

Program will start at 10:00 am



ETCC QUARTERLY MEETING: *COMMERCIAL BUILDING ENERGY POLICY – ADAPTING TO THE CHANGES*

February 16, 2016

Energy Education Center, Irwindale, CA

HOSTED BY: Southern California Edison

Wifi: xxxxx

WIFI code: xxxxx

Welcome, Safety and ETCC Updates

Edwin Hornquist

Emerging Technology Program Manager | Southern
California Edison

WELCOME!

Before we get started....
housekeeping and safety

FOR OUR ONLINE MEETING PARTICIPANTS

- Quick logistics
 - Phone lines are muted, so if no sound is coming from your speakers, [click here](#)
 - Speaker check: select “raise” hand in the control panel to confirm you are able to hear
 - Please use question field to ask questions during Q&A or if any technical issues

HOUSEKEEPING FOR ALL PARTICIPANTS

- Please **turn off** or **silence** your phone, and **step outside** for any non-program conversations
- Video and audio recording today's session
 - Will be posted on www.etcc-ca.com
- Slides will be posted to www.etcc-ca.com
- Don't forget to fill out evaluations!

SAFETY MESSAGE

- In the event of an emergency:
 - Earthquake
 - Fire
 - Other evacuation
- Meeting point
- 911
- CPR

TODAY'S AGENDA

10:00 AM	Welcome, Safety & ETCC Updates
10:20 AM	Legislation to Implementation: Practical Impacts of Commercial Energy Policy
11:40 PM	LUNCH (provided)
12:45 PM	We Built It, Now What? Engaging All Stakeholders in Ongoing Operation of ZNE Commercial Spaces
1:55 PM	BREAK
2:15 PM	A Macro Approach to the Micro Grid
3:30 PM	WRAP UP

EMERGING TECHNOLOGIES COORDINATING COUNCIL (ETCC)

The ETCC supports ETP efforts in the advancement of energy efficiency and demand response initiatives through its leadership, impact and influence in the emerging technology domain. It pursues this objective by strategically engaging with a wide range of external ET stakeholders and effectively and efficiently managing coordination among ETCC members.

Members include:



EMERGING TECHNOLOGIES PROGRAM MISSION

“...to increase energy efficiency market demand and technology supply through evaluation of *emerging* and *underutilized* advanced technologies to increase customer savings...”

Emerging Technologies

Programs

Codes and Standards

Zero Net Energy



LED Lighting



EE Rebates



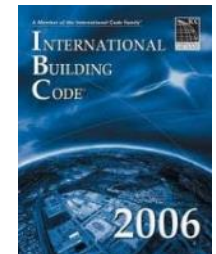
Retail and Manufacturer Strategy



Appliance Standards



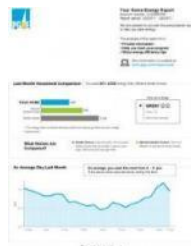
Building Codes



HVAC



Home Energy Report



Contractor Training and Outreach

ET PROGRAM DESIGN

Technology Development Support

- Provide resources to transform early-stage technologies / concepts into saleable products
- Develop forward-looking product specifications
- Provide outreach to early-stage entrepreneurs, investors, and analysts (TRIO)

Technology Assessment

- Evaluate performance claims
- Generate energy savings and cost data required for regulatory approval of a new EE measures

Technology Introduction Support

- Conduct scaled field placements to foster market traction
- Build demonstration showcases to create visibility / market awareness
- Conduct third-party solicitations using competitive bidding (TRIP solicitation)

UPCOMING ETCC EVENTS

Date	Event	Location & Host
April 26, 2016	Q2 Meeting: Agriculture	Stockton (PG&E)
August 25, 2016	Q3 Meeting: Residential	San Diego (SDG&E)
Fall 2016	Emerging Technologies Summit	Los Angeles area (SoCal Gas)

To sign up for the ETCC Insight newsletter, check the box on the sign-in / registration sheet or sign up online at: www.etcc-ca.com/subscribe

Check the ETCC website for updates: <http://www.etcc-ca.com/events>



LEGISLATION TO IMPLEMENTATION: PRACTICAL IMPACTS OF COMMERCIAL ENERGY POLICY

David Hodgins, Executive Director | LA Better Buildings
Challenge – *moderator*

Patrick Saxton, Advisor to Commissioner Andrew McAllister |
California Energy Commission

Andrew Meiman, Principal | ARC Alternatives

Matt Evans, Manager, Emerging Products, Customer Programs &
Services | Southern California Edison

David Hodgins
Executive Director | LA Better
Buildings Challenge



David Hodgins, Executive Director

www.LA-BBC.com / info@la-bbc.com

A Leadership Initiative



- **20% Energy & Water Savings by 2020***
- **Local & National Competition**
- **Recognition & Free Services**



* 2009 baseline

Where We Work

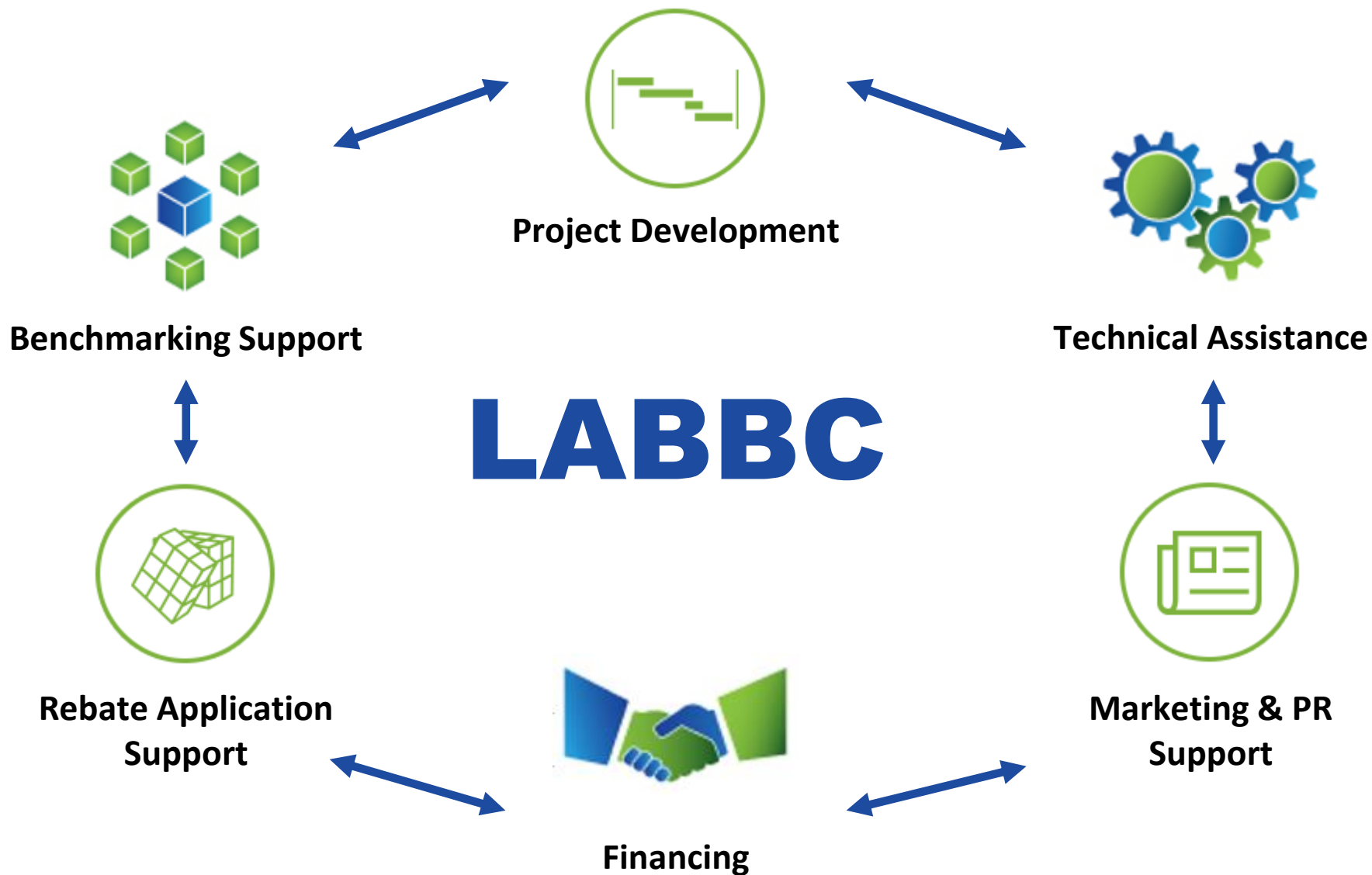


REAL ESTATE

GOVERNMENT
& UTILITIES

TECHNOLOGY





Patrick Saxton
Advisor to Advisor to Commissioner Andrew
McAllister | California Energy Commission

ETCC: Practical Implications of Commercial Energy Efficiency Policy

Patrick Saxton, P.E.

