



CALIFORNIA ENERGY COMMISSION

# Energizing California's Communities with Renewables: A Southern California Urban Perspective

Bateman Hall, Room 1

11331 Ernestine Ave, Lynwood, CA 90262

Wednesday, September 30, 2015

10:00 a.m. – 12:00 p.m.

**Michael Sokol**

Energy Research and Development Division

California Energy Commission

[Michael.Sokol@energy.ca.gov](mailto:Michael.Sokol@energy.ca.gov)

916-327-1416



## Today's Agenda

- 10:00 – 10:05      Welcome and Introductions – California Energy Commission
- 10:05 – 10:30      Overview of Energy Commission Efforts and Resources  
Mike Sokol, Energy Commission
- 10:30 – 10:45      Case Study #1 – Waste Heat-to-Power at a Textile Dyeing  
Facility in Hawthorne  
David Berokoff, Berokoff Energy Solutions
- 10:45 – 11:00      Case Study #2 – Deployment and Integration of Renewables in  
Irvine  
Brendan Shaffer, University of California, Irvine
- 11:00 – 11:15      Case Study #3 – Zero Net Energy Homes and Apartments in  
Fontana and Lancaster  
Will Vicent and Ron Kliewer, Southern California Edison
- 11:15 – 12:00      General Q&A and Public Discussion



## Goals of Today's Workshop

- Overview of community-scale renewable energy and past programs at the Energy Commission
- Summarize high-level conclusions and lessons learned from prior projects
- Highlight opportunities for community-scale renewable energy projects through the Electric Program Investment Charge (EPIC) and other funding sources
- Engage attendees in a discussion on how to better target future funding opportunities and increase community engagement



## Commitment to Diversity

The Energy Commission adopted a resolution strengthening its commitment to diversity in our funding programs. We continue to encourage disadvantaged and underrepresented businesses and communities to engage in and benefit from our many programs.

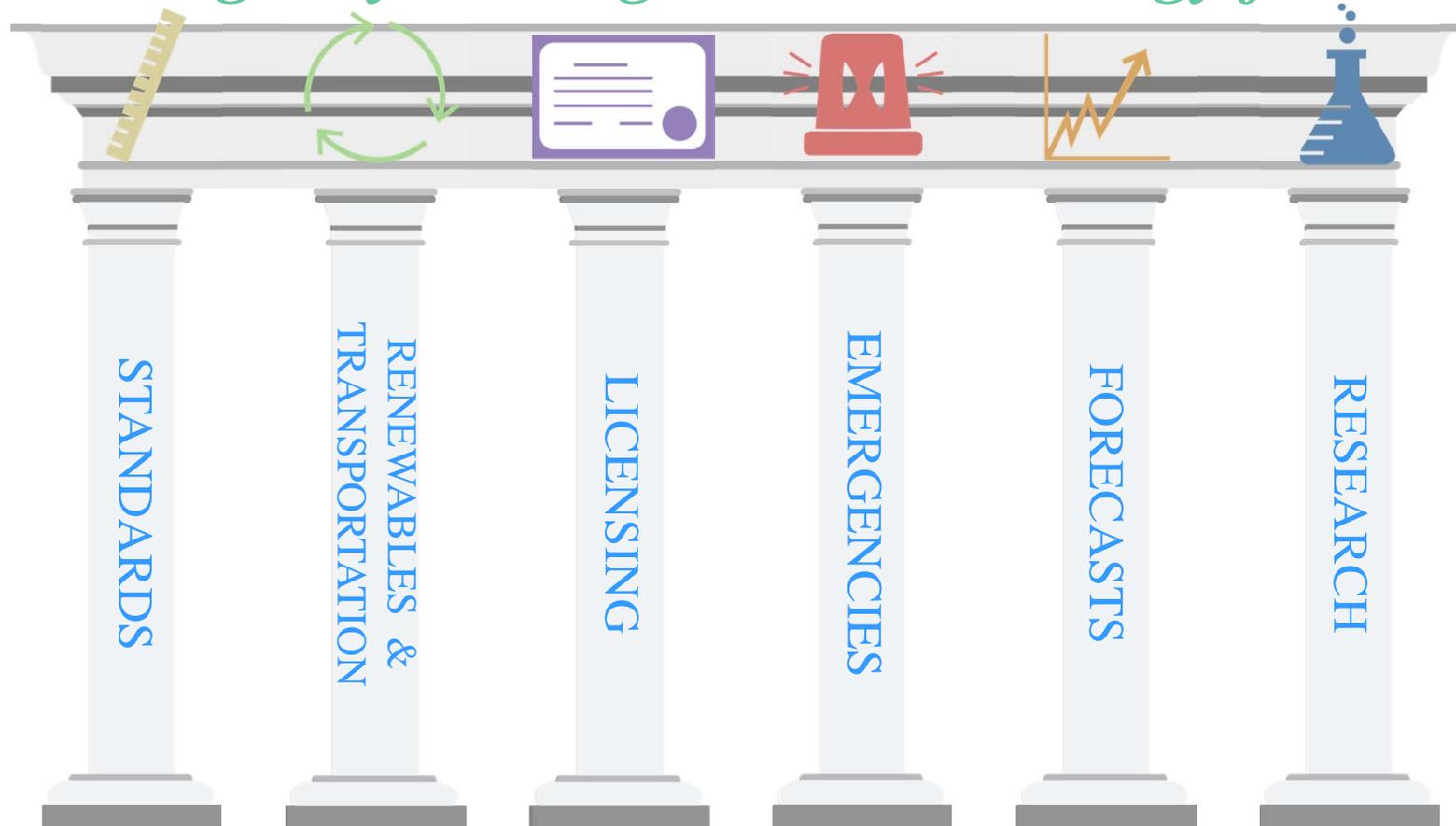
To meet this commitment, Energy Commission staff conducts outreach efforts and activities to:

- Engage with disadvantaged and underrepresented groups throughout the state.
- Notify potential new applicants about the Energy Commission's funding opportunities.
- Assist applicants in understanding how to apply for funding from the Energy Commission's programs.
- Survey participants to measure progress in diversity outreach efforts.



