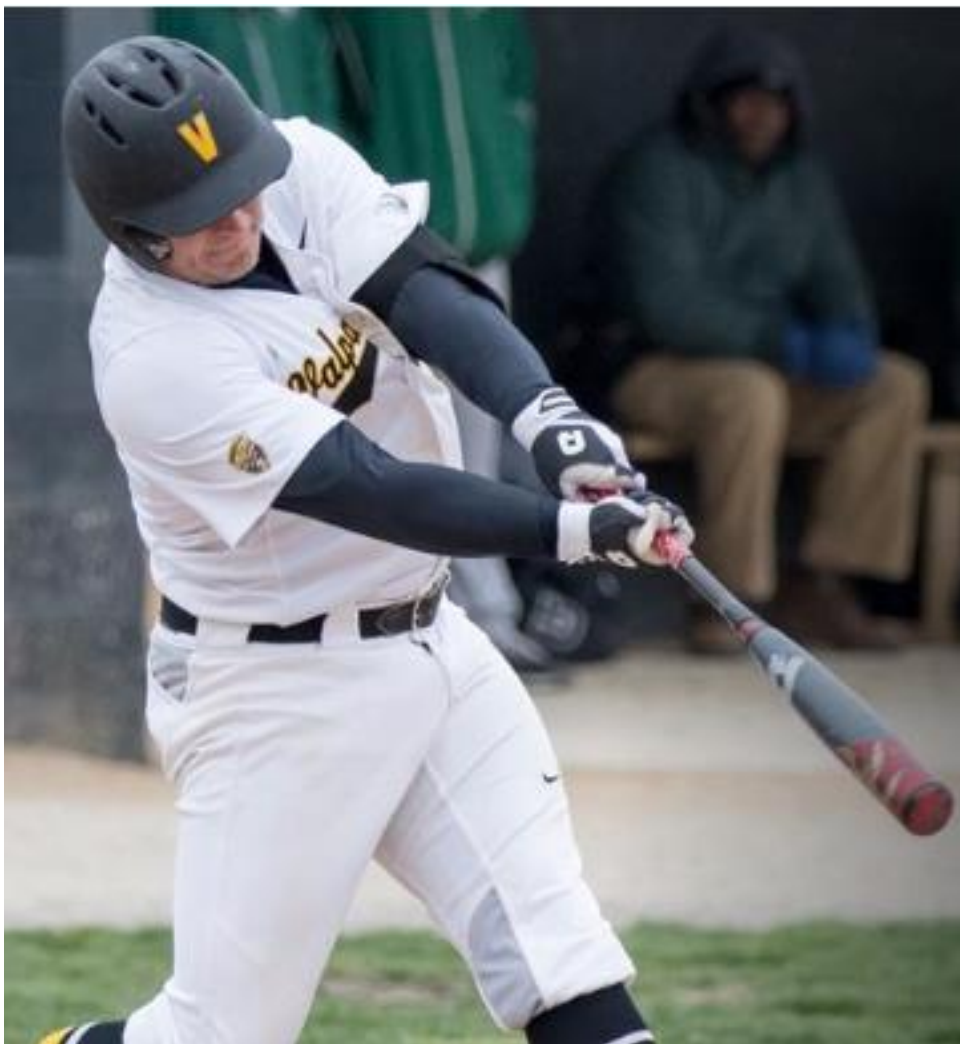




# SCE Background



- One of the nation's largest electric utilities
- Nearly 14 million residents in service territory
- Approximately 5 million customer accounts
- 50,000 square-mile service area
- Over 125 years of experience
- Issues facing California
  - Energy Efficiency Goals
  - GHG reduction
  - Water Energy Nexus
  - Load management/sustainability

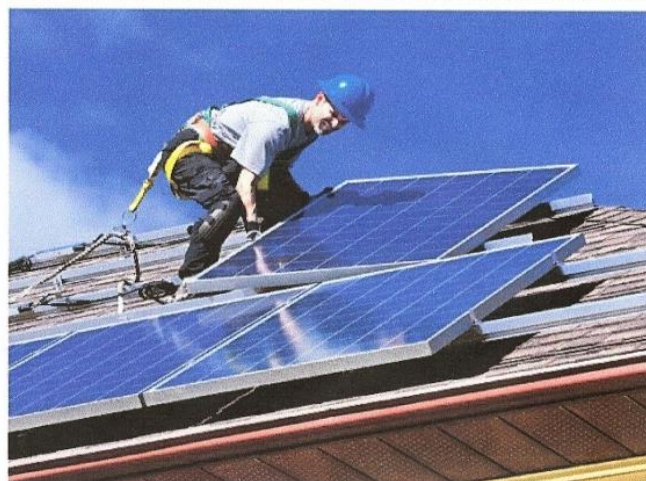
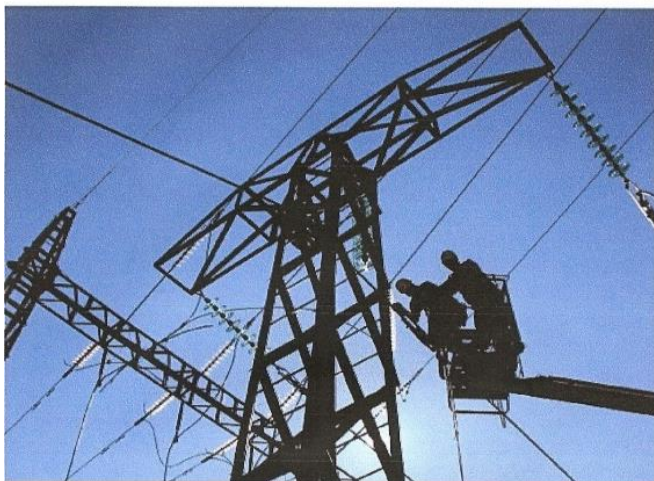
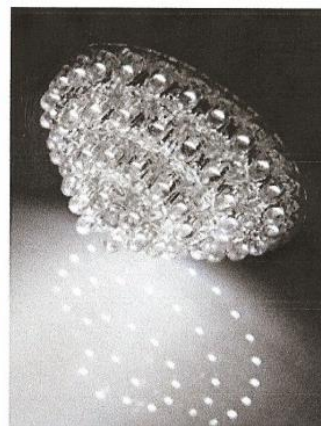
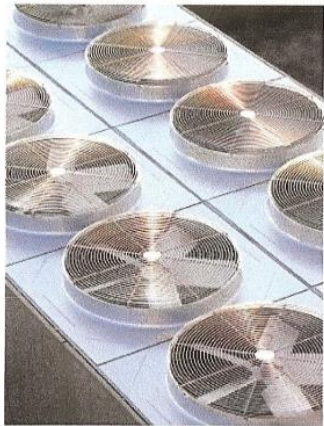


## Delaney Goes Deep Twice in 13-10 Win over Purdue

Dan Delaney delivered a pair of three-run homers in a 13-10 victory over visiting Purdue on Wednesday. The senior struck in the third and sixth innings to help the Crusaders snap a seven-game slide. Delaney reached the 40-RBI plateau in Valpo's final midweek tilt of the season.

