CALIFORNIA ENERGY COMMISSION

Energizing California's Communities with Renewables: A Southern California High Desert Perspective

Victorville City Hall, Room D

14343 Civic Dr. Victorville, CA 92393

Tuesday, September 29, 2015

2:30 p.m. – 4:30 p.m.

Michael Sokol

Energy Research and Development Division

California Energy Commission

Michael.Sokol@energy.ca.gov

916-327-1416

Today's Agenda

2:30 – 2:35	Welcome and Introductions – California Energy Commission
2:35 – 3:00	Overview of Energy Commission Efforts and Resources
	Mike Sokol, Energy Commission
3:00 – 3:15	Case Study #1 – Community Scale Generation at the Chemehuevi Community Center
	Alfredo Martinez-Morales, University of California, Riverside
3:15 – 3:30	Case Study #2 – Zero Net Energy Homes and Apartments in Fontana and Lancaster
	Will Vicent and Ron Kliewer, Southern California Edison
3:30 – 4:30	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

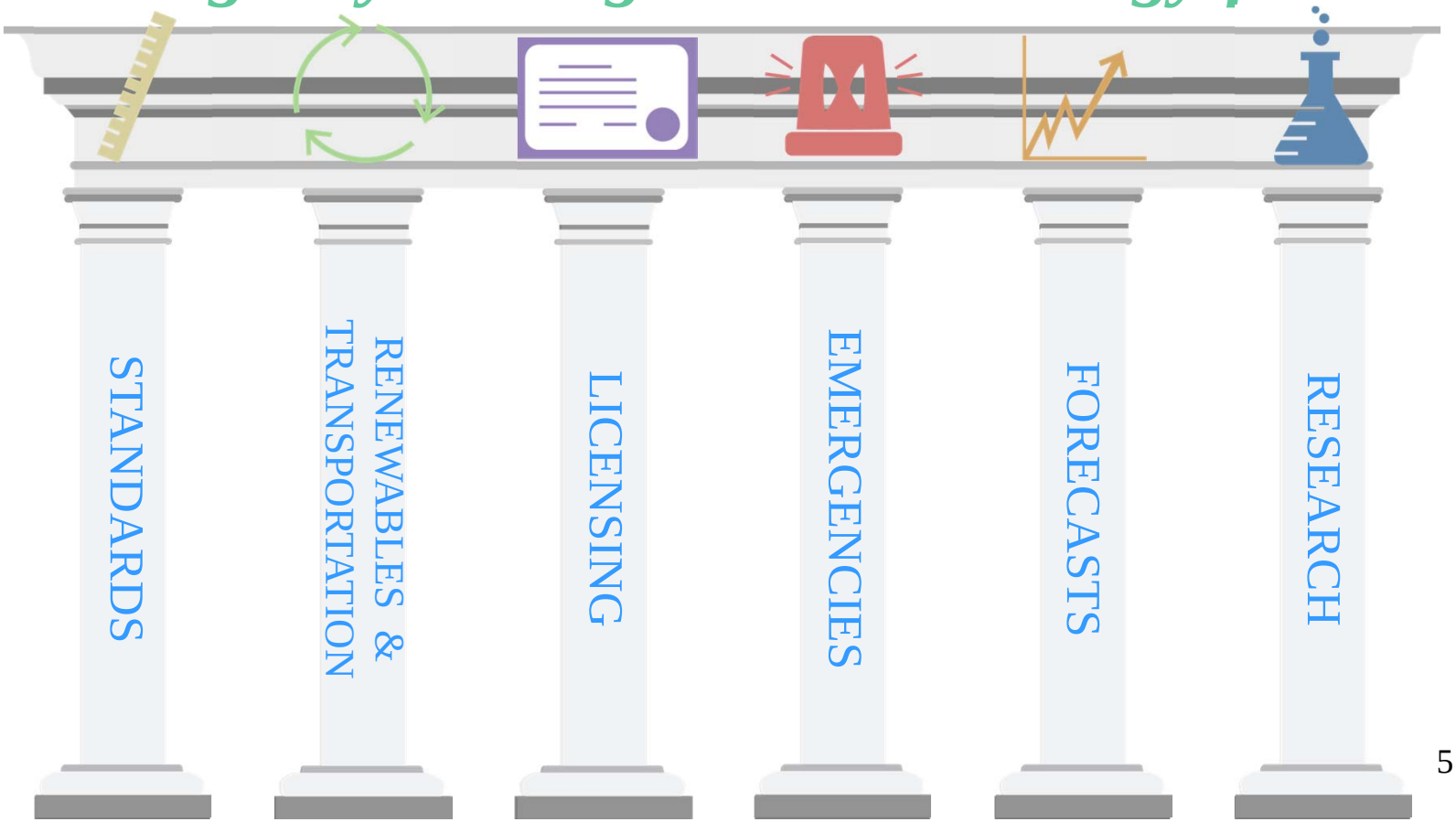
The Energy Commission adopted a resolution strengthening its commitment to diversity in our funding programs. We continue to encourage disadvantaged and underrepresented businesses and communities to engage in and benefit from our many programs.