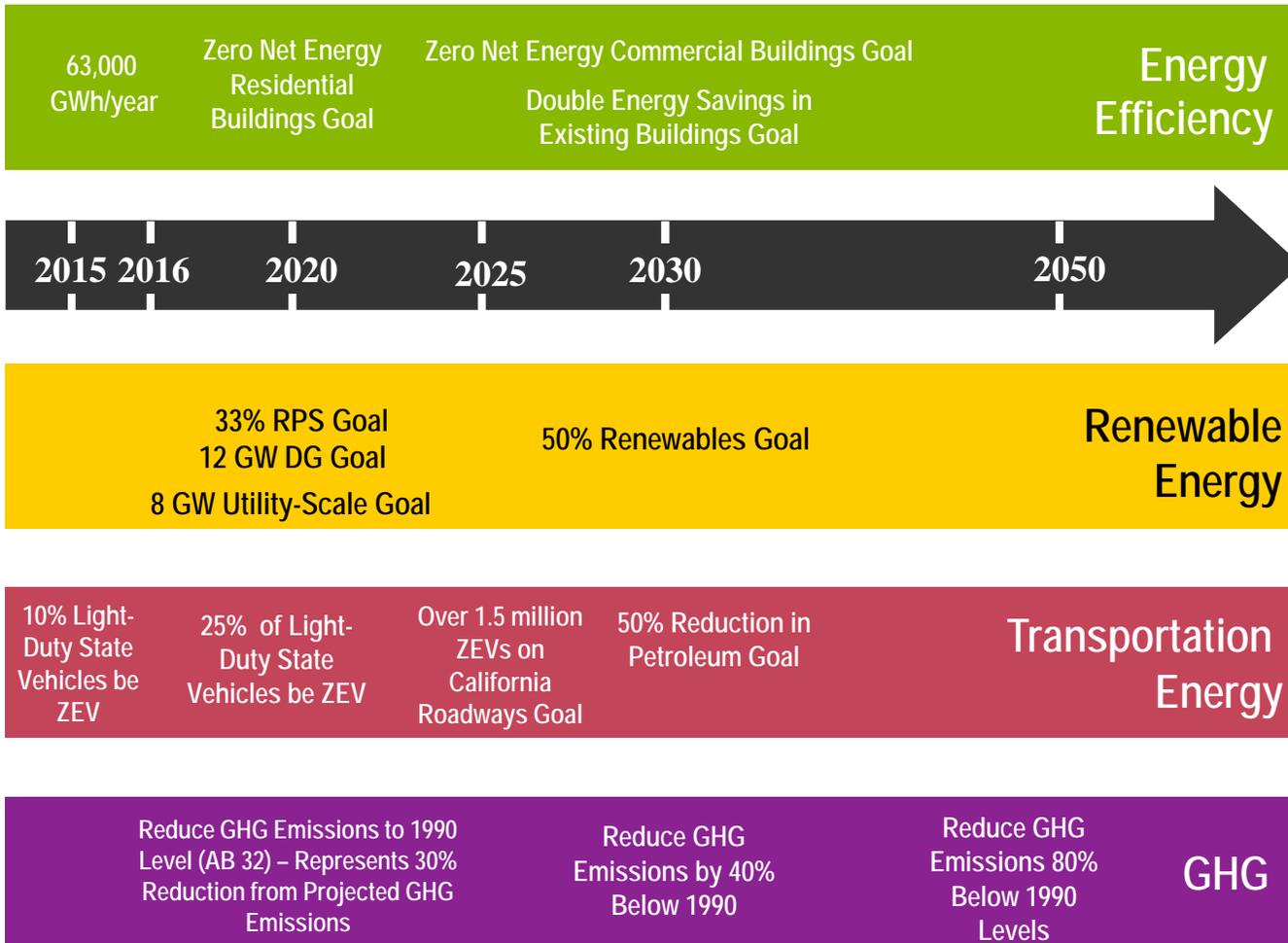
# About the Energy Commission

*The agency driving our clean energy future*





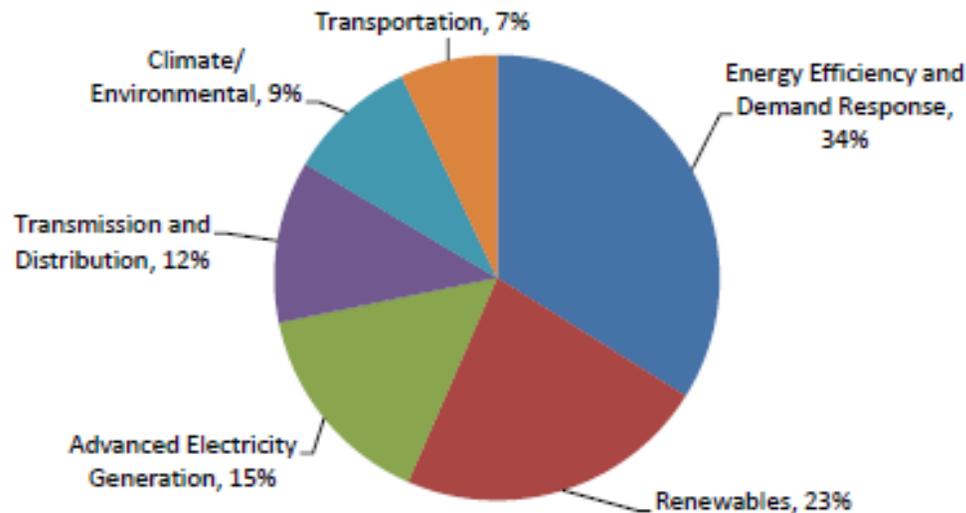
# State Energy Policy Drives Energy RD&D Investments





## Public Interest Energy Research (PIER)

- Funded RD&D projects to develop energy technologies that provide:
  - increased environmental benefits,
  - greater system reliability, and
  - lower system costs.
- Over \$911 million encumbered from 1997 - 2014





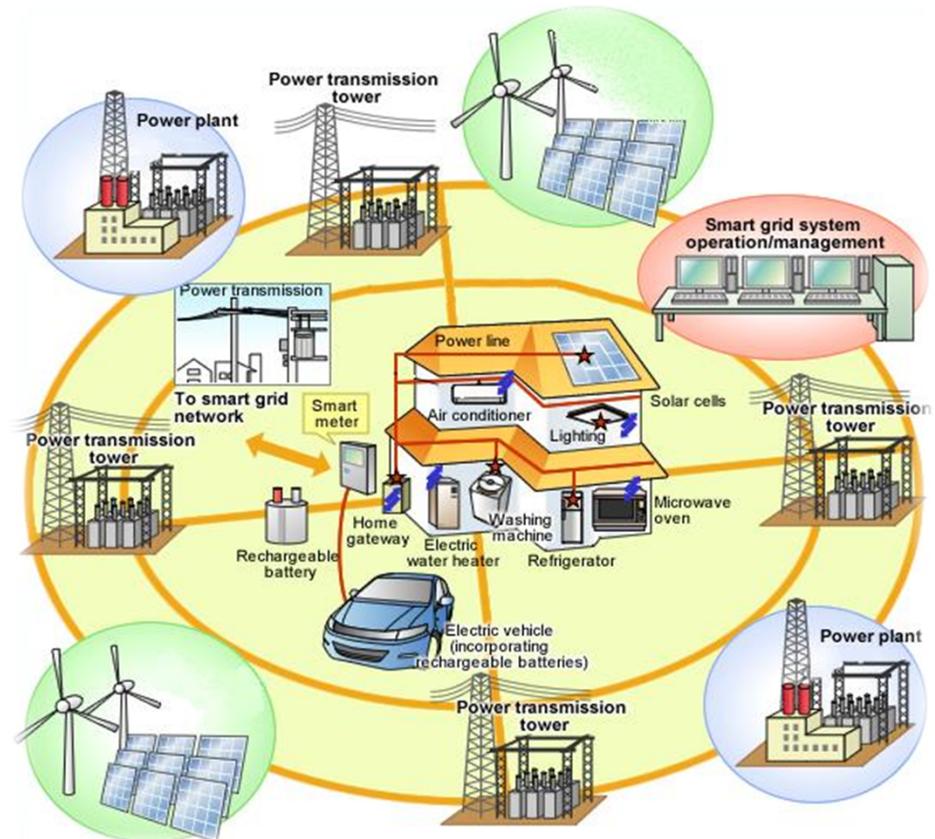
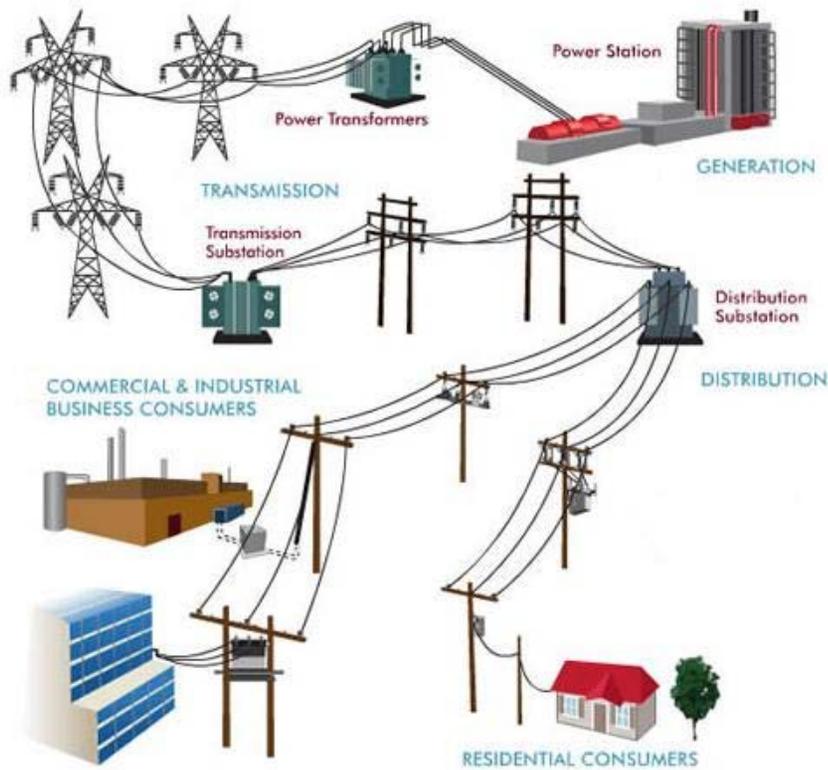
## Electric Program Investment Charge (EPIC)

