



California Energy Commission

Facing California's Energy Challenges

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California Energy Commission

Responsibilities

- **Forecasting**: Forecasts future energy needs and maintains historical energy data
- **Energy Efficiency**: Promotes energy efficiency by setting the state's appliance and building standards (Title 20 & 24)
- **Contingency Planning**: Plans for and directs the State's response to energy emergencies
- **Permitting**: Permits thermal power plants 50 megawatts (MW) or larger
- **PIER**: Administers the Public Interest Energy Research (PIER) program, advancing science and technology in energy related fields
- **Transportation**: Supports the deployment of alternative and renewable fuel sources
- **IEPR**: Publishes the Integrated Energy Policy Report (IEPR) – provides strategies and recommendations to further the state's goal of ensuring reliable, affordable, and environmentally responsible energy sources.
- **Renewable Energy**: Supports the development of renewables through incentives authorized by the Public Goods Charge



California's Leading Environmental Goal

GHG Emissions Reduction Energy Measures (AB 32 – 2006)

- Cap & Trade
- Low Carbon Fuel Standard
- Combined Heat & Power
- Energy Efficiency
- Renewable Portfolio Standard (RPS) – 33%
- Alternative & Renewable Fuel & Vehicle
Technology Program (Assembly Bill 118)



Contingency Planning

Planning for System Reliability without San Onofre

- Local generation is essential to serve all consumers in the Los Angeles Basin and San Diego area
- The CAISO must plan for eastern transmission and generator losses in San Diego
- San Diego's reliability is dependent upon imported electricity from Huntington Beach units 3 & 4





Contingency Planning

Example: San Onofre Nuclear Generating Station Outage



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- Statewide Planning Studies



CA Independent Systems Operator

- Operational Studies



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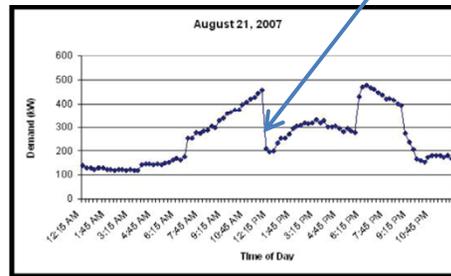
California ISO
Shaping a Renewed Future



Office of the Governor



California Public Utilities Commission



CA Public Utilities Commission

- Demand Response
- Flex Alert Campaign



System Reliability Issue

- San Onofre Nuclear Generating Station (SONGS) Summer 2012 Outage

Supply & Demand Management Actions

- Return Huntington Beach units 3 & 4 to service
- Accelerate Barre-Ellis transmission upgrade
- Complete Sunrise transmission line and related outage planning
- Fully fund Flex Alerts
- Fully utilize available demand response
- Seek additional military and public agency demand response
- Ensure that existing generation is well-maintained and available



**ZERO NET
ENERGY**



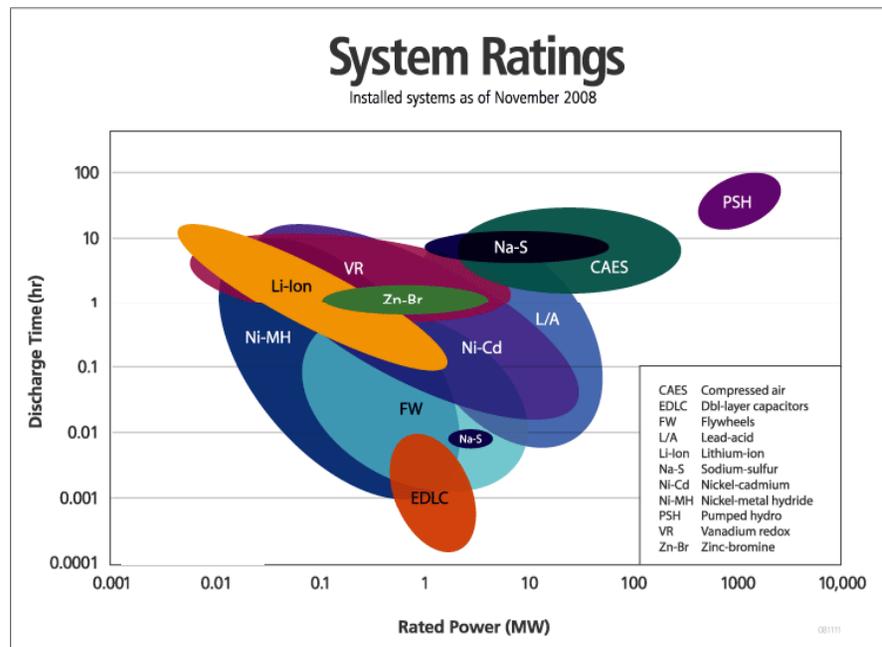
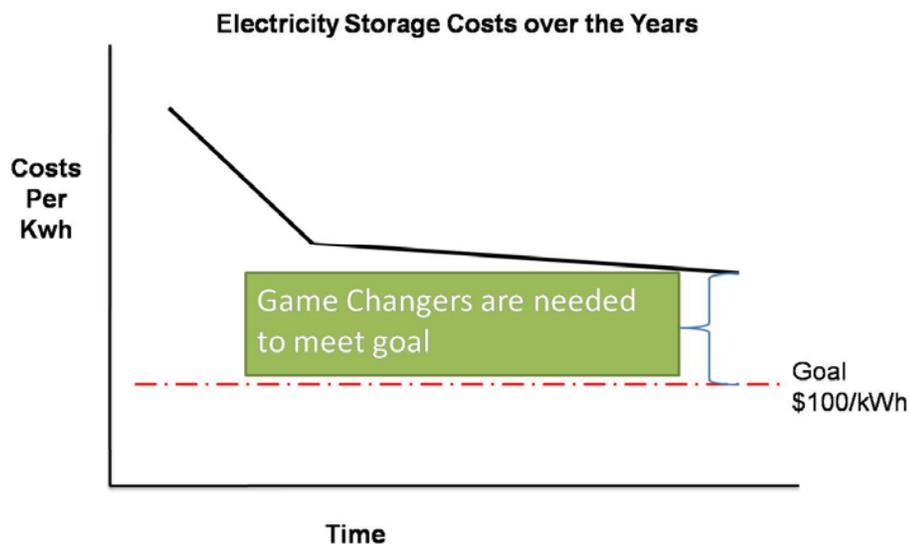
Achieving California's Energy Goals

