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 each other and from the Internet.
Building Sophistication

- Bill Data
- Smart Meter Data
- Building-level sub-meters
- Circuit-level sub-metering
- IoT Device Control
- BMS Automation
160+ Vendor & Device Integrations

Compatibility with 95% of existing building systems technologies
Cloud-based building management

Finance & Planning  Sustainability  Energy Management  Tenant Management  Reporting
Cloud-based building management

Finance & Planning
- Budgets & Planning
- Savings Verification
- Utility Bill Verification

Sustainability
- Public Dashboards
- Energy Competitions
- Compliance Reporting

Energy Management
- Schedule Optimization
- Peak Demand Mgmt
- Building Drift Analysis

Tenant Management
- Tenant Billing
- Tenant Comfort
- Tenant Engagement

Reporting
- Automated EnergySTAR
- Customized Reporting
- Workflow Automation
Enter your BuildingOS login information

sarah@stanford.edu

***********

Login

Create an Account

Forgot Password
Verify Bill Accuracy

Morro Center
Electricity consumption, 2014

- Billed
- Measured

<table>
<thead>
<tr>
<th>Month</th>
<th>Billed</th>
<th>Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>$10k</td>
<td>$8k</td>
</tr>
<tr>
<td>Feb</td>
<td>$15k</td>
<td>$12k</td>
</tr>
<tr>
<td>Mar</td>
<td>$20k</td>
<td>$18k</td>
</tr>
<tr>
<td>Apr</td>
<td>$25k</td>
<td>$22k</td>
</tr>
<tr>
<td>May</td>
<td>$30k</td>
<td>$28k</td>
</tr>
<tr>
<td>Jun</td>
<td>$35k</td>
<td>$32k</td>
</tr>
<tr>
<td>Jul</td>
<td>$40k</td>
<td>$37k</td>
</tr>
<tr>
<td>Aug</td>
<td>$45k</td>
<td>$42k</td>
</tr>
<tr>
<td>Sep</td>
<td>$50k</td>
<td>$47k</td>
</tr>
<tr>
<td>Oct</td>
<td>$55k</td>
<td>$52k</td>
</tr>
<tr>
<td>Nov</td>
<td>$60k</td>
<td>$58k</td>
</tr>
<tr>
<td>Dec</td>
<td>$65k</td>
<td>$62k</td>
</tr>
</tbody>
</table>

- Consumption: 20% overbilled
  - 2,635 kWh more than measured
- Total Bills: $105,670
  - 685,058 kWh
- Cost Discrepancy: $21,134
  - 20% of total bills
### Comparisons at DPR Construction

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Usage</th>
<th>kWh</th>
<th>500</th>
<th>1k</th>
<th>1.5k</th>
<th>2k</th>
<th>2.5k</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPR Receptacles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPR HVAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPR Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenant HVAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenant Receptacles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core Exterior Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core Receptacles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenant Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core Lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Core HVAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Proprietary & Confidential

Optimize Performance in Real-Time

Trend Analysis

Plaza de Basilio ▼ electricity use ▼ over ▼ this week ▼ compared to ▼ previous week ▼

<table>
<thead>
<tr>
<th>Day</th>
<th>Consumption</th>
<th>Baseload demand</th>
<th>Peak demand</th>
<th>Compared to expected peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue</td>
<td>974 kWh</td>
<td>0.79 kw</td>
<td>67 kw</td>
<td>82%</td>
</tr>
<tr>
<td>Wed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Building Schedule Optimization

Heat Map

Building: Y2E2 Building
Meter: total electricity
Period: from Apr 1, 2014 to Sep 30, 2014
Days: all days
Comparison: none

Recalculate
Detecting Building Drift

Building Drift - Changes in Baseload

Cell size represents baseload this week. Cell color represents drift from baseload last week.
Manage Peak Demand

Load Profile Analysis

- Astaire
- total electricity use over the last 30 days showing Weekends with none

Graph showing load profile analysis with Max, Average, and Min lines.