- Established by CPUC in 2012 to fund investments to advance clean energy technologies and approaches for the benefit of investor-owned utility electricity ratepayers.
- The Energy Commission administers approximately \$130 million per year.
- EPIC uses an **energy innovation pipeline** approach to creating new energy solutions, fostering regional innovation, and bringing clean energy ideas to the marketplace





# Supporting Evolution of the Electricity Grid



Historical Grid

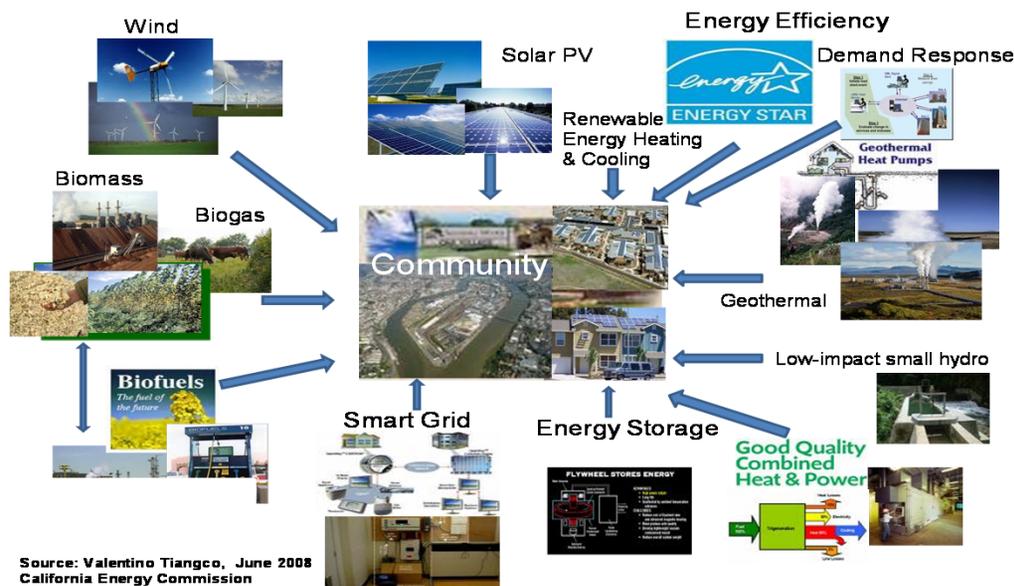


“Smart” Grid



# Community Scale Renewable Energy Research, Development, and Demonstration Overview

## Building Blocks of Renewable-based Energy Secure Communities (RESCO)

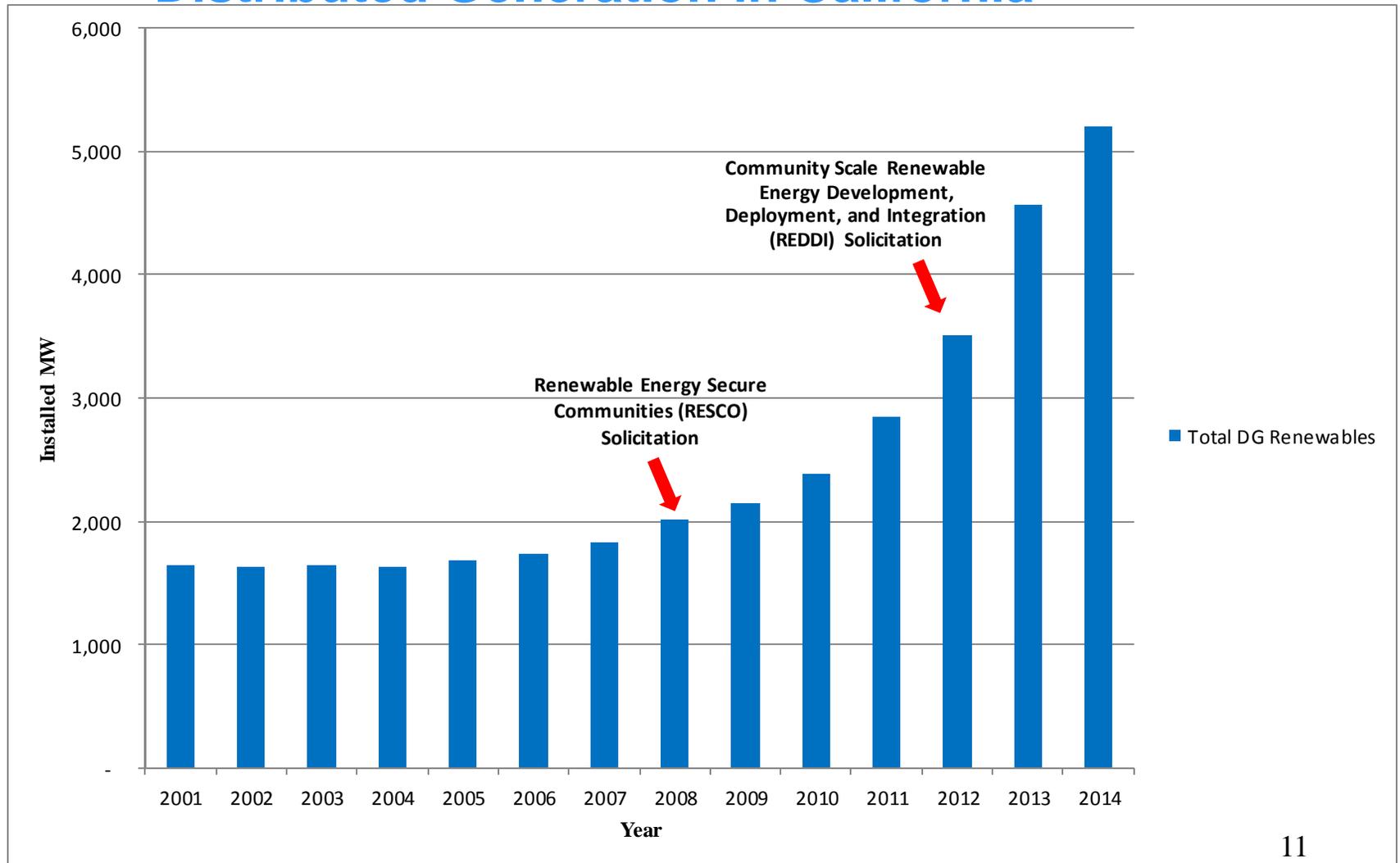


- 11 projects from 2008 solicitation
- 10 projects from 2012 solicitation
  - Total awards over \$18 million
  - Attracted over \$23 million match
  - Follow-on interest and funding from numerous parties
  - EPIC program aims to pick up where PIER left off

- Communities that secure their primary energy supply through locally-available renewable energy resources and community-wide energy management strategies
- PIER funding awarded under two separate solicitations
  - 2008 Renewable Energy Secure Communities (RESCO)
  - 2012 Community Scale Renewable Energy Development, Deployment, and Integration (REDDI)
- EPIC continues funding for this community scale renewable energy approach



