Meeting Stretch Goals for Energy Efficiency

California's 2009-2020 Strategic Plan

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2009-2020 Energy Efficiency Strategic Planning Process
California Public Utilities Commission

ACEEE Market Transformation Conference – March 31, 2008

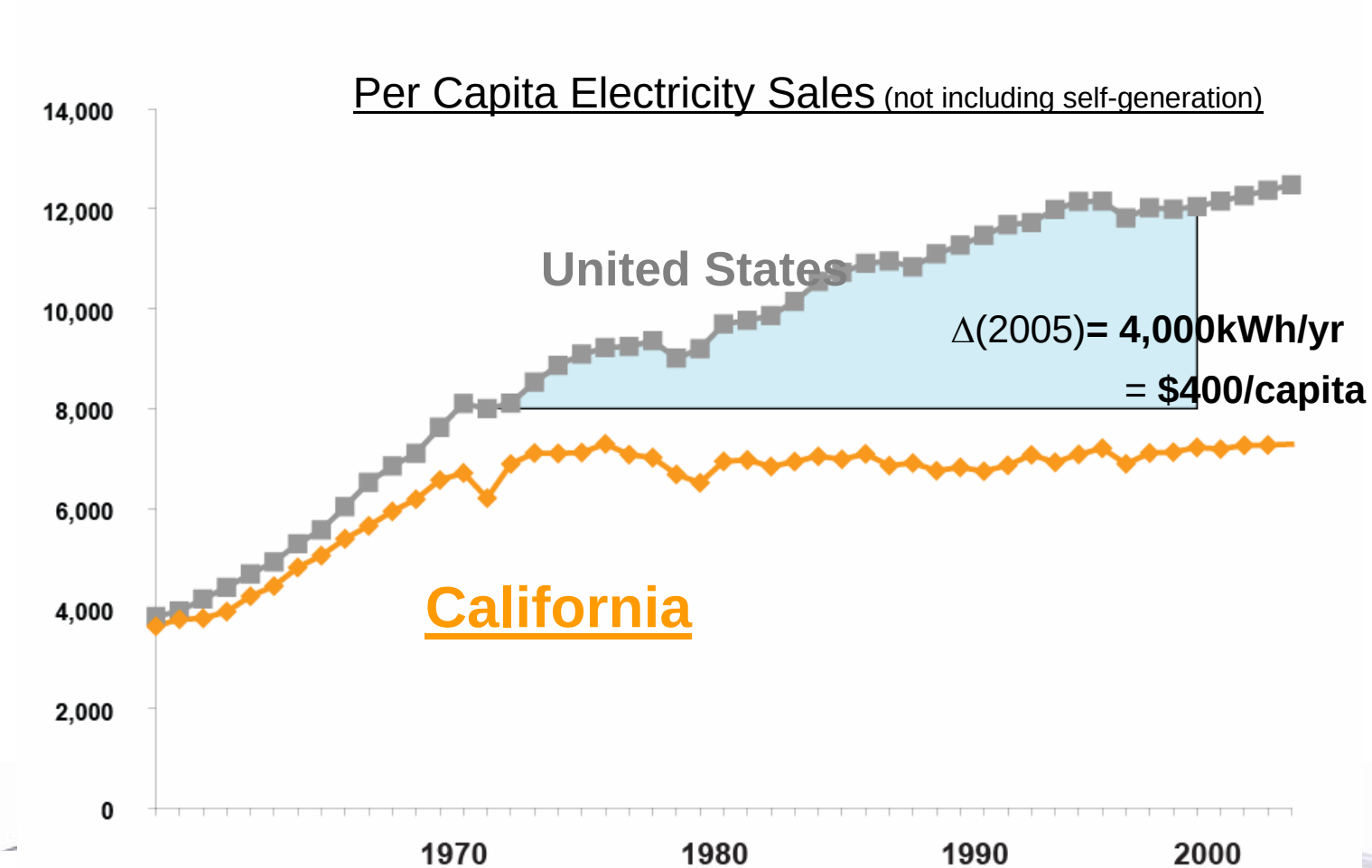
Organization of talk~

- Where we've been
- Can we go further?
- Adopting "Big Bold" Targets
- Links to AB32 (statewide GHG goals)