Advisor to Commissioner Andrew McAllister

California Energy Commission

patrick.saxton@energy.ca.gov

February 16, 2016



SB 350

- Establish savings & demand reduction targets to achieve doubling of statewide EE savings by 2030
- 50% eligible renewable energy resources by 2030
- Integrated Resource Plans to ensure planning trajectory for meeting GHG emissions reduction targets, 50% RPS, and other statutory requirements

AB 802

- Increase the EE of existing buildings based on all estimated energy savings and energy usage reductions
- Establish benchmarking & disclosure program



Andrew Meiman
Principal | ARC Alternatives

Andrew Meiman, P.E.



- Co-founder and Principal – ARC Alternatives
- Over 20 years consulting experience in government, education, and utility sectors
- Statewide Program Manager for the University of California, California State University and Investor Owned Utility Energy Efficiency Partnership (UC/CSU/IOU Partnership)



Andrew Meiman
Principal
ARC Alternatives
415-297-9870
andrew@arc-alternatives.com



University of California championing a whole building approach to achieve next level of energy efficiency

- Comprehensive approach including retrofit, commissioning, operational and behavioral strategies
- Whole-building, meter-based savings from existing conditions
- Performance-based incentive paid over time to encourage persistence, incremental savings and to mitigate risk
- Financing deeper savings by capturing a “portfolio effect” at building level
- Building focused delivery approach
- Comply with SB-350, AB-802 and AB-1150
- Carbon accounting to advance UC Carbon Neutrality Goal



**Carbon Neutrality
Initiative**



Matt Evans
Manager, Emerging Products,
Customer Programs & Services |
Southern California Edison

Matt Evans, Ph.D.

Manager, Emerging Products
Customer Programs & Services

matthew.evans@sce.com

626.302.0772



**Have an idea to help us save energy,
reduce demand, or improve operations?**

Let us know!

visit
on.sce.com/ideas
to share your idea



Data Analytics: Building-Level Information System

DSM Program Participation &
Distributed Energy Resources



Audit Results &
Equipment Inventory

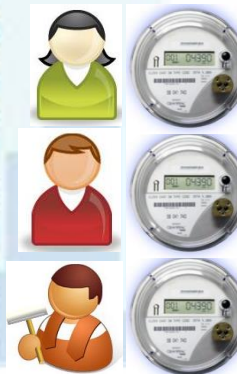


Benchmarking
Information



37 → 92

Owner & Tenant
Information – CSS
& Assessor Data

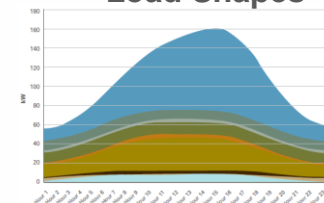


**AB 802: Whole-building
Energy Usage Data &
Pay for Performance**

Distribution System
Information



Building & Customer
Load Shapes





DISCUSSION / Q&A

LEGISLATION TO IMPLEMENTATION: PRACTICAL IMPACTS OF COMMERCIAL ENERGY POLICY

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Challenge – *moderator*

Patrick Saxton, Advisor to Commissioner Andrew McAllister |
California Energy Commission

Andrew Meiman, Principal | ARC Alternatives

Matt Evans, Manager, Emerging Products, Customer Programs &
Services | Southern California Edison

LUNCH

Program will resume at 12:45 pm

PLEASE FILL OUT EVALUATIONS!



WE BUILT IT, NOW WHAT? ENGAGING ALL STAKEHOLDERS IN ONGOING OPERATION OF ZNE COMMERCIAL SPACES

Ralph DiNola, CEO | New Buildings Institute - *moderator*

Mary Ann Piette, Director, Building Technology and Urban Systems Division | LBNL

Brandon Tinianov, VP Business Development | ViewGlass

Siva Gunda, Research Director, Energy Efficiency Center | UC Davis

Ralph DiNola
CEO | New Buildings Institute

We Built It, Now What?

Engaging All
Stakeholders in Ongoing
Operation of ZNE
Commercial Spaces

ETCC Quarterly Meeting, Q1
Irwindale, CA

February 16, 2016



Ralph DiNola

CEO

New Buildings Institute
ralph@newbuildings.org

virtuous cycle

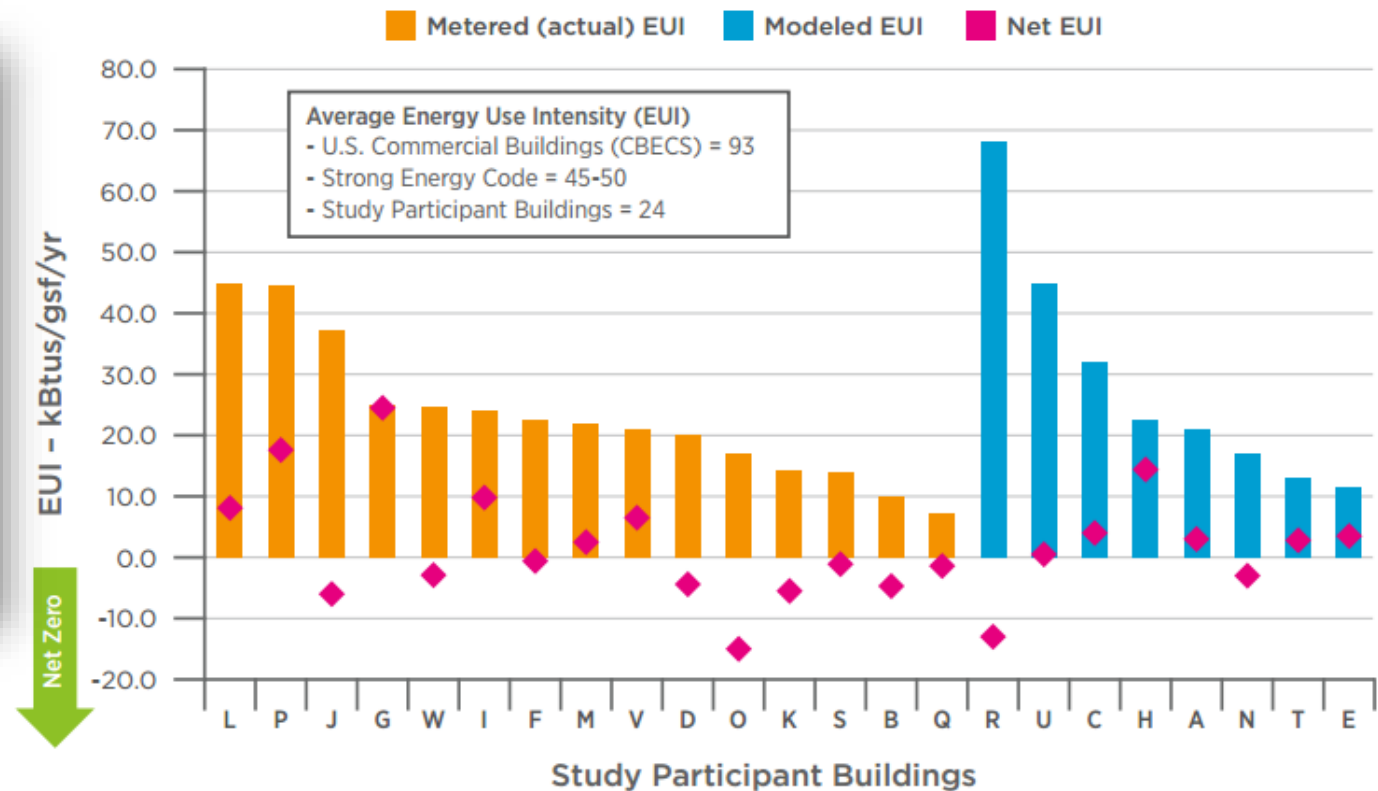
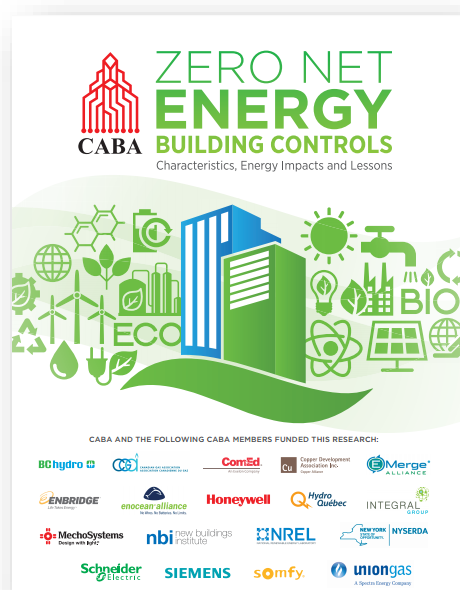
We are an engine of innovation for the energy efficiency industry. We drive research, uncover solutions, and advance industry practices and policies that deliver positive change in the built environment.