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

Energy Efficiency

- 63,000 GWh/year
- Zero Net Energy Residential Buildings Goal
- Zero Net Energy Commercial Buildings Goal
- Double Energy Savings in Existing Buildings Goal

2015 2016 2020 2025 2030 2050

Renewable Energy

- 33% RPS Goal
- 12 GW DG Goal
- 8 GW Utility-Scale Goal
- 50% Renewables Goal

Transportation Energy

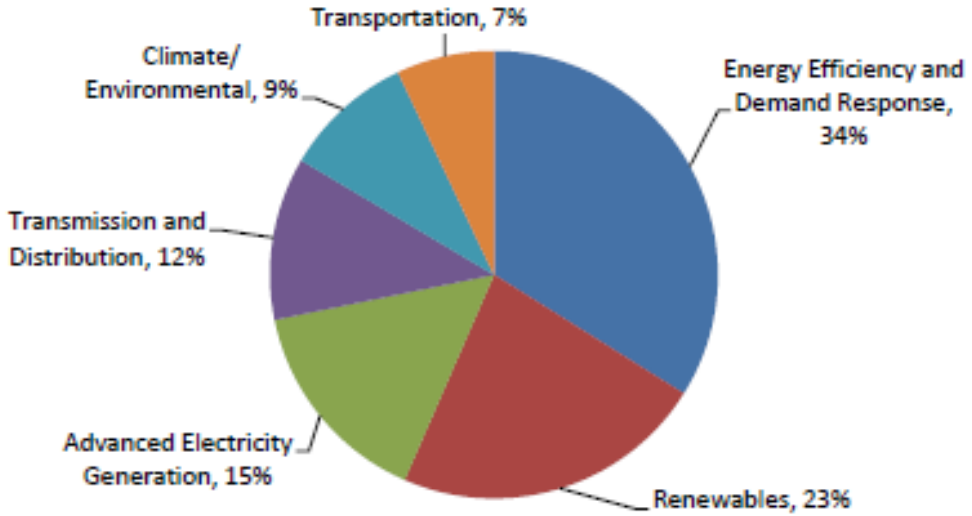
- 10% Light-Duty State Vehicles be ZEV
- 25% of Light-Duty State Vehicles be ZEV
- Over 1.5 million ZEVs on California Roadways Goal
- 50% Reduction in Petroleum Goal

GHG

- Reduce GHG Emissions to 1990 Level (AB 32) – Represents 30% Reduction from Projected GHG Emissions
- Reduce GHG Emissions by 40% Below 1990
- Reduce GHG Emissions 80% Below 1990 Levels

Public Interest Energy Research (PIER)

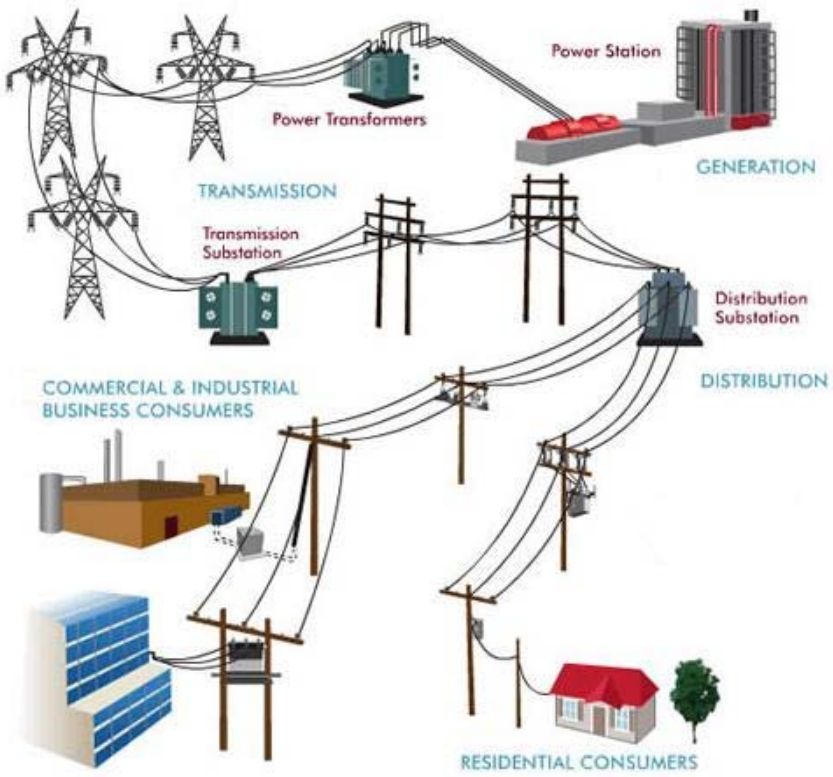
- Funded RD&D projects to develop energy technologies that provide:
  - increased environmental benefits,
  - greater system reliability, and
  - lower system costs.
- Over $911 million encumbered from 1997 - 2014