[Photo Gallery](#)

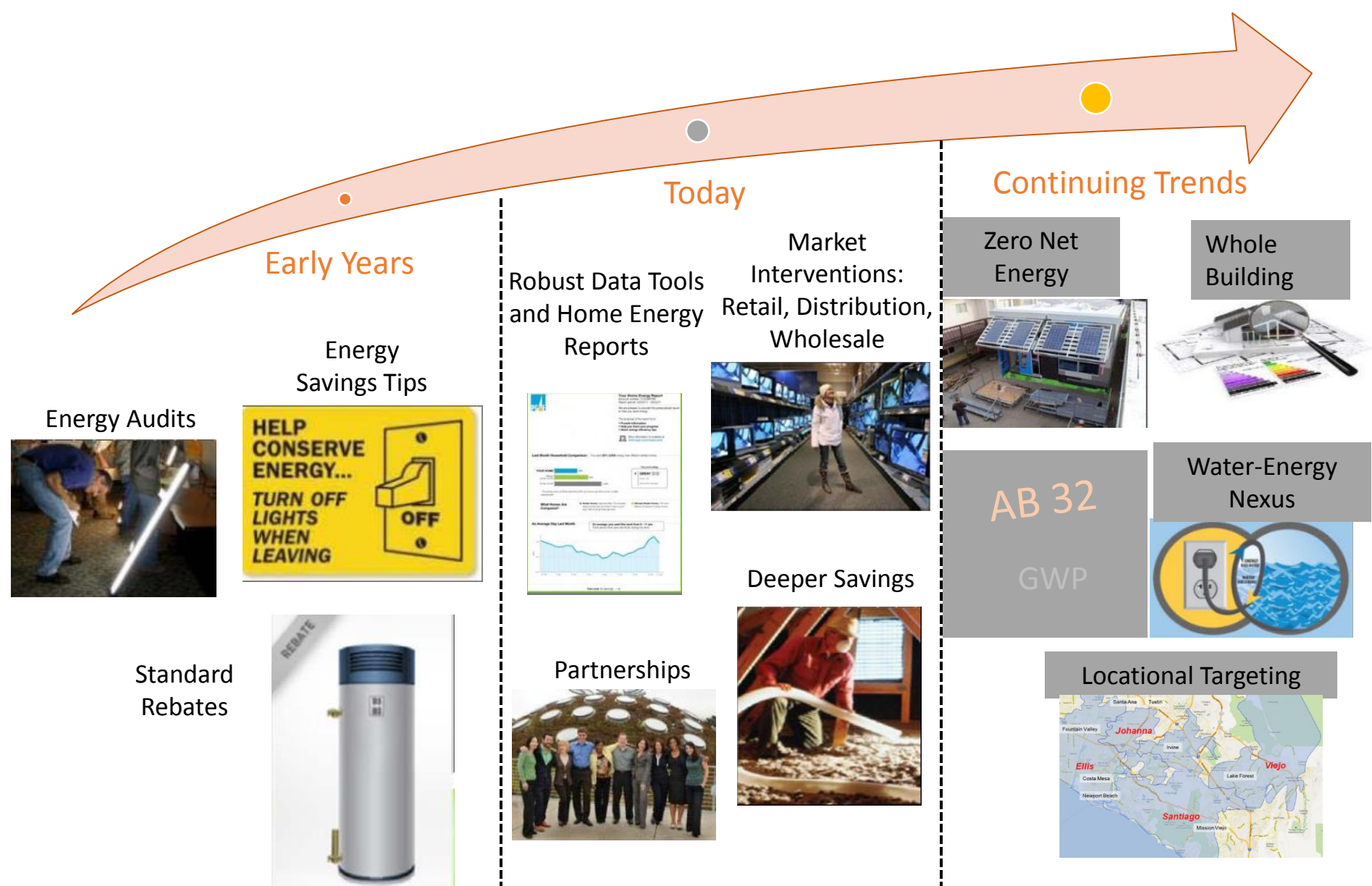




# CA | Energy Efficiency Strategic Plan

January 2011 Update