NBI Zero Net Energy Building Controls Study

Characteristics, Energy Impacts, and Lessons from Zero Net Energy Buildings

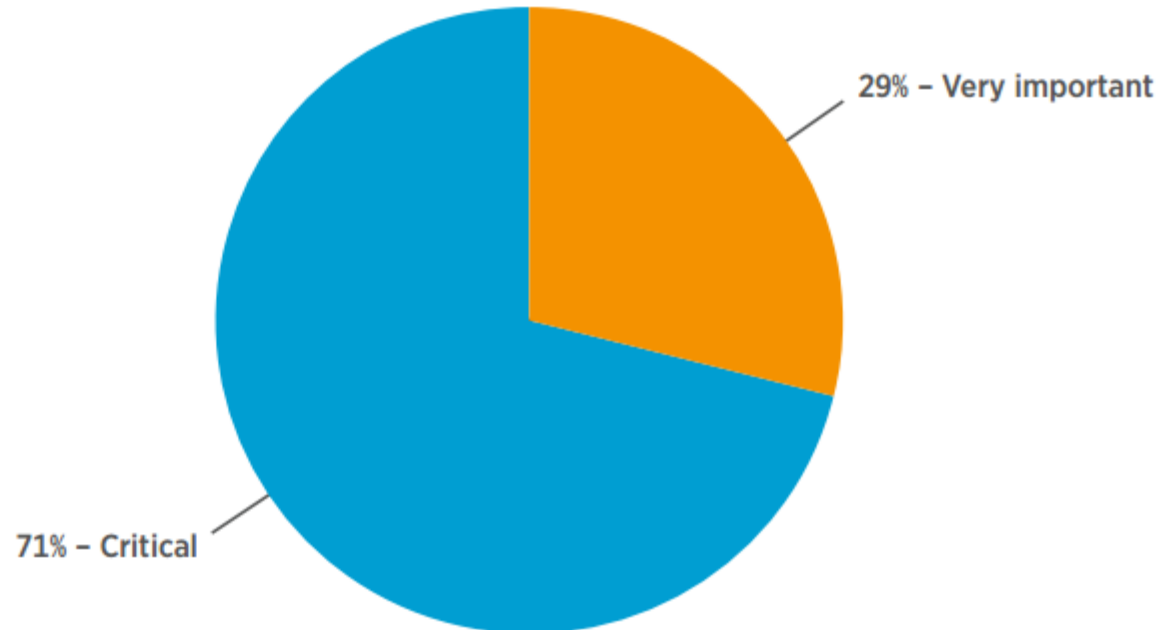
Figure 9: Energy Use Intensity (EUI) of Participant Buildings



Value of Setting the ZNE Target

Figure 8: The Value of Setting Early Energy Targets to the Performance Outcome

■ Not important ■ Somewhat important ■ Important ■ Very important ■ Critical



GETTING TO **zero** NATIONAL FORUM 2016

Save the Date

October 12-14, 2016 | Denver, CO



Thank You!

Ralph DiNola

CEO, NBI

ralph@newbuildings.org

343 Second Street

David and Lucille Packard Foundation Building
Courtesy: EHDD

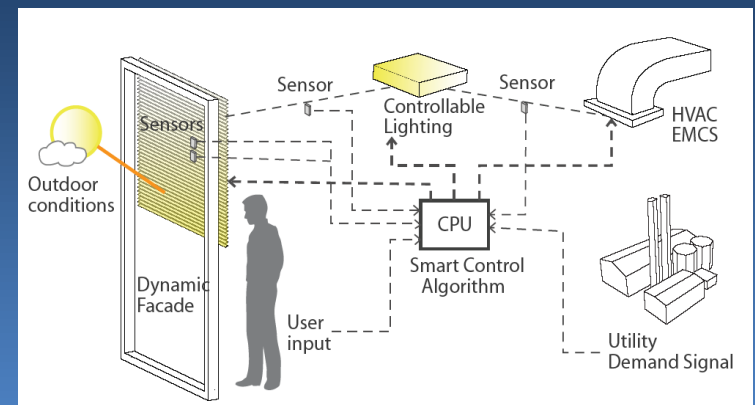
Mary Ann Piette
Director, Building Technology and Urban
Systems Division | LBNL



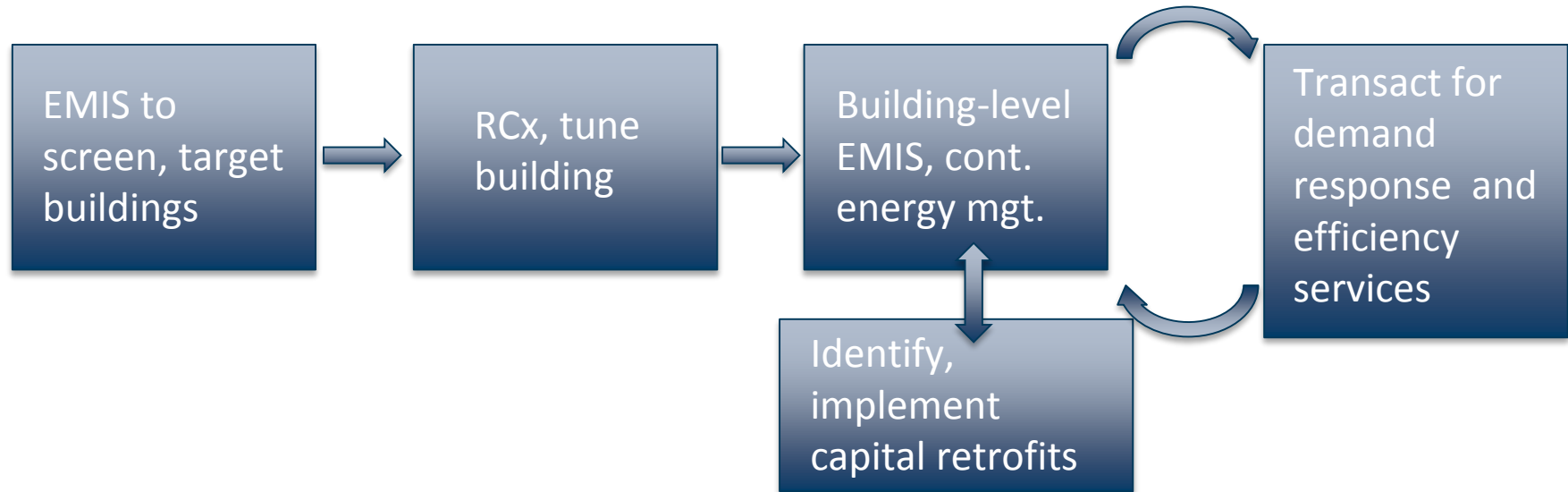
We Built It, Now What? Engaging All Stakeholders in Ongoing Operation of ZNE Commercial Spaces

