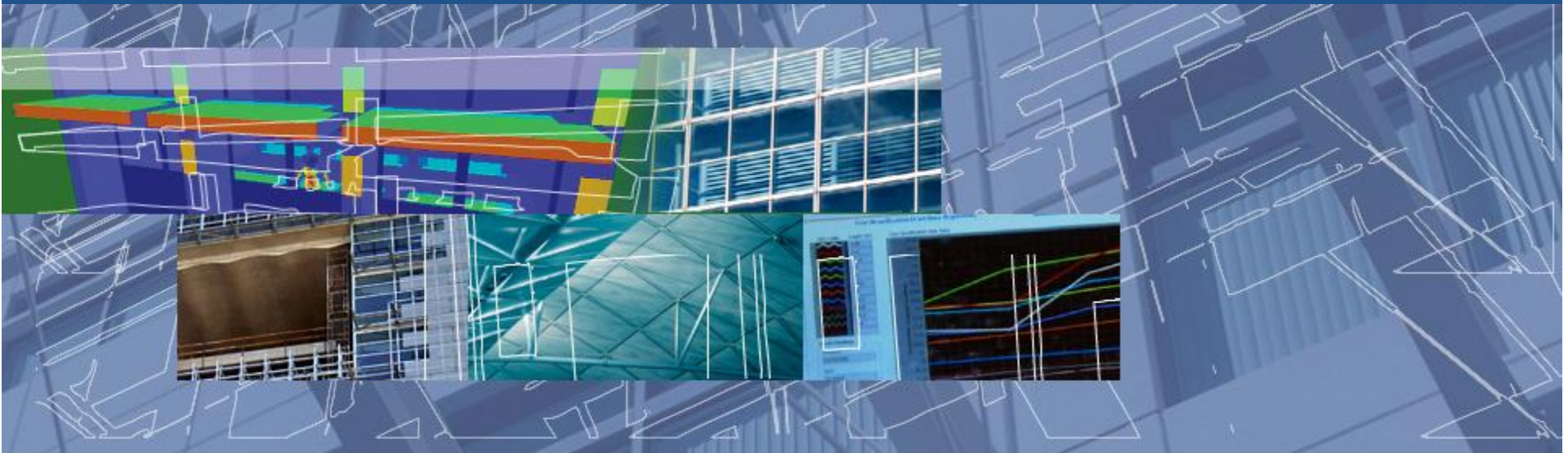


# Testing a Social Media Prototype for Commercial Building Energy and Operations

David Lehrer, Soazig Kaam  
Center for the Built Environment  
UC Berkeley

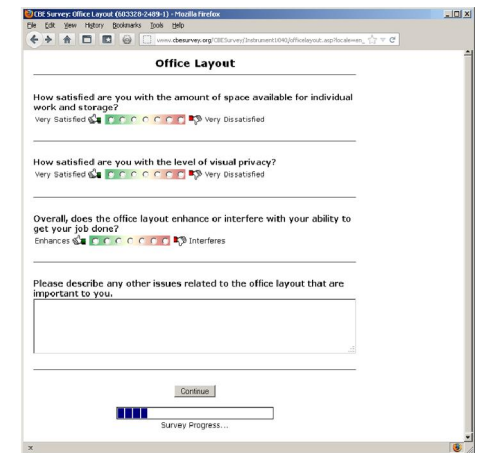
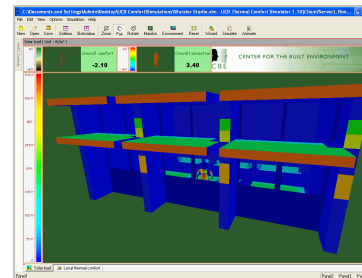
Janani Vasudev  
Empirical, Inc. User Experience  
Research and Design



CENTER FOR THE BUILT ENVIRONMENT, UC BERKELEY

# Center for the Built Environment (CBE)

- Industry/University Collaborative Research Center founded in 1997 with support from the National Science Foundation
- Industry consortium partners support, guide and collaborate on research
- Fundamental research, design guidance and evaluation of promising technologies
  - Occupant comfort and satisfaction
  - HVAC systems
  - Envelope systems
  - Human/building interactions
  - Improving building standards



# CBE Industry Advisory Board

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Viega  
View Dynamic Glass  
WSP  
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ZGF Architects



# Background and motivation

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- Non-technical energy solutions in the workplace not sufficiently explored nor leveraged in policy (Moezzi and Janda 2014)
- Commercial building complexities include scale and diversity of stakeholders; but occupants impact energy use (plug loads up to 50%)
- Previous CBE study identified a need for better communications between commercial building operators and occupants
- Little research on design aspects of energy display methods (Froehlich et al. 2012)



