Robert Fortunato, LA Cleantech Incubator
David Hodgins, LA Better Buildings Challenge
Project Summary

Timeline:
Start date: July 2015
Planned end date: July 2018

Key Milestones
2. Project Development Agreement, June 2016

Key Partners:

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<tr>
<th>LA Cleantech Incubator</th>
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<tr>
<td>LA Better Buildings Challenge</td>
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<tr>
<td>LA Department of Water and Power</td>
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<tr>
<td>Southern California Gas</td>
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</table>

Budget:

Total Project $ to Date:
- DOE: $154,074
- Cost Share: $177,784

Total Project $:
- DOE: $558,055
- Cost Share: $558,055

Project Outcome:
The intended outcome of this project is to accelerate market adoption of best-in-class building technologies, and to create an “on-ramp” for emerging technologies to enter the market.
Purpose and Objectives

Problem Statement: Technology is advancing rapidly, investment brings risk, and property owners and managers are extremely busy – together these factors slow the market’s adoption of best-in-class technologies.

Target Market and Audience: SoCal Edge currently targets Commercial buildings in the City of Los Angeles, which account for 12.8 million megawatt-hours of energy consumption (50%). The audience is property managers and owners with large real estate portfolios, who will be able to scale successful pilots.

Impact of Project:

- Outputs:
  - 5 completed pilot projects, with 2 scaling up to multiple sites
  - Emerging Technologies “Onramp” process establish with local utilities
  - Near-term outcomes: Implementation of pilot projects, savings
  - Intermediate-term outcomes: Expansion of technology awareness and adoption, increased energy and water savings
  - Long-term outcomes: Broad scale adoption of energy efficiency measures, exponential savings impacts
Approach

- Identify best-in-class technologies through RFI processes
  - Leverage Green Proving Ground testing and research (9 GPG approved technologies)
  - Leverage DOE performance specifications across 16 approved technologies
  - Engage utility partners

- Negotiate tech demonstration opportunities and define metrics for success that can lead to scaled up portfolio implementation (Currently 45 projects in the pipeline)

- Market technologies to LABBC owner/manager partner base (>90M Square Feet)

- Connect with and Provide technical assistance to real estate portfolio owners.

- In parallel, work with utility partners to develop emerging technology “on-ramp” and utility rebates where available (Memorandum of Understanding in place with Los Angeles Department of Water & Power (LADWP), SoCal Gas, Metropolitan Water District (MWD).

- Develop M&V process for emerging tech projects and expedited permitting for new efficiency tech
Approach

Key Issues:

<table>
<thead>
<tr>
<th>Barriers to Market Adoption</th>
<th>Applied SoCal Edge Strategies</th>
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<tbody>
<tr>
<td>Lack of financial resources to implement projects and pilots.</td>
<td>Strong outreach efforts to obtain additional funding through grants, loans and other financial assistance programs.</td>
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<td>Difficult regulatory and contracting environment for project pilots.</td>
<td>Working with city agencies and utilities to establish a project task force to streamline the permitting, vetting and rebate process for new tech.</td>
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<tr>
<td>Implementation timelines are much longer than originally projected.</td>
<td>Working with property owners, legal resources, vendors, utilities and city governments to implement structured approach to implementation of projects.</td>
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Distinctive Characteristics:

- LACI campus & capabilities (60,000 SF multi-tenant R&D Center), establishment of water and energy clusters to galvanize industry and stakeholders.
- LABBC partnership base (>90M SF)
- Technical Advisory support from industry experts
- Utility engagement with LADWP, SoCal Gas, & MWD
- Partnerships with a various experts, including NREL
Progress and Accomplishments

Accomplishments:
- 4 demonstration projects, including UgMo, Rain Systems, Hive and Ayyeka
- 4 pilot projects, including Dynamic Water, Nalco (2), and HydroGel
- >20 Property Assessments
- Created a strong campaign of outreach, technical assistance, and convening
- Brand recognition for the SoCal Edge program and its capabilities

Market Impact:
Demonstration Projects

<table>
<thead>
<tr>
<th>Installation Date</th>
<th>Expected Savings</th>
<th>Ugmo Irrigation</th>
<th>Ayyeka Grey Water Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/25/16</td>
<td>109,866.24 gallons</td>
<td>11/2/16</td>
<td>In process</td>
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<tr>
<td>11/2/16</td>
<td>1.7MWh</td>
<td>9/24/16</td>
<td>111,649.15 gallons 1.786 MWh</td>
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Pilot Projects

<table>
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<tr>
<th>Property Assessed</th>
<th>Property Owner</th>
<th>Property SF</th>
<th>Expected Energy Savings through Pilot project</th>
<th>Expected Water Savings through Pilot project</th>
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Awards/Recognition: Portfolio companies featured in Mashable series on clean tech. High publicity for program during incubator launch with city of LA.

Lessons Learned: The largest hurdles have been timing, identifying budgets, building permitting and the overall timelines to get projects sited, negotiated and installed.