Challenges & Potential Solutions



Variable Renewable Energy Sources

Energy Storage



- Cost and regulations are barriers to greater use of storage
- In June 2012, Federal Energy Regulatory Commission issued a Notice of Proposed Rulemaking to revise the Commissions current accounting and reporting requirements to support energy storage assets
- Storage combined with Demand Response may offer a less expensive solution
- Needs both breakthroughs and economies of scale



Zero Net-Energy (ZNE)

2013 New Building Standards a Step Toward ZNE

CALIFORNIA'S 2013 — RESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS

CALIFORNIA ENERGY COMMISSION

For nearly 35 years, the California Energy Commission has saved Californians more than \$66 billion in electricity and natural gas savings through energy efficient building and appliance standards. These standards include better windows, insulation, lighting, air conditioning systems and other features that reduce energy consumption in homes and businesses. Since 1978 these standards have helped protect the environment by reducing more than 250 million metric tons of greenhouse gas emissions (or the equivalent of removing 37 million cars off California roads).

\$6,200 SAVINGS OVER A 30 YR. MORTGAGE | INITIAL COST \$2,290

Title 24: 2013 New Building Standards

- Adopted May 31st, 2012
- Included “Solar ready roof” – good step toward ZNE
- Need to accelerate energy savings from building components regulated under Title-24 to reach ZNE goal

RECOMMENDED



WHOLE HOUSE FAN

Displaces warm air with cool outside air on cool summer nights.



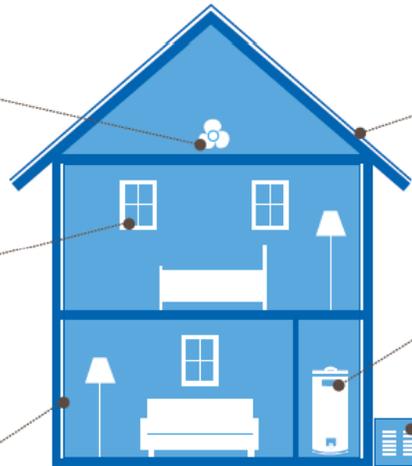
IMPROVED WINDOWS

Improved windows keep the sun's heat out of your home during hot summer months and keep warm air in during winter months improving comfort and reducing energy consumption.



INSULATED WALLS

Better insulation reduces heating and cooling costs while improving comfort at home.



These are cost effective measures that home builders may consider to achieve new levels of efficiency. They can be traded for other efficient technologies such as higher efficiency HVAC units, higher efficiency water heaters, etc.

REQUIRED



SOLAR-READY ROOF

Makes space available on rooftops for easier installation of optional photovoltaic or solar thermal panels at a future date.



HOT WATER PIPE INSULATION

Pipe insulation improves the overall energy efficiency of a home's hot water system. This means that homeowners can get hot water quicker without wasting gallons of water by running the tap.



VERIFY AIR CONDITIONER INSTALLATION

Improper installation of your cooling system reduces its efficiency. Having the installation verified by an independent inspection guarantees your air conditioner will operate as efficiently as designed. This improves comfort and reduces the home's energy use.