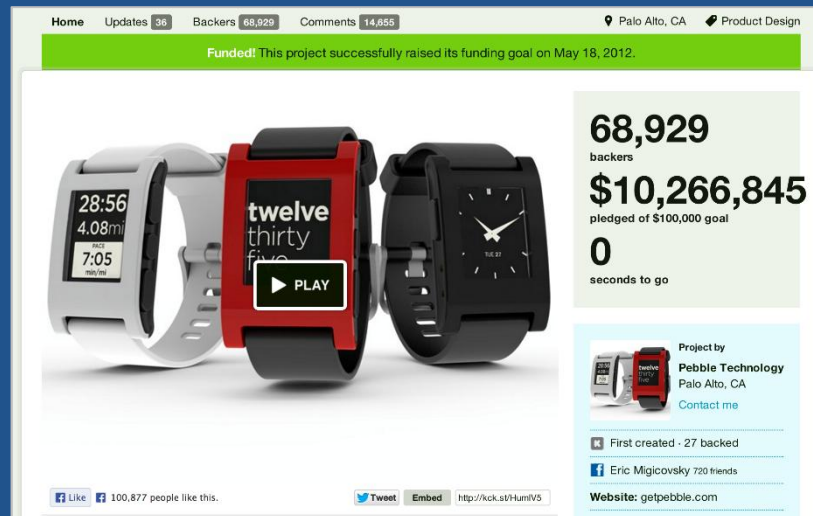
Brower Center, Solomon ETC/WRT



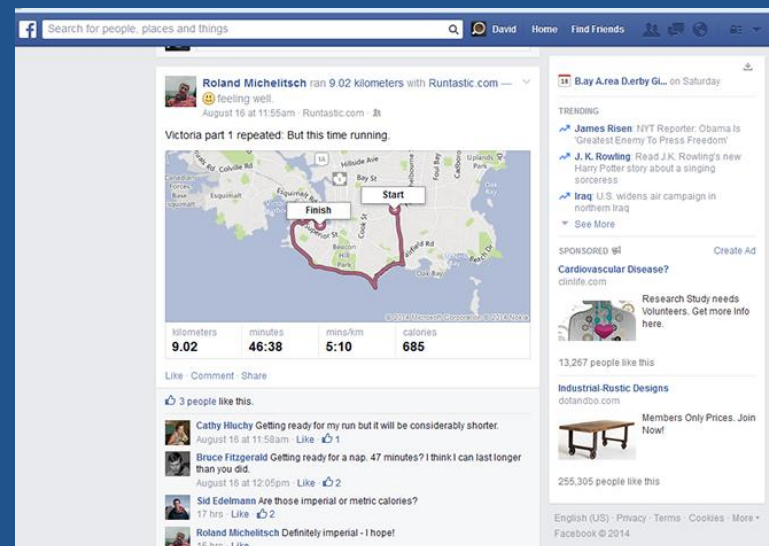
Clif Bar Offices, ZGF



# How can we leverage the power of social media for energy engagement?



www.metanexus.net



# Research scope

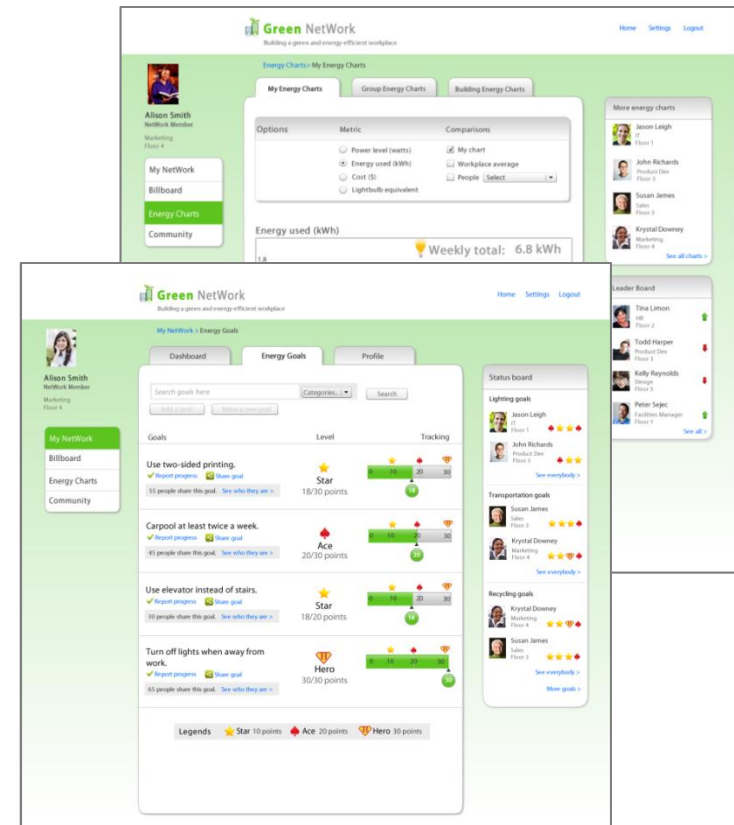
## Objective

Evaluate opportunities for using a social media application for:

- Encouraging energy-saving behavior in commercial buildings
- Improving communication between operators and occupants

## Research method

- Develop high-fidelity prototype
- Lab test with subjects as proxies for office occupants (today's talk)
- Evaluate via interviews with building professionals (see the full report)



# Lab testing at UC Berkeley's XLab

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- Subjects demoed prototype, responded to questionnaires during and after (Likert, ranking, open-ended questions)
- 128 subjects, 4 sessions
- 87% students, 11% staff
- Office experience
  - 41% <1 year
  - 48% 1-5 years
  - 11% over 5 years

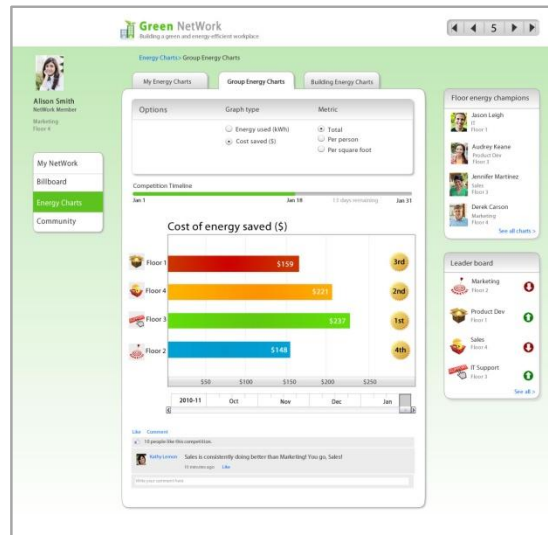


Conducting test at XLab

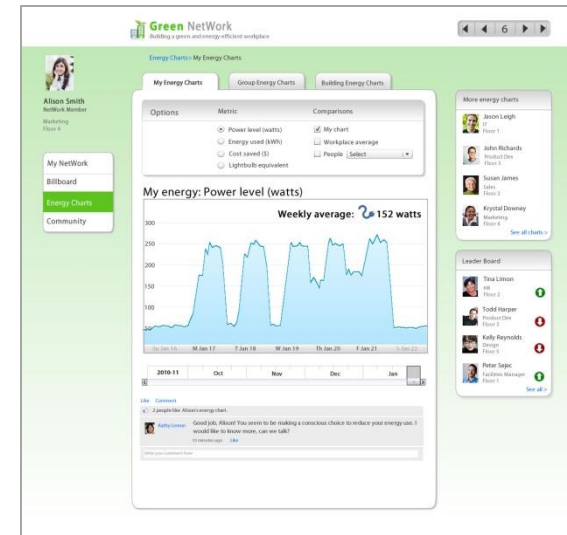
# Options for viewing energy information



Whole building (power by end use)



Floor level (energy competition)



“My Energy” (power per person)