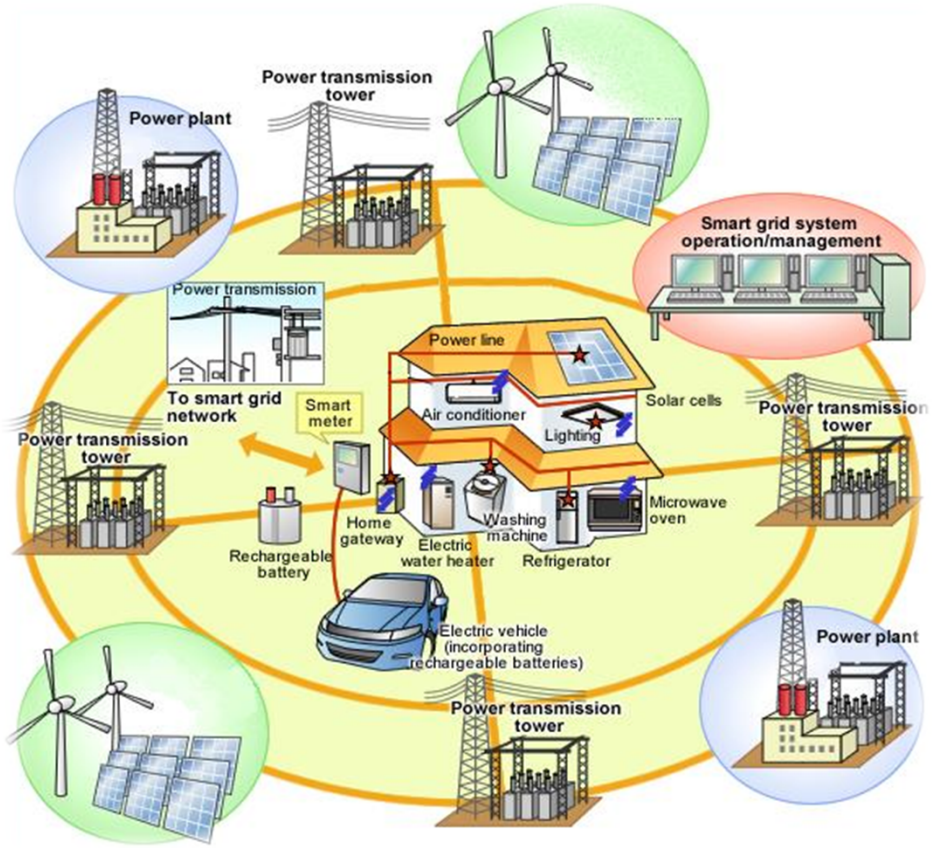


Electric Program Investment Charge (EPIC)

- 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

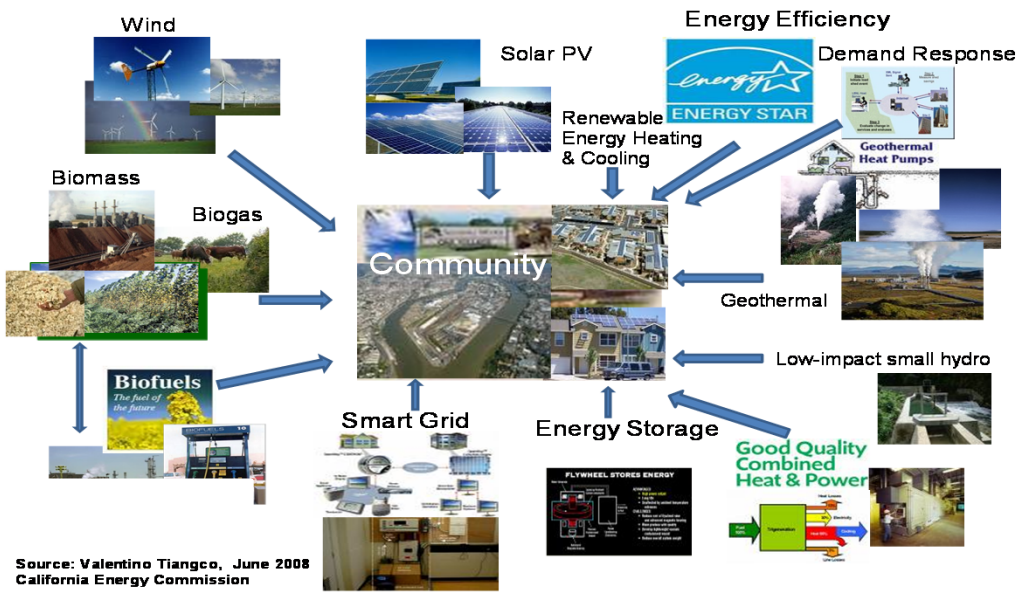




Historical Grid → "Smart" Grid

Community Scale Renewable Energy Research, Development, and Demonstration Overview