# Evolving Energy Efficiency Trends

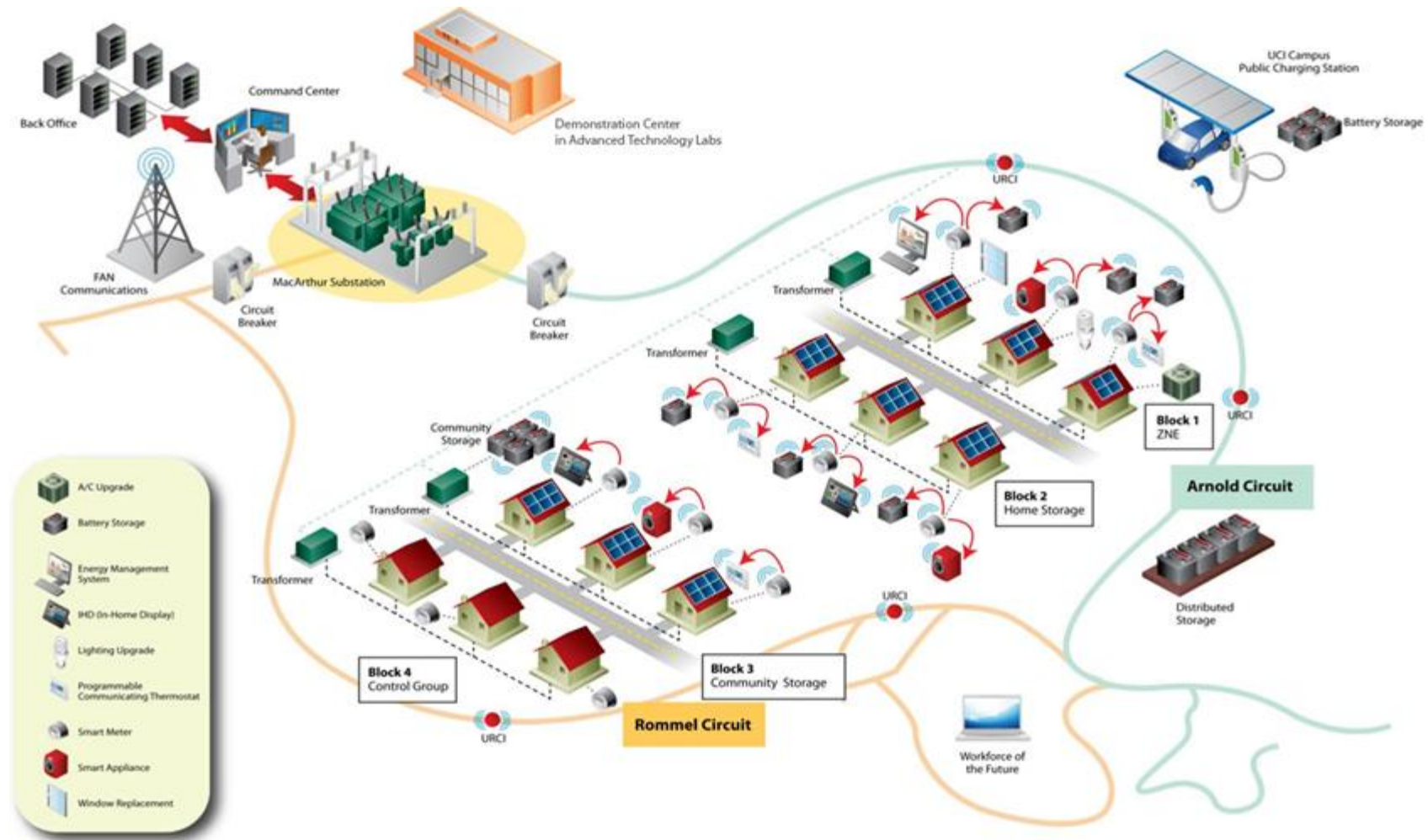




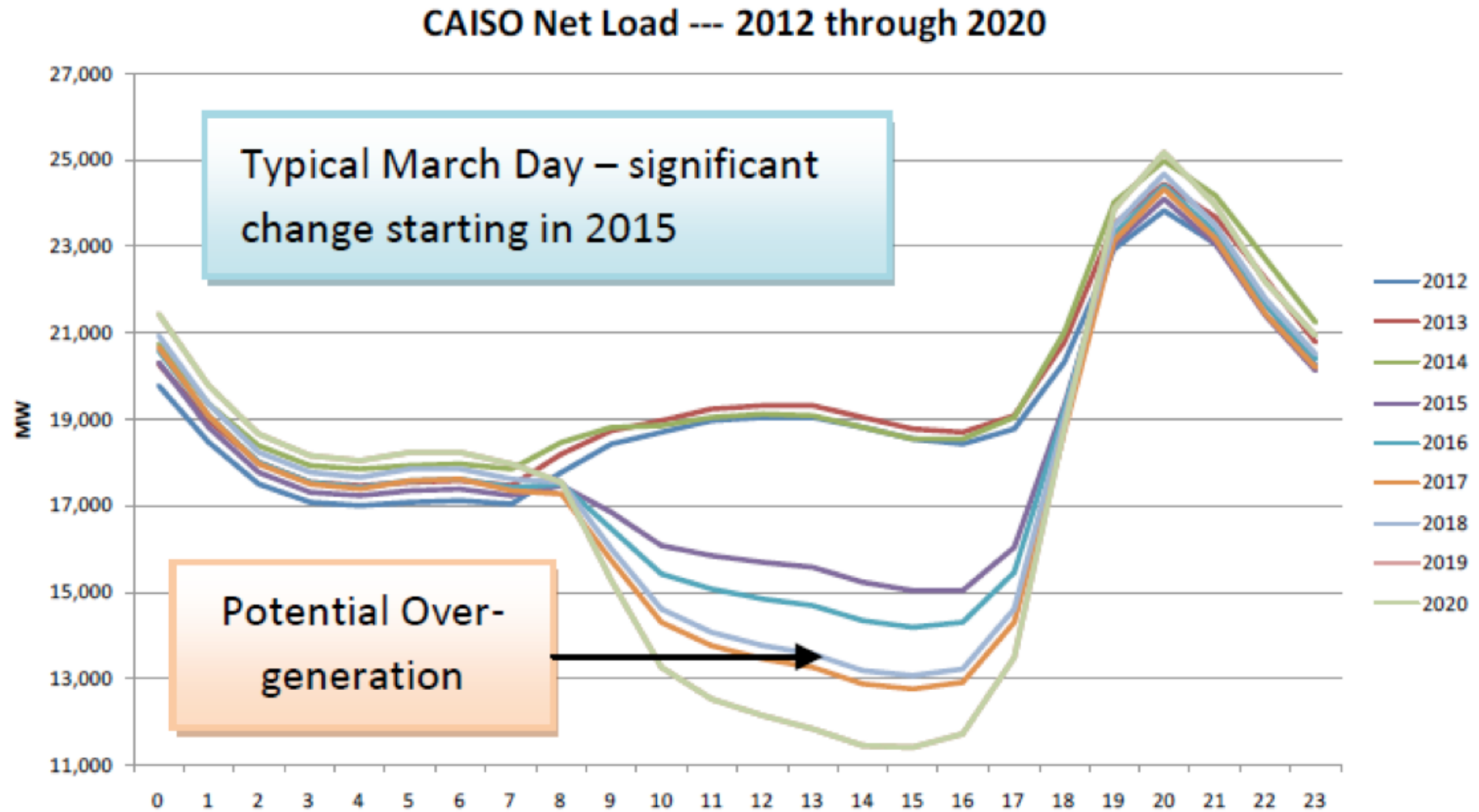
# Loading Order!

