The Future of Lab Benchmarking

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Learning Objectives

• Identify the potential uses of benchmarking data for labs and those that are in use by the community today

• List a variety of metrics by which lab buildings can be compared

• Understand the stated benchmarking needs of lab professionals today

• Contribute to the discussion on the future trajectory of lab benchmarking
The I²SL Benchmarking Working Group

• Genesis: future of Labs21 tool
  • Funding
  • Maintenance
  • Ownership and hosting
  • Aging interface

• Mission: to maximize the value of benchmarking in lab sustainability
  • Not just about the Labs21 tool
  • Whole-building benchmarking

• Group meeting Wed afternoon – all welcome!

i2sl.org/working/benchmarking.html
Benchmarking trends

• Increased demand:
  • Disclosure ordinances
  • LEED EBOM
  • ASHRAE audits
  • ASHRAE bEQ

• Tools becoming sophisticated:
  • Portfolio Manager/Energy Star
  • Building Performance Database
  • EnergyIQ

• There is a future
Benchmarking trends for labs

- Not much in last 10 years
  - Many institutions benchmark internally
  - Private datasets held by designers, consultants, energy monitoring companies
  - Plenty of confusion about lab EUIs

- Labs21 tool only real resource
  - Lab-specific filtering
  - Sustained tool usage

- Energy Star coming for pharma
Where do we go from here?

1) How is benchmarking data used?

- Scoping
- Ranking
- Research
- Industry trends
- Target setting
- Design criteria
Where do we go from here?

2) How *should* data be used?

- Labs are tricky
- **Functional requirements vs. inefficiencies**
  - Type of lab
  - Climate zone
  - Lab area
  - # fume hoods?
  - Tight humidity limits?
  - Local code restrictions on ACH?
  - Pneumatic controls
Many possible directions

• Automatic data transfer
• Update regression analysis
• Live submetering data
• Publish annual report
• Granular BMS data
• Update Labs21 tool user interface
• Longitudinal benchmarking
• Incorporate in BPD
• Actionable outputs
• Paywalls and incentives
• International expansion
• Rankings (e.g. Energy Star)
• Leveraging utility efficiency programs
• API for data export to other tools
We asked you:
The benchmarking survey

- March-May 2015
- 376 responses:
  - Many facilities, design arch/eng, consultants
  - Most from USA

Credit: Vikram and Tim
You care about benchmarking

- Important or very important to 80% of respondents
- Most important to:
  - Energy managers
  - Energy consultants
- Least important to:
  - Occupants
Some of you use the Labs21 tool

• Most usage:
  • Energy consultants

• Less usage:
  • Facilities and owners
  • Design arch/eng

• Least usage:
  • Occupants
  • Vendors
Data use cases as expected

• Labs21 tool uses match overall benchmarking uses

• Commonly claimed uses:
  • Comparing energy performance against peers
  • Supporting business case for energy projects and efficient design
  • Quantifying typical loads for design
  • Encouraging occupants to conserve

• Only 3% said LEED EBOM
There’s some confusion

- Common reasons for not using Labs21 tool:
  - Unaware of existence
  - Confusing interface and output
  - Data perceived to be limited and old
  - NMJ
What you want

• More buildings
• More detailed data

Favorite metrics:
• Site EUI
• End use breakdown
• Air change rate
What you give

• Only 10% of those with data submit it
  • No time
  • No permission
  • Unaware of tool
  • NMJ
  • Dataset not worth it

• 50% of those with data would be prepared to enter more
  • Really?
  • Some questions aren’t easy
Proposal: 2 parallel paths

• Retain Labs21 tool for high-level scoping
  • Useful conversation starter
  • Minimal barrier to use
  • Broad participation

• Tackle other important questions separately
  • Targeted
  • Specific
  • Detailed
The future of the Labs21 tool

1. Secure hosting
2. Train data checkers
3. Update and simplify interface & documentation
4. Outreach effort

- LBL servers
- Working group members
- PHP programmer needed
- New regression analysis?
- I²SL network

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![Energy Use Intensity vs. Lab Area Ratio graph]

- Labs21 Peer Group
- (of building)
- (corrected for central plant)
Targeted investigations

• Answer specific important questions with demographic and statistical data
• Aggregate data from other studies (or case studies)
• New resources for I²SL webpage
• Examples:
  • **End use breakdown:** collate data from lab plug load studies (Stanford, UC Irvine, UC Davis, CEEL)
  • **Lab air change rates:** collect data on institutional policies and investigate trends
  • **Total lab area in US**
  • **Do chilled beams result in energy savings?**
Questions?

Working group meeting: Wed 1:30-3:30pm

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