ETCC February 2016

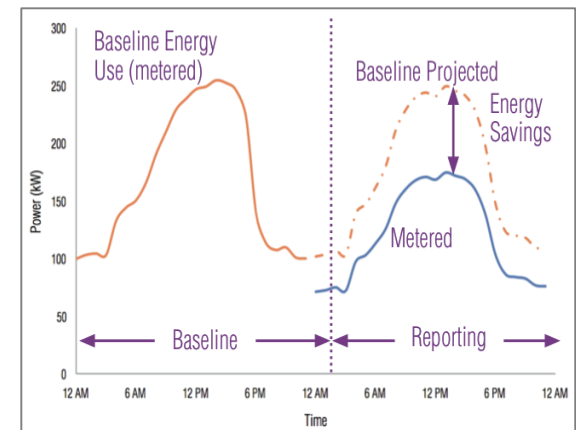
Mary Ann Piette, Building Technology and Urban Systems



Develop More Holistic Integrated Process for Efficient Commercial Buildings



- **Energy Management & Info Systems** track energy
- Begin with low-cost / high return **retrofit commissioning (RCx)**
- **EMIS** to ID retrofits, capital measures
- Ongoing whole-building measurement for persistence and performance-based outcomes



Guarantee Performance: Market Impact Model

Develop Standardized Practices for Risk Analysis and Management



Performance monitoring
and uncertainty analysis



Business and financial
modeling and risk analysis



Legal and contractual
frameworks

enables



A Vast New Market of Products and Services for Guaranteed Performance

Hedging products for efficiency savings

ESPCs for everyone, not just *MUSH* market

Performance insurance for vendors and service providers *and more.....*

resulting



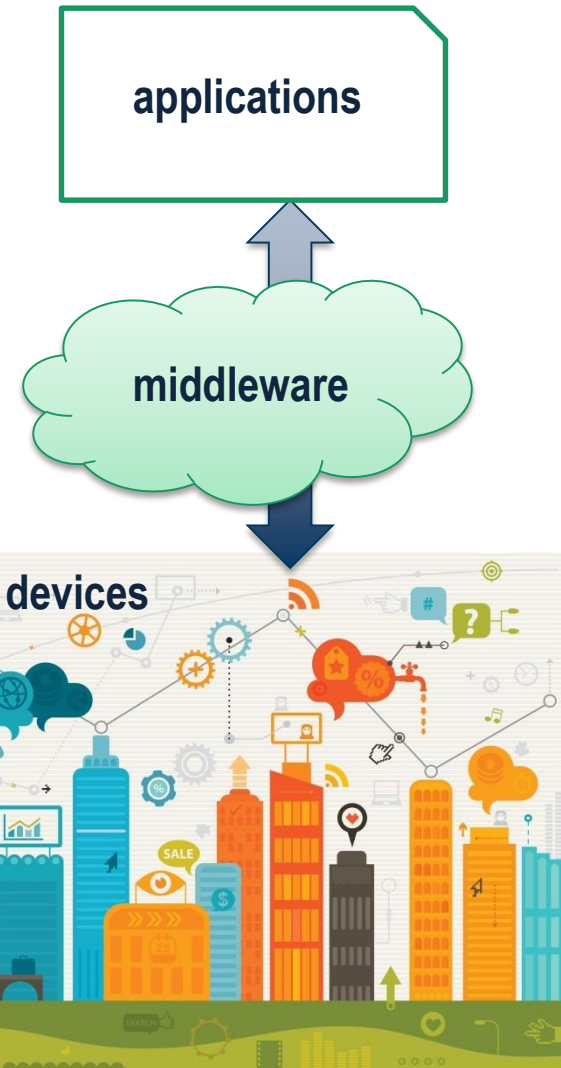
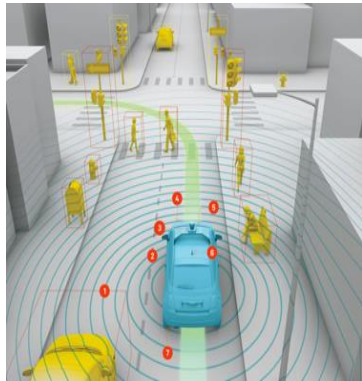
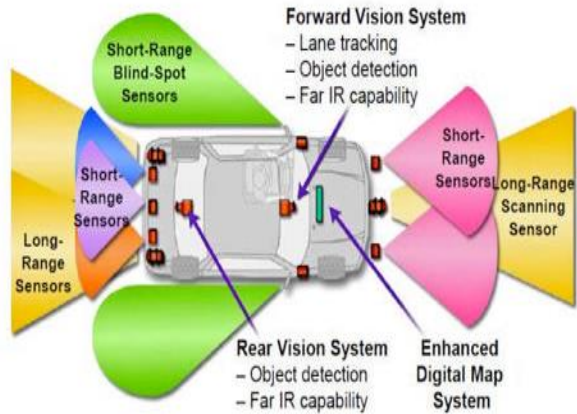
in