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

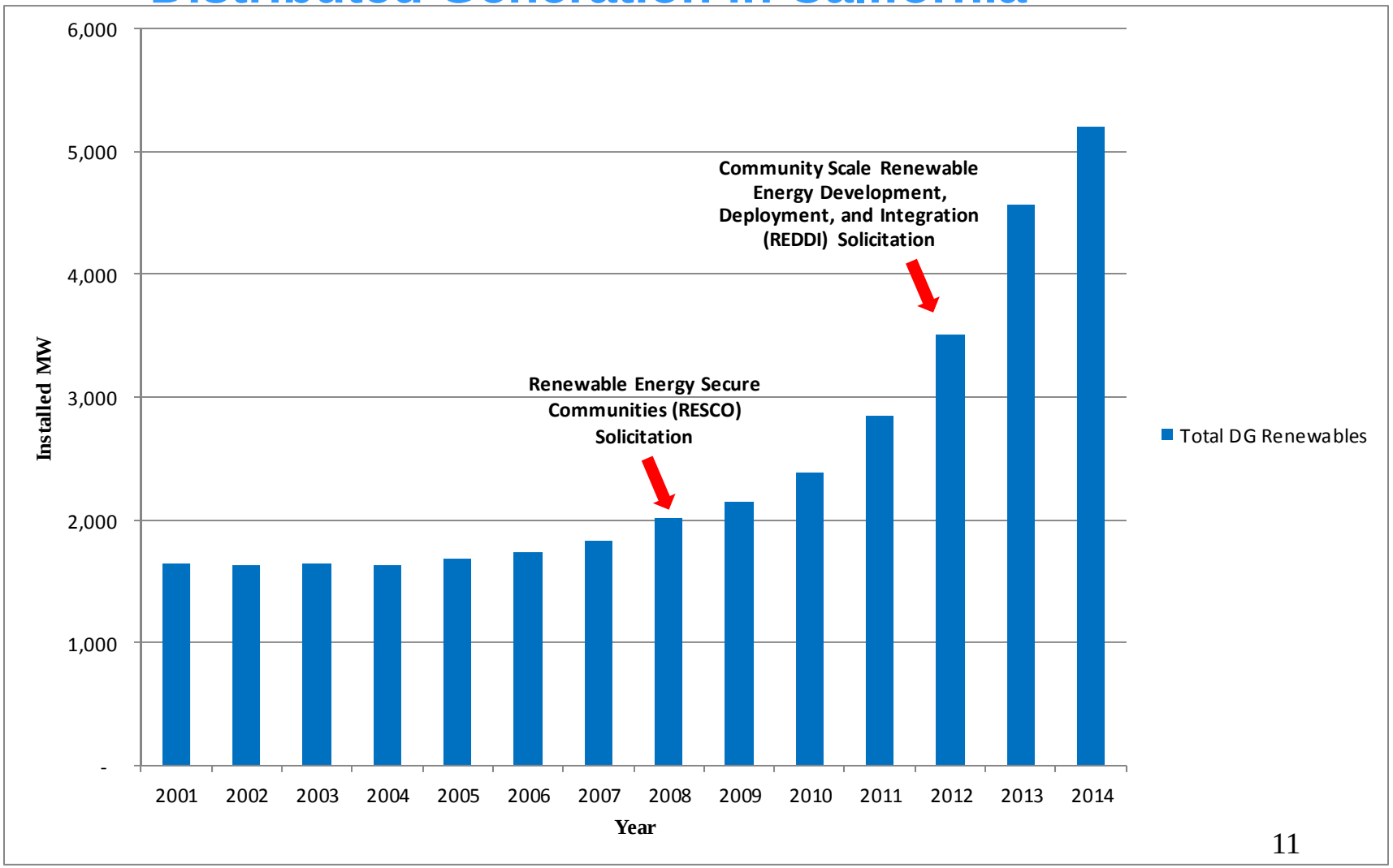


Source: Valentino Tiangco, June 2008 California Energy Commission

- 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

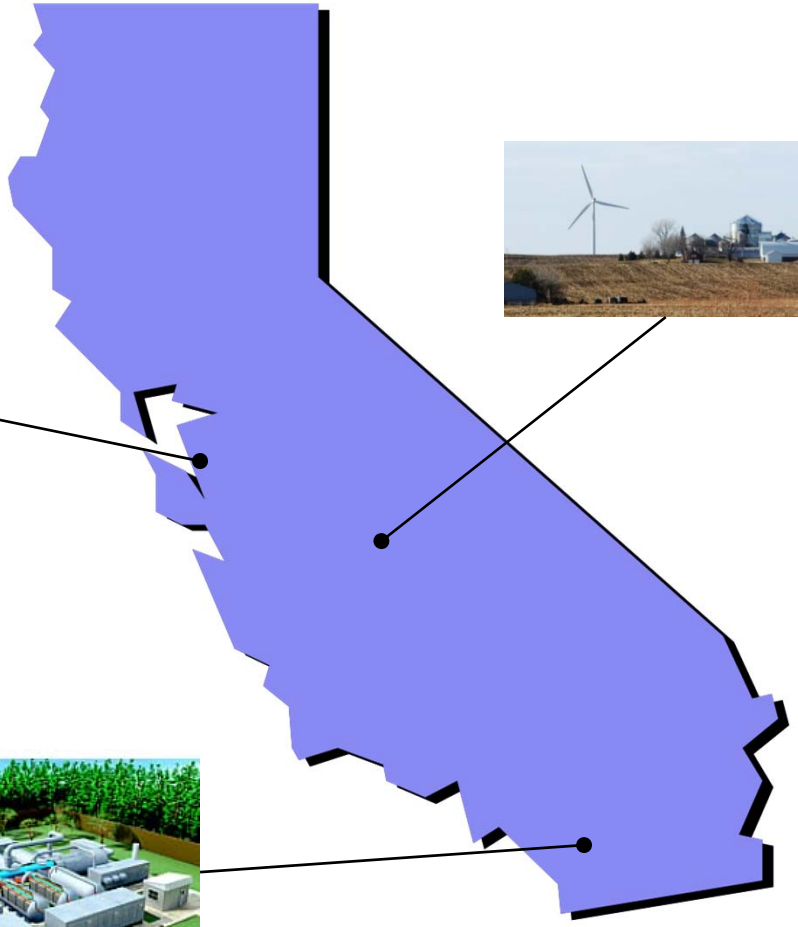
Energy Commission Programs as a Catalyst for Distributed Generation in California



