



Plug Load Energy Efficiency in the ZNE Picture Overview of California Energy Efficiency Vision



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Presentation Overview

- California Strategic Plan Big Bold Initiatives
- Plug Loads and ZNE
- CPUC/IOU activities
- CEC Activities
- Useful Links



Big Bold Energy Efficiency Strategies



(1) All new residential construction in California will be zero net energy by 2020

(2) All new commercial construction in California will be zero net energy by 2030

(3) Heating, Ventilation, and Air Conditioning (HVAC) industry will be transformed to ensure that its energy performance is optimal for California's climate



(4) All eligible low-income customers will be given the opportunity to participate in the low energy efficiency program by 2020



2013 IEPR ZNE Building Definition

*“A ZNE Code Building is one where the **net of the amount of energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building**, at the level of a single “project” seeking development entitlements and building code permits, measured using the California Energy Commission’s Time Dependent Valuation (TDV) metric. **A ZNE Code Building meets an Energy Use Intensity value** designated in the Building Energy Efficiency Standards by building type and climate zone that reflects best practices for highly efficient buildings.” (IEPR 2013).*

In other words... **A ZNE (Code) Building**

Accomplishes deep Energy Efficiency (and DR) first

Then produces as much onsite renewable energy in the course of a year as it consumes (measured using TDV).

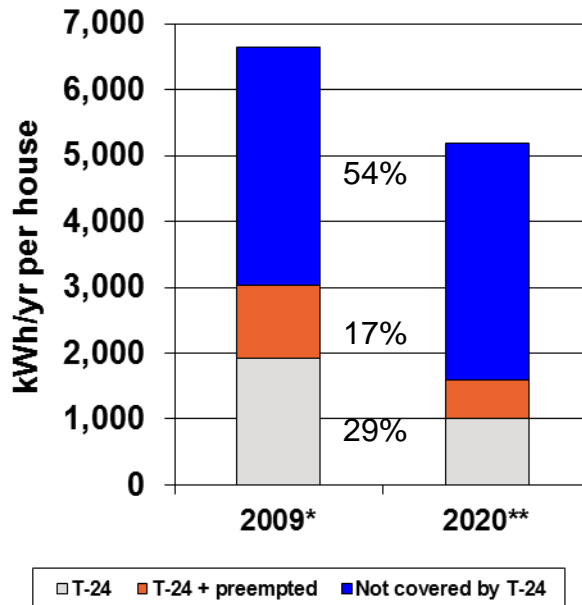
Does not imply zero utility costs



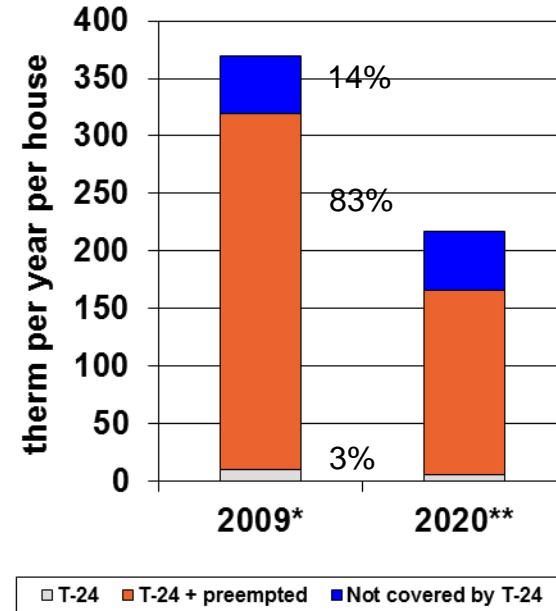


Plug Loads are Key....