- *Energy Efficiency*
- *Demand Response and permanent load shifting*
- *Renewable Resources*
- *Distributed Generation/energy storage*

# Existing Single Family Neighborhoods – Irvine, CA



# The Duck Curve



“Our goal is to foster and enable new technologies to modernize and green the electric grid. The entire ISO is committed to advancing the organization toward a sustainable energy future.”...Steve Berberich, CEO, CAISO



**For Operating Day: Wednesday, May 11, 2016**

The Renewables Watch provides important information about actual renewable production within the ISO grid as California moves toward a 33 percent renewable generation portfolio. The information provided is as accurate as can be delivered in a daily format. It is unverified raw data and is not intended to be used as the basis for operational or financial decisions.

## Renewables Production

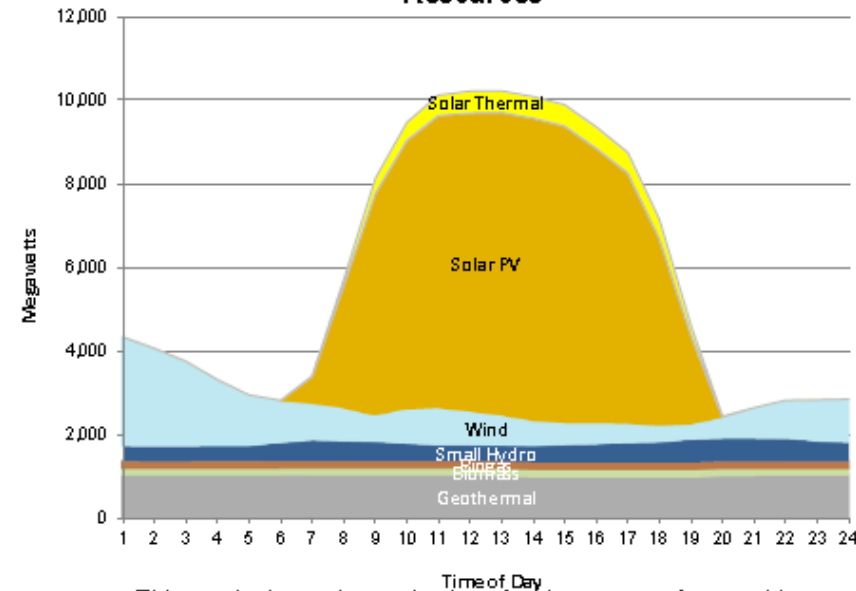
### 24-Hour Renewables Production

Renewable Resources	Peak Production Time	Peak Production (MW)	Daily Production (MWh)
Solar Thermal	11:06	528	5,231
Solar	12:42	7,237	69,910
Wind	0:01	2,713	23,460
Small Hydro	20:05	551	10,560
Biogas	0:44	184	4,268
Biomass	12:02	198	4,557
Geothermal	5:56	1,007	23,744
<b>Total Renewables</b>			<b>141,731</b>

Total 24-Hour System Demand (MWh): 624,686

This table gives numeric values related to the production from the various types of renewable resources for the reporting day. All values are hourly average unless otherwise stated. Peak Production is an average over one minute. The total renewable production in megawatt-hours is compared to the total energy demand for the ISO system for the day.

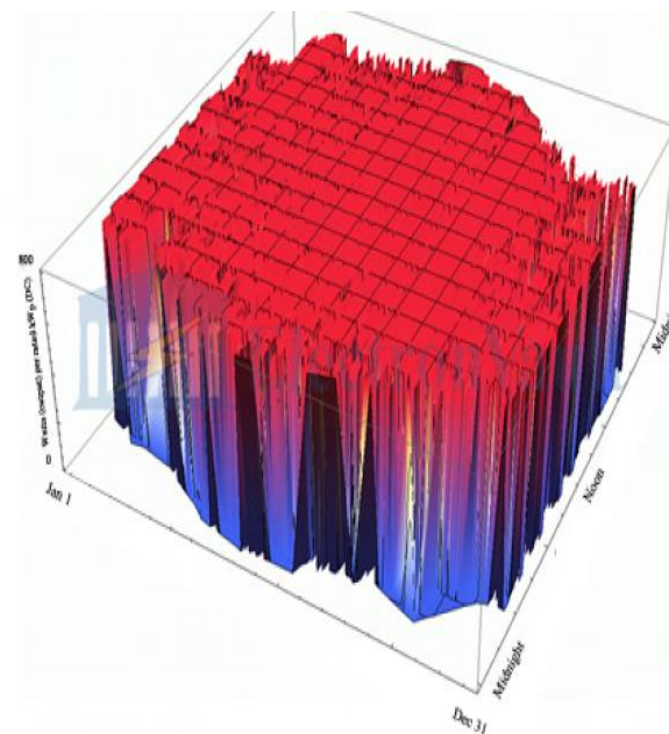
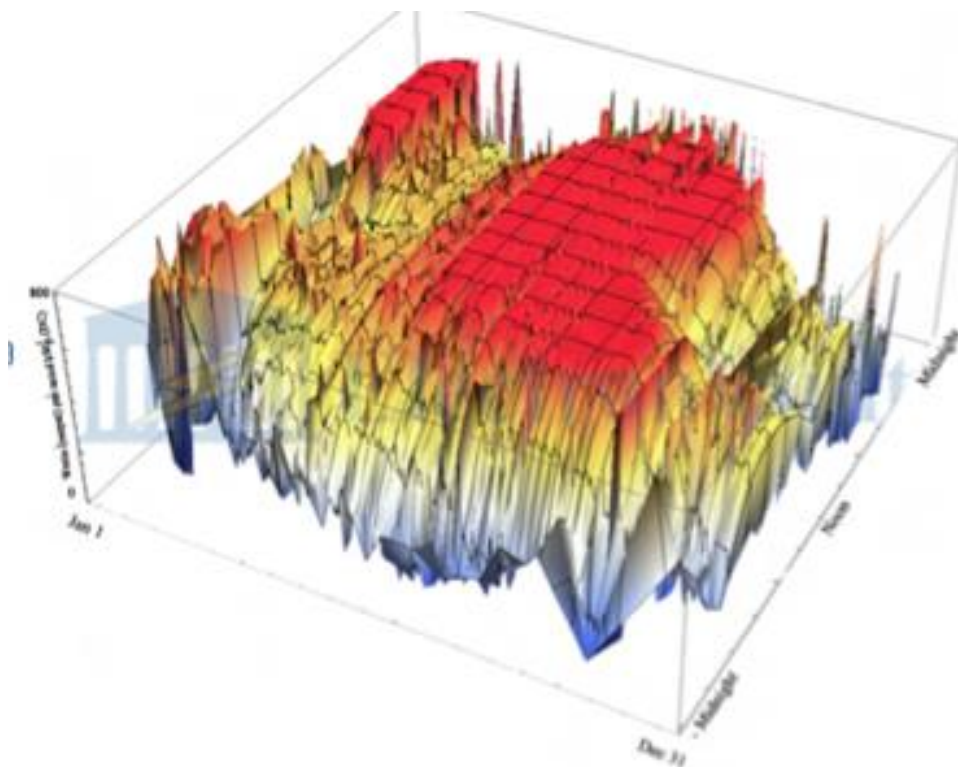
### Hourly Average Breakdown of Renewable Resources