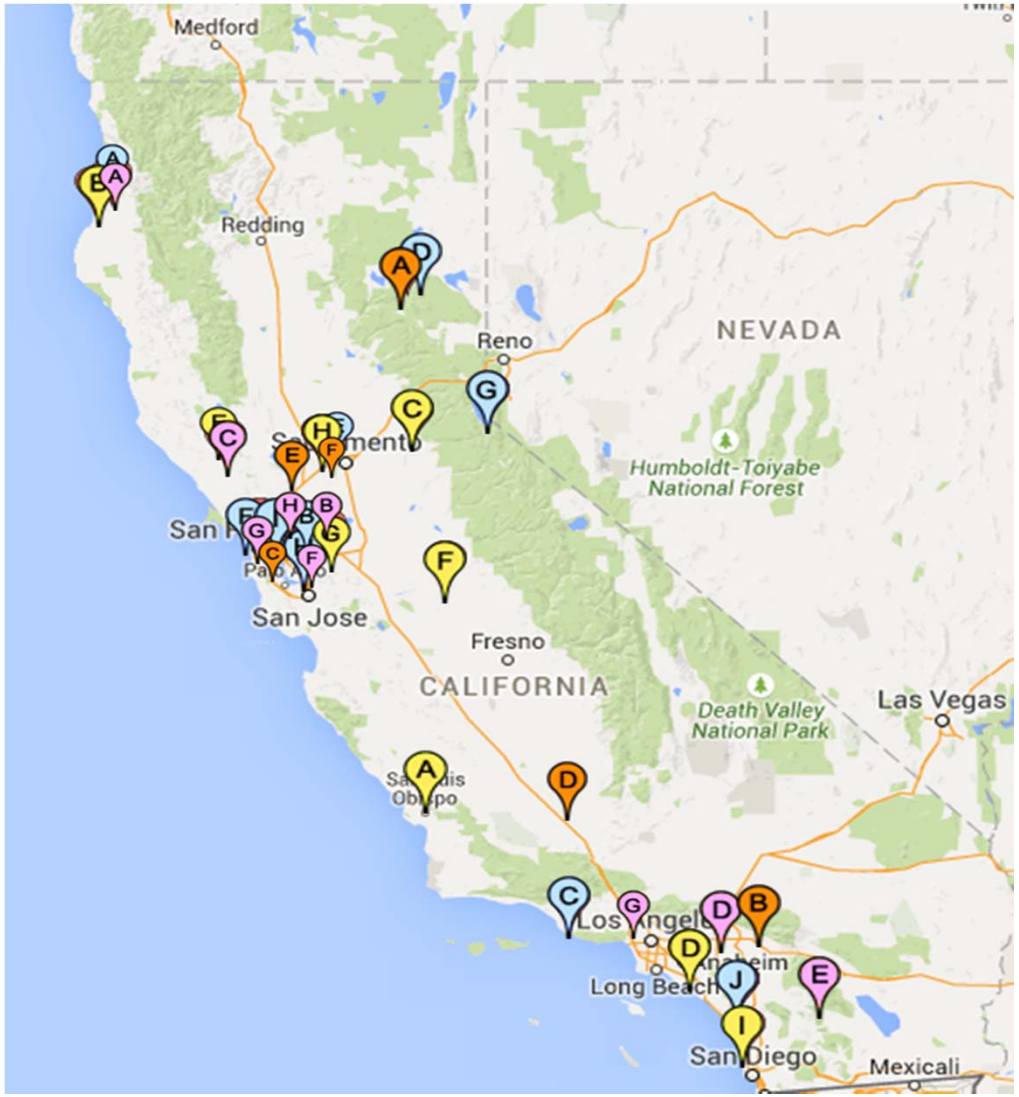
Source: Energy Commission Staff Analysis (2015)

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



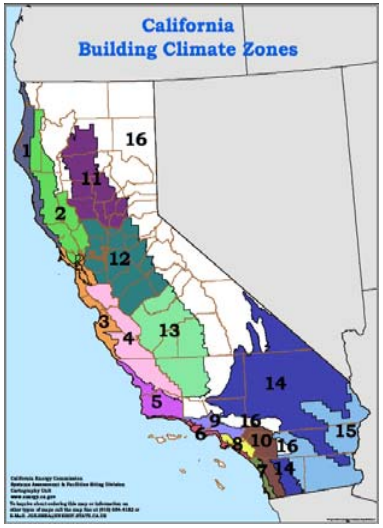
PIER Solicitation PON-12-502

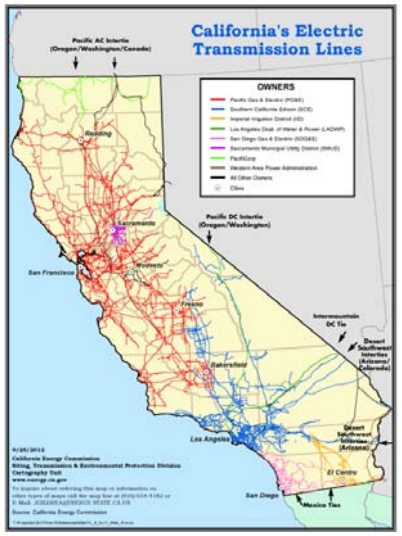
PIER Solicitation PON-08-004

EPIC Solicitation PON-14-301

EPIC Solicitation PON-14-307

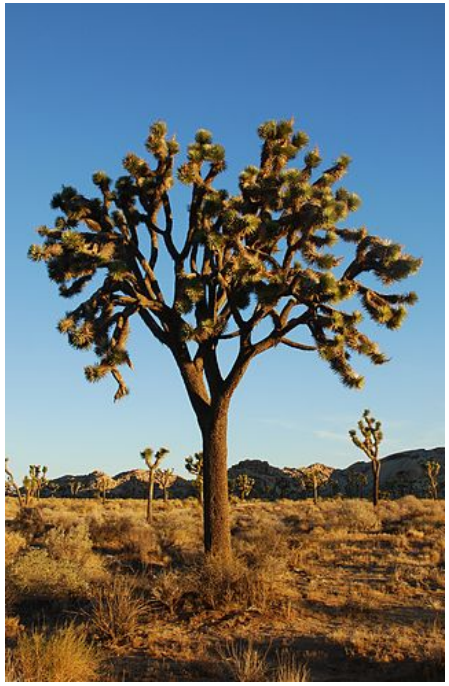
Localized Renewable Energy Issues





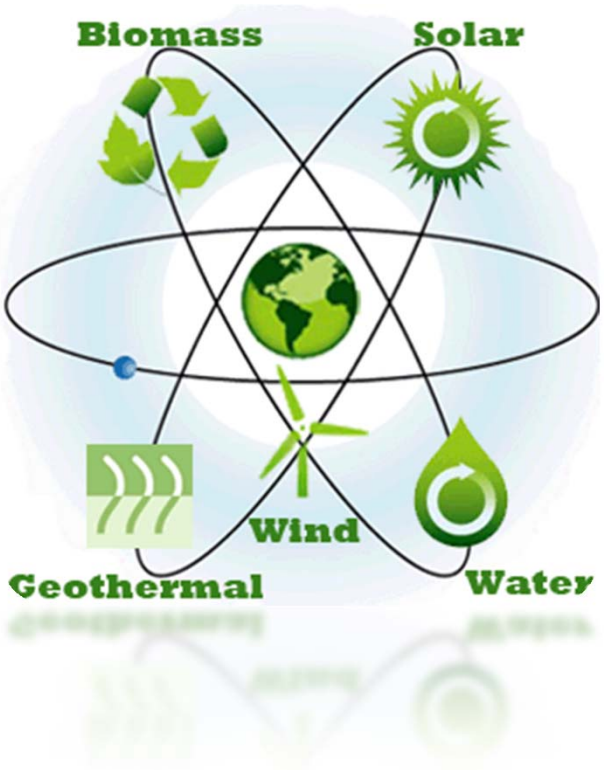
- Each region and community has unique characteristics
  - Climate Zones
  - Daily Demand Profiles
  - Seasonal Demand Profiles
  - Localized Renewable Resources
  - T&D Limitations
  - Air Basins/Air Districts
  - Siting Constraints
  - Utility Territories
  - Other Factors

