

Technology Resource Innovation Outreach

TRIO Symposium

June 10, 2014

Hosted by Southern California Gas Company



SoCalGas Technology Program Priorities



A. Y. Ahmed
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SoCalGas ETP Priorities

ETP - Gas Technologies

**Deep
Retrofits**

**Transform
HVAC
Markets**

**Zero Net
Energy**

Support for Integrated Solutions

Technical Feasibility

Specifications

Demonstrations

Behavior Impacts

Support for Efficiency Measures

Deemed

Custom



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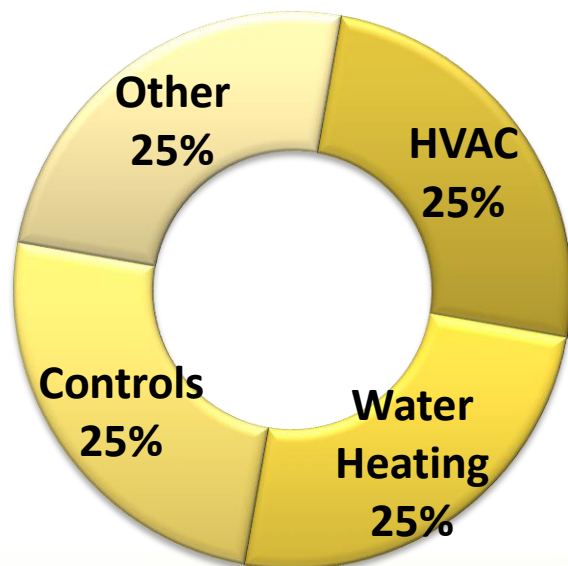
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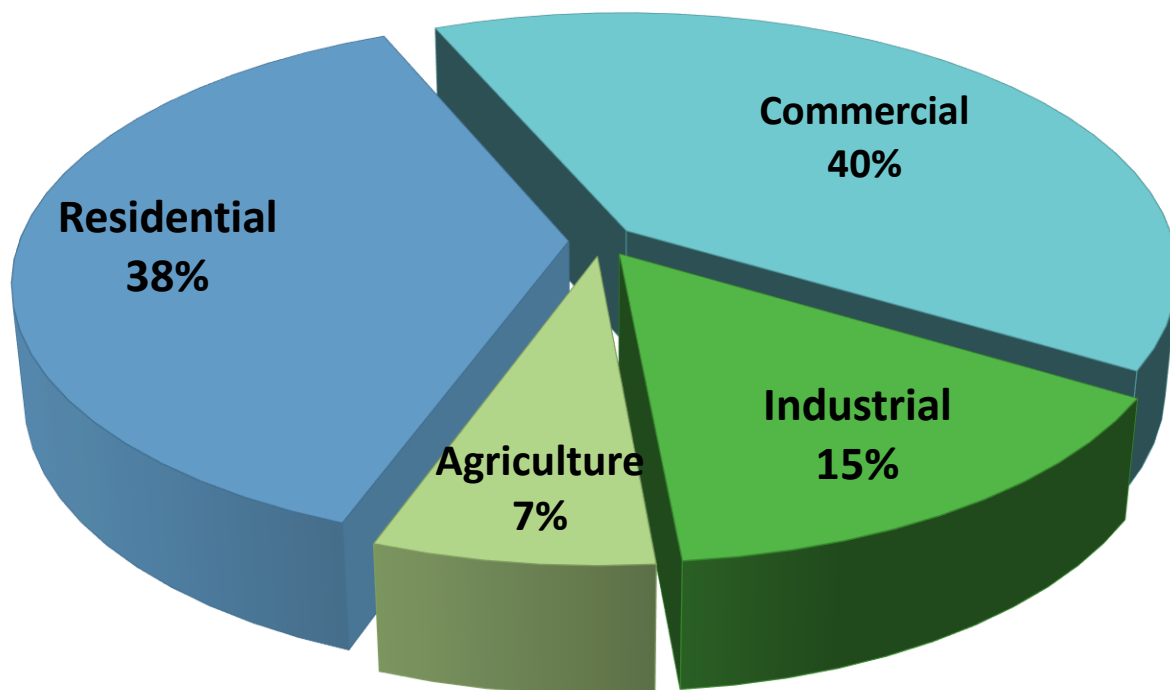
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2013-2014 Program Implementation Plan (PIP)

**ETP Funds
by End-Use**



**ETP Funds
by Segment**



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2013-2014 Cycle Deliverables

9 SoCalGas Measures (PIP Goal @ 2/Yr)

Energx VFD Controls for MF DHW Systems

(savings ~ 17 therms/year/MFR dwelling unit, typically 40 units/controller)



Recirculators

Residential HW Re-circulators

(savings ~5-10 therms/year/SFR Home)



Energx controller



i-O-Stat

i-O-Stat, A HVAC Fan Stop Delay

(savings ~0-15 therms/year/SFR Home)

Combo-system, SFR w/GTI

(savings ~40-100 therms/year/SFR Home)

Combo System



MF Sub-metering Technology

(savings 20-46 therms/year/MFR dwelling unit)

Gas Submeters



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2013-2014 Cycle Deliverables