Electricity Consumption



Natural Gas Consumption



* Data for single family home built after 2001. Source: 2009 Residential Appliance Saturation Survey

** Projects cumulative 52% reduction in T-24 loads by 2020





Electricity End-uses

Over half of home electricity consumption not covered by T-24

End-Use	kWh/yr	
Not covered by T-24	3,612	
Dryer	187	
Clothes Washer	109	
Dish Washer	73	
First Refrigerator	707	
Additional Refrigerator	313	
Freezer	138	
Range/Oven	105	
Television	645	
Microwave	122	
Home Office Equipment	17	
Personal Computer	602	
Well Pump	28	
Miscellaneous	568	
T-24 + Preempted	1,106	
Conv. Space Heating	37	
Heating	13	
Aux Space Heating	0	
Central Air Conditioning	876	
Room Air Conditioning	47	
Water Heating	133	
T-24	1,927	
Furnace Fan	164	
Attic Fan	14	
Evaporative Cooling	43	
Solar Water Heating	0	
Pool Pump	234	
Spa	25	
Outdoor Lighting	284	
Spa Electric Heat	28	
Lighting	1,136	
Total	6,645	

54%

10%

29%

Natural Gas End-uses

End-Use	Therm/yr	%
Not Covered by T-24	51.4	
Dryer	16.2	
Range/Oven	31.7	14%
Miscellaneous	3.5	
T-24+ preempted	309.0	
Primary Heat	175.8	83%
Conv. Gas Water Heat	133.2	
T-24	10.2	
Pool Heat	5.6	
Spa Heat	2.9	3%
Auxiliary Heat	1.6	
Total	370.5	

Not Covered by T-24

Plug loads are installed after building inspection and are not covered by T-24

T-24 + Preempted

T-24 is preempted from requiring higher equipment efficiency but T-24 can impact the loads on equipment (envelope eff, controls etc.)

Covered by T-24

Loads and equipment efficiency can be regulated by T-24

* 2009 Residential Appliance Saturation Survey

Source: McHugh Energy Consultants





CPUC/IOU activities





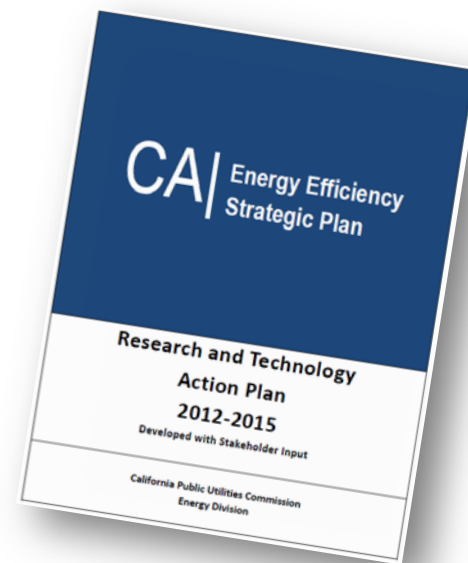
CPUC / IOU Plug Load and Appliances Activities 2013-14

- IOU incentive Programs
 - Clothes Washers/Dryers
 - Refrigerators
 - Pool Pumps
- IOU pilots
 - SCE: Set-Top Boxes
 - PG&E: Plug Load Whole Store Trial
- Emerging Tech projects
 - Assessments
 - Market studies
 - Scaled Field Placements
 - Demonstrations
 - How to do business with IOUs
- Emerging Technologies Coordinating Council (ETCC)
- Studies
 - Plug Load Energy Consumption Study
 - Residential Solution Workbook: Clothes Dryers; Pool Pumps; Advanced Power Strips; Space Heaters; Audio/Video; and Computing products





Research and Technology Action Plan



Goal 1

Create demand pull and research agenda for incremental and game changing EE technologies