The Region's Energy Profile



- Abundant sunshine for most of the year, some of the best solar resources in the country
- High summer temperature leads to high cooling demand
- Some wind energy potential
- Some potential for bioenergy development
- Some geothermal potential
- Rural communities provide ideal locations to build out distributed generation

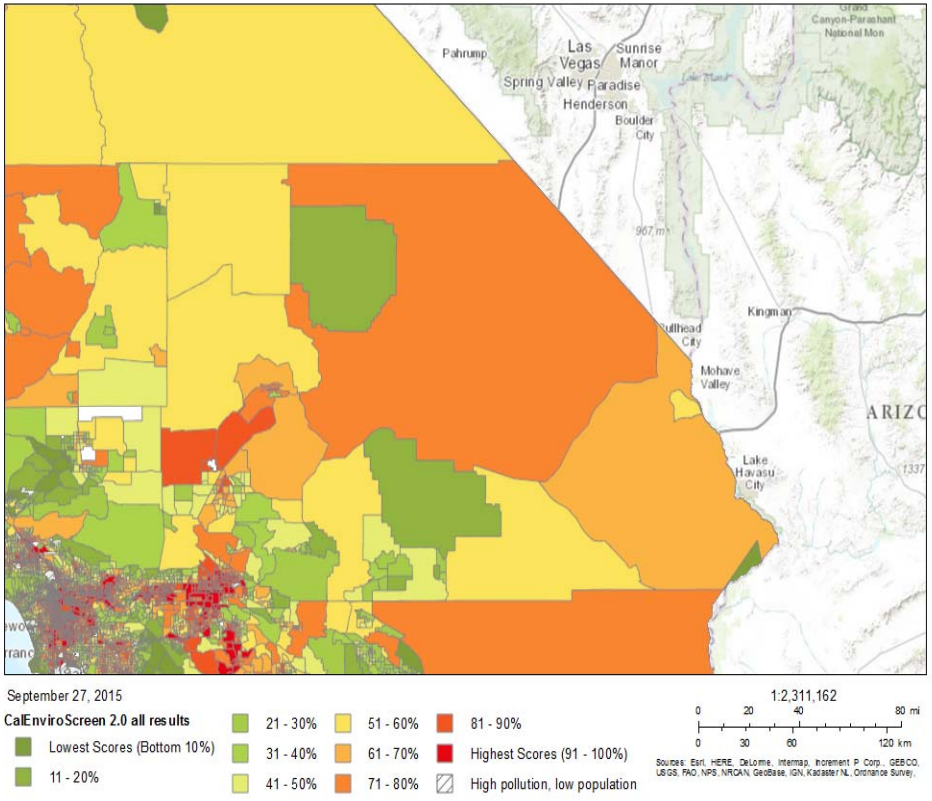
Need for Greater Renewable Energy in the High Desert Region



- Thousands 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
- Improve air and water quality
- Reduce local waste streams
- Leverage previous efforts under the Desert Renewable Energy Conservation Plan (DRECP) to benefit communities

CalEnviroscreen 2014 Findings

CalEnviroScreen 2.0 results



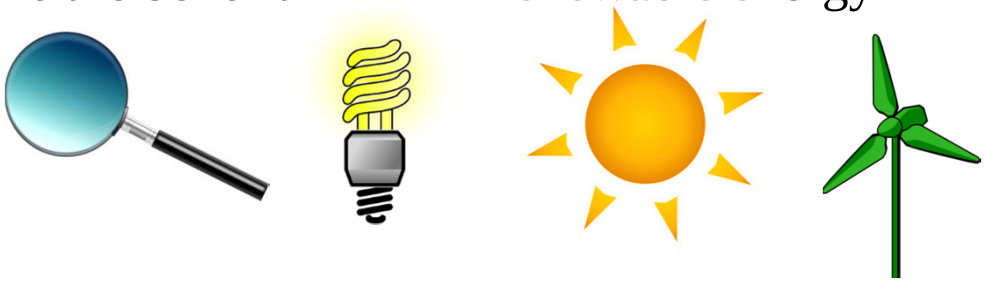
- Identifies communities that are disproportionately burdened by air pollution
- Methodology incorporates Air Quality (PM2.5), diesel particulate emissions, pesticide use, and toxic releases from waste sites and facilities
- Several census tracts in parts of the region recorded high scores

More info at:

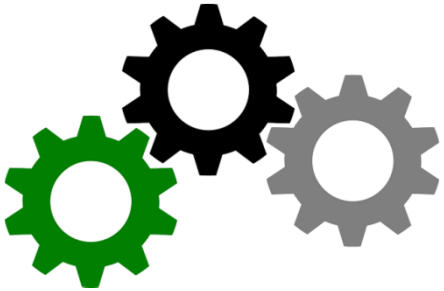
- http://oehha.ca.gov/ej/ces2.html

A Few Observations and Conclusions

- The High Desert 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

- 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

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

This list is updated periodically online at: http://energy.ca.gov/contracts/epic.html

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.