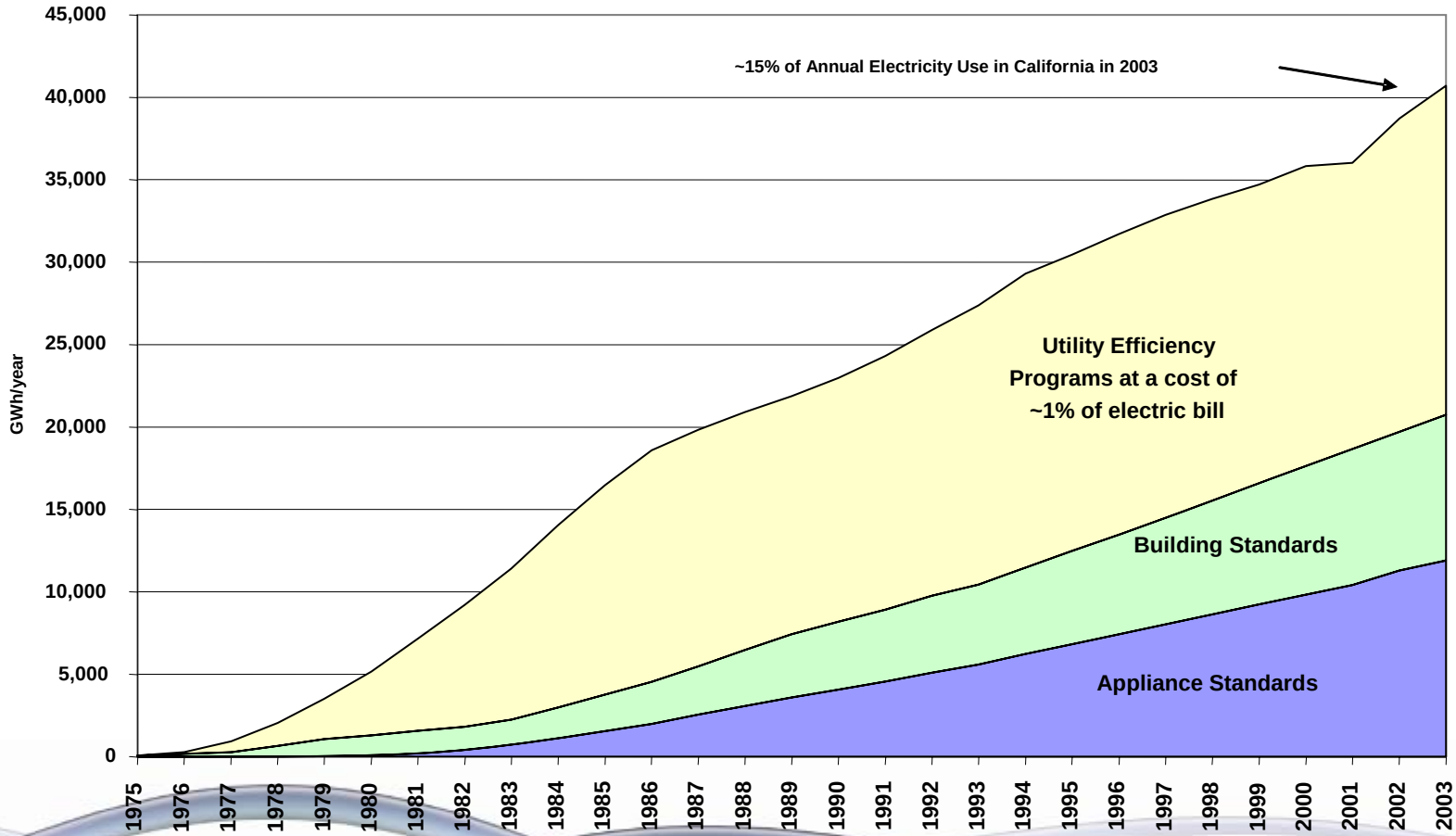
Where we've been & are now

- Tremendous efficiency savings- mostly codes & standards, some utility programs
- Range of program types, administered by utilities
- But… most savings still from simple lighting direct install, rebate or give away programs