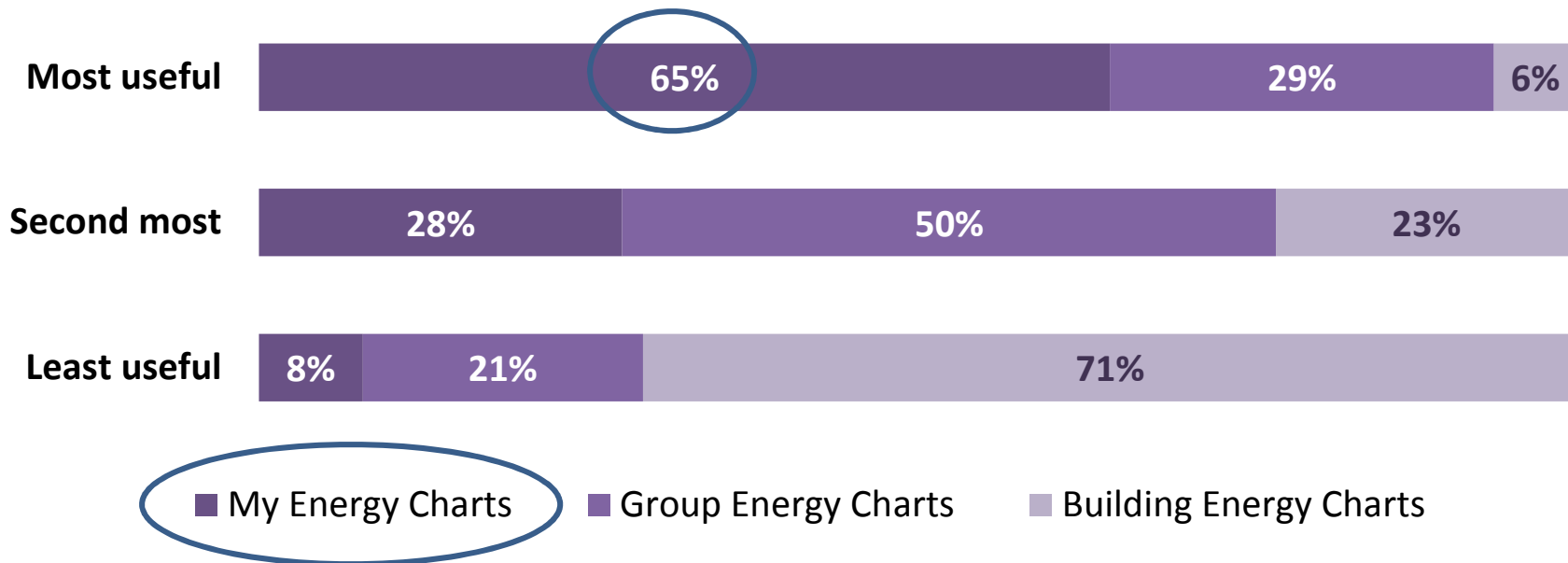
- **Granularity:** Three levels of energy information, increasing in granularity from whole building, to floor level, to individual office or workstation
- **Metrics:** Four metrics for individual energy information: cost, power, amount (kWh), and “light bulb equivalent”



## Viewing energy information: Granularity

- Clear stated preference for more personalized energy info, at the level of individual workstation or office (65% ranked as most useful)
- Whole building level information ranked last

*Please rank these energy charts in terms of their usefulness, from 1 most useful, to 3 least useful.*



## Viewing energy information: Comments

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*I like that you can monitor your own energy use and so you know how effective you are being in your efforts at using less energy.*

*...most people (unless they are familiar with the watt and joules or technical terms like that) will not be concerned about pages like "watts used." I think people will be more concerned about the costs of energy and not the amount of energy spent.*

