The future of campus energy management and innovative technologies for key stakeholders

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Presentation Outline

• Overview of Lucid
• Trends in Energy Management
• Innovative Hardware and Software Solutions
• Tools for Occupant Engagement
• Examples of Sustainability Initiatives
• BuildingOS for Facilities + Operations
• Finance Management
• Question & Answer
Overview of Lucid
Lucid started as a group of educators, engineers, and students committed to breaking down barriers to commercial energy efficiency with smart technology solutions:

- Expensive, Proprietary Hardware and Software
- Disparate Systems and Decentralized Data
- Costly, Difficult Integrations
- Lack of Affordable Access to Real-Time Data
Lucid works with over 350 organizations, including leading institutions across North America.
180 Leaders in Sustainability
Lucid’s BuildingOS Product Suite

• Bring all of your metering and building systems online
• Get instant, portfolio-wide data access from a centralized platform
• Cut down on energy costs and streamline efficiency
• Connect diverse teams and engage building occupants

An operating system for commercial building technology.
Trends in Energy Management
“A disruptive innovation is an innovation that helps create a new market and value network, and eventually disrupts an existing market and value network (over a few years or decades), displacing an earlier technology.”

Clayton Christensen, in 1995
Find a place to stay.
Rent from people in 33,424 cities and 192 countries.
Smart buildings are a huge and growing opportunity

5M commercial buildings in the U.S.

40%+ of energy is wasted

$35B spent on commercial building automation in 2013

94% of commercial buildings still don’t have automation technologies
Building technologies today are complex, fragmented, and disconnected from one another.
160+ supported integrations
BUILDINGS ARE A SOFTWARE PROBLEM
Innovative Hardware and Software Solutions
12 monthly bills
12 monthly bills

15 minute data (35,000 readings)
Key Areas of Interest

Occupant Engagement

Sustainability Initiatives

Facilities and Operations

Finance Management
BuildingOS for Occupant Engagement

Facilities and Operations

Sustainability Initiatives

Finance Management
The Importance of Student Involvement

- Butte College – Northern California

- First college in the nation to go “grid-positive” with over 25,000 solar panels

- Sustainability success due to curriculum development, student engagement, green workforce development, and the largest community college transportation system in California.
CAMPUS CONSERVATION NATIONALS 2013
The Importance of Student Involvement

- CCN Competition
- Launch of an EcoReps Program
- Engaging students to be the drivers of the competition
- Used Lucid’s Building Dashboard to track and communicate progress
- Manual water readings
- 23% reduction - Winning 1st Place in our league of 9 other schools!
The Importance of Student Involvement

- Professional development opportunities
- Impacting the lives of students casts a wide net of impact
The industries gold standard for tenant and occupancy engagement
Real-time feedback drives behavior change and improves operational efficiency.

The Power of Feedback
Building Dashboard can track any building system or sub-meter and display information as frequently as once per minute.

Reduction Competitions
Host exciting real-time energy and water use reduction competitions across your entire organization.

What Makes it Green
Tell the story of your own building by showcasing its unique green features backed with real-time performance data and payback calculations.
• Manage all of your existing and future competitions

• Upload content for the Green Features App on Building Dashboard

• Create Building Blocks to embed in your organization’s website, and use to view with mobile devices

• Program and control your Building Orbs!
Building Blocks

- Trends, Competition Leaderboards, Numerical Gauges, Character Gauges, and Competition Rankings
- Customize your Building Blocks and simply drop a few lines of HTML code into your website
- Display live energy performance and competition results on any webpage
Building Blocks Examples

Regional Energy Smackdown
10 participants • January 1 — December 31, 2014
San Francisco 23% New York City 16% Pittsburgh 10%
2,450,933 kilowatt-hours saved

Electricity Use at Student Center

Energy Challenge 2014
March 31 — November 16, 2014
5 participants
1. Campus Array 22.4% reduction
2. Grocery Store 8.8% reduction
3. Motel 6.0% reduction
4. Hospital 3.3% reduction
5. Headquarters 3.5% increase

Willamette C. Johnson Place
Electricity usage today compared to yesterday
1,285.3 kilowatt-hours consumed today

Electricity Use at Abbey Abode

Water Use
47,513 gallons this year
Building Orbs
BuildingOS for Sustainability Initiatives

- Occupant Engagement
- Facilities and Operations
- Sustainability Initiatives
- Finance Management
Using BuildingOS Sustainability Initiatives – Green Features
Using BuildingOS Sustainability Initiatives – Commitments and Competitions

2.2 million kWh saved
Campus Conservation Nationals 2014

476,000 gallons saved
Campus Conservation Nationals 2014

1.8 million
1L water bottles

How are you reducing your use?