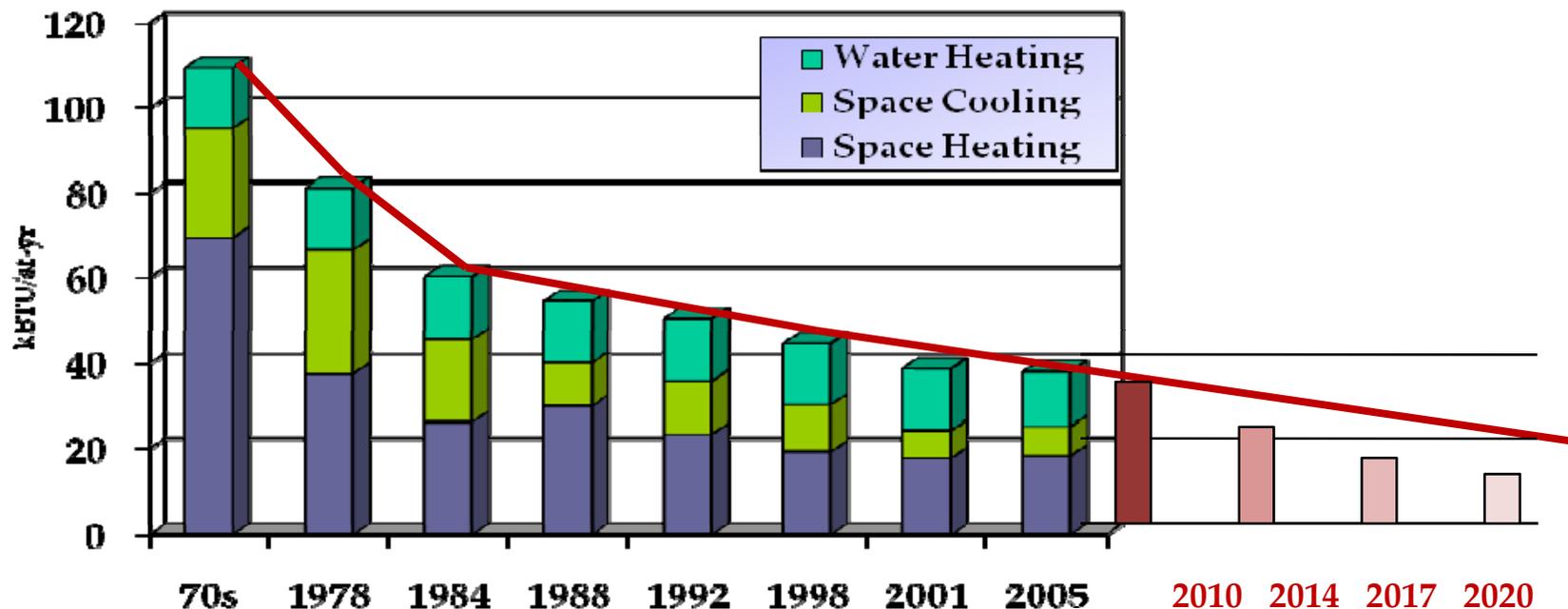


Zero Net-Energy (ZNE)

New Residential Buildings by 2020

Title 24: 2017 & Beyond New Building Standards

- Quality Insulation Installation
- Further improve attic efficiency (e.g. raised heel trusses)
- Further reduce wasted hot water (e.g. designed plumbing systems)
- More options to use PV for code compliance
- Heating/Cooling fault detection reporting via communicating T-stats?
- Ductless heating & cooling systems?
- Plug load management?





Plug Load Management

New Residential Buildings by 2020

Title 20: Appliance Building Standards

- Battery Charger Standards:
 - The average California home has approximately 11 battery chargers.
 - This number is expected to grow substantially.
- What Appliances & What Level of Efficiency?
 - Computers and Servers?
 - Set Top Boxes?
 - Refrigeration/Condensing Units?
 - LED Lamps & Outdoor Lighting?

Nearly Two-Thirds of Annual U.S. Set-Top Box Energy Use Occurs When Viewers are Not Watching or Recording Content



RESULTS IN...

Electricity Consumption:
3 Power Plants (500 MW each)
Emissions:
5 Million Metric Tons CO₂/year
Cost to Consumers:
\$1 Billion/year

RESULTS IN...

Electricity Consumption:
6 Power Plants (500 MW each)
Emissions:
11 Million Metric Tons CO₂/year
Cost to Consumers:
\$2 Billion/year

In Use = watching or recording a show

Not In Use = not watching or recording a show





Overcoming Technological Barriers

Research & Development to Achieve ZNE

Examples of PIER program research conducted to achieve ZNE for residential buildings :

- **Piping and Water heating research (\$10 million)**
 - Recommended changes of air distribution duct standard designs are intended to match standard designs with multi-family building physical constraints and, therefore, they will not trigger any building practice changes and cost increase.
- **Battery Charger research (\$306 million)**
 - The Energy Commission's research partners including UC-Irvine, Electric Power Research Institute, Ecova (formerly Ecos) and Lawrence Berkeley National Laboratory are conducting plug load research in order to devise load management systems for products, such as battery chargers.
- **Evaluation of the results from previous building standards to determine additional areas for future standards**
 - These evaluations determine what further cost-effective improvements are needed based on actual building operations.