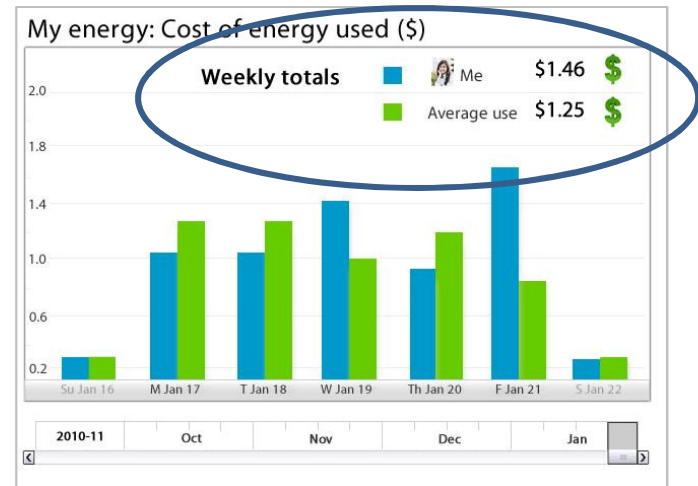
# Options for normalizing energy use



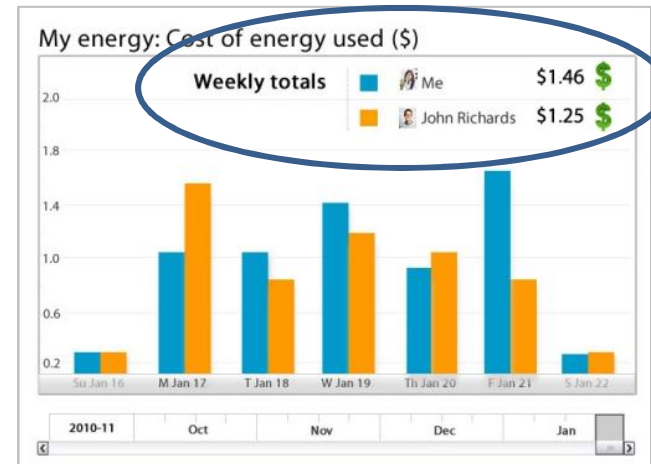
“My Energy” showing cost, no comparison

Three options, shown as weekly bar chart

- No comparison
- Compare to average user
- Compare to selected individuals



Comparison with average use

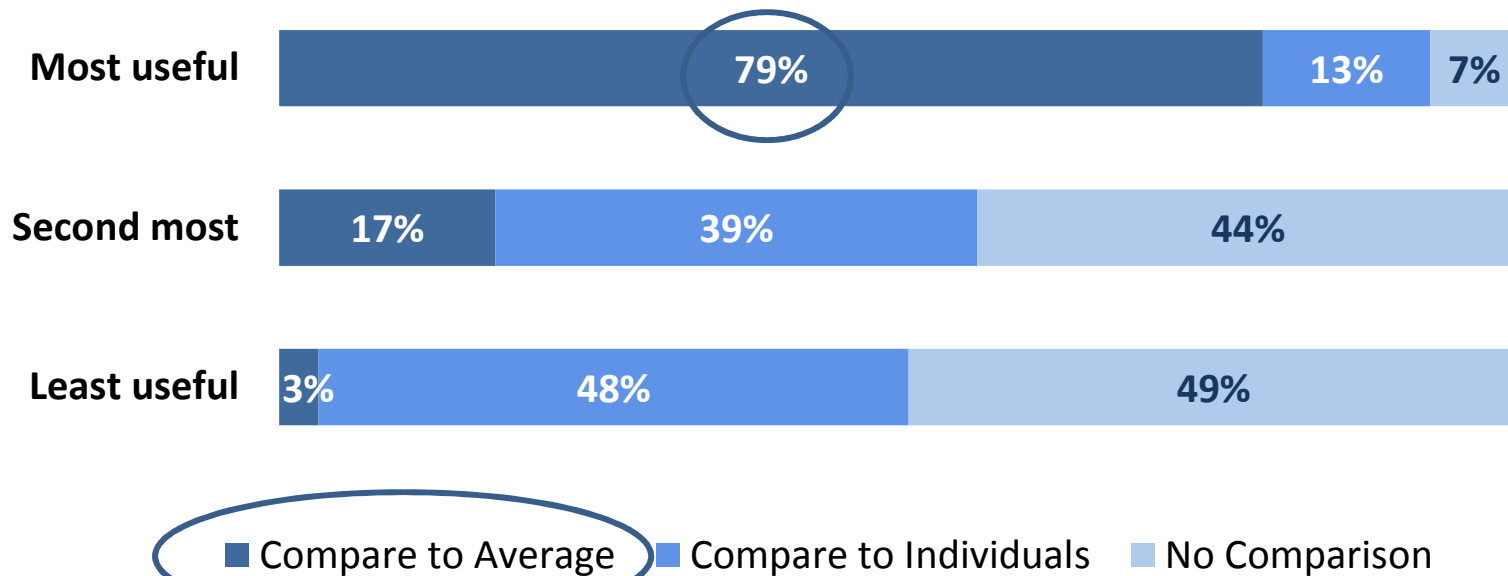


Comparison with selected individual

# Normalizing energy use: Comparison type

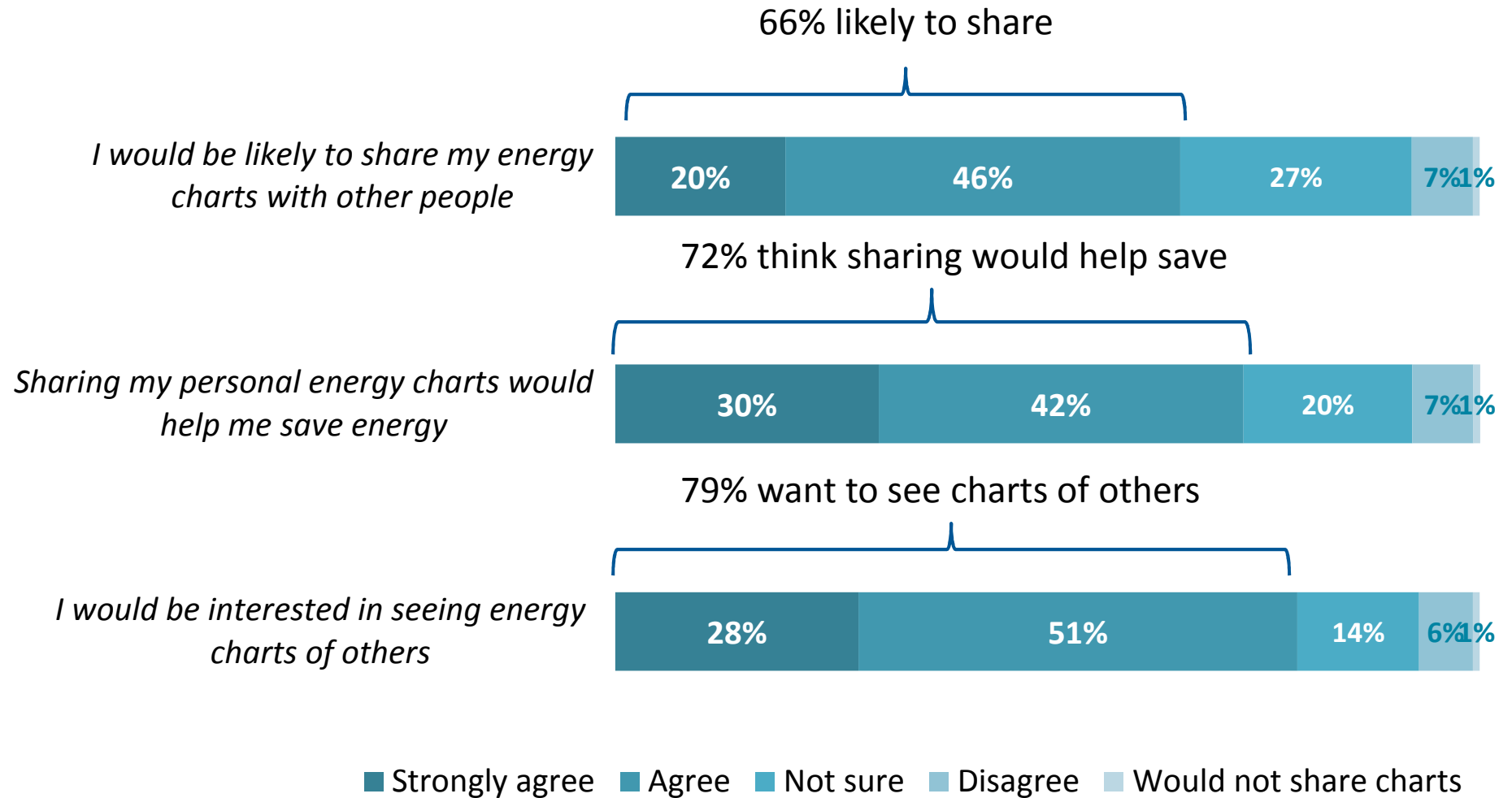
- Strong stated preference for comparison to average user (79% ranked as first choice)