Electricity use in California



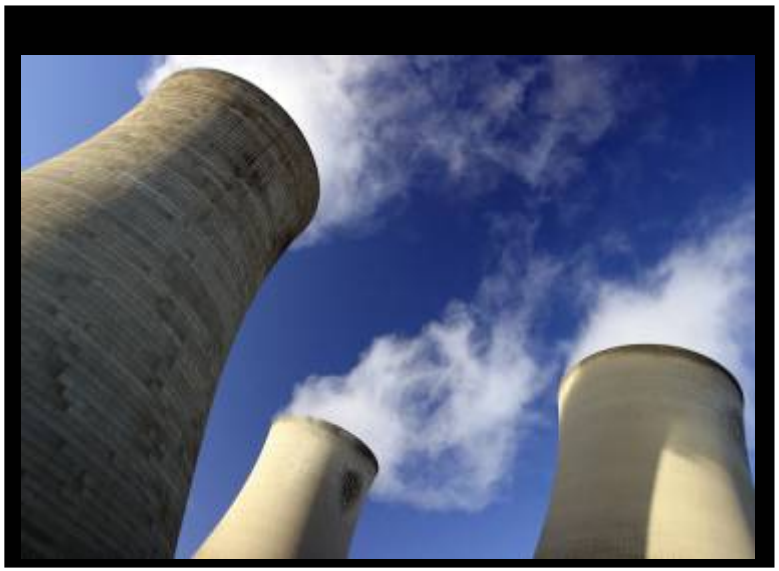
Annual Energy Savings from Energy Efficiency Programs and Standards



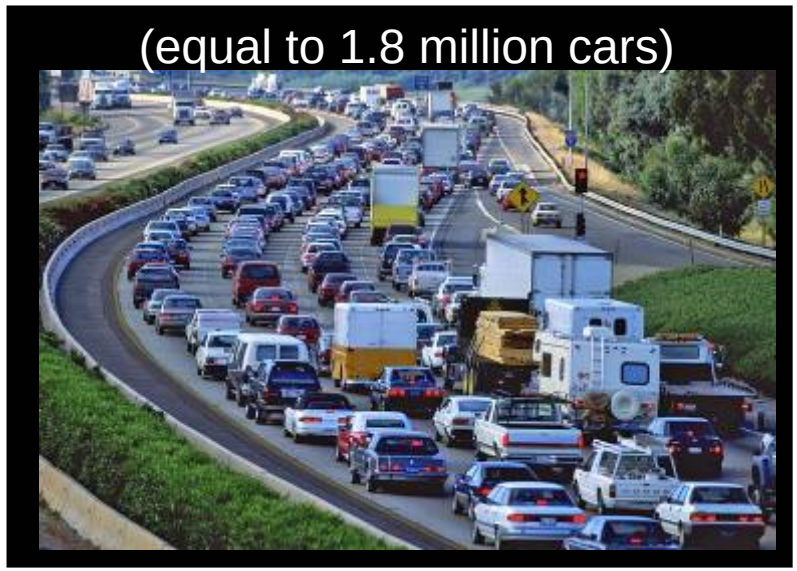
Source: Rosenfeld, California Energy Commission