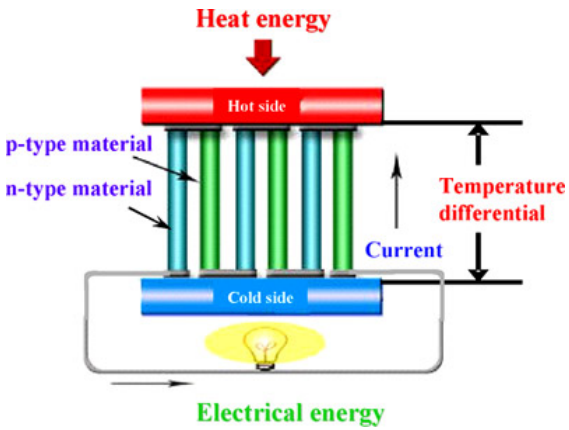
- Phase II will fund an Advanced Energy Community Build-out.

- Draft is available here (comment period is over):

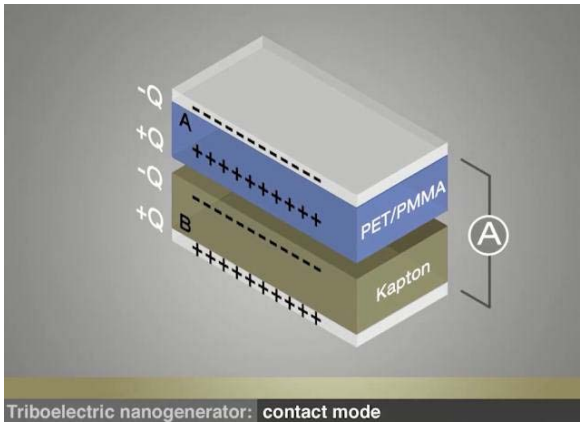
http://www.energy.ca.gov/research/notices/2015-07-29_request_for_draft_grant_funding.pdf

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/

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

Investment Plans available at: http://www.energy.ca.gov/research/epic/documents/

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/
- San Bernardino County Renewable Energy Planning Efforts – http://cms.sbcounty.gov/lus/Planning/RenewableEnergy.aspx

*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
(415) 703-5032

Distribution Resource Plans (DRPs)

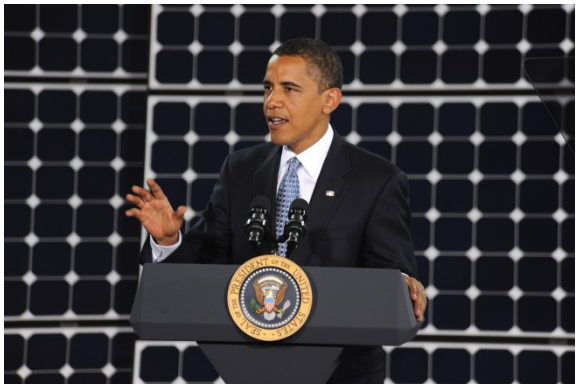
- Investor-Owned Utilities (like SCE) are developing plans for incorporating more distributed energy resources
  - May include distributed and community-scale renewables, electric vehicles, energy efficiency, energy storage, and more…
- Aims to identify optimal locations to deploy projects to minimize 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/drp/