*Please rank these energy charts in terms of their usefulness, from 1 most useful, to 3 least useful.*





# Social media features: Sharing energy charts



## Normalizing energy use and social aspects: Comments

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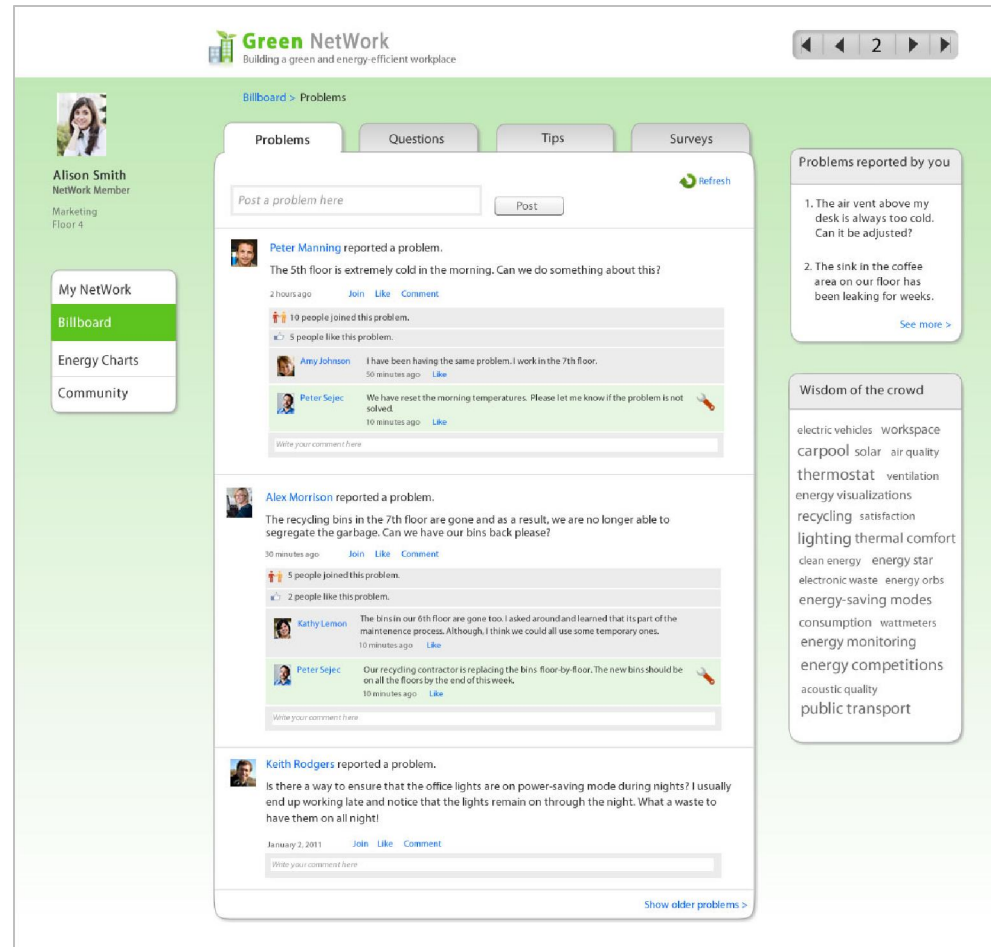
*I liked the comparisons between individual energy use. It made it competitive and like a game, which is a good thing when it comes to energy conservation  
(a typically dull conversation topic).*