**Increased Investment in
Building Performance**

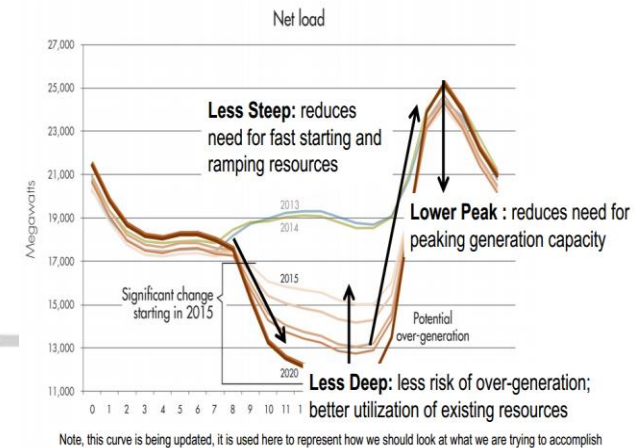
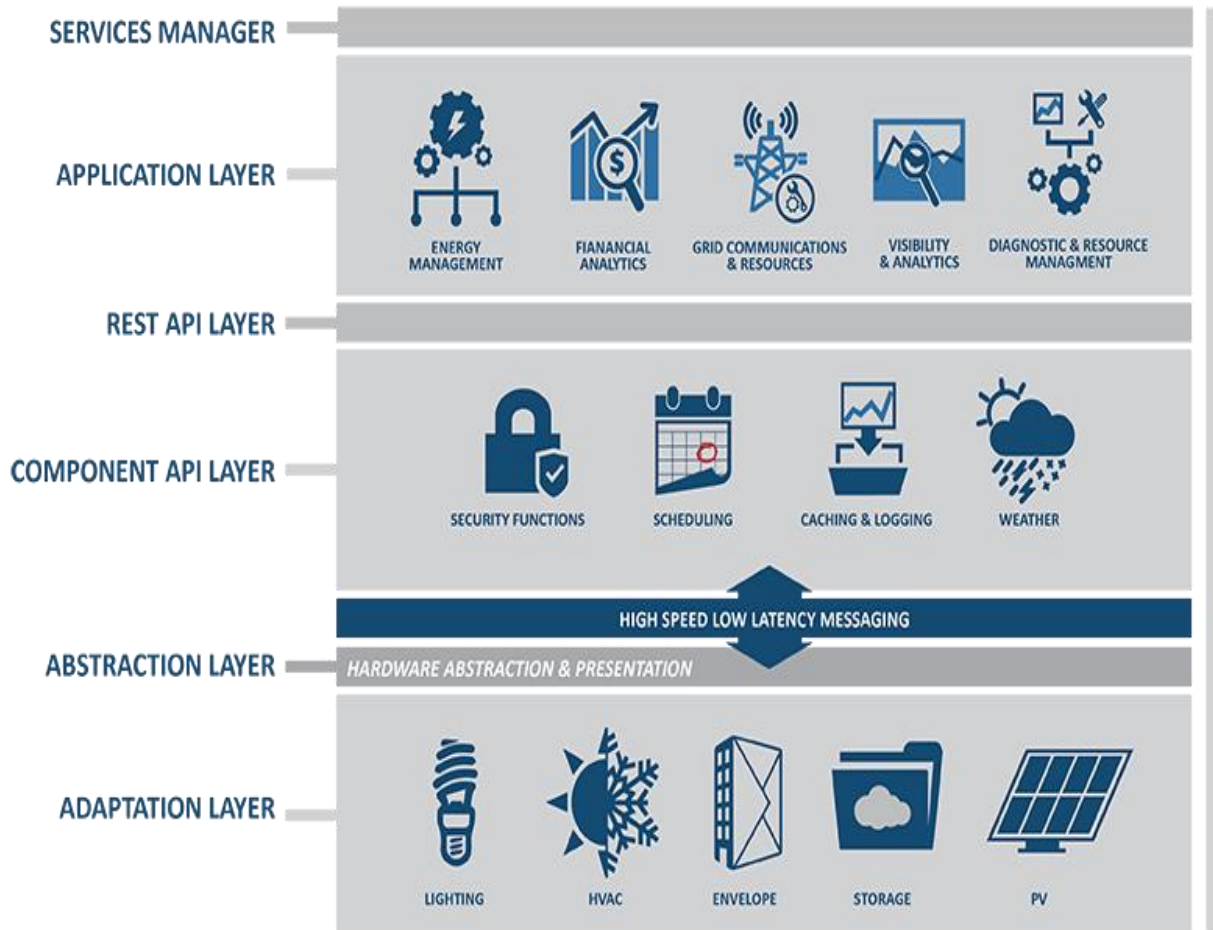


**Better Performance
Persistence and Assurance**

Autonomous Vehicles and Automated Building Operations



Interoperable Building Controls will Both Improve Efficiency and Integrate with Grid



Flatten the Duck with Internet Building Operating System

Brandon Tinianov
VP Business Development | ViewGlass



view

Dynamic Glass

Brandon Tinianov, Ph.D., PE
VP Business Development

Brandon.Tinianov@ViewGlass.com

408-828-4758

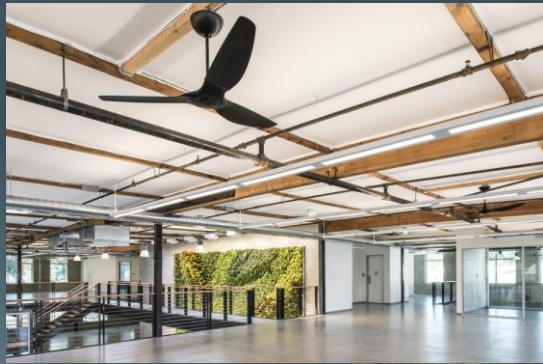


Designed to predict the sun
to maintain comfort

Net Zero Energy Commercial – 435 Indio



CEC NZE Demonstration – 415 Mathilda



NZE Commercial Findings



ADDITIONAL COST TO RENOVATE SUSTAINABLY VS. LESS EXPENSIVE
STANDARD METHOD OF RENOVATING => (\$49.84 / SF)

ADDITIONAL VALUE CREATED DUE TO A REDUCTION IN OPERATING
EXPENSES AND RESERVE REQUIREMENTS => \$52.94 / SF

ADDITIONAL VALUE DUE TO ACCELERATED LEASE-UP TIME VS.
AVERAGE MARKET DOWNTIME => \$22.81 / SF

ADDITIONAL VALUE DUE TO RECEIVING A PREMIUM IN RENT OVER THE
TOP OF THE MARKET RENTS => \$34.47 / SF

Siva Gunda

Research Director, Energy Efficiency
Center | UC Davis

Developing strategies to address ZNE goals of existing Small and Medium Commercial

SIVA GUNDA,

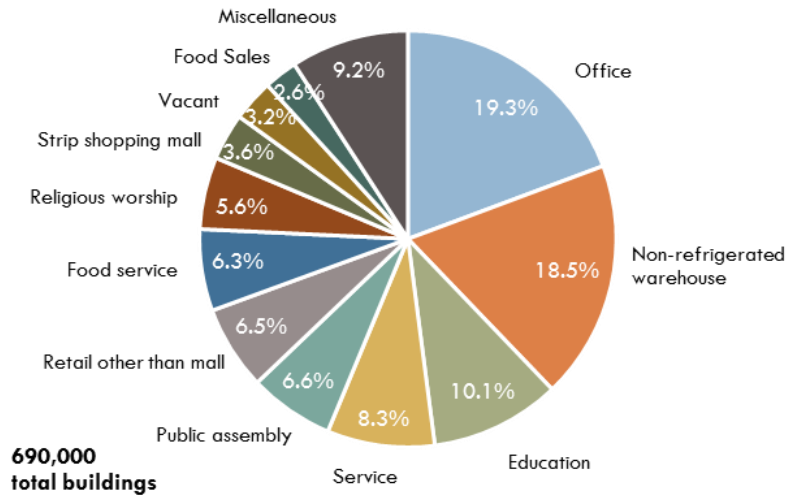
RESEARCH DIRECTOR, ENERGY EFFICIENCY CENTER, UC DAVIS

SGUNDA@UCDAVIS.EDU

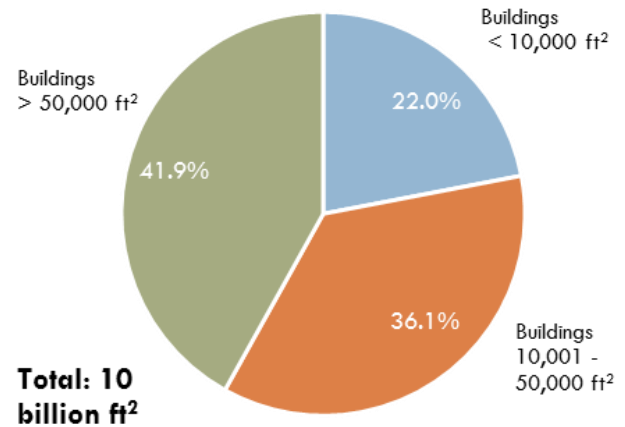


Large existing small and medium commercial building stock

Building Type by Number of Buildings



Californian Commercial Buildings Size of Buildings (Breakdown by ft²)



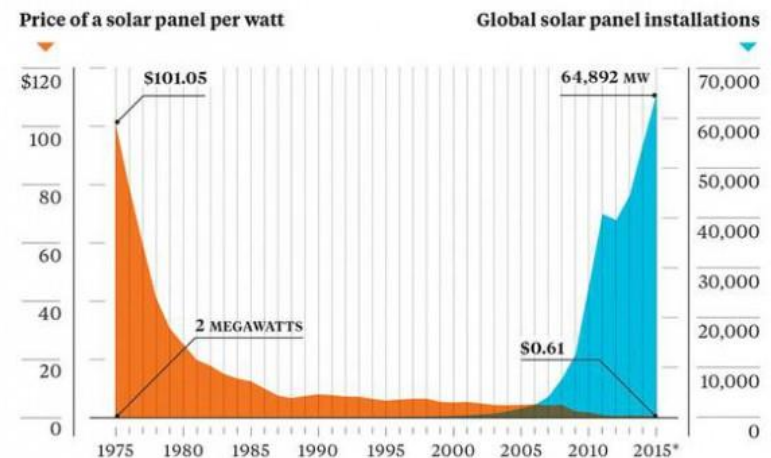
Market Transformation Efforts at UC Davis

Existing building stock “especially small and medium commercial” is very difficult to address.