Goal 2

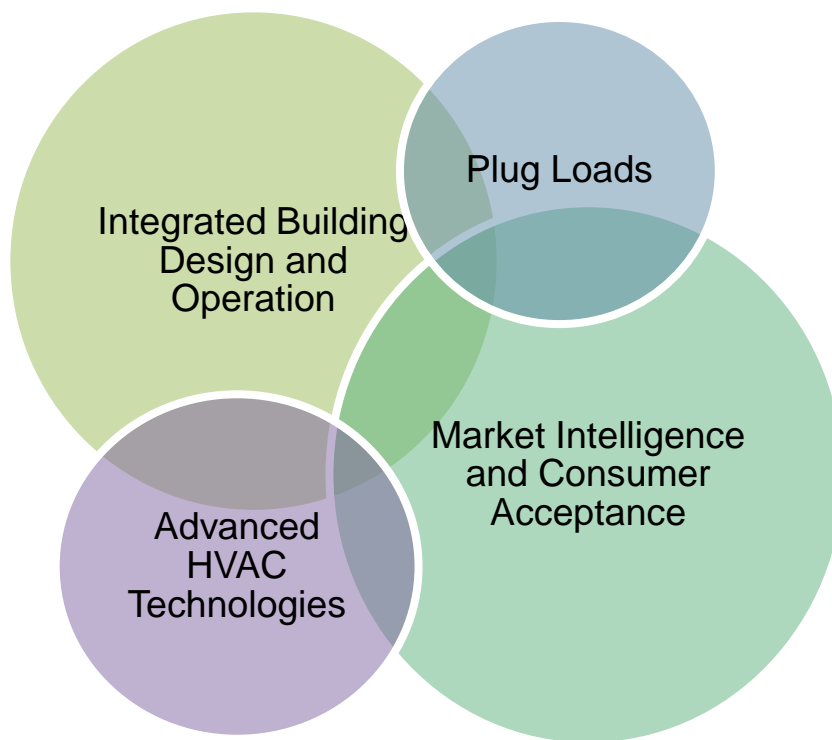
Targeted Emerging Technologies to support Strategic Plan





R&T Action Plan Areas

- Plug Loads were identified as one of the key focus areas of the Research and Technology Action Plan due to key role in achieving ZNE goals





R&T Plug Loads Chapter

- Vision

- Research and energy efficient devices will be developed to reduce Plug Load consumption in Residential and Commercial Buildings to reach 2020 and 2030 ZNE goals and technology advances will form the basis of future Plug Load Standards.

- Strategies:

- Form partnerships to increase availability and adoption of energy efficient plug load solutions
- Targeted R&D to achieve even higher efficiency in appliances





CEC activities





Energy Commission Updated Title 20 Appliance Rulemaking schedule

Category Draft Regulations Released

- Faucets, Toilets, Urinals
- Air Filters, Dimming Ballasts
- LED lamps, MR lamps
- Pool Pump motors*, Portable electric spas*
- Computers, Monitors, and Displays
- Network Equipment*
- Game Consoles
- Commercial Clothes Dryers*

April 2014

April 2014

May 2014

August 2014

November 2014

February 2015

February 2015

February 2015



Prioritized Due to Potential Savings

- Reduced water consumption of 50 billion gallons per year (5 billion gallons from toilets and urinals and 45 billion gallons from faucets)
- Peak electricity reduction of 1,400 megawatts
- Energy savings of 9,800 gigawatt----hours per year
- Natural gas savings of 162 million therms per year



*The schedule for these products may be revised based on feedback





Electric Program Investment Charge (EPIC) Program

- The Electric Program Investment Charge (EPIC) is designed to assist the development of non-commercialized new and emerging clean energy technologies in California, while providing assistance to commercially viable projects.
- CPUC found that each of the first triennial investment plans offer a reasonable probability of providing electricity ratepayer benefits by promoting greater reliability, lowering costs, and increasing safety.
- Projects should be selected for award of EPIC funding on a competitive basis unless the administrators have specifically detailed and justified exceptions to this in their approved investment plans. PRC § 25711.5 requires competitive bidding to be the preferred method for the CEC to award EPIC funds and imposes specific requirements.
- EPIC administrators are required to report the use of non-competitive awards in their annual reports to the Commission.