*I also enjoy that users would be able to set goals and have other people join those goals too. It really creates an environment of peer support.*

*I think a person versus person feature...could negatively and unfairly single some people out that may need to use more energy for their job than their co-workers.*

# Occupant-operator communications: Billboard

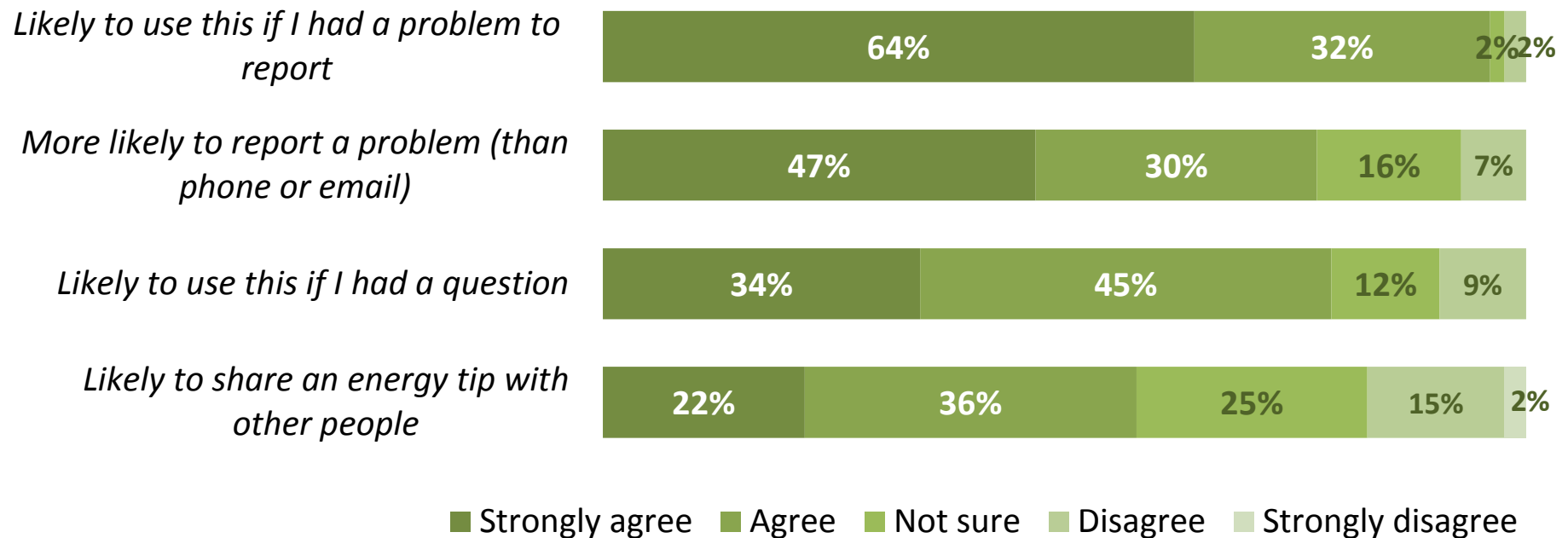
- Occupants can post problems, questions and tips
- Operators (and other occupants) can respond to postings
- Subjects asked about likelihood of use, usefulness, and level of interest