- Defining Zero Net Readiness and developing models
- Solutions need to be deployed at scale with deep energy efficiency as a goal - Climate appropriate solutions
- Cost effective ways to auditing and retrofitting buildings – California Conservation Corps Energy Corp Model
- Broader workforce needs
- Performance based incentives

Continuing to prioritize efficiency over DG

Strategies to deploy Advanced Energy Communities



<https://cleantechnica.com/2016/02/12/is-this-the-best-solar-chart-yet/>
(courtesy of the [Earth Policy Institute](#)/Bloomberg)

DISCUSSION / Q&A

WE BUILT IT, NOW WHAT? ENGAGING ALL STAKEHOLDERS IN ONGOING OPERATION OF ZNE COMMERCIAL SPACES

Ralph DiNola, CEO | New Buildings Institute - *moderator*

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BREAK

Program will resume at 2:15 pm

PLEASE FILL OUT EVALUATIONS!

A MACRO APPROACH TO THE MICRO GRID

Paul Delaney, Senior Engineer | SCE - *moderator*

Dick Paulson, CEO | Pargen

Jeff Bedell, VP Sustainability | Macerich

Rob Ferber, CEO | ElectronVault

Paul Delaney
Senior Engineer | SCE

Dick Paulson
CEO | Pargen



COMMERCIAL BUILDING ENERGY POLICY ADAPTING TO THE CHANGES

February 16, 2016
Irwindale, California

Presented By:

Dick Paulsen, CEO Pargen, LLC
949-735-2434





PDE

Total Energy Solutions
Electrical Contractors



SOLAR

168 Monocrystalline
Panels 250 watts each



EV CHARGERS

The Microgrid



INVERTER

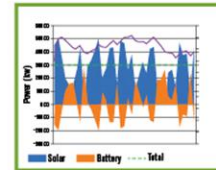
Integrates multiple DC Sources
Bi-directional

BATTERY ENERGY STORAGE SYSTEM



UTILITY GRID

Demand
Response
Capability



DATA CENTER

Multiple back-up
generation sources
to maintain critical
power reliability



Jeff Bedell
VP Sustainability | Macerich

Commercial/Retail Approach to the Micro Grid

Jeff Bedell, VP Sustainability
Jeff.Bedell@Macerich.com
424-229-3486

2/16/20
16



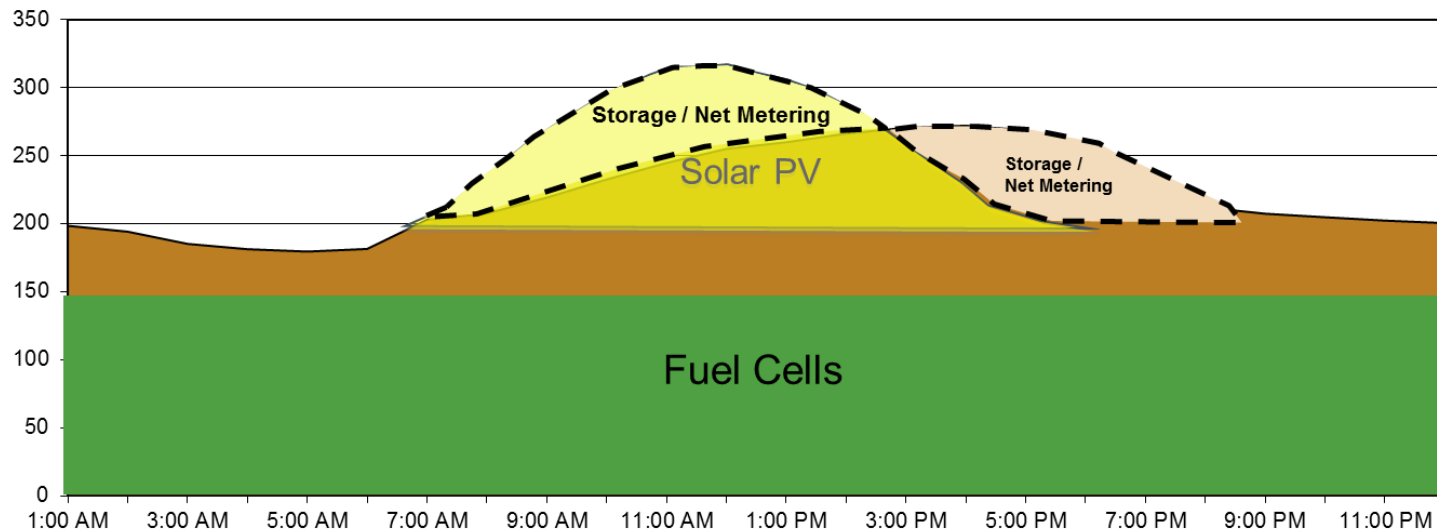
MACERICH
Sustainability

Macerich is committed to creating a sustainable, healthy environment for our employees, retailers, guests, communities and future generations.



Macerich approach to Load Control

Load Curve with Fuel Cells + Solar + Storage



- DG technologies can be sized respectively to match customer load curves
- Size solar and storage for peak of load curve
- Fuel cells with solar and storage provide peak islanding capability

Micro Grids at Retail Centers

- Key Advantages:
 - Operating cost savings
 - Long term pricing hedge
 - Redundancy and back-up
 - Local load shaping
 - Local dispatch, and emergency shelter

Santa Monica Based Project

- New Integrated Systems – SMP
 - Minimized Load Requirements
 - Maximized Curtailment
 - Open Air Center, Master Metered
- System Integration
 - FC, Expanded Solar, Micro turbines, EVCS
 - Considering Battery Storage (shaping)
 - Combined Return TBD (SCE)