California's Energy Efficiency Program & Goals— **2004 - 2013**

- Eliminates need for 10 new power plants



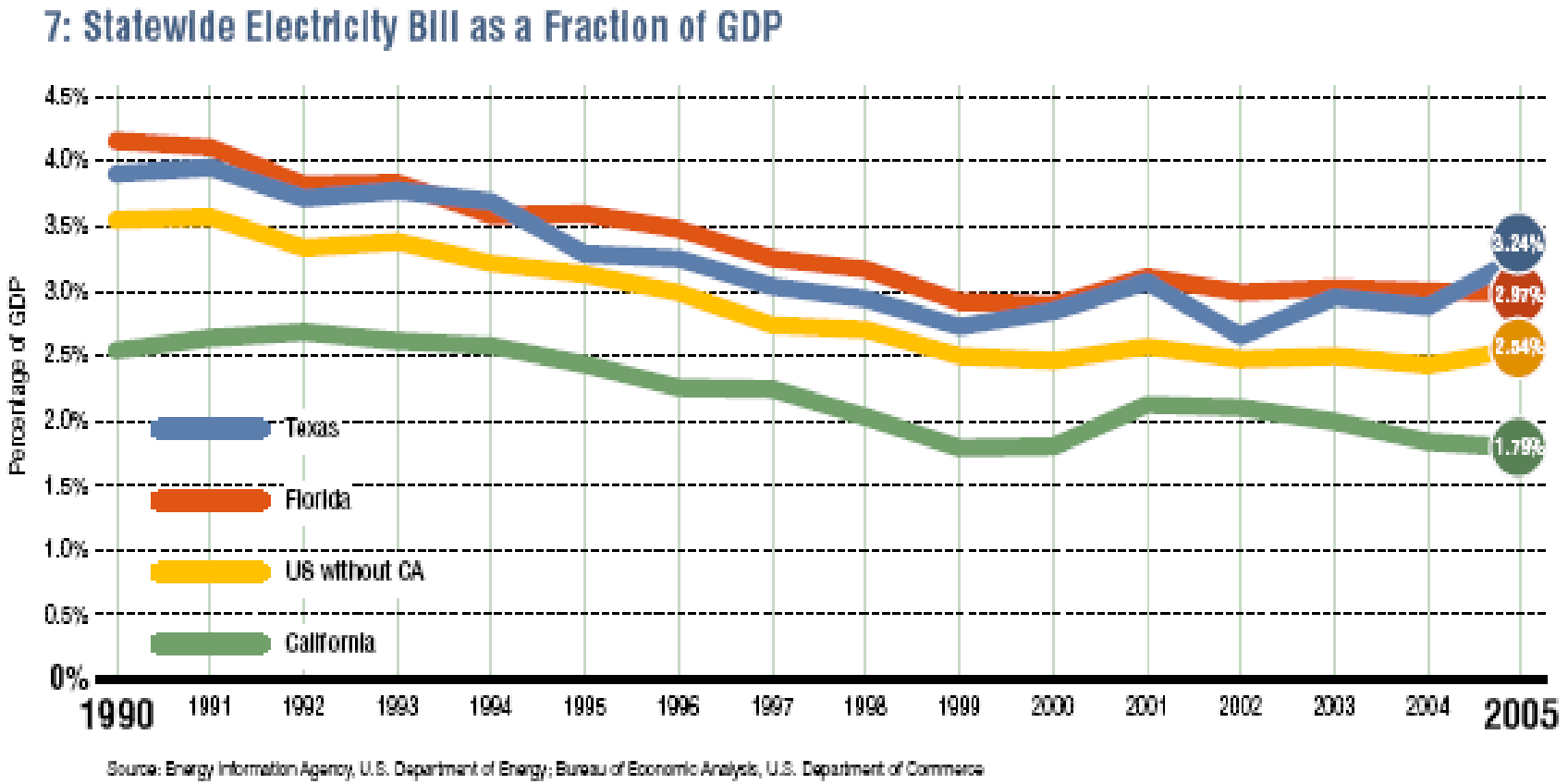
- Eliminates 9 million tons of CO_2 emissions annually



- $10 billion in net savings

to consumers

Statewide Electricity Bill as Fraction of GDP…



Source: California Green Innovation Index, 2008 Inaugural Issue – Next 10, page 21.