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

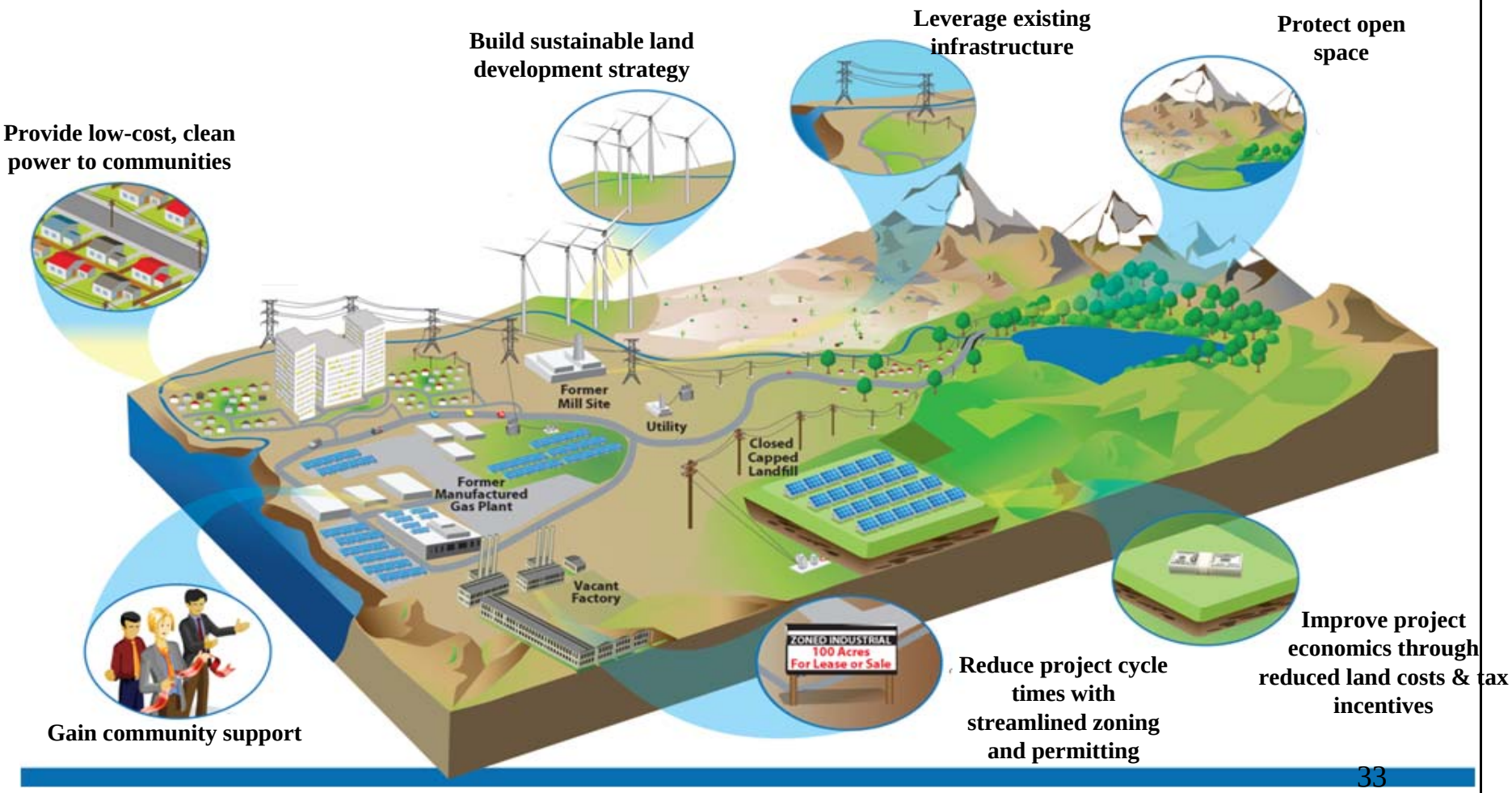
CALIFORNIA ENERGY COMMISSION

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?

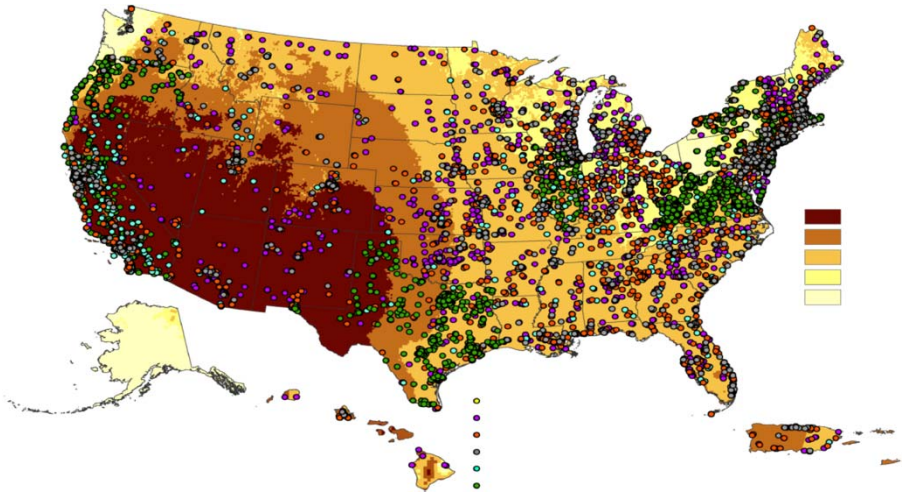


RE-Powering America's Land

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 listserve for newsletters & announcements

For More Information

Andria Benner (benner.andria@epa.gov)
(415) 972-3189
ZiZi Searles (searles.zizi@epa.gov)
(415) 972-3178
Karen Irwin (irwin.karen@epa.gov)
(415) 947-4116

Other Federal Resources

- US Department of Energy Technical Assistance Programs
  - http://energy.gov/eere/services/technical-assistance
- Department of Energy Guide to Community Energy Strategic Planning
  - http://energy.gov/eere/slsc/guide-community-energy-strategic-planning
- US Department of Agriculture (USDA) Grants
  - http://www.usda.gov/wps/portal/usda/usdahome?navid=GRANTS_LOANS

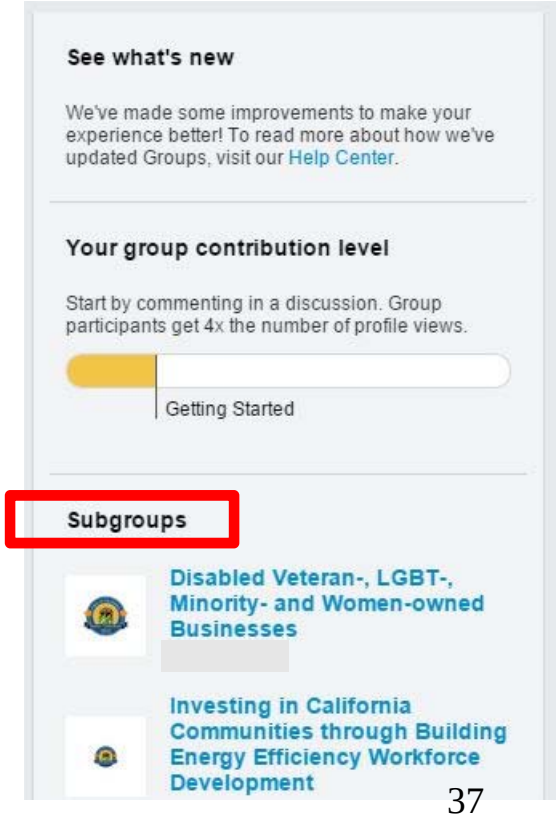
Connect with the Energy Commission!

…and the Energy Commission's listserves
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)
- Once there, find and join the desired solicitation subgroup.



Other Presentations

3:00 – 3:15	Case Study #1 – Community Scale Generation at the Chemehuevi Community Center
	Alfredo Martinez-Morales, University of California, Riverside
3:15 – 3:30	Case Study #2 – Zero Net Energy Homes and Apartments in Fontana and Lancaster
	Will Vicent and Ron Kliewer, Southern California Edison

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#09292015_victorville

Send any further comment and questions to
michael.sokol@energy.ca.gov