# Energy Commission Programs as a Catalyst for Distributed Generation in California

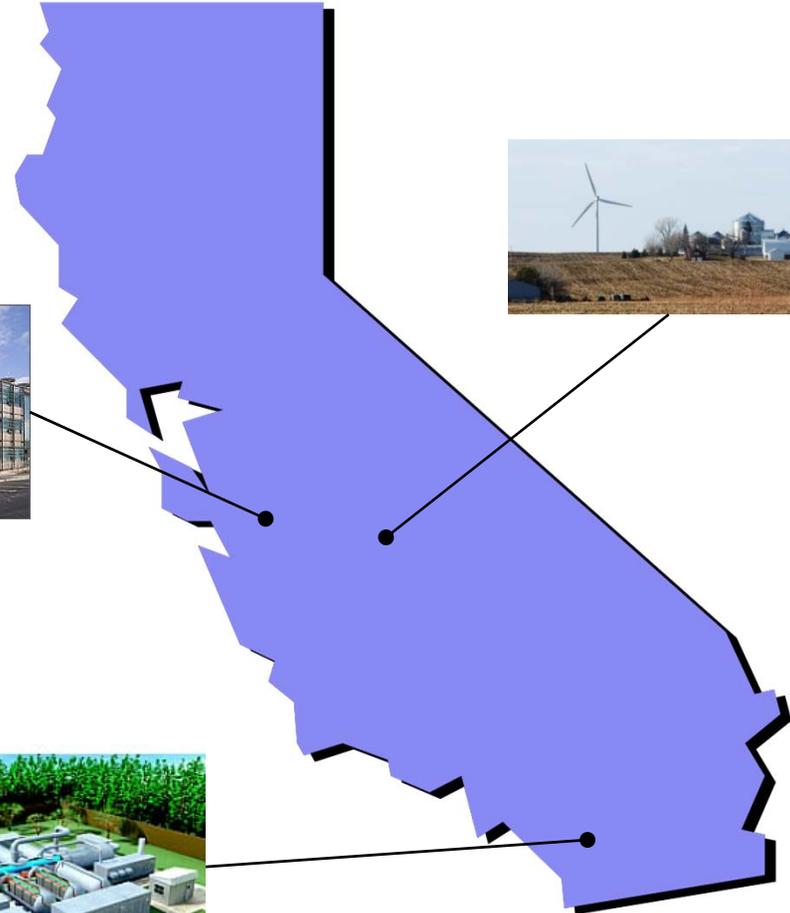


Source: Energy Commission Staff Analysis (2015)



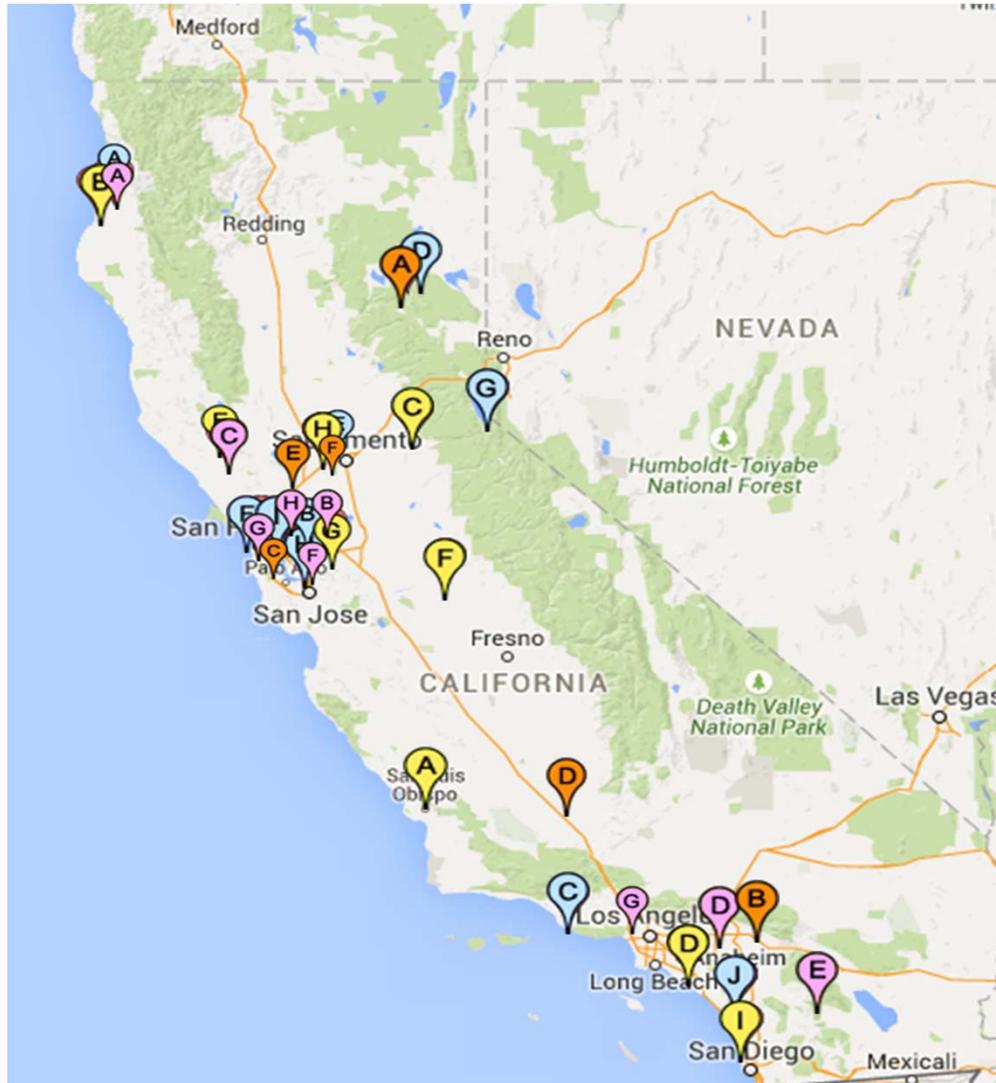
## Definition of “Community” is Diverse

- Commercial business parks
  - Industrial campuses
  - Urban neighborhoods
  - Suburban neighborhoods
    - Shopping centers
    - Rural communities
    - Military complexes
- Institutional/municipal facilities
  - E.g. Hospitals, prisons
  - College campuses
  - Mixed-use communities
  - Others not included here





# Geographic and Resource Diversity



-  PIER Solicitation PON-12-502
-  PIER Solicitation PON-08-004
-  EPIC Solicitation PON-14-301
-  EPIC Solicitation PON-14-307



# Localized Renewable Energy Issues

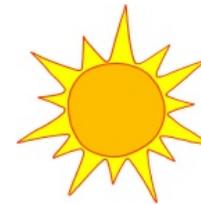
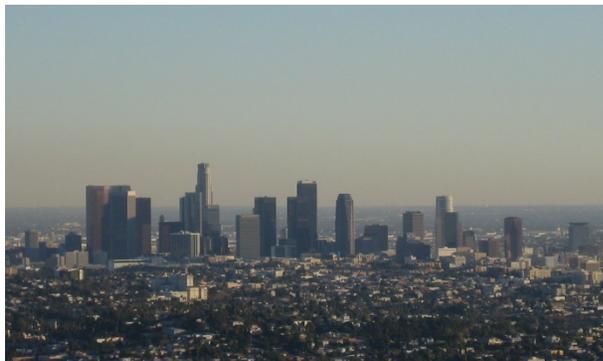


- Each region and community has unique characteristics
  - Climate Zones
  - Daily Demand Profiles
  - Seasonal Demand Profiles
  - Localized Renewable Resources
  - T&D Limitations
  - Air Basins/Air Districts
  - Siting Constraints
  - Utility Territories
  - Other Factors