9 SoCalGas Measures (PIP Goal @ 2/Year)

H₂AC, Restaurants w/GTI (savings ~220 therms/year Gas & 16,000 kwh/year in electric energy/10 Ton unit)



H₂AC



M2G, Commercial Space Heating
(savings 5-15%)

Hybrid Tankless Water Heater
(savings ~23 therms/year/SFR Home)



Hybrid
Tankless
Water Heater



Boiler Reset
Controllers



Boiler Reset Controls
(savings up to 70 Th/year/MFR dwelling unit, typically 40)

Projects in progress

EnergyStar fryers



EnergyStar Fryers - Market Transformation Assistance
(savings ~2,000 therms/year/unit, valued at \$6,000 including oil savings)

High E Wall Furnaces - Validate Savings
(savings ~20 therms/year/unit)



Lang stovetop



Lang Stovetop - Product Development
(savings ~15% or 30-200 therms/year/unit)

Pre-Rinse Spray Valves - Validate Savings & Market Constraints (savings ~6 therms & 166 gallons water/valve)



Pre-rinse spray valves

Hi-E
wall furnaces

ShowerStart



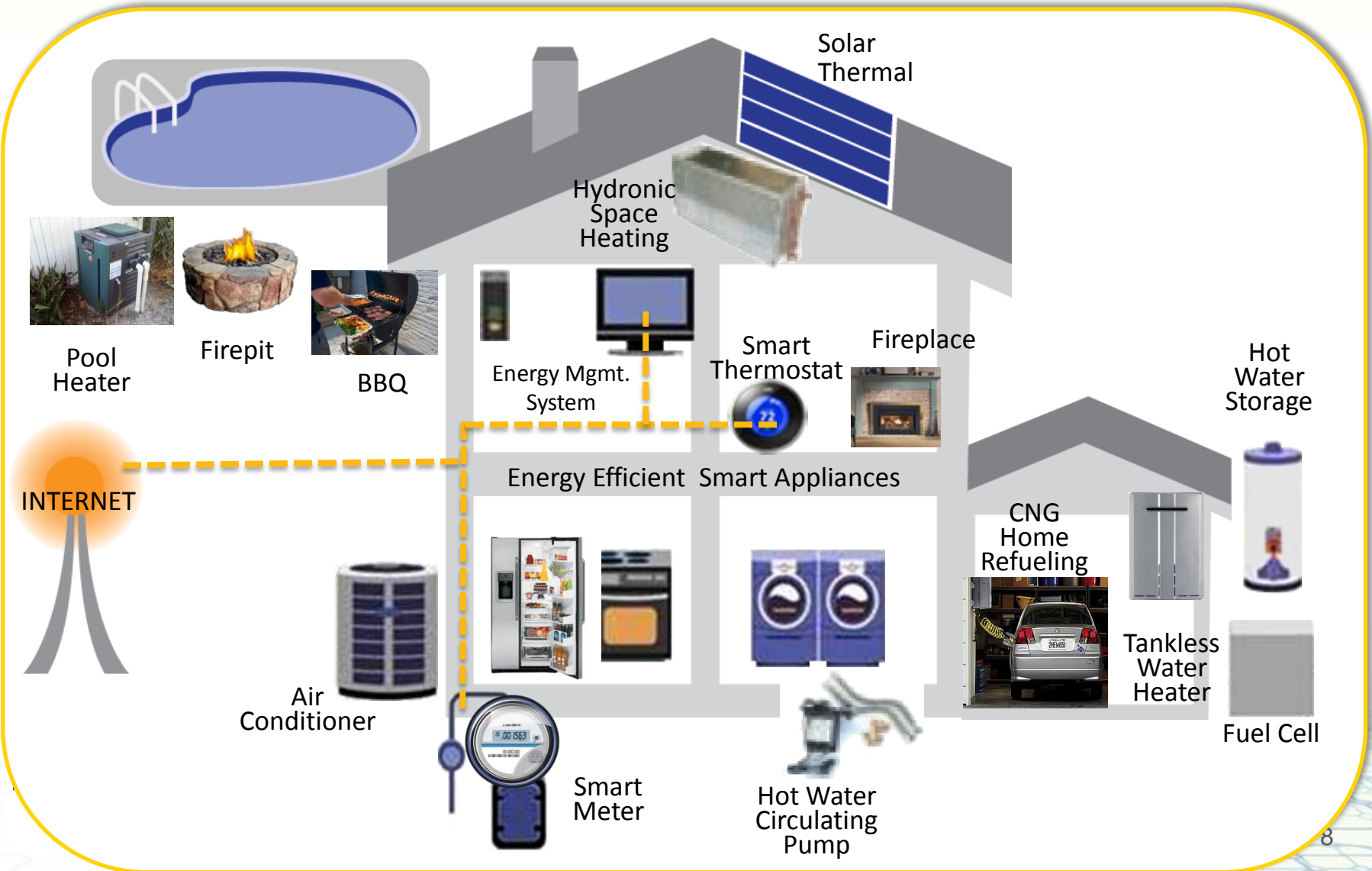
ShowerStart - Market Transformation Assistance
(savings ~2 therms/year/unit)