This graph shows the production of various types of renewable generation across the day.

**System Peak Demand (MW)**  
\*one minute average **30,895**  
**Time: 20:28**

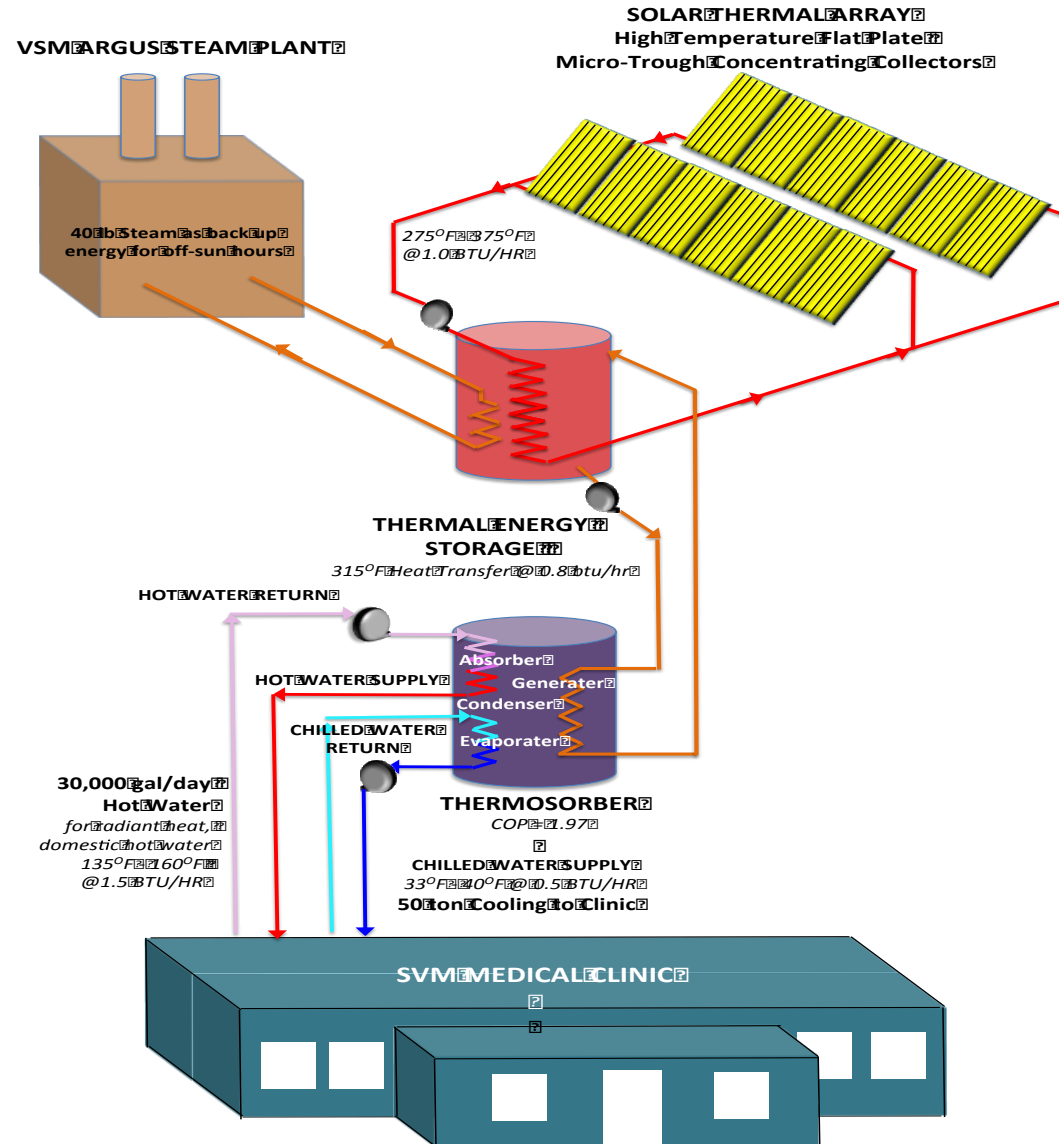
# Optimized PV Distributed Generation



Energy storage allows  
at least 30 minutes notification  
of ramp up and ramp down.

# solar thermal absorption cooling & heating, thermal storage

## SOLAR THERMOSORBER SYSTEM for Searles Valley Minerals Medical Clinic





# AB 802 Summary

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## Three Primary Areas

1. Expands the types and level of information the CEC can access
2. Requires the CPUC to authorize IOUs to provide “to code” incentives and count “to-code” savings
3. Replaces and expands the current “AB 1103 Benchmarking” program

## CEC Information Access

- Utilities must provide individual historic billing data to the CEC
- CEC must maintain reasonable policies and procedures to protect customer information from unauthorized disclosure.