Project Integration & Collaboration:

- LABBC conducts outreach, provides project development support
- LACI conducts outreach, refers owners/manager to LABBC, integrates new portfolio companies and emerging tech into program.
- Provides a unique blend of next generation technology with proven implementation methods. Bridges the nexus between utilities, tech vendors, municipalities and portfolio owners.
- LACI has developed a Built Environment Cluster that sources tech and generates project opportunities (165 registrants, key players include USGBC-LA, NREL, LADWP, MWD, LA Metro, City of LA, UCLA, private sector)
- Utility partners help fund outreach efforts, define technologies of interest, with annual or bi-annual commitments to submit their technology challenges to help source new tech

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Partners, Subcontractors, and Collaborators:

SoCal Edge First Movers
SoCal Edge Key Partnership Activities

- Collaboration with Emerging Tech Team on M&V & Rebates
- MOU Draft to accelerate permitting for energy efficiency and water conservation technologies.
- Marketing partner for new demonstration projects
- Collaboration with engineers on demo projects, M&V, and rebates
LACI Portfolio Companies

- **AYYEKA**
  - Rethink Remote Monitoring

- **BK LITEC**
  - IoT Hardware Embedded LED Lighting
  - 50-70% energy savings

- **Built Bright**
  - 30% potential savings over traditional lighting methods

- **rain systems**
  - Advanced Irrigation Reduction Technologies
  - 50% water cost savings

- **saya**
  - Zero Waste Water Systems
  - 25% water savings

Highlighted companies implemented pilot projects
GSA Vetted Technologies

- Smart Meters
  15-20% water savings

- Wireless Pneumatic Thermostats
  15-20% HVAC energy savings

- Wireless Advanced Lighting Controls
  30-40% energy savings

- Non-Chemical Water Treatment
  15-30% water savings
GSA Vetted Technologies

Non-Chemical Water Treatment
up to 30% savings on cooling tower discharge water

Advanced Water Softening Treatment
up to 80% water savings on cooling tower blowdown

Wireless Sensor Networks
20-40% of cooling energy with ROIs of less than 3 years

Water Efficient Fixtures
10-20% water savings

Wireless Moisture Sensors
40-80% water savings
Communications

- Conducted LABBC Tech Showcase with approximately 300 attendees. Consisted of a full day of technology showcases, customer engagement and fast pitch component highlighting specific application options. Incredibly successful event resulted in at least 6 new customer leads and a potential installation.

- Working with 6 technical advisors focused on implementing water efficiency measures during one of the state’s longest draught periods.
  - Revamped SoCal Edge Website
  - Created Banners to Market SoCal Edge program
  - GreenBuild 2016 Tours and related events
  - Presentations to LADWP and their top customers with approximately 85 attendees
  - Quarterly technology highlight email blasts (Distribution List of 3,000)
  - Conducted 28 LKIC Campus Tech Tours (450 people)
  - Presentations to students from UCLA, USC, and CalPoly Pomona, UC Riverside, CSUN, LACC
  - Presentations to High School students from all over Los Angeles County
Next Steps and Future Plans: Future project activities include establishing additional pilots with large probability of scaling to portfolio scale adoption. Continued gathering of data and disciplined measurement and verification protocols. Establishment of additional technology onramp sources such as competitions, technology challenges and/or calls to action. Continued focus on marketing and outreach of program benefits to additional segments in the built environment. Engage professional writers, engineers and marketers to further expand scope and reach of pilot case studies.
REFERENCE SLIDES
Project Budget: Total program budget of $1,116,110 based on 50% cost share. Variances: A portion of the budget was shifted from LABBC to LACI to support additional staff to further develop the program and assist with project implementation. Cost to Date: 30% of the budget has been spent. Additional Funding: No additional funding is currently in place, however, the program has been pursuing additional grant opportunities through various City, State and Federal opportunities.

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# Project Plan and Schedule

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<th>Quarter</th>
<th>Q1</th>
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<td>Subtask 3.6: Deliver 5th of 5 Case Studies</td>
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<td><strong>Task 4.0 -- Graduating to Scale</strong></td>
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<td>Subtask 4.1: Annual Presentation of TDI Project Findings and Progress to Utility</td>
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<td><strong>Total</strong></td>
<td><strong>4,763 properties</strong></td>
<td><strong>1.5 billion SF</strong></td>
<td><strong>9,012,917 kWh per year</strong></td>
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Ayyeka

- Monitors flow, pressure, level, pH, turbidity, oxygen, etc.
- Plug-and-play GPS self locating.
- Low power “Wavelet” accepts any data from any sensor, any manufacturer, data to SCADA control and visualization system.
- First large installation: Cincinnati Wastewater System.
• “HS frame” LED design eliminates a separate heat sink.
• Allows for form factors such as drop-in replacements for metal halide street light bulbs.
• Hollow design allows for IoT hardware integration.
The Chai gateway sends 6-second residential smart meter data to Chai servers for analysis. 6,000 users, increasing. Individual electrical appliances are identified by profile. Users receive push notifications with advice on how to reduce electrical consumption, on average by over 30%.
AQUACEReo measures residential water flow, providing data, analytics and control:

- Leak detection and auto shutoff.
- Pipe freeze protection.
- Smart metering for utilities.
- Water consumption monitoring & reporting.
- Partnerships with insurance to reduce claims.
- Analytics data for various verticals.
Patented process injects cross-linked polymers under turf for water retention and access by root system.

Polymers absorb 200 x their weight in water, preventing evaporative loss.
Hive Lighting

- Plasma and advanced LED lighting for film, television and live event.
- Applications in scientific imaging and architectural lighting.

Energy efficient solutions for high intensity and quality lighting.

Plasma
- 50%+ energy savings
- Small point source
- 50,000 hour lifetime
- Less heat
- Superior color rendering
- No flicker at any frame rate

HMI / Metal Halide
(continues industry standard)
- 8+ inches
- Inefficient
- Very Hot
- Requires ballast
- 300 hour lifetime
- Flicker