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Smart ZNE - Natural Gas Home



Forward Goals & Focus

Sectors

- Industrial
- Agriculture
- Commercial

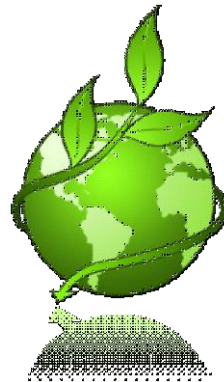


Technology

- Water / Energy Nexus
- Controls
- HVAC



RD&D



Cherif Youssef



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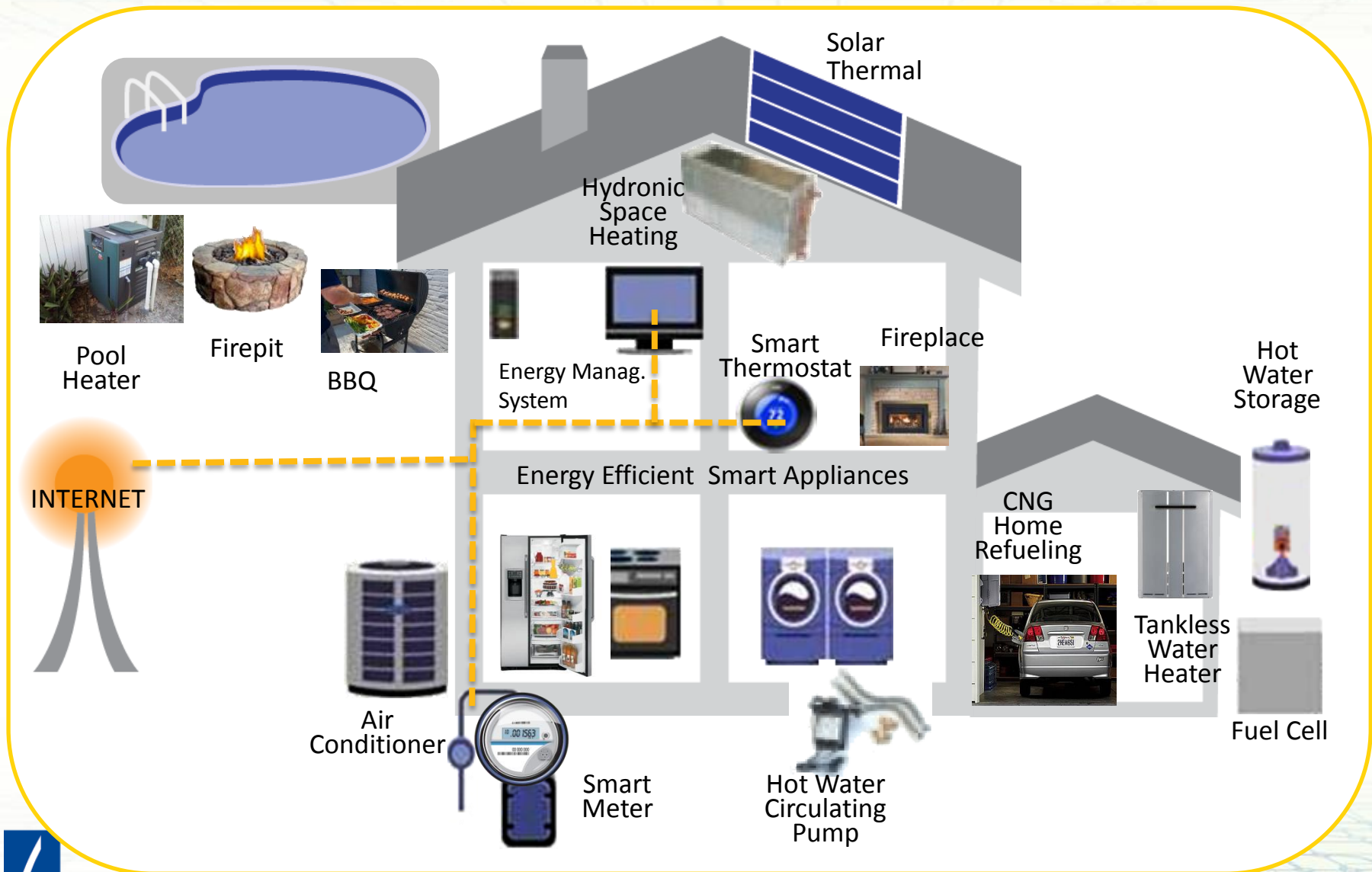
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Environmental & Regulatory Policies and Drivers

- » Improve Energy Efficiency for Customer End Use Equipment:
 - Reduce natural gas consumption by 23 million therms per year (2014).
 - Meet or exceeds Title 24 standards
- » Reduce Criteria Pollution: Comply with Federal 8-hour Ozone and PM 2.5 emission standards; Reduce NOx emissions
- » Reduce GHG Emissions: to 1990 level by 2020 (AB32), and 80% reduction from 1990 level by 2050
- » Additional emissions issues are getting greater focus by ARB and SCAQMD and could result in additional rules



Smart ZNE - Natural Gas Home



Residential Applications

Low NOx Water Heater



GHPWH

Tankless Water Heater



Low NOx Central Furnace



Home Refueling Appliance



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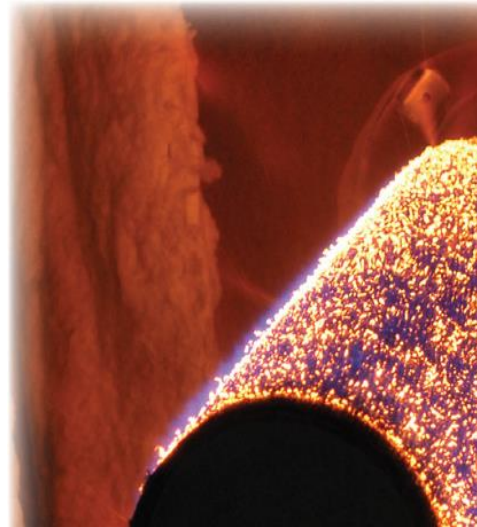
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Commercial / Industrial Applications

Cooking Equipment



Industrial Low NOx Burners

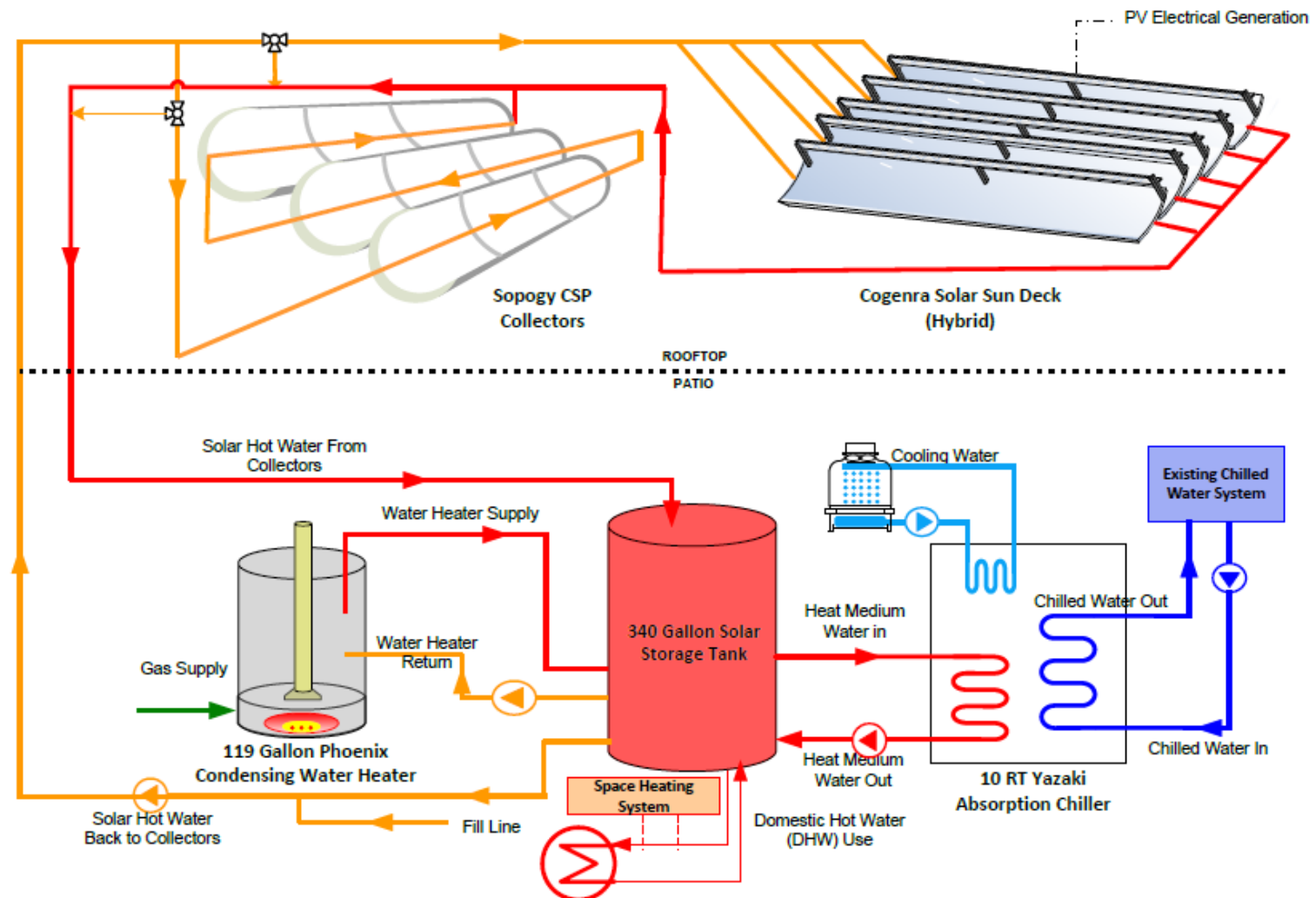


Boiler Waste Heat Recovery



Solar-Thermal Heating & Cooling

SOCALGAS ERC SOLAR COOLING & HEATING DEMONSTRATION PROJECT



Clean Generation – DG/CHP

Policy Drivers

AB 32

- GHG Reduction

ZNE

- 2020 Mandate Res.
- 2030 Mandate Comm.

Clean Air Act
Criteria Pollutants
(NO_x Reduction)

Increase Energy
Efficiency

Technologies

Microturbines

Fuel Cell

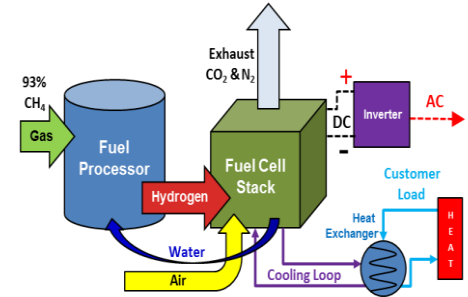
IC Engine

- Tecogen
- Cont. Controls

Waste Heat Recovery

- ORC

Stirling Engine

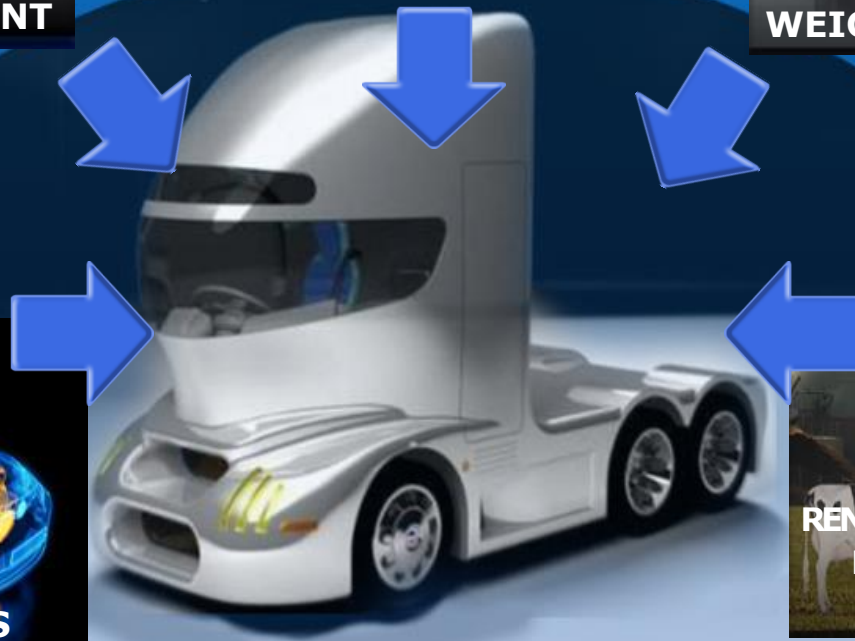


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Alternative Fuel HD Vehicles



**Heavy Duty
Trucks**



Locomotives



**Marine
Vessels**



Alternative Fuel MD/LD Vehicles

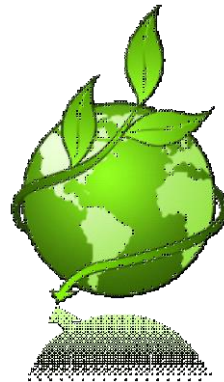


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Equity Investments



Kate Zeng



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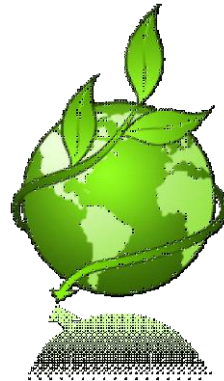


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SCG Equity Investment Program

- » Program was established thru regulatory proceeding in 1999 and funded by ratepayers as a subset of SCG RD&D program – SDG&E's RDD program was approved in 2008 GRC
- » Equity program purpose is to accelerate the development and market adoption of technologies that benefit utility customers or business operations and that advance Commission policy
- » Net profit sharing of 25/75 between shareholder/ratepayer in place for SCG and SDG&E program per CPUC 2012 GRC Decision for the current cycle thru 2015
- » Deals sourced through networking in CleanTech community and direct approach by companies aware of our program
- » Typically 1-3 deals per year, funding size \$250k to \$1-2 mm total for each company – no hard limit on investment but generally below 25% of total RDD funding
- » Decision on standard RDD projects versus equity versus combination (RDD projects with equity component) determined case by case
- » Key program benefit is insider insight into technology status and maturity
- » Total investments since inception: 21 companies, \$40.8 million, 9 companies remain active in current portfolio (3 SDG&E, 6 SCG)

CEC RD&D Program



Erik Stokes



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CEC RD&D Funding Programs: Research Programs Brings Innovation from Lab to Life

Erik Stokes

Virginia Lew

Energy Research & Development Division

California Energy Commission

TRIO Symposium

June 10, 2014



Agenda

- Electric Program Investment Charge
- Natural Gas RD&D Program

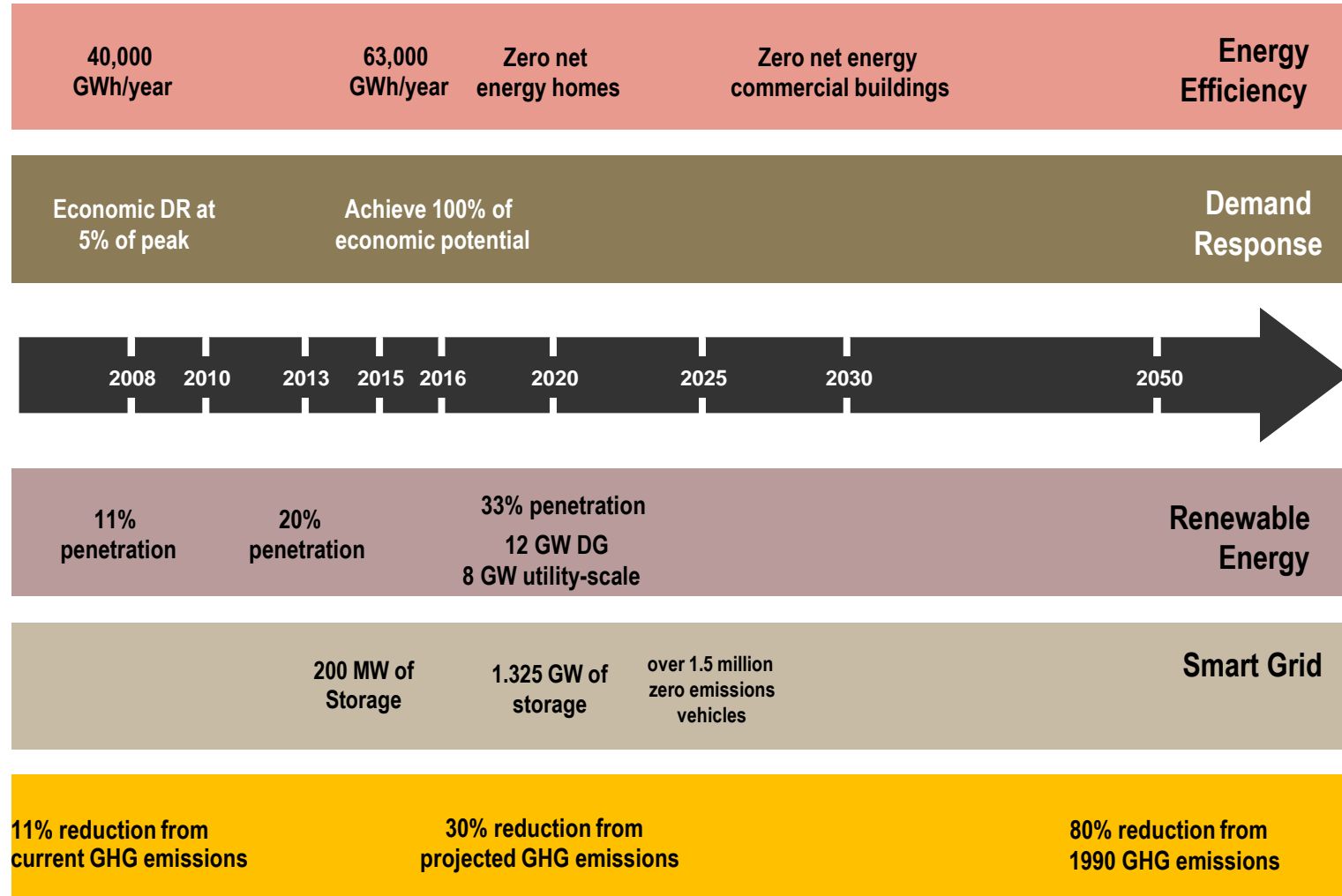


What is EPIC?

- The *Electric Program Investment Charge* addresses a significant gap in the area of emerging clean energy technology support.
- In May of 2012 the CPUC adopted D.12-05-037, establishing a framework to support the development and deployment of next generation clean energy technologies.
- This program, funded via the Electric Program Investment Charge, provides funds administered by the CEC, as well as the Investor Owned Utilities.

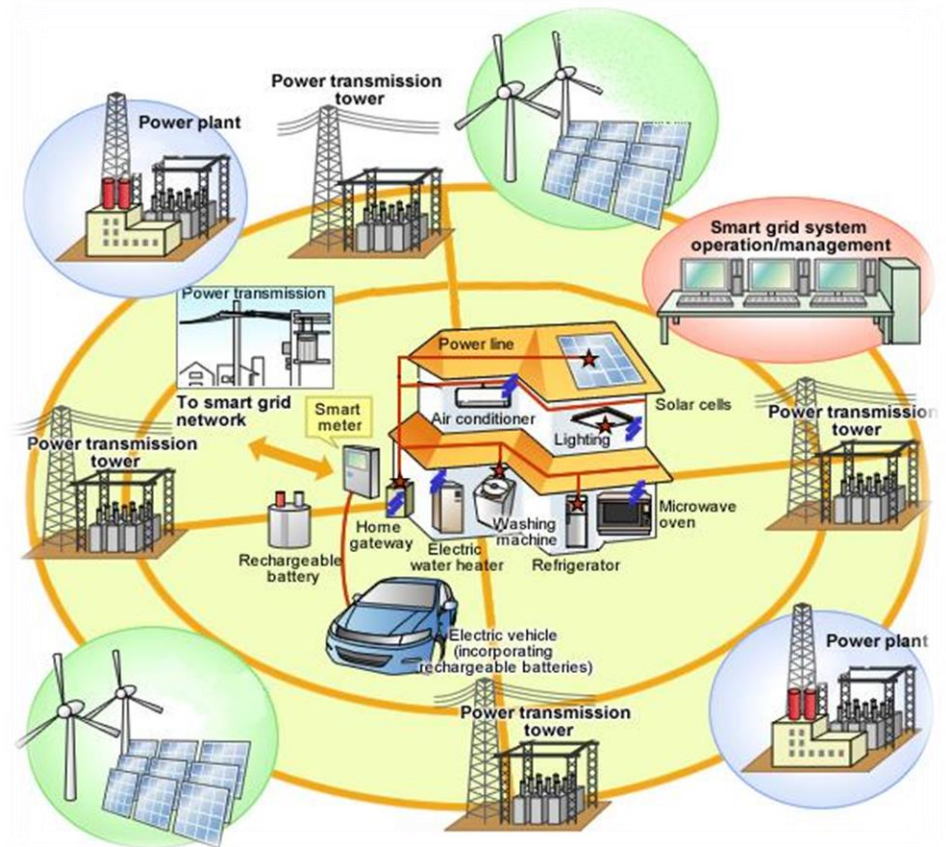
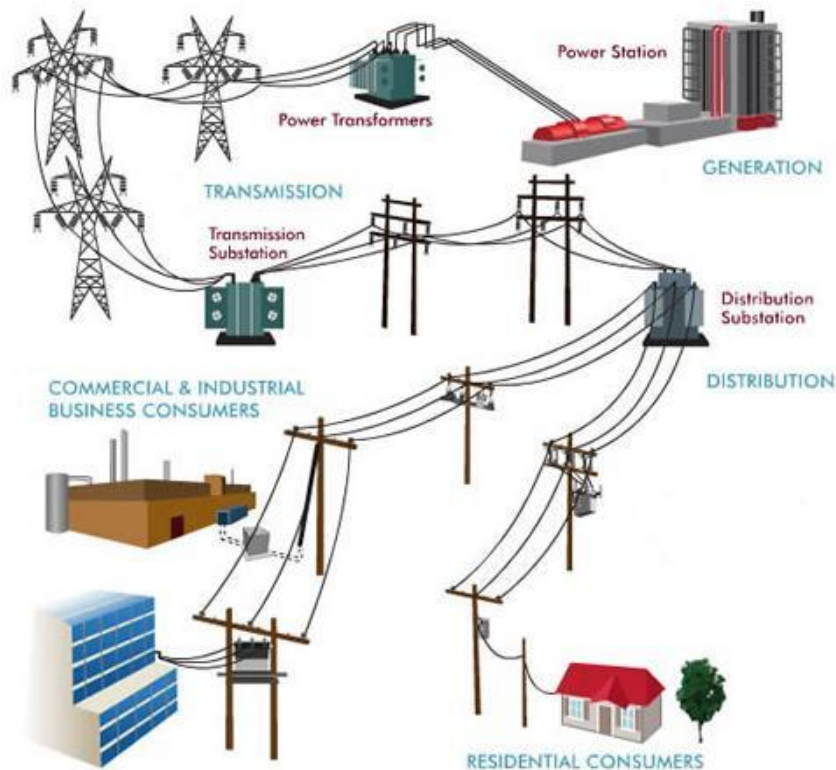


California Has Adopted Ambitious Energy Policies





These Policies Provide a Vision for the Future Electric Grid





Investments Will Fill Key Funding Gaps Within the Innovation Pipeline

Energy Innovation Pipeline





Current Status of the EPIC Program

- Energy Commission is currently implementing the 2012-14 Triennial Investment Plan.
 - Current Funding Opportunities:
<http://www.energy.ca.gov/contracts/epic.html>
 - Schedule of Upcoming Funding Opportunities
http://www.energy.ca.gov/research/upcoming_funding.html
- In April, 2014 the Energy Commission submitted the proposed 2015-17 Triennial Investment Plan to the CPUC.
- CPUC is expected to issue a decision on the 2015-17 Investment Plan in December, 2014.



Workshop on EPIC Grant Solicitation Process

- Public workshop scheduled for June 17th in Sacramento; others are planned for Southern California, Bay Area, and the Central Valley.
- Purpose: Assist potential applicants in understanding how to find and apply for EPIC grant funding opportunities from the California Energy Commission, and to serve as a forum for questions and answers relating to the general EPIC grant solicitation process
- <http://www.energy.ca.gov/calendar/index.php?eID=2117>



Applied Research and Development Three-Year CEC EPIC Budget Plan (2012 - 2014):

Funding Area	Amount (Millions)
Energy efficiency and demand response	\$64.7
Clean generation	\$44.0
Smart grid enabling clean energy	\$23.0
Innovation clusters	\$27.0
Cost share for federal awards	Up to 10%
Applied Research and Development Program Area Total	\$158.7



Technology Demonstration and Deployment Three-Year CEC EPIC Budget Plan (2012 - 2014):

Funding Area	Amount (Millions)
Emerging energy efficiency and demand-side management	\$37.3
Emerging clean energy generation technologies and deployment strategies, including \$27 million for bioenergy.	\$48.0
Energy smart community demonstrations	\$44.5
Federal cost share	Up to 10%
Technology Demonstration and Deployment Program Area Total	\$129.8



Market Facilitation

Three-Year CEC EPIC Budget Plan (2012 - 2014):

Funding Area	Amount (Millions)
Regulatory Assistance and Streamlining	\$23.3
Clean Energy Workforce Development	\$4.5
Market Assessment, Program Evaluation, and Stakeholder Outreach	\$15.5
Market Facilitation Program Area Total	\$43.3



Initiatives for Proposed 2015-17 EPIC Investment Plan

- The proposed funding initiatives are based on:
 - SB 96 (2013 Statute) and other relevant energy statutes and policies.
 - Stakeholder comments received.
 - Current knowledge of state-of-the-art technologies.
 - Existing RD&D efforts, including 2012-2014 EPIC Investment Plan.
 - Known barriers and gaps.
- Proposed funding initiatives incorporate:
 - CPUC EPIC defined program areas.
 - Guiding principles and electricity value chain.
 - Policy and other ratepayer benefits as described in CPUC EPIC decisions.
 - Greatest potential value proposition for ratepayers.



Applied Research and Development

- Energy Efficiency and Demand Response
 - *Strategic Objective 1.* Improve Energy Efficiency Technologies and Strategies in California's Buildings, Industries, Agriculture and Water Sectors.
 - *Strategic Objective 2.* Enable Cost-Effective Demand Response for California IOU Electricity Customers.
- Clean Generation
 - *Strategic Objective 3.* Develop Innovative Solutions to Increase the Market Penetration of Distributed Renewable and Advanced Generation.
 - *Strategic Objective 4.* Improve Power Plant Performance, Reduce Cost, and Accelerate Market Acceptance of Existing and Emerging Utility-Scale Renewable Energy Generation Systems.
 - *Strategic Objective 5.* Reduce the Environmental and Public Health Impacts of Electricity Generation and Make the Electricity System Less Vulnerable to Climate Impacts.



Applied Research and Development

- Smart Grid Enabling Clean Energy
 - *Strategic Objective 6.* Advance the Use of Smart Inverters as a Tool to Manage Areas with High Penetrations of PV.
 - *Strategic Objective 7.* Develop Advanced Distribution Modeling Tools for the Future Smart Grid.
 - *Strategic Objective 8.* Advance Customer Systems to Coordinate with Utility Communication Systems.
 - *Strategic Objective 9.* Advance Electric Vehicle Infrastructure to Provide Electricity System Benefits.
- Cross-Cutting
 - *Strategic Objective 10.* Advance the Early Development of Breakthrough Energy Concepts.
 - *Strategic Objective 11.* Provide Federal Cost Share for Applied Research Awards.



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.* Take Microgrids to the Next Level: Maximize the Value to Customers.
- *Strategic Objective 15.* Demonstrate Advanced Energy Storage Interconnection Systems to Lower Costs, Facilitate Market, and Improve Grid Reliability.
- *Strategic Objective 16.* Expand Smart Charging and Vehicle-to-Grid Power Transfer for Electric Vehicles.
- *Strategic Objective 17.* Provide Federal Cost Share for Technology Demonstration and Deployment Awards.



Market Facilitation

- *Strategic Objective 18.* Foster the Development of the Most Promising Energy Technologies into Successful Businesses.
- *Strategic Objective 19.* Facilitate Inclusion of Emerging Clean Energy Technologies into Large-Scale Procurement Processes.
- *Strategic Objective 20.* Accelerate the Deployment of Energy Technologies in IOU Territories Through Innovative Local Planning and Permitting Approaches.
- *Strategic Objective 21.* Inform Investments and Decision-Making Through Market and Technical Analysis.



Natural Gas RD&D Program

- Administered by the CEC with California Public Utilities Commission (CPUC) oversight.
- Provides \$24 million annually for R&D that benefits natural gas ratepayers.
- 2013/2014 Natural Gas Research Budget Plan submitted to the CPUC in March, 2013



Natural Gas 2013/2014 Budget

Areas	Proposed FY 2013/14 Natural Gas Budget
Energy Efficiency	\$8,541,000
Renewable Energy	\$3,000,000
Energy Infrastructure <ul style="list-style-type: none">• Natural gas pipeline integrity• Energy related environmental• Transportation	\$8,500,000



Natural Gas RD&D Program Funding Opportunities

- Schedule of Natural Gas RD&D Solicitations
http://www.energy.ca.gov/contracts/natural_gas_upcoming.html
- Energy Innovations Small Grant Program
<http://www.energy.ca.gov/research/innovations/index.html>



For More Information:

EPIC Website (workshops; funding opportunities; join mail list):
<http://www.energy.ca.gov/research/epic>

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THANK YOU!!!

PLEASE FILL OUT EVALUATIONS!



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