## “To-Code” Savings

- Provide financial incentives (etc.) based on all estimated energy savings
- Consider normalized metered energy consumption as a measure of energy savings
- Shall include meeting or exceeding Title 24
- Also include savings from operational, behavioral, and retro-commissioning activities
- Count all energy saving in meeting the goals (*unless determined otherwise*)
- Effective Jan. 1, 2016, IOUs can count “to-code” savings for high opportunity projects or programs
- Separate CPUC proceeding to authorize IOUs “to-code” activities by Sept. 1, 2016
- Recoverable in rates

# AB 802 Summary Continued

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## Building Energy Benchmarking

- Covered buildings
  - All nonresidential buildings (*any building with no residential utility accounts*); or,
  - All mixed-use or multifamily buildings with 5 or more active utility accounts (*any building with five or more active utility accounts, residential or nonresidential*)
- Disclosure
  - Beginning on Jan. 1, 2017, utilities provide whole-building energy usage data upon request to Portfolio Manager
  - 3 or more active utility accounts = aggregation
  - 2 active utility accounts = aggregation plus account holder's electronic or written authorization
  - 1 active utility account = CISR
  - Aggregation of energy usage data is on a monthly basis
- CEC regulations – key In-scope provisions
  - Set a schedule for public disclosure
  - Determine who will deliver the energy usage data and related information to the commission
- Cost is recoverable in rates

# SB 350 Summary

## Clean Energy and Pollution Reduction Act of 2015

### Four Primary Areas

1. Increase the RPS to 50% by 2030
2. Transportation electrification
3. Double the EE savings in electricity and natural gas by 2030
4. Provide for the transformation of the CAISO into a regional organization

### 50% RPS by 2030

- Current mandate is 33% by 2020
- Sets interim goals of 40% (2021-2024) and 45% (2025-2027)
- DG cannot be counted toward achieving the target

### Transportation Electrification

- Defines the utility role more clearly: Charging infrastructure investments and other TE programs by utilities are linked to helping the state achieve its long-term climate and air quality goals
- Broadens the definition of electric vehicles: Includes all forms of TE such as goods movement and transit
- Directs the CPUC to order electric utilities to file applications for TE programs and investments that accelerate widespread transportation electrification.
- Directs the CARB to remove GHG regulatory disincentives to utilities as TE load grows (e.g. provide free GHG allowances)



# SB 350 Summary Continued

## Clean Energy and Pollution Reduction Act of 2015

### Energy Efficiency

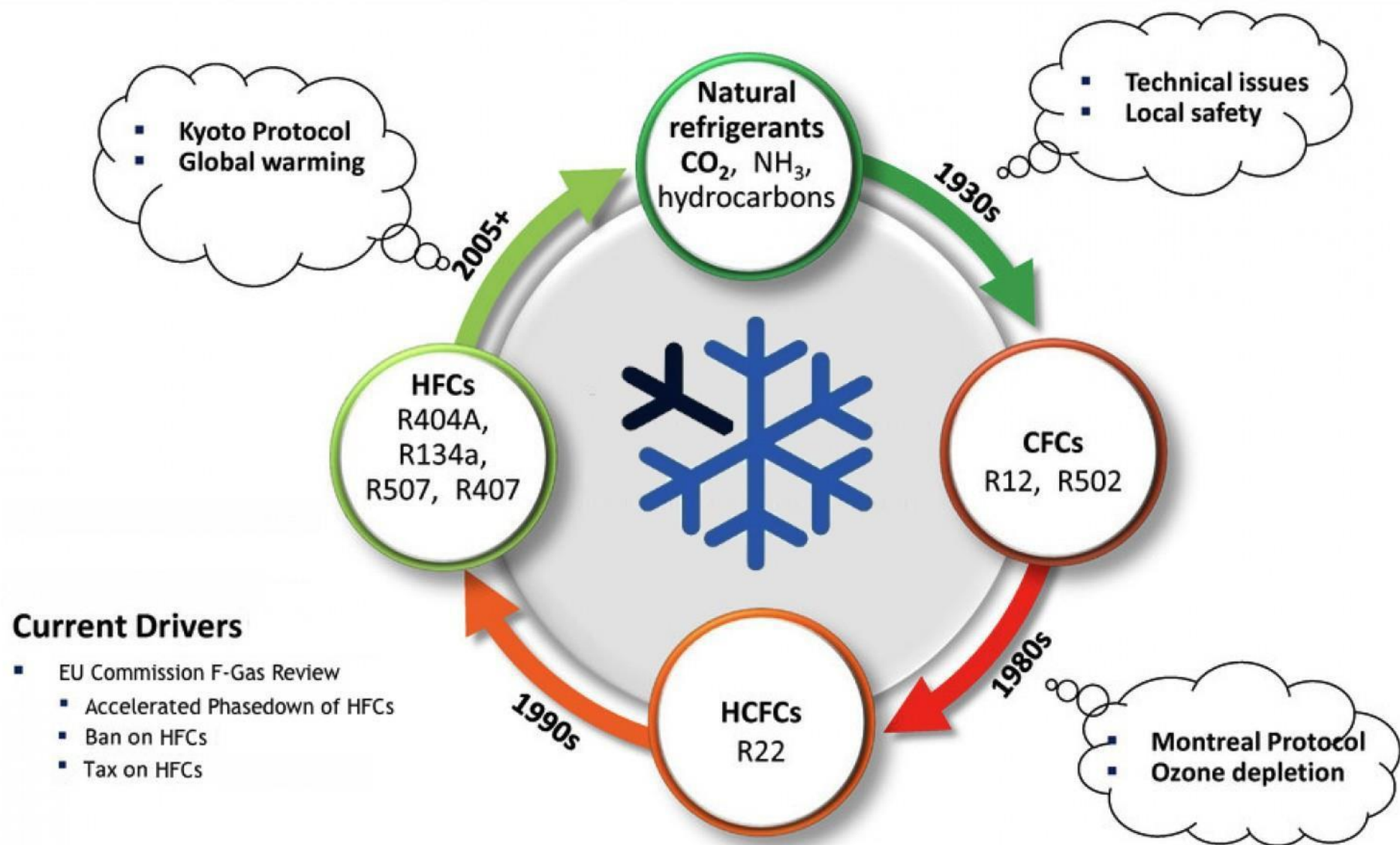
- Setting EE Targets
  - CEC to set annual EE targets through 2030 by Nov. 1, 2017
  - Targets are based upon a doubling of the EE mid-case potential estimates (the mid-case is representative of our current EE goals)
  - CPUC establishes EE targets for the IOUs based upon the CEC's targets
  - CEC and CPUC targets must be cost-effective and feasible
- Key EE Policy Changes
  - Directs the CPUC to review and update its policies governing EE programs to facilitate achieving the targets set by the CEC
  - Includes, at a minimum
    - Establishing market transformation and pay for performance programs
    - Counting operational, behavioral, and retro-commissioning savings
    - Basing incentive payment on measured results
  - CPUC can revise the targets and shall also modify, revise, or update its policies as needed to address barriers preventing achievement of those targets