Billboard prototype

## Billboard key findings

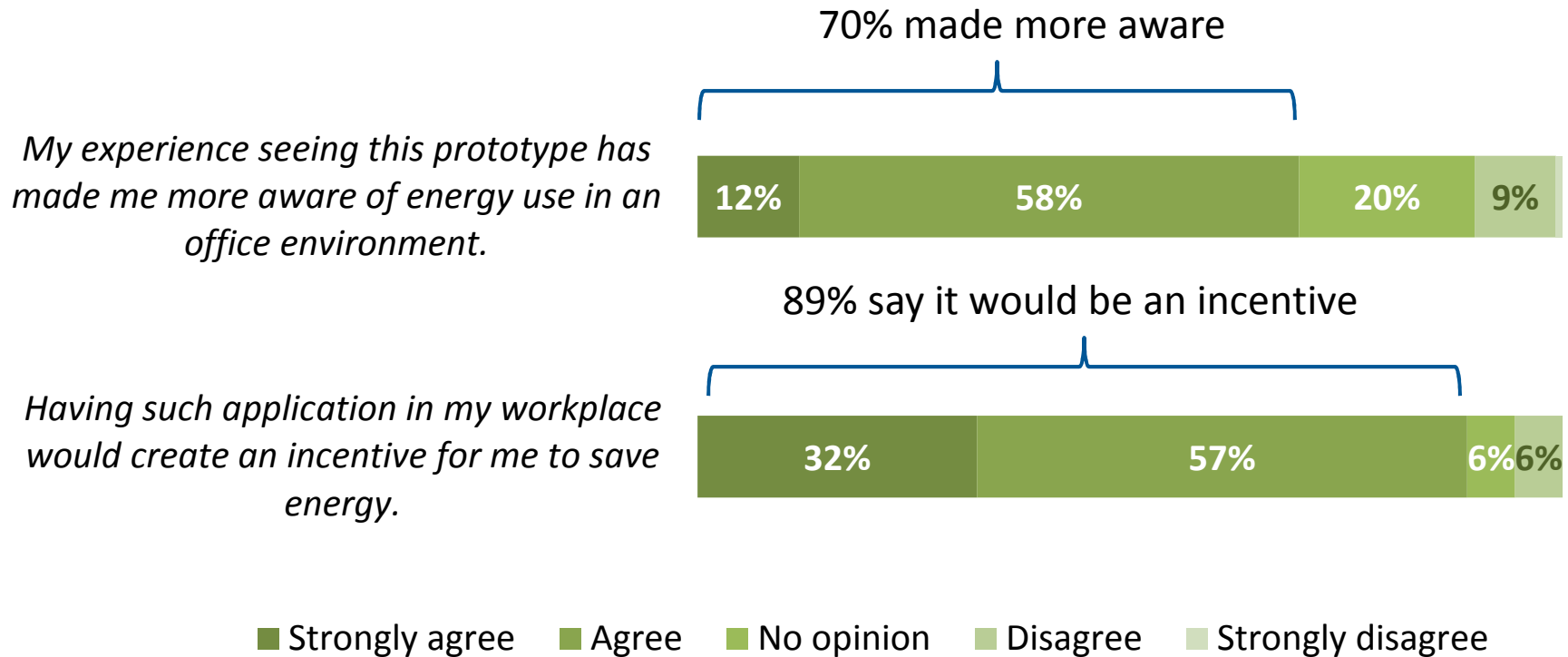
- People indicated they would use this to report problems (96%)
- More likely to do so than by phone or email (77%)
- Less interest in sharing energy tips
- Overall 95% rated billboard feature as "very useful" or "useful"





# Post-demo questions: Awareness and incentive

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# Insightful comments

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## **What features do you specifically like?** (126 comments)

*...It's a social networking site with a layout and interface similar to Facebook, which I already use and am familiar with...*

*...I also enjoy friendly competition, and I would definitely be a cheerleader for our individual unit, and set up a competition with other units...*

## **What features do you specifically dislike?** (122 comments)

*Seeing all problems reported and by whom [are] not really relevant to my day...*

*I'd tell Peter Manning to quit whining and put on a sweater!*

*While I do think groups are not a bad a idea, I do not think employees would go out of their way to try to save money to a well-off company...*

## **Please list additional features that would be helpful.** (98 comments)

*...connect with local weather notifications such as 'Spare the Air Day'.*

# Resources

David Lehrer  
[lehrer@berkeley.edu](mailto:lehrer@berkeley.edu)

Prototype online at:  
[www.cbe.berkeley.edu/prototype](http://www.cbe.berkeley.edu/prototype)

Reports and related papers:  
[www.cbe.berkeley.edu/research/visualizing-info.htm](http://www.cbe.berkeley.edu/research/visualizing-info.htm)

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California Energy Commission  
PIER Program