Current Policy Context- CPUC

- Policy
- Standards
- Funding
- EM&V

1. Decoupling (2001) –(1st Decoupling in 1982)
2. Public Benefits Charge (2002)
3. California Energy Action Plan (2003)
4. Energy Efficiency Goals (2004) –10yr goals
5. Administration (2005) –EE portfolios
6. California's Energy Action Plan II (2005) (LO)
7. Policy Rules (2005)
8. Avoided Costs (2005)
9. Adoption of 2006-2008 Programs ('05-'06)
10. EM&V Framework (2005-2006)
11. Energy Efficiency Incentives* (2007)

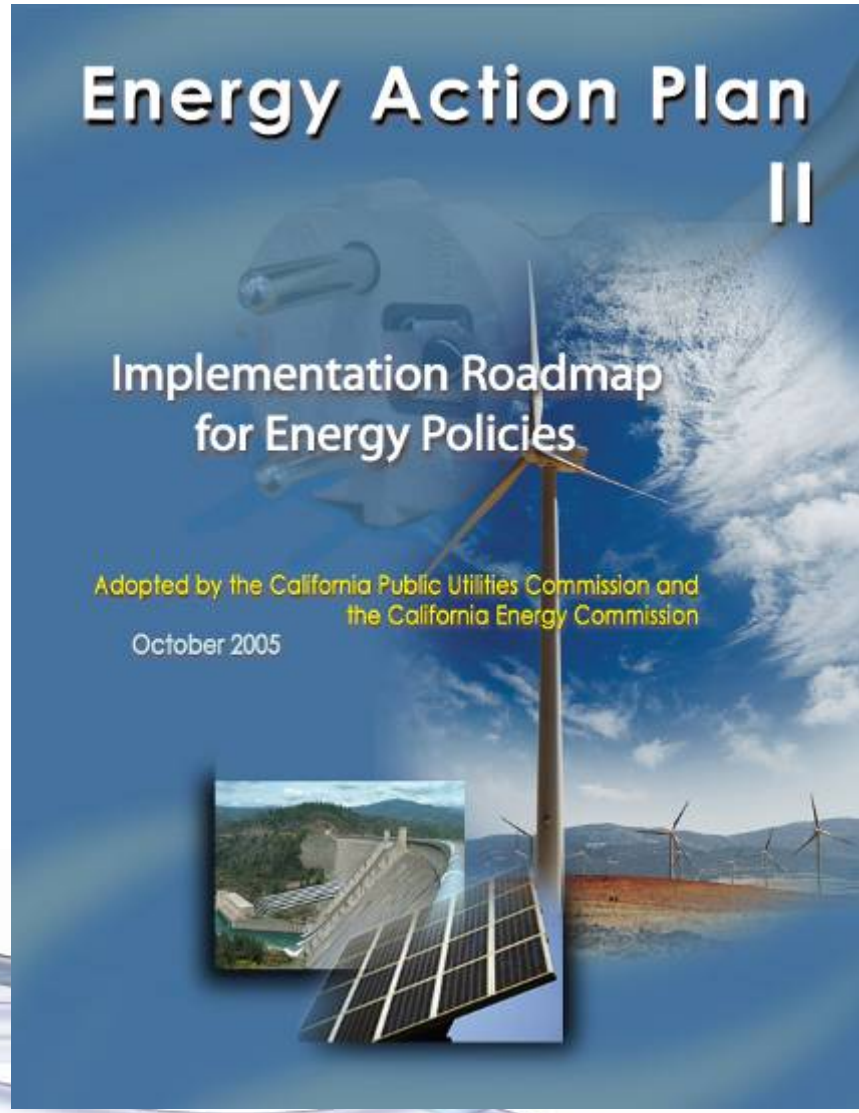
*1st stockholder shared savings in 1991 through restructuring

Energy Action Plan II

"Loading Order" of preferred resources:

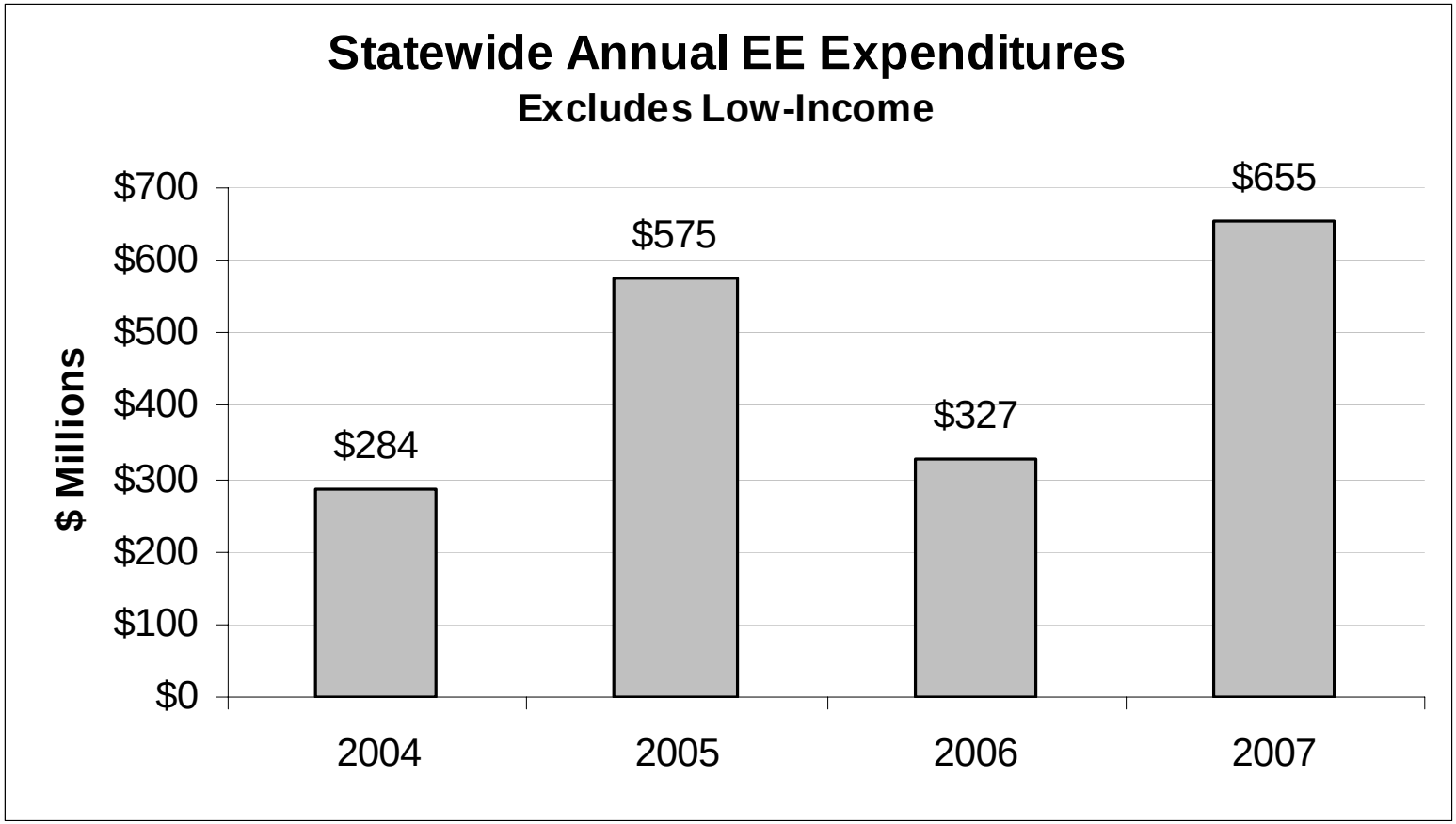
1. Energy efficiency and conservation
2. Demand response and advanced metering infrastructure programs
3. Renewable generation
4. Cleanest available fossil resources

Adds climate change, RD&D, and transportation



www.cpuc.ca.gov/PUBLISHED/REPORT/51604.htm

Total Annual California IOU EE Actual Spending (all IOUs rolled up) 2004-2007



source: Utility Annual Reports for 2004 and 2005, Table 1.1 and 2006, Table 3. Utility 2007 Monthly Reports, Table 1.1 posted to http://eega2006.cpuc.ca.gov

Energy Efficiency: 2006-2008

- Statewide Programs
  - Residential
  - Commercial/Industrial/Agricultural
  - On/Off-Bill Financing
  - New Construction
  - Codes & Standards
  - Emerging Technologies
- Statewide Marketing and Outreach
- Third Party (EE Contractors) Programs
- Government Agencies Partnership Programs