EPIC Program is now Live

- On November 1, 2012, each of the Program Administrators submitted their respective initial triennial investment plans to the CPUC for consideration
- The investment plans were modified and approved in Decision 13-11-025 on November 14, 2013.



Open funding opportunities

- Developing Advanced Energy Storage Technology Solutions to Lower Costs and Achieve Policy Goals ([PON-13-302](#))
- Developing a Portfolio of Advanced Efficiency Solutions: Technologies and Approaches for More Affordable and Comfortable Buildings ([PON-13-301](#))

\$6 million

\$25 million





Useful links

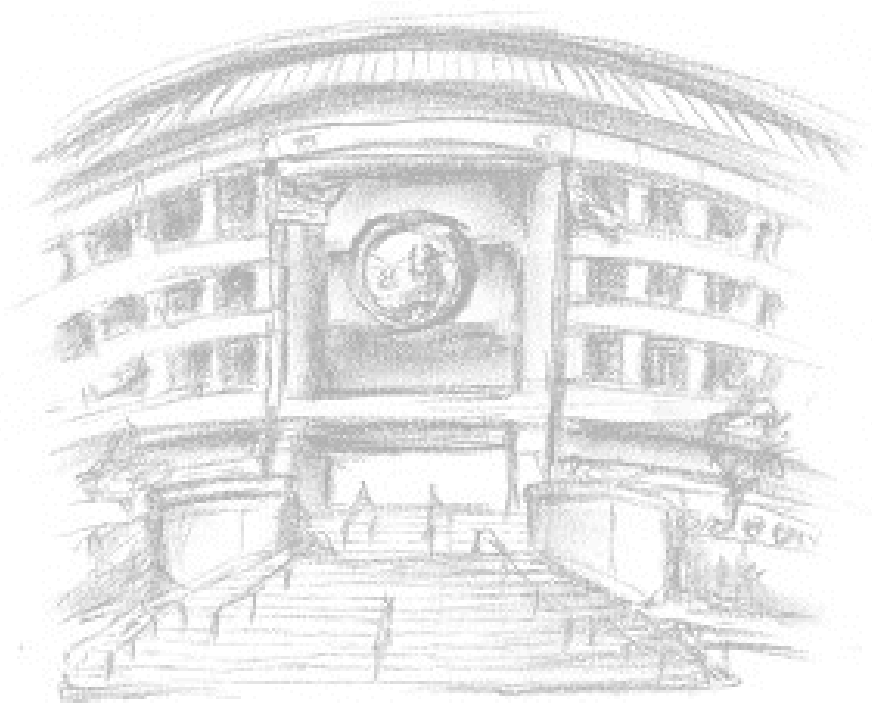
- CPUC Energy Efficiency Portal: www.cpuc.ca.gov/ee
- CPUC Data Portal: <http://eestats.cpuc.ca.gov/Default.aspx>
- CPUC Strategic Plan:
<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/eesp/index.htm>
- Research and Technology Action Plan: <http://calenergyactionplan.net/>
- CEC EPIC: <http://www.energy.ca.gov/research/epic/index.html>
- Emerging Technologies Coordinating Council: www.etcc-ca.com

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Thank you!





CEC Appliance Standards OIR

Topic	Phase 1: Short Term (2 nd Qtr 2012 – 2 nd Qtr 2013)	Phase 2: Mid Term (2 nd Qtr 2013 – 2 nd Qtr 2014)	Phase 3: Long Term (2 nd Qtr 2014 – 2 nd Qtr 2015)
Consumer Electronics	Displays; Game consoles; Computers; Set-top boxes	Servers; Imaging equipment	Low power modes; Power factor
Lighting	Dimming ballasts; Multi-faceted reflector (MR) lamps; Light-emitting diode (LED) lamps	EISA exempt lamps; Lighting accessories; Outdoor lighting	Linear fluorescent fixtures;
Water and Other	Commercial clothes dryers; Toilets and urinals; Air filter labeling; Faucets; Amend pools and spas standards Water meters	Plug-in luminous signs; Irrigation equipment	Commercial dishwashers; Recirculation pumps; Refrigeration condensing units

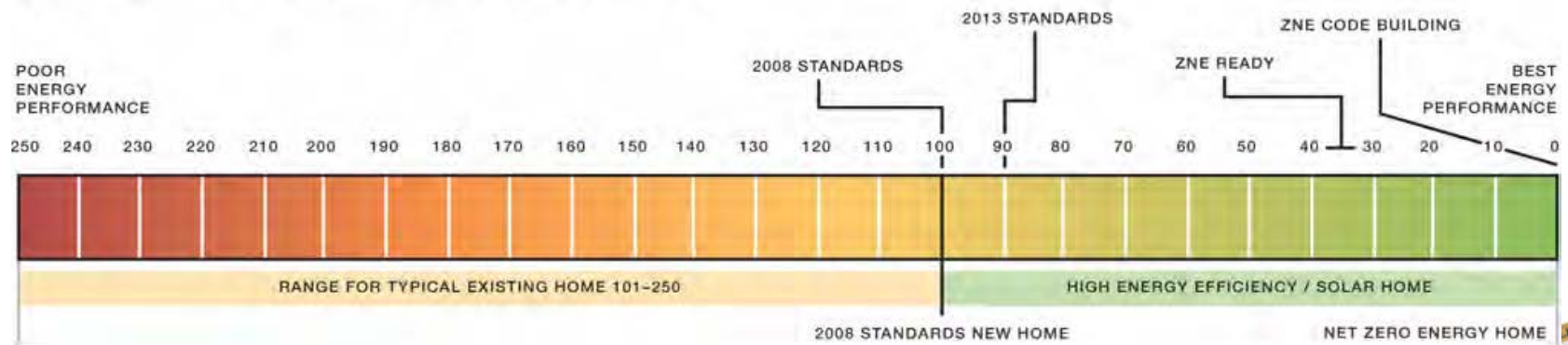




Off-site Renewables and ZNE Ready (IEPR 2013)

- Recognizes that full onsite renewables for ZNE infeasible in some situations
 - Need for meaningful flexibility and specific exceptions
 - Need for development entitlements for off-site renewable energy resources
 - **Must be enforceable by applicable enforcement agency and enable tracking and matching to specific buildings claiming offset**
 - Consider as part of CPUC ZNE Res Working Group?

CALIFORNIA HOME ENERGY RATING CERTIFICATE



EPIC Funding for 2012-2014 Investment Plans

Funding Element	CEC	Utilities	CPUC	Total (\$ Millions)
Applied Research	\$55.0	-	-	\$55.0
Technology Demonstration and Deployment	\$45.0*	\$30.0	-	\$75.0
Market Facilitation	\$15.0	-	-	\$15.0
Program Administration	\$12.8	\$3.4	-	\$16.2
Program Oversight	-	-	\$0.8	\$0.8
Total (\$ Millions)	\$127.8	\$33.4	\$0.8	\$162.0

- *A minimum of 20% of the CEC's funding for technology demonstration and deployment must be used for bioenergy projects
- The figures above will be adjusted on January 1, 2015 commensurate with the average change in the Consumer Price Index, specifically the Consumer Price Index for Urban Wage Earners and Clerical Workers for the third quarter, for the previous three years.





EPIC Program- Funding by each PA

Program Administrators 2012-2014 Triennial Investment Plan Program Budget Allocations (in \$ Millions)				
Program Administrator	2012	2013	2014	Total
CEC	113.1	127.8	127.8	368.7
PG&E	15.1	17.1	17.1	49.3
SCE	12.2	14.1	14.1	40.4
SDG&E	2.6	3.0	3.0	8.6
Total	143.0	162.0	162.0	467.0

The figures above will be adjusted on January 1, 2015 commensurate with the average change in the Consumer Price Index, specifically the Consumer Price Index for Urban Wage Earners and Clerical Workers for the third quarter, for the previous three years.