## The Region's Energy Profile

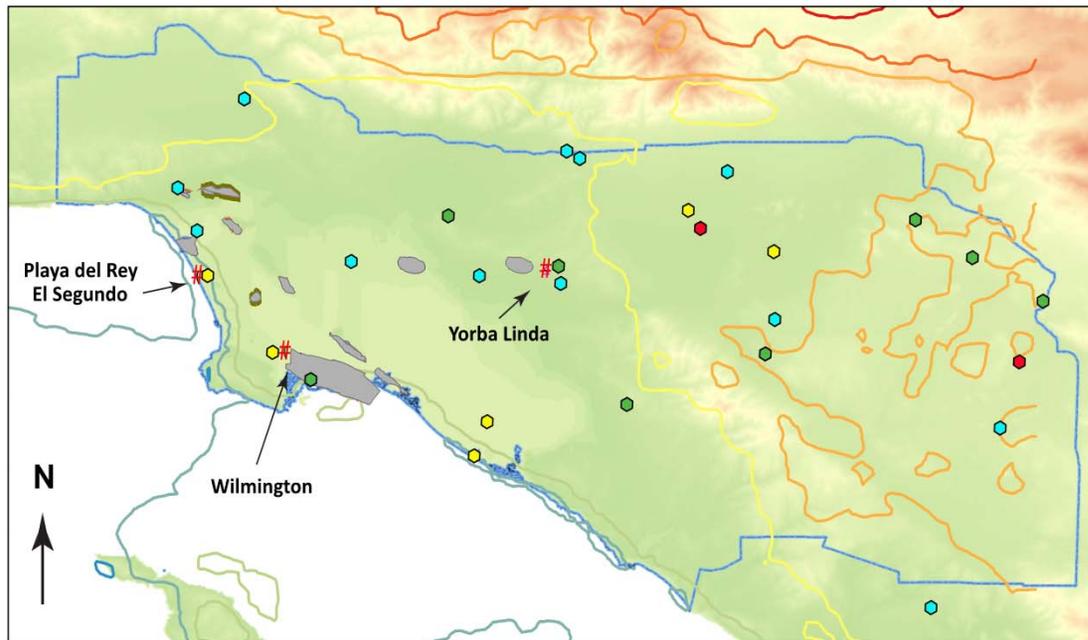
- Moderate temperatures most of the year due to coastal influence
- Decent solar resource available
- High population density, with lots of multi-family residences and renters
- Potential for urban biomass and waste stream diversion





# Integrated Renewable Energy Potential in the Los Angeles Basin

Locations of Biomass, Small Hydro, Geothermal and Solar Resources



**Legend**

LA Basin Boundary

0 2.5 5 10 15 20 Miles

**BIOMASS & SMALL HYDRO**

- # Collocated Sites
- Landfills
- Wastewater Treatment
- Dairy Region
- Small Hydro Plant

**GEO THERMAL**

- Oil Fields
- Oil Faults
- Oil Contour

**SOLAR**  
(kWh/m<sup>2</sup>/day)

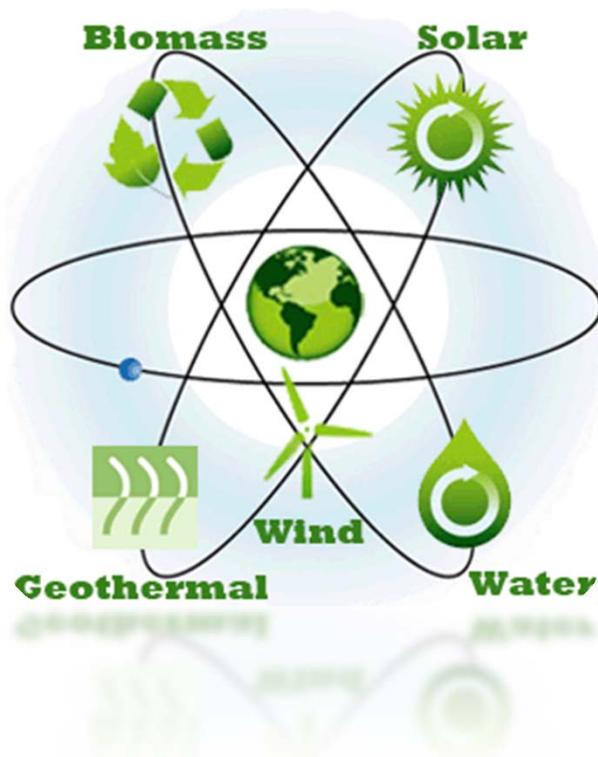
- 4.7
- 4.9
- 5.1
- 5.3
- 5.5
- 5.7
- 5.9

- Potential for co-locating renewable energy projects in the LA Basin
- Looked at ways to leverage existing sites to streamline localized renewable energy development
- Work conducted by UC Davis California Renewable Energy Center Collaboratives

<http://energy.ucdavis.edu/research/programs-and-centers/crecpage/>



## Need for Greater Renewable Energy in the Los Angeles Region

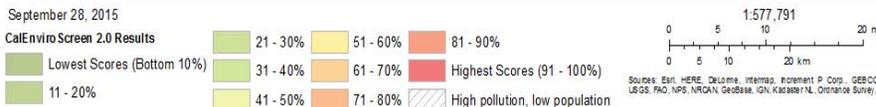
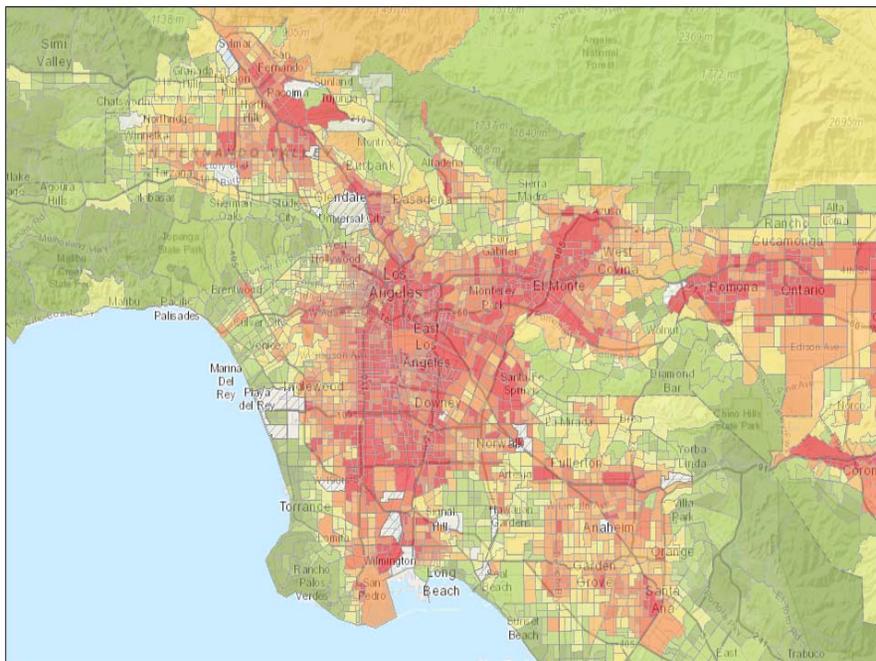


- Millions of dollars in electricity bill savings through local energy projects
- Local jobs and economic development with community-scale renewables
- Increase local resiliency to emergency scenarios and climate change
- Addressing local air quality concerns and reducing urban waste streams
- Supporting local grid capacity needs due to closure of older power plants



# CalEnviroScreen 2014 Findings

CalEnviroScreen 2.0 results



- Identifies communities that are disproportionately burdened by air pollution
- Methodology incorporates Air Quality (PM2.5), diesel particulate emissions, pesticide use, and toxic releases from waste sites and facilities
- Numerous census tracts in the region recorded high scores

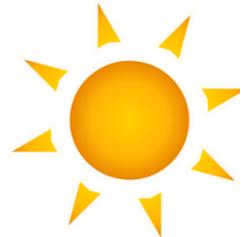
More info at:

- <http://oehha.ca.gov/ej/ces2.html>



## A Few Observations and Conclusions

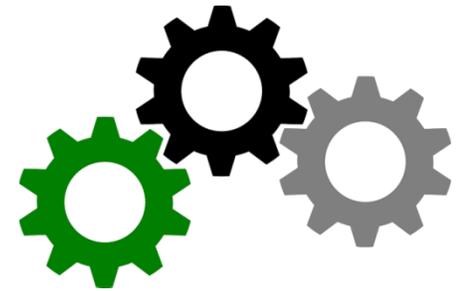
- The Los Angeles region and each community is endowed with unique resources and decision-making structure that require customization for energy models, etc.
- It takes a large coordinated effort from a multi-stakeholder team to conduct meaningful analysis for planning efforts
  - Local Government, Academia, Industry, Utilities
- Developing an integrated plan is the first step on the road to success
- Engage stakeholders early and often to build project support
- Pursuing community renewables can help achieve other local goals, such as GHG emissions, job creation, and possibly drought mitigation
- Local energy plans need to account for legacy infrastructure, existing contracts and rules, and stakeholder interests
- Technology innovation is still needed in this area in order to maximize the benefits of local renewable energy





## Technical Innovation is Still Needed!

- Smart Microgrid Controllers
- Advanced Energy Generation Technologies
- Smart Inverters for High Penetration Solar
- Zero-Net Energy/Carbon Communities
- Master Community Planning for Carbon Reduction
- Forecasting and Prediction of Grid Conditions
- Electric Vehicle Integration
- Community Scale Energy Storage Solutions
- Streamlined Planning and Permitting





## EPIC Continues to Fund Solutions

- EPIC Microgrid Demonstrations

- Critical Facilities
- High-penetration renewables
- Grid-linked Electric Vehicles

See awards at: [http://www.energy.ca.gov/contracts/PON-14-301\\_NOPA\\_revised\\_2.pdf](http://www.energy.ca.gov/contracts/PON-14-301_NOPA_revised_2.pdf)

- EPIC Community Scale Renewable Energy Demos

- Integrated community energy management strategies to reduce peak demand and costs, and maximize benefits
- Targeted for disadvantaged communities

See awards at: [http://www.energy.ca.gov/contracts/PON-14-307\\_NOPA\\_Amended.pdf](http://www.energy.ca.gov/contracts/PON-14-307_NOPA_Amended.pdf)



## Anticipated 2015 EPIC Solicitations

Solicitation Title	Program Area/Strategic Objective	Estimated Funding Amount
Conduct Energy Research Gap Assessment and Roadmapping	Applied Research and Development (S10)	\$3 million
Reduce the Environmental and Public Health Impacts of Electricity Generation and Make the Electricity System Less Vulnerable to Climate Impacts: Phase II	Applied Research and Development (S5)	\$8.5 million
Sustainable Energy Entrepreneur Development (SEED) Initiative	Applied Research and Development (S10)	\$16 million
Regional Energy Innovation Clusters	Applied Research and Development (S10)	\$8 million
Clean Energy Research, Technology Showcase, and Policy Forums	Market Facilitation (S18)	\$1 million
Measuring Innovation Progress to Guide Future Investment	Market Facilitation (S18)	\$1 million
Establish Strategies for Enhanced Local Regulatory Assistance and Permit Streamlining that will Accelerate Deployment of Clean Energy	Market Facilitation (S16)	\$17.3 million
Connecting Emerging Technologies and Strategies to Market Needs and Opportunities	Market Facilitation (S18)	\$3 million
Developing Technologies, Tools, and Strategies to Enable the Smart Grid of 2020	Applied Research and Development (S6)	\$8 million
Guiding Future Energy Needs, Plans, and Programs through Commercial End-Use Surveys	Market Facilitation (S18)	\$8 million
Reducing Costs for Communities and Business Through Integrated Demand-Side Management and Zero-Net Energy Demonstrations	Applied Research and Development (S1)	\$3 million
	Technology Demonstration and Deployment (S12 & S14)	\$20 million
Developing New Technologies and Applications that Enable cost-beneficial Customer-Side -of-the-Meter Energy Choices	Applied Research and Development (S2)	\$16.4 million
Developing a Portfolio of Advanced Efficiency Solutions (Phase 2)	Applied Research and Development (S1)	\$7 million
Developing Operational Tools, Models, and Simulations to Improve Grid Resource Planning	Applied Research and Development (S7)	\$TBD



## Current Opportunities Under EPIC

### **Regional Energy Innovation Clusters:**

<http://www.energy.ca.gov/contracts/epic.html#GFO-15-306>

- \$20 million available to provide services and resources at the regional level to assist entrepreneurs in bringing energy innovations to market.

### **Sustainable Energy Entrepreneur Development (SEED) Initiative:**

<http://www.energy.ca.gov/contracts/epic.html#RFP-15-306>

- \$33 million available to develop and implement a new initiative providing technical and financial support to energy entrepreneurs.

### **Connecting Emerging Energy Technologies and Strategies to Market Needs and Opportunities:** <http://www.energy.ca.gov/contracts/epic.html#RFP-15-304>

- \$7 million available to fund market intelligence, analysis, and expertise to support the commercial success of emerging energy technologies.



## Upcoming Funding Opportunities

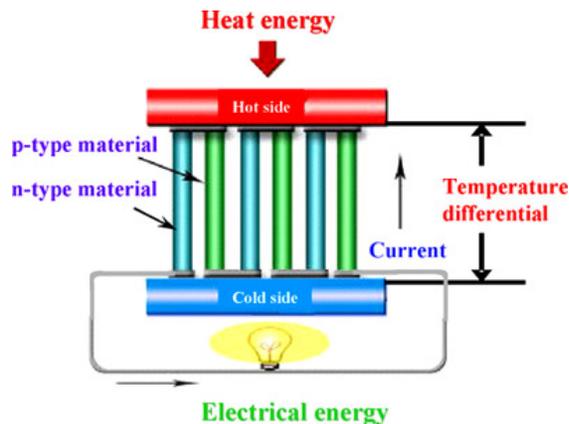
- In Q4 2015, the Energy Commission plans to release a solicitation that will fund a two phase competition that will challenge project teams to develop innovative and replicable approaches for accelerating the deployment of Advanced Energy Communities.
- Phase I will focus on Planning and Permitting Advanced Energy Communities.
- Phase II will fund an Advanced Energy Community Build-out.
- Draft is available here (comment period is over):

[http://www.energy.ca.gov/research/notices/2015-07-29\\_request\\_for\\_draft\\_grant\\_funding.pdf](http://www.energy.ca.gov/research/notices/2015-07-29_request_for_draft_grant_funding.pdf)

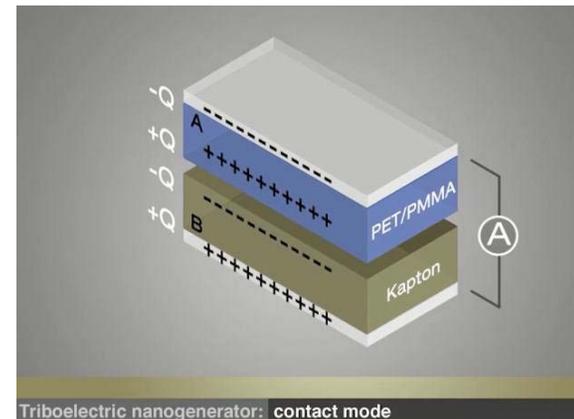


## Upcoming Funding Opportunities

- In Q1 2016, the Energy Commission plans to release a two phase solicitation that will develop and demonstrate advanced breakthrough technologies for renewable generation and piezoelectric-based systems for converting mechanical stress or vibrations to electricity.



Conceptual generator based on the Seebeck effect whereby a temperature difference applied to two dissimilar materials produces an electric current



Conceptual generator based on the Piezoelectric effect whereby a pressure difference applied to two dissimilar materials produces an electric current

- Scoping workshop presentation is available here:

[http://www.energy.ca.gov/research/notices/2015-09-14\\_workshop/presentations/](http://www.energy.ca.gov/research/notices/2015-09-14_workshop/presentations/)



## EPIC Research Plans for 2015-2017

### **Applied Research and Development**

- Strategic Objective 3. Develop Innovative Solutions to Increase the Market Penetration of Distributed Renewable and Advanced Generation.
- Strategic Objective 5. Reduce the Environmental and Public Health Impacts of Electricity Generation and Make the Electricity System Less Vulnerable to Climate Impacts.