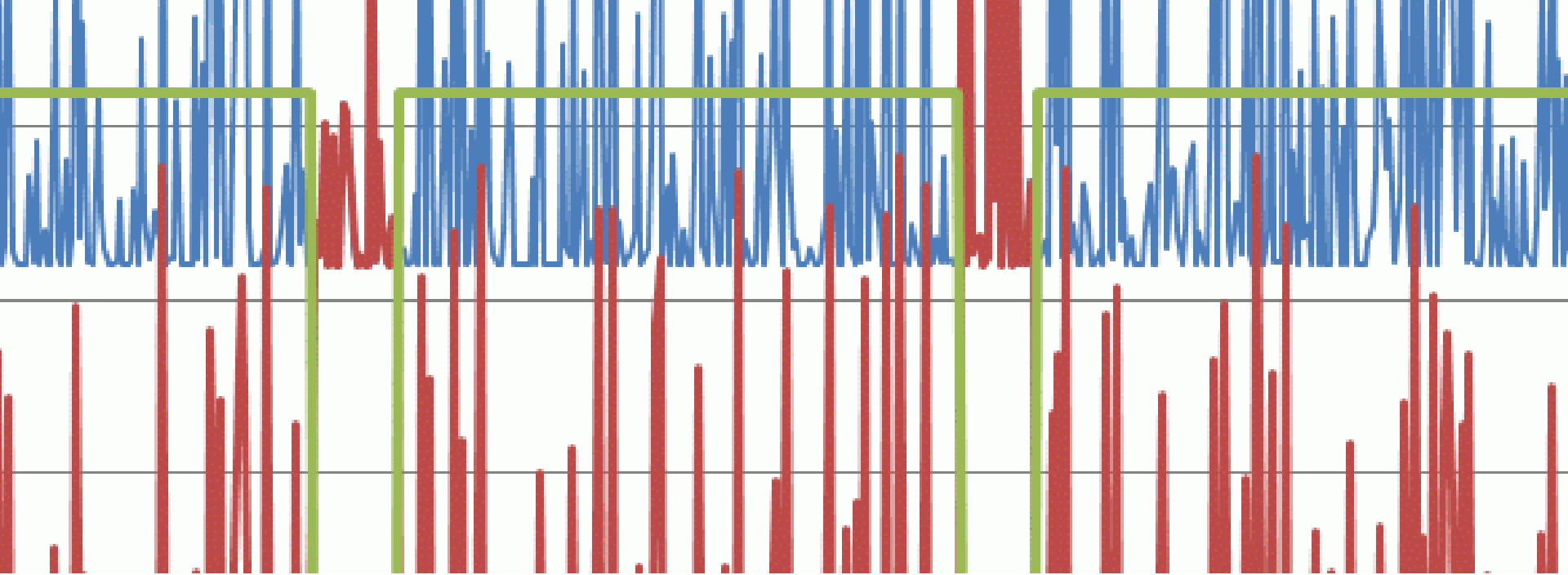
Rob Ferber
CEO | ElectronVault



Taming the Wilds
Rehabilitating Modern Generation

ETCC Quarterly Meeting
February 12, 2016
Irwindale, CA

Rob Ferber, CEO ElectronVault
Direct (650) 395-9436
rob@electronvault.com

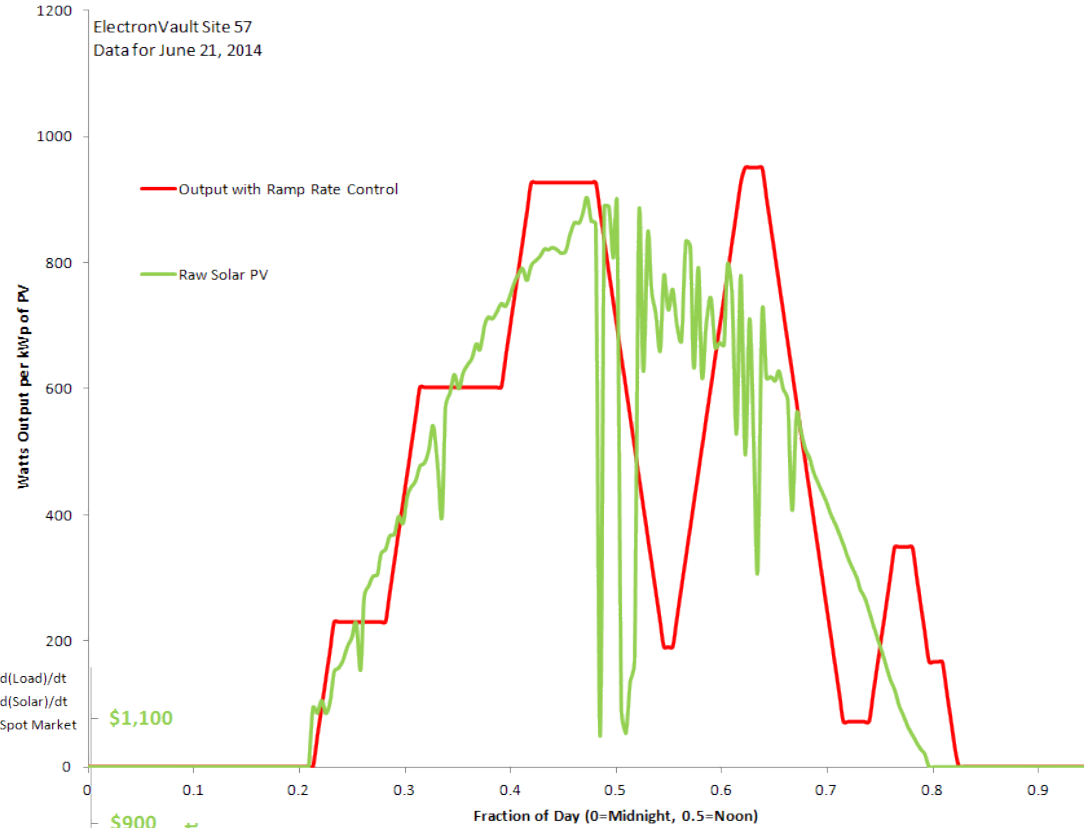


- Ramping: 1% per minute or less
- Generation-side microgrids

Taming the Wilds

Managing Ramping

ElectronVault Site 57
Data for June 21, 2014



\$1,100

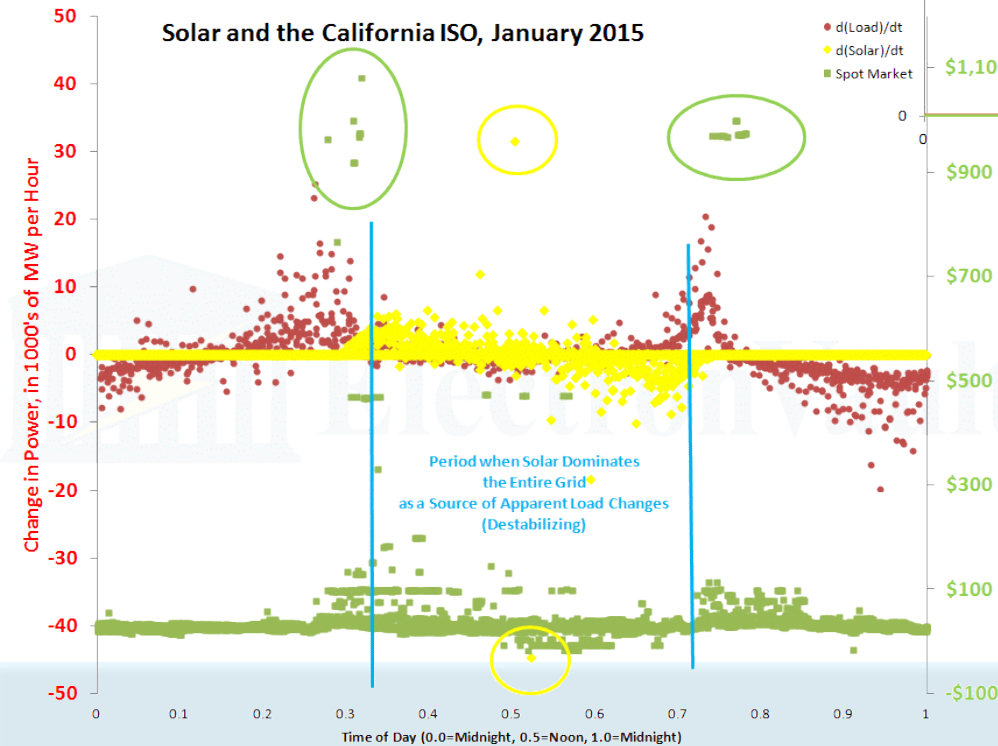
$d(\text{Load})/dt$
 $d(\text{Solar})/dt$
Spot Market