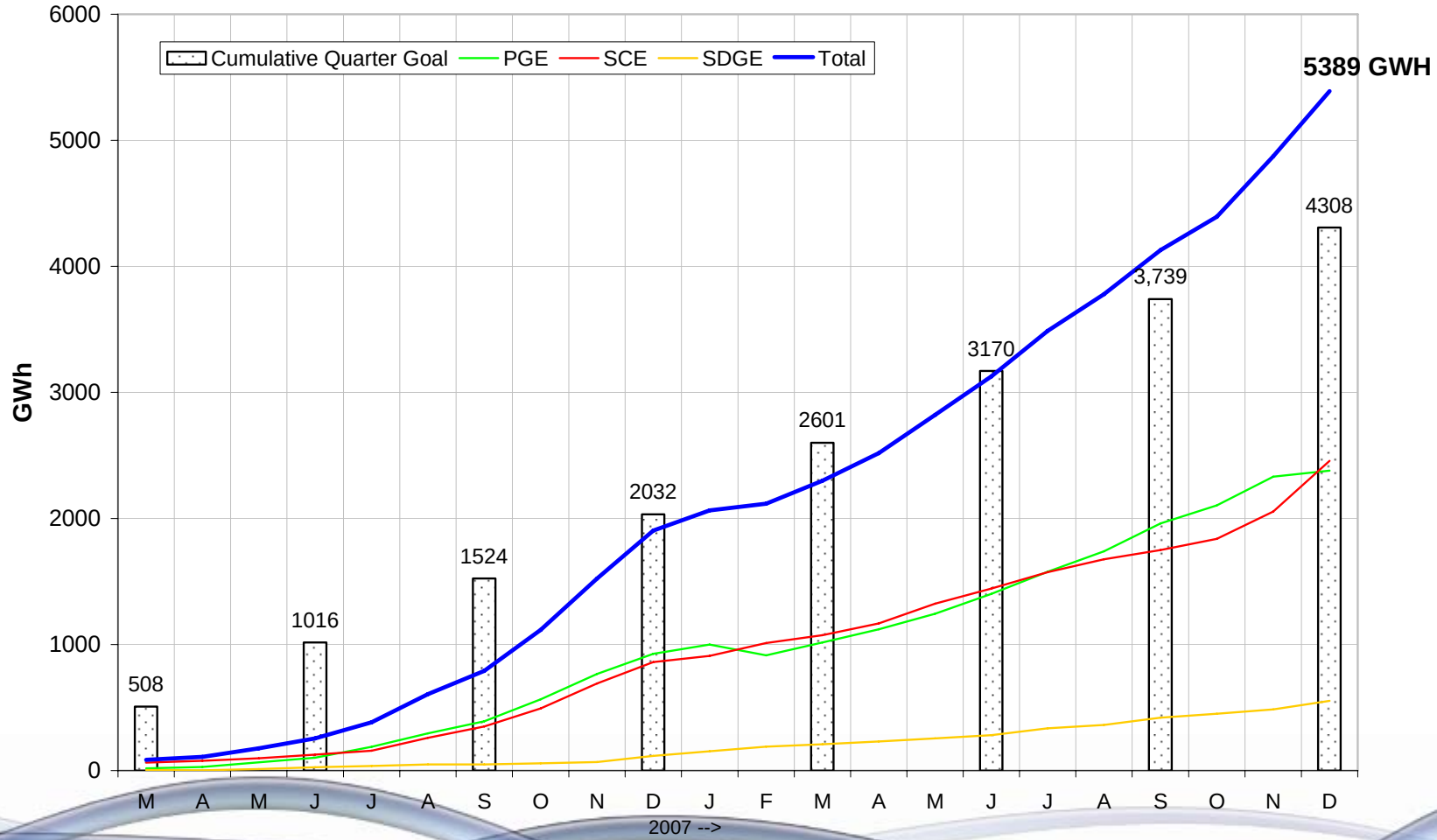
Information on CA utility EE programs:
www.californiaenergyefficiency.com