I love saving energy!
Daniel Galante, Apr 14 at 6:12pm

There are 5 ways to win points for the energy Challenge. Anyone know what they are?
Shaun 0 & 39;Malley, Apr 14 at 3:18pm

Hey Everyone, Go Online and vote for PSU in the CCN Poster Competition. Let’s win Nationally!!!
Shaun 0 & 39;Malley, Apr 14 at 11:19am

Shaun O & 39;Malley, Apr 14 at 11:20am

Adjust your computer’s power setting so the display sleeps after 5 minutes of inactivity
30 people have committed

Air dry laundry instead of using an electric or gas dryer
300 people have committed

Take the stairs instead of the elevator
30 people have committed

Turn off lights in bathrooms and common spaces at night
30 people have committed

I make sure windows that are not being used

Commit to Conserve
TOTAL
COMMITMENTS
2,494
Illinois Green Economy Network & Lucid

- 17 colleges
- Used to highlight the campuses' renewable energy systems
- Main goals of the project include: student awareness, centralized platform to track all production, promoting Illinois sustainability initiatives.
- Current status: Phase 1 currently going through QA process.
- Future plans: Centralizing energy data for all Illinois Community Colleges to manage data and sharing best practices.
BuildingOS for Facilities and Operations

Occupant Engagement

Sustainability Initiatives

Facilities and Operations

Finance Management
The Operation Savings Behind BuildingOS

Operational Efficiency

3-8% savings
Peak Demand Reduction with Load Profile Analysis

2-3% savings
Scheduling optimization with Heat Map Analysis

1-2% savings
Bill reconciliation with Bill Analysis

2-3% savings
Identify largest consumers and changes over time with Portfolio Drift
Heat Map Analysis

Understand how much energy your facilities are using 24/7/365 to make no-cost adjustments to your HVAC and lighting systems that can deliver significant recurring savings.

• Analyze a year’s worth of interval data and identify optimization opportunities
• Compare interval data to peak demand to see how peak demand fluctuates throughout the year, and when you are spending the most on peak demand changes
• Compare to baseload to see how on-loads are fluctuating
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**BEFORE**

**AFTER**
Portfolio Drift Analysis

• Find out where you'll get the best ROI with energy efficiency investments

• A portfolio-wide view of performance quickly shows which facilities have the largest impact and tracks their savings over time

• View the percent change of key building performance indicators
Receive a Meter Alerts Email every time the condition for an Alert is met.

- Set up an Alert when you approach a peak demand threshold to reduce demand and associated peak demand charges.

- Quickly catch malfunctioning equipment and leaks – set an Alert when consumption is high when you expect it to be low, such as nights and weekends.

- Learn when your building has veered off track – set an Alert to discover when resource use has deviated over the last.

- Stay under budget and keep your CFO in the know – set an Alert when spend on resources is getting close to your monthly budget.
Trend Analysis

Review meter data over any timescale and compare against past or predicted performance.
BuildingOS for Finance Management

- Occupant Engagement
- Sustainability Initiatives
- Facilities and Operations
- Finance Management
Bill Analysis

- Intuitive tool used by the Finance Teams for Utility Bill Management.
Create a weather normalized baseline in BuildingOS to benchmark your current usage

Before project implementation, create a custom weather-normalized baseline in the Meters section within BuildingOS, measuring your status quo performance over a chosen seed period of at least 2 weeks duration.

Compare real-time usage against your baseline using the Trend Analysis App

Once you have implemented your project, use the Trend Analysis App to view your real-time electricity and water use and compare it against your custom baseline over any time period before, during, or after project implementation.

Automatically generate key performance metrics to quickly determine project ROI

Quickly determine project ROI by automatically generating cost and performance metrics in Trend Analysis, including $ and kW savings from baseline, % to baseline, and consumption to baseline.
12 projects

HVAC efficiency retrofits and improvements
Jan 2012 - Dec 2015
13 measures 10 facilities 4 team members $27,550 saved so far

Central Campus sub-metering improvements
May 2013 - Dec 2014
22 measures 56 facilities 8 team members

Social demand response program
Jun 2012 - Sep 2014
5 measures 20 facilities 16 team members $88,900 saved so far
Central Campus sub-metering improvements at Lucid

Start Date: Jan 2012  End Date: Dec 2016

Status: In Progress

Description
Without a meter to measure individual usage, there is less incentive to conserve electricity or stop water leaks. This sub-metering project is designed to generate awareness among tenants, who will be required to pay for all of their usage and any leaks they allow to remain unspared starting in 2016. Beginning in January 2012...

Projected savings: $14,550
121,230 kWh
Savings to date: 27%
Actual ROI: 22
Measures: 56
Partners: 4

Team Members

Name: Alexa Rhoads  Organization: Lucid  Role: Executive Officer

Name: Chelsea Hodge  Organization: Lucid  Role: Faculty / Staff

Name: Karthik Damar  Organization: Lucid  Role: Energy Manager

Name: Lauren Miller  Organization: Lucid  Role: Sustainability Coordinator

Internal Notes & Docs
- Project mission statement and objectives
- Sub-metering installation guide
Come by our booth to learn more!

Enter our raffle to win a Rainforest Eagle gateway
Questions?
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