Proprietary & Confidential
Savings Measurement + Verification

Document each efficiency project and expected ROI

Automate reporting of savings across entire portfolio

Award-winning algorithm guarantees accuracy
Extensive coverage across US utilities and growing quickly

Support for different rate types (TOU, Peak Demand, Tiered)

Accurate cost calculations across all BuildingOS apps
Most Expensive Hourly Periods

9:00-10:00am
$15,670
8:00-9:00am
$12,040
7:00-8:00pm
$10,330

Total Electricity Bills / Last 12 months

HIGHEST
$876,810 (Aug)
2ND HIGHEST
$874,920 (Jul)
3RD HIGHEST
$873,680 (Sep)

Meter Status

1,060 online
32 offline
10 flatlines
Y2E2 Building

Overview
- 20 Meters
- 4 Utility Accounts
- Files
- Audit Trail

Total Electricity Use / Last 7 days compared to forecast

<table>
<thead>
<tr>
<th>Date</th>
<th>Total Use</th>
<th>Total Spend</th>
<th>Compared to Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tue Apr 28</td>
<td>960 kWh</td>
<td>$12,270</td>
<td>8%</td>
</tr>
<tr>
<td>Wed Apr 29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thu Apr 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fri May 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sat May 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun May 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mon May 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

473 Via Ortega
Stanford, CA 94305

Offices, Labs
166,560 ft²
4 floors
400 occupants

Edit this Building
Actions
90 out of 100

Community Comparison
Science Buildings, Last 24 hours

Best Building: 0.38 kWh / m²
This Building: 0.42 kWh / m²
Median Building: 0.73 kWh / m²
Worst Building: 1.05 kWh / m²

Most Expensive Hourly Periods

- 12:00-1:00pm: $335
- 1:00-2:00pm: $290
- 10:00-11:00am: $264

Summary / 2015

- TOTAL UTILITY COSTS: $125,780
- TOTAL ELECTRICITY USE: 361,800 kWh
- TOTAL WATER USE: 267,350 gallons
- TOTAL SOLAR PV PRODUCTION: 35,710 kWh
**Total Electricity Use** / Last 12 Months

- **HIGH**: 56,890 kWh (May)
- **MEDIAN**: 34,590 kWh (Nov)
- **LOW**: 16,720 kWh (Jul)

**Summary** / 2015

- **TOTAL UTILITY COSTS**: $125,780
- **TOTAL ELECTRICITY USE**: 361,800 kWh
- **TOTAL WATER USE**: 267,350 gallons
- **TOTAL SOLAR PV PRODUCTION**: 35,710 kWh
- **TOTAL CO2 EMISSIONS**: 160,140 lbs CO₂
Automated PDF generation and email delivery
Connected Cities is a technology-driven program from Lucid to enable cities to maximize resource efficiency for a stronger and more resilient building stock.

- Connected Cities is a Clinton Global Initiative Commitment to Action
  Commitments to Action are new, unique and measurable solutions to the world’s most pressing challenges.

- Complementary to existing systems and commitments
  Connected Cities unlocks the data for your city & county buildings no matter what systems you have in place.
What Connected Cities Receive

- **Centralize** historical energy and water data for all buildings
- **Automate** Energy Star benchmarking and disclosure for all buildings
- **Automate** utility bill data capture for key buildings
- **Demonstrate** results using real-time electricity data for key buildings
- **Access** experts in resource efficiency and BuildingOS through your Connected Cities Success Manager
- **Promote** results to key stakeholders with tools and templates for clear reporting and communications
- **Learn and share** with other cities through the Connected Cities Exchange
- **Get recognized** as a leader through awards and media
Automated Energy Star, Comparisons & Efficiency ROI Tracking

Proprietary & Confidential
Orlando, Santa Cruz First to Sign Up for Lucid’s Connected Cities

June 10, 2015 By Linda Hardesty

Lucid launched Connected Cities, a program that Lucid says will connect 100 US cities to BuildingOS over the next three years. The program, born out of Lucid’s commitment to action to the Clinton Global Initiative, is being anchored by the City of Orlando, Florida, and the City of Santa Cruz, California.

Lucid has partnered with Dell to provide Internet of Things to facilitate implementation processes.

Participating cities will receive access to Lucid’s BuildingOS building management platform to centralize energy and water data for all city buildings. Cities will also receive access to Lucid’s new ENERGY STAR application for BuildingOS, which automates ENERGY STAR benchmarking and disclosure for all buildings, as well as Bill Trends, an application that automatically collects and analyzes all utility bill data.

Bolstering the Connected Cities offering is the Connected Cities Network of experts in city resource efficiency. The network fosters collaboration between cities to share scalable tactics and creates network effect for all city stakeholders to collectively yield significant energy savings.
Cal Poly leverages Building Dashboard to engage students in achieving campus-wide energy reduction goals and reinvigorate discussion about sustainability.

Lucid’s Building Dashboard provides facilities staff and the student housing community with the visualization and communication tools they need to foster a sweeping new dialogue about campus sustainability through friendly competitions and social media.
Kadri Jugandi
Business Development Manager
415.699.0310
kadri@luciddg.com