\$/MWh Energy Price on ISO Spot Market

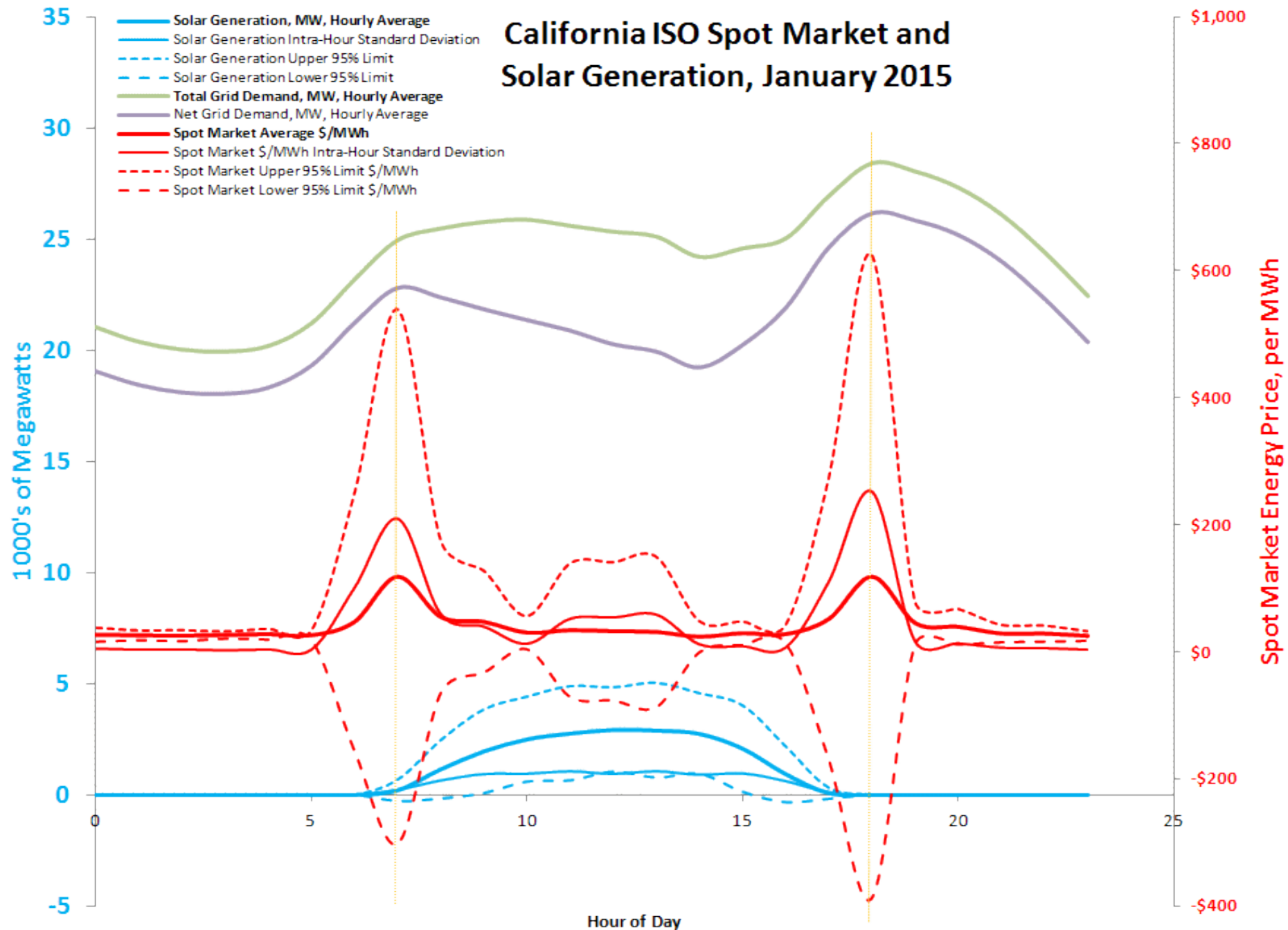
\$100

-\$100

Solar and the California ISO, January 2015

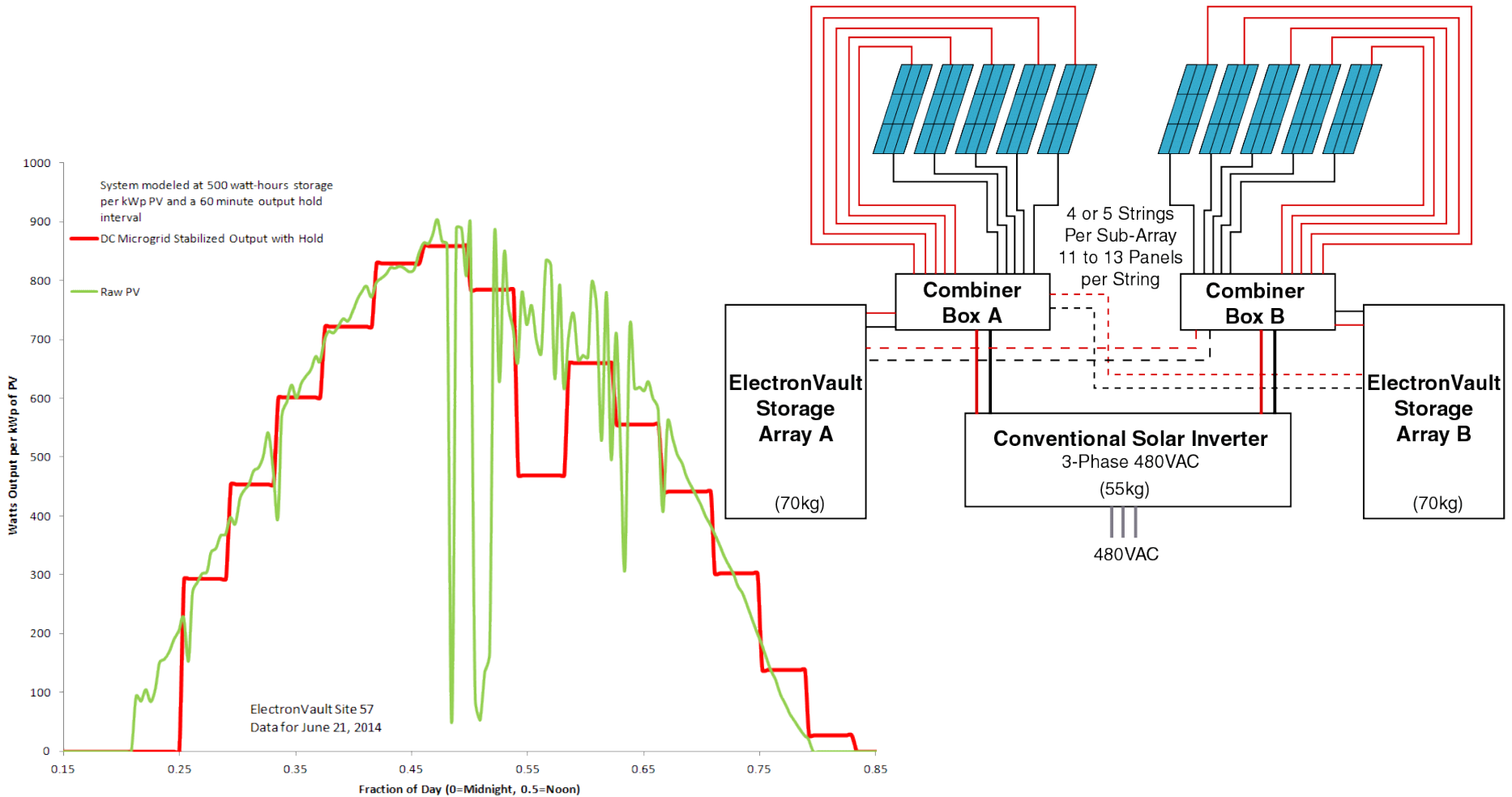


California ISO Spot Market and Solar Generation, January 2015



Generation-side Microgrids

20kW Mast Mounted Carport Solar
with ElectronVault Output Stabilization via DC Generation-Side Microgrid



ElectronVault Energy Advisory provides

strategic business, technical, and operational guidance on projects where management of energy drives superior financial returns.



ElectronVault Energy Storage and Management provides

energy management solutions that are long-term investments in cost control, reliability, and security while promising ease of management.



DISCUSSION / Q&A

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SESSION WRAP-UP

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Check the ETCC website for updates: <http://www.etcc-ca.com/events>