### **Technology Demonstration and Deployment**

- Strategic Objective 12. Overcome Barriers to Emerging Energy Efficiency and Demand-Side Management Solutions through Demonstrations in New and Existing Buildings
- Strategic Objective 13. Demonstrate and Evaluate Biomass to Energy Conversion Systems, Enabling Tools, and Deployment Strategies
- Strategic Objective 14. Taking Microgrids to the Next Level: Maximizing the Value to Customers



## Regional Workshop Information

**September 17, 2015. 10:00 a.m. — 12:00 p.m.**

Elihu M Harris State Building, Room 2  
1515 Clay Street  
Oakland, CA 94612  
Focus on solar and urban resources in the Bay Area.

**September 21, 2015. 2:00 p.m. — 4:00 p.m.**

City of Redding Community Room  
777 Cypress Avenue  
Redding CA, 96001  
Focus on woody biomass in North State rural communities.

**September 23, 2015. 2:00 p.m. — 4:00 p.m.**

San Joaquin Valley Air Pollution Control District  
1990 E Gettysburg Avenue  
Fresno, CA 93726  
Focus on Ag waste, dairies and solar in the Central Valley.

**September 29, 2015. 9:30 a.m. — 11:30 a.m.**

Norman F. Feldheym Central Library  
Kellogg Room A/B  
555 West 6th Street  
San Bernardino, CA 92410  
Focus on community solar in the San Bernardino Valley.

**September 29, 2015. 2:30 p.m. — 4:30 p.m.**

Victorville City Hall, Room D  
14343 Civic Drive  
Victorville, CA 92393  
Focus on community solar in the High Desert region.

**September 30, 2015. 10:00 a.m. — 12:00 p.m.**

Bateman Hall, Room 1  
1131 Ernestine Avenue,  
Lynwood, CA 90262  
Focus on solar and urban resources in the Los Angeles Area.

**October 7, 2015. 10:00 a.m. — 12:00 p.m.**

SANDAG Facility  
401 B Street #800  
San Diego, CA 92101  
Focus on solar in the Southern California coastal region.

### Join Us Online

Instructions for remote participation in these workshops are included with the workshop notices posted at:  
<http://energy.ca.gov/research/notices/>



## Some Renewable Energy Programs

Large array of statewide and local programs offering different types of funding & technical assistance

- CalRecycle Incentives for Businesses –  
<http://www.calrecycle.ca.gov/Business/Incentives.htm/>
- California Alternative and Renewable Fuel and Vehicle Technology Program -  
<http://www.energy.ca.gov/altfuels/>
- LA County Solar Map and Green Planning Tool  
<http://solarmap.lacounty.gov/>
- South Coast Air Quality Management District (SCAQMD) Funding Programs  
<http://www.aqmd.gov/grants-bids/funding>

\*Information about additional incentive programs can be found at  
<http://programs.dsireusa.org/system/program?state=CA>



## The California Clean Energy Jobs Act – Proposition 39

- Up to \$550 million annually for energy projects such as energy efficiency upgrades and clean energy generation at schools.
- Roughly \$2.5 available from 2013 - 2018 to:
  - create clean energy jobs,
  - reduce greenhouse gas emissions, and
  - save energy and costs for schools.
- Includes accountability requirements to ensure funds deliver expected outcomes.

<http://www.energy.ca.gov/efficiency/proposition39/>



## Enhanced Community Renewables Program

- California Public Utilities Commission (CPUC) and investor-owned utility program to enable access to ‘shared’ renewable energy projects
- Individuals can purchase a portion of an offsite renewable project (3 MW or less) and count it as their own
- Groups and communities can come together to benefit from shared renewable energy projects
  - Provide renewable energy to those that currently don’t have access
  - Leverage economies of scale to drive down costs vs rooftop systems



For more information:  
Patrick Doherty, Analyst  
CPUC Energy Division  
[PD1@cpuc.ca.gov](mailto:PD1@cpuc.ca.gov)  
(415) 703-5032



## Distribution Resource Plans (DRPs)

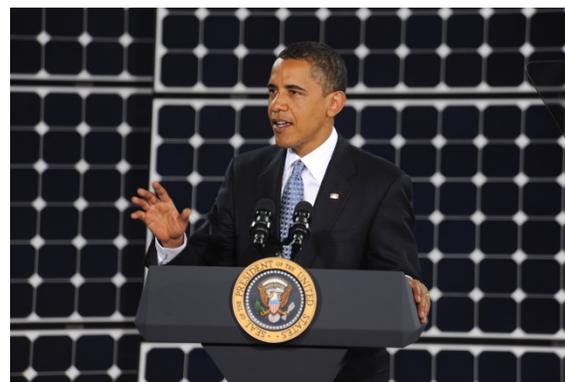
- Investor-Owned Utilities (like SCE) are developing plans for incorporating more distributed energy resources
  - May include distributed and community-scale renewables, electric vehicles, energy efficiency, energy storage, and more...
- Aims to identify optimal locations to deploy projects to minimize the need for upgrades and benefit the electric grid
- May open up opportunities for communities and third-party developers to pursue projects
- More info at: <http://www.cpuc.ca.gov/PUC/energy/drps/>



## Federal Level – US Clean Power Plan

- Announced by President Obama in August 2015
- Administered by US Environmental Protection Agency
- Aims to reduce carbon emissions from the power sector, and benefit communities

“EPA will encourage states to work with communities to include programs that will bring clean energy resources to communities as part of their state plans.”



More info: <https://www.whitehouse.gov/climate-change>



# RE-Powering America's Land

## Siting Renewable Energy on Potentially Contaminated Lands, Landfills, and Mine Sites

- Mapping & Screening Tools
- Informational Resources
- Facts Sheets & Success Stories





# Why Renewables on Potentially Contaminated Lands?

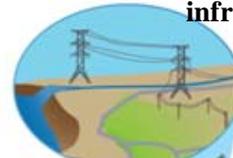
Provide low-cost, clean power to communities