Types of Energy Efficiency Programs

1. **Rebate** – Customer purchases energy efficiency measure at lower cost with the difference paid for by the program
2. **Audit** – Inspection of a home or business to identify energy efficiency opportunities
3. **Direct Install** – Installation of energy efficiency measures at no cost to the customer
4. **Appliance Turn-In** – Takes inefficient appliances out of circulation with free or rebated recycling services
5. **Education** – Training for the general public as well as trade allies such as builders or building operators
6. **Performance Contracting** – Typically nonresidential programs; provides rebate for equipment and building retrofit per unit of energy saved rather than per measure purchased or installed
7. **Energy Management Services** – Typically Nonresidential programs. A combination of audit services, rebates and/or direct install, as well as load management and self-generation

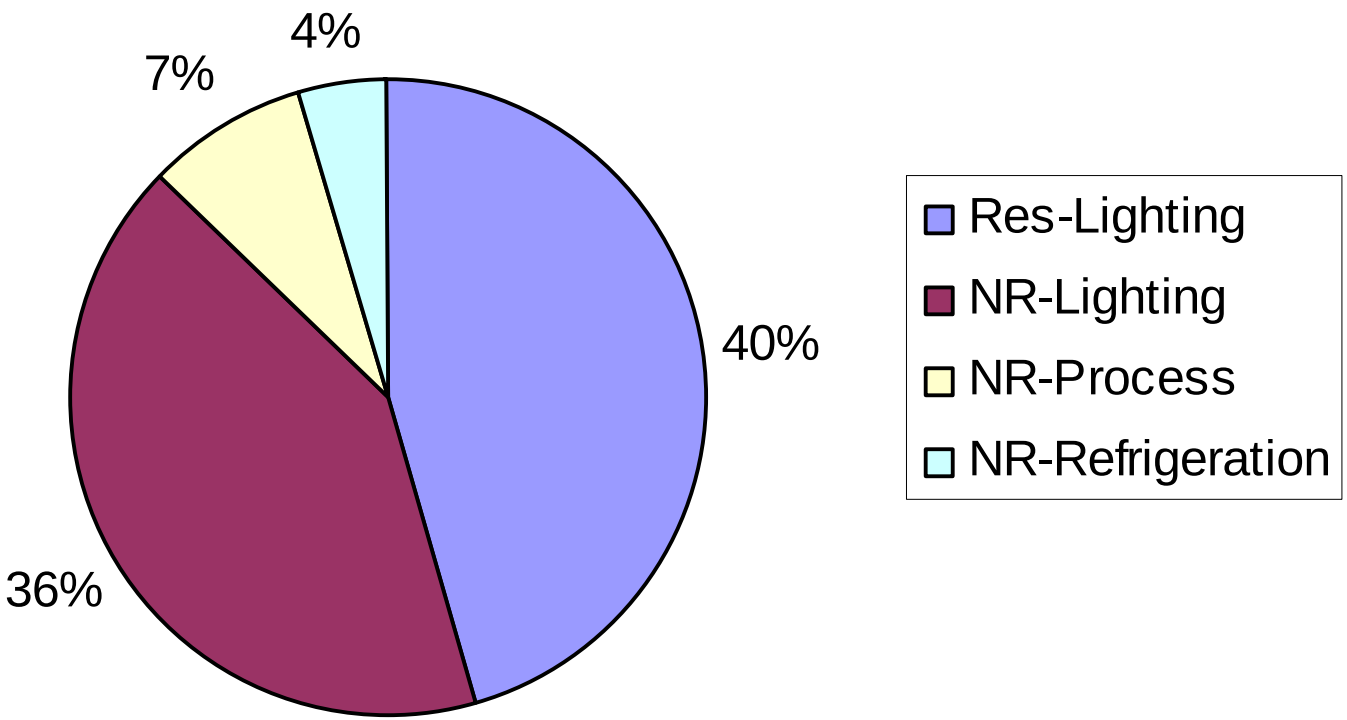
Installed Savings due to Energy Efficiency Measures 2006- 2007

Electricity Savings



