Approach
 - Performance Map Approach

Current Progress

- Key parameter identification

Medium Office

Impact of Overall Change - Sorted - CZ09

| | TDV | Elec | Gas |
|-----------------------------------|--------|--------|--------|
| Equipment Power Density | 46.19% | 47.06% | 0.01% |
| Lighting Power Density | 15.52% | 15.81% | 0.00% |
| Window Area with Daylt Ctrl | 12.76% | 13.00% | 0.00% |
| Cooling Efficiency | 11.09% | 11.30% | 0.00% |
| Glazing SHGC | 8.41% | 8.56% | 0.01% |
| Daylight Controls | 7.88% | 8.02% | 0.00% |
| System Type | 7.72% | 7.87% | 0.01% |
| Window Area no Daylt Ctrl | 6.43% | 6.55% | 0.00% |
| Fan Static Pressure | 5.48% | 5.59% | 0.00% |
| Roof Reflectivity | 2.99% | 3.04% | 0.00% |
| Domestic Water Heating Efficiency | 0.82% | 0.00% | 44.36% |
| Glazing U-Value | 0.58% | 0.59% | 0.01% |
| Ventilation Airflow | 0.48% | 0.49% | 0.00% |
| Wall Insulation | 0.46% | 0.46% | 0.00% |
| Roof Insulation | 0.22% | 0.22% | 0.01% |
| Infiltration | 0.06% | 0.06% | 0.00% |
| Heating Efficiency | 0.00% | 0.00% | 0.00% |

Current Progress



- Are there any missing parameters that should be considered?
 - Especially for building types other than small/medium office, quick service restaurant, and stand-alone retail.

Field Assessment Protocol

- Goals:
 - Provide sufficient data for a meaningful rating
 - Applies to a wide range of building types and sizes
 - Establish a process that is repeatable and replicable
 - Minimize need for specialized expertise and test equipment
 - ‘Affordable’

Field Assessment Protocol

- Assets Covered
 - Envelope
 - HVAC
 - Lighting
 - Some Plug loads (eg. data center?)
 - DHW
 - Renewable energy generation

Field Assessment Protocol

- Data Sources

- Physical Testing



- Visual inspection



- Documentation review



Field Assessment Protocol



- Are there any recommendations for innovative approaches to capture data?

Field Assessment Protocol



- Cost drivers
 - Number and availability of inputs required
 - Data collection method
 - Building size
 - Building system complexity
 - Assessor skill requirements

Field Assessment Protocol

- Difficult to assess parameters
 - Abstract building geometries
 - Envelope characteristics
 - Lighting Power Density
 - BAS capabilities
 - Difficult to simulate systems
 - Natural ventilation
 - System variations



Field Assessment Protocol

- De-rating efficiencies of old or worn-out equipment?
 - Based on age?
 - Based on condition?
 - Automatic or special consideration?

Field Assessment Protocol



- Are there any general feelings regarding equipment de-rating?
- What about recommendations to deal with sub-par equipment?

Field Assessment Protocol

- Cost Targets



- HERS = \$300-\$800
- Typical Audits = \$0.05 - \$0.50/sqft
 - Depends greatly on building size & complexity
- Any strong feelings on acceptable costs?

Quality Assurance

- Repeatability/Accuracy
 - Options for QA
 - Certification of Field Assessors?
 - Certification of Raters?
 - Certification of Software?
 - Preference among existing certifications?
 - How might the field assessment / rating fit in with EBCx providers' services?

Questions / Comments / Discussion





Thank you for participating!