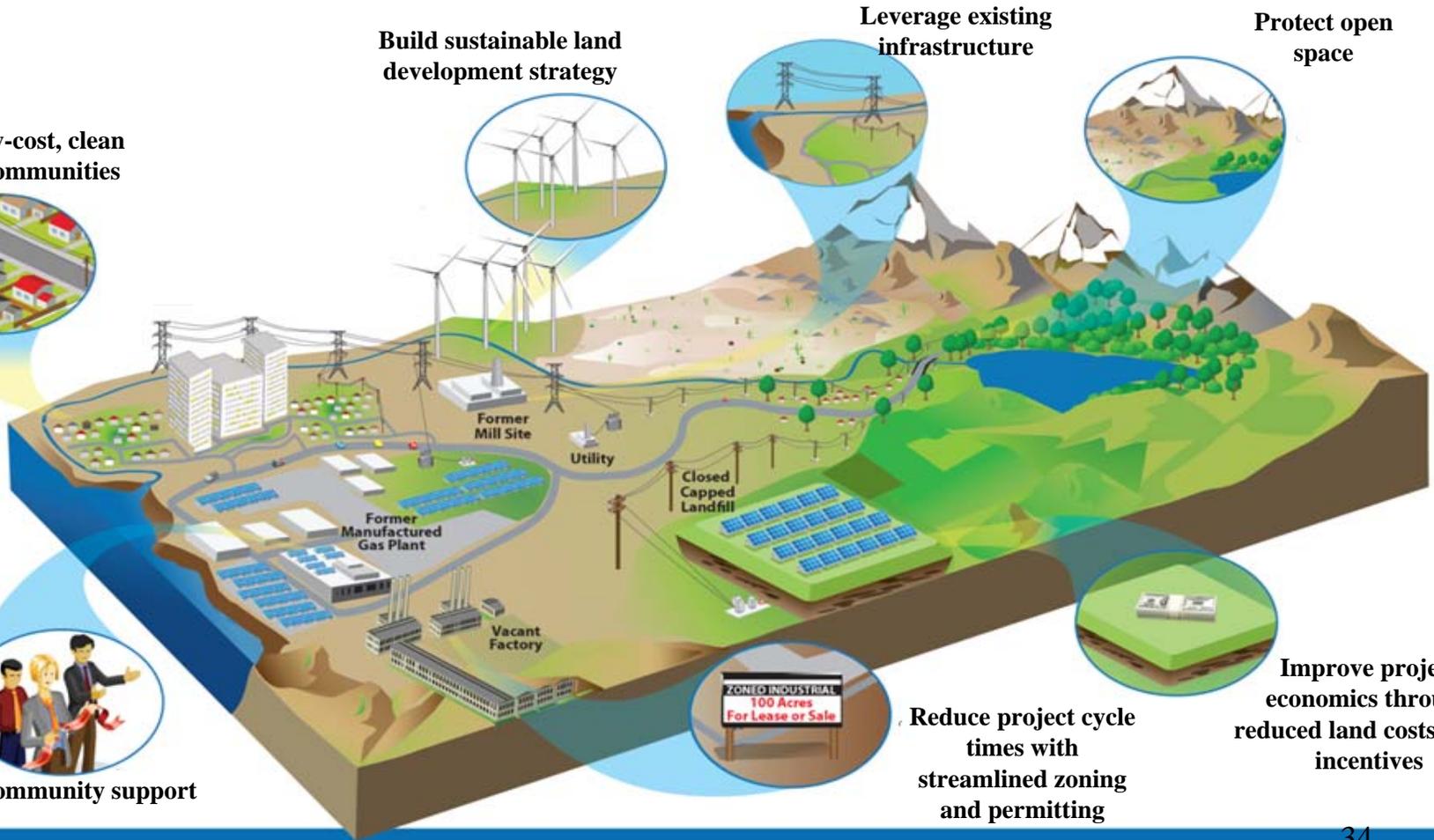
Build sustainable land development strategy



Leverage existing infrastructure



Protect open space



Gain community support



Reduce project cycle times with streamlined zoning and permitting



Improve project economics through reduced land costs & tax incentives





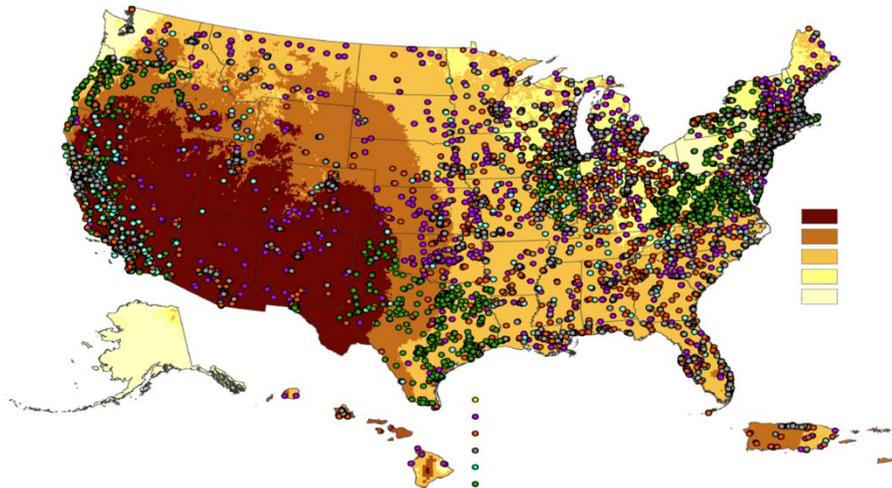
# RE-Powering America's Land

[www.epa.gov/renewableenergyland/](http://www.epa.gov/renewableenergyland/)



## RE-Powering Mapper

80,000 sites pre-screened, > 10,000 in CA



- Abandoned Mine Land
- Brownfield
- RCRA
- Superfund
- Landfill Methane Outreach Program
- State Tracked (CA, HI, IL, MA, NJ, NY, OR, PA, TX, VA, WV)

## Electronic Decision Tree for Solar and Wind

Walks through a series of Yes/No questions to help users evaluate whether a site is a good candidate for a solar PV or wind project

- Potentially contaminated sites, e.g., brownfields
  - Landfills
- Underutilized (abandoned parcels, parking lots)
  - Rooftop solar (commercial/industrial)

Stay Tuned...Coming Soon!

Subscribe to Re-Powering listserv for newsletters & announcements

## For More Information

[Andria Benner](mailto:benner.andria@epa.gov) (benner.andria@epa.gov)

(415) 972-3189

[ZiZi Searles](mailto:searles.zizi@epa.gov) (searles.zizi@epa.gov)

(415) 972-3178

[Karen Irwin](mailto:irwin.karen@epa.gov) (irwin.karen@epa.gov)

(415) 947-4116



## Other Federal Resources

- US Department of Energy Technical Assistance Programs
  - <http://energy.gov/eere/services/technical-assistance>
- US Department of Energy Guide to Community Energy Strategic Planning
  - <http://energy.gov/eere/slsc/guide-community-energy-strategic-planning>
- US Department of Energy Clean Cities Program
  - <http://www1.eere.energy.gov/cleancities/index.html>



# CALIFORNIA ENERGY COMMISSION

## Connect with the Energy Commission!



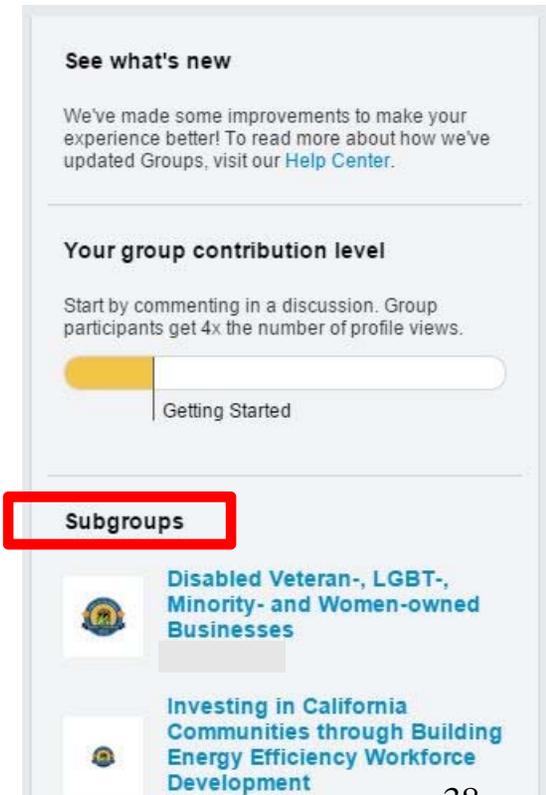
...and the Energy  
Commission's listserves  
[www.energy.ca.gov/research](http://www.energy.ca.gov/research)



## Find Partners via LinkedIn

The Energy Commission has created a user-driven LinkedIn group page to help potential applicants **connect**, **collaborate** and **partner** on proposals for funding opportunities.

- Participants can join the “California Energy Commission Networking Hub” by:
  - Searching for the “California Energy Commission Networking Hub” group; or
  - Entering this link into your browser: ([bit.ly/CalEnergyNetwork](https://bit.ly/CalEnergyNetwork))
- Once there, find and join the desired solicitation subgroup.





## Public Questions and Answers



- Please state your name and affiliation as an introduction
- Please keep comments within 3-5 minutes to allow enough time for others



## Thank you for participating!

Presentations and workshop information will be  
posted to:

<http://www.energy.ca.gov/research/notices/index.html#09302015>

Send any further comment and questions to  
[michael.sokol@energy.ca.gov](mailto:michael.sokol@energy.ca.gov)