# Electrical Training Institute – NZE+ Renovation



# Phasing Out Ozone Depleting Refrigerants

## The Closed Cycle .....Driving Natural & Alternative Refrigerant Solutions





## Atmosphere America January 2016 issue...

With the help of natural refrigerants, the California Air Resources Board plans to roll back emissions of HFCs in the state by 40% of 2013 levels by 2030, setting a standard for the rest of the U.S. and much of the world

—by Michael Garry



California, the most populous state in the U.S. with more than 39 million people, has the world's eighth largest economy. Due in part to its reliance on cars, the state emitted more greenhouse gas (17 metric tons) per capita in 2012 than every other leading world economy except the U.S. itself (18.6 metric tons), according to the World Resources Institute.

But California, known as the Golden State, is also among the world's most aggressive economies when it comes to crafting policy to reduce greenhouse gas emissions. In 2006, the state passed its landmark California Global Warming Solutions Act, AB 32, which calls for greenhouse gas emissions to be cut to 1990 levels by 2020.

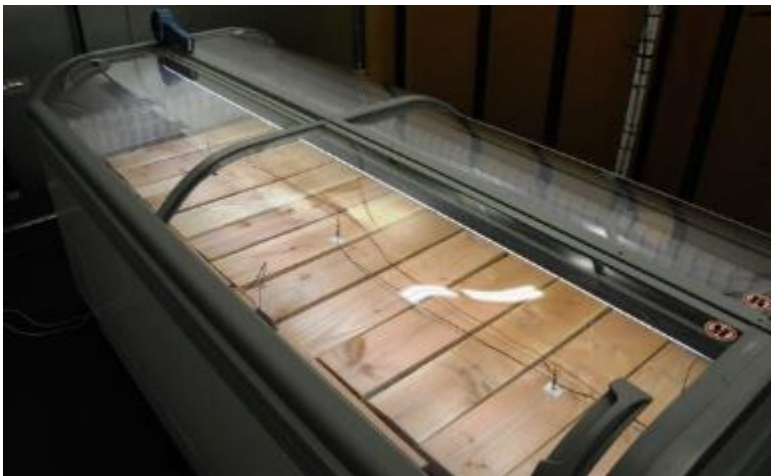
# STRATEGIES THAT DRIVE ADOPTION

**Lab & Field Testing**

**Engaging Industry**

**Partnering with Our Customers**

**Developing Solutions**



EPRI



Low Charge Ammonia

New Alternative Refrigerants

Customer Engagement for Refrigerant Options

Ultra Low Temp Freezer

Self Contained Display Cases

High Efficiency R-22 Refrigerant Replacement

Refrigerated Display Case Work Program Update



**SOUTHERN CALIFORNIA EDISON TAKES ON NATURAL REFRIGERANTS**

The utility is evaluating the energy savings delivered by natural refrigerant technologies, with an eye on driving their marketplace adoption.

By Michael Garry





# Renewable Energy Efficient Farms

## for urban communities and rural livestock operations

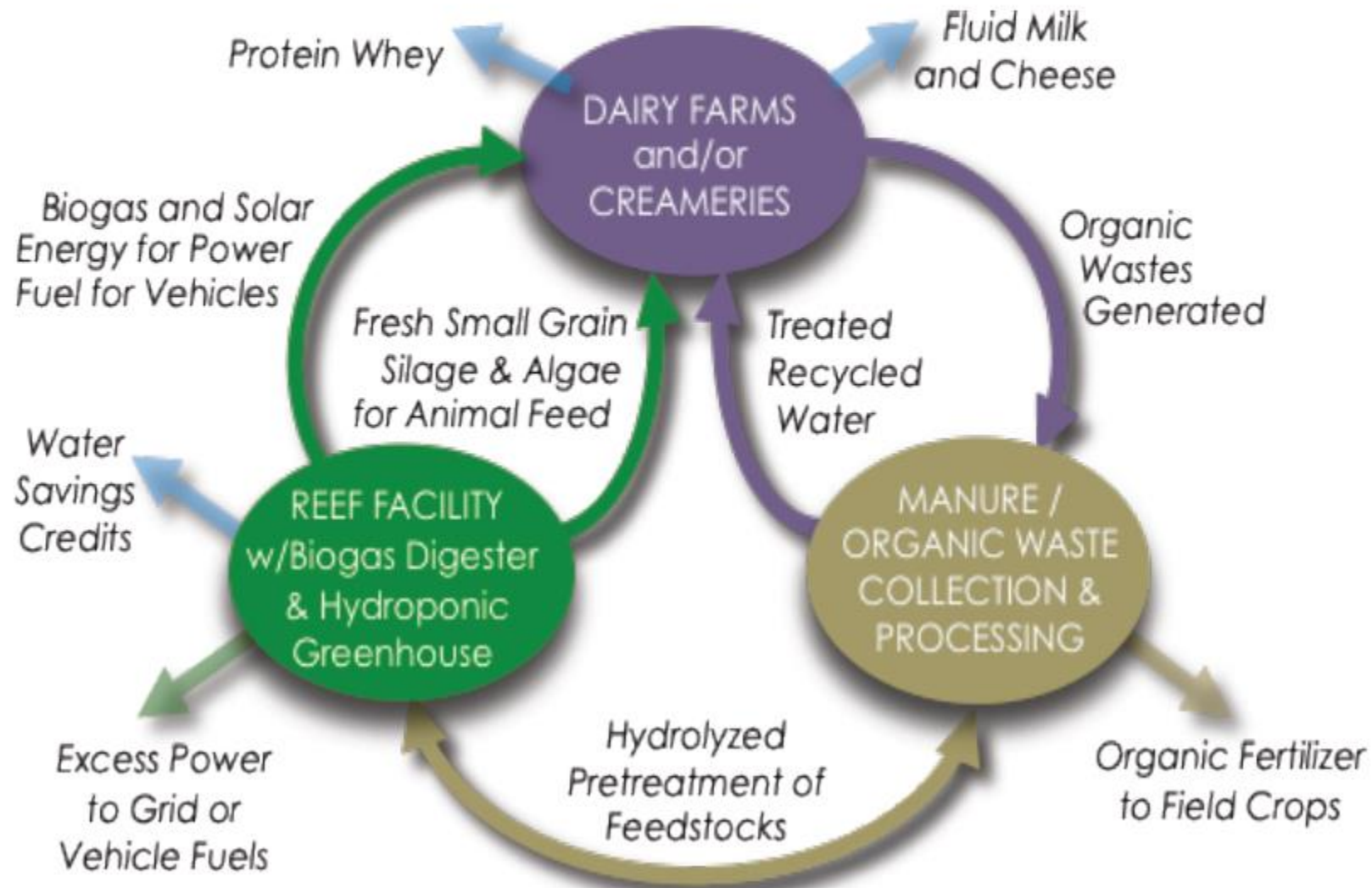
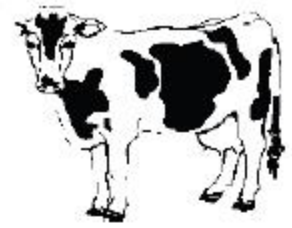
REEF is a modular and scalable closed-loop operating system designed to efficiently produce healthy fresh and nutritious food for humans and animal feeds for livestock:

- Using renewable energy derived from the sun and biogas fuel from
- Recycling of organic wastes, nutrients and CO<sub>2</sub>
- Saving water resources
- Reducing overall environmental footprint and land use impact

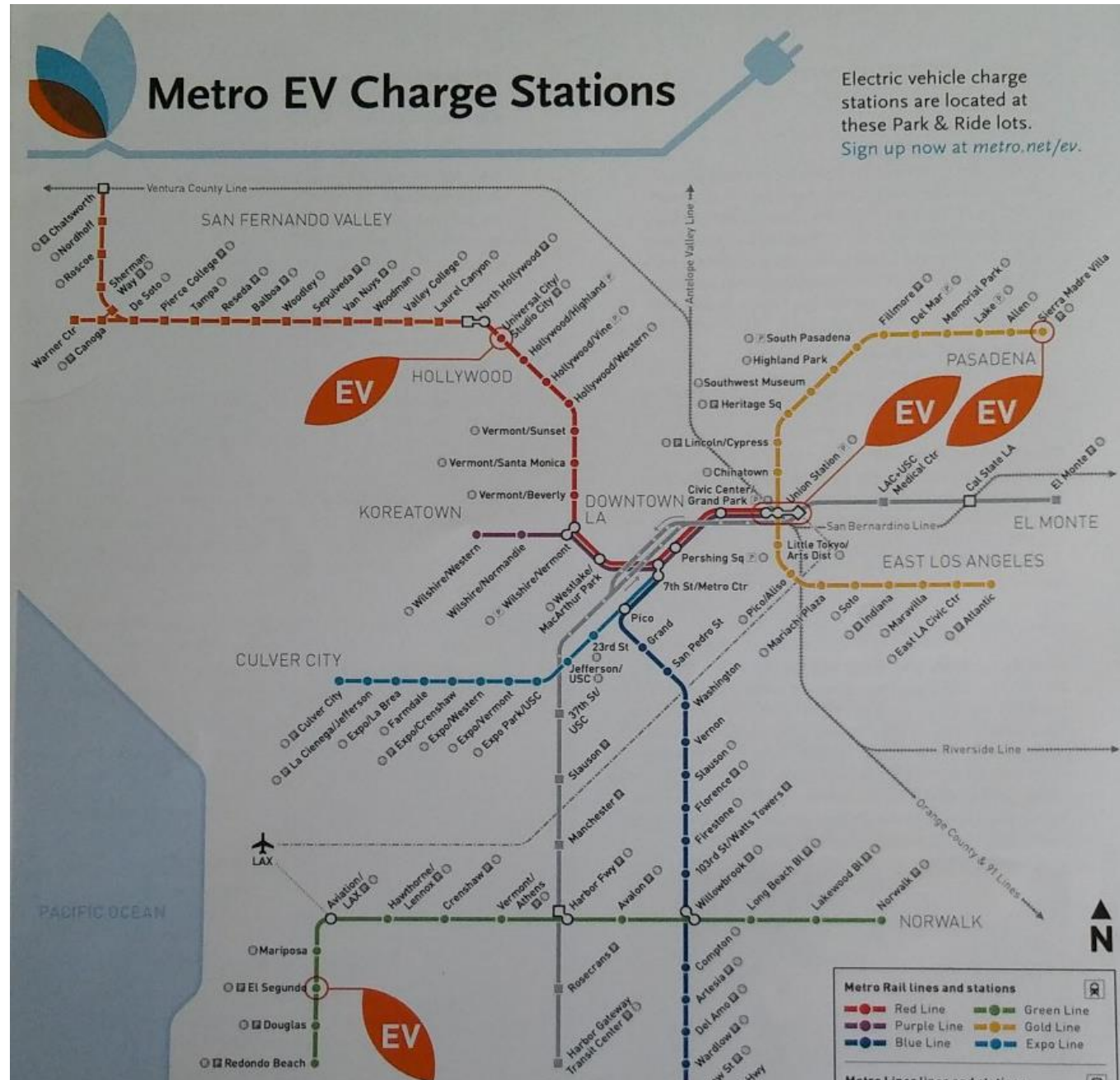




# Closed-Loop Dairy REEF



# LA Metro First-Last Mile...



# LA Metro First-Last Mile...new light rail platforms





**Paul Delaney**

**[paul.delaney@sce.com](mailto:paul.delaney@sce.com)**

**(626) 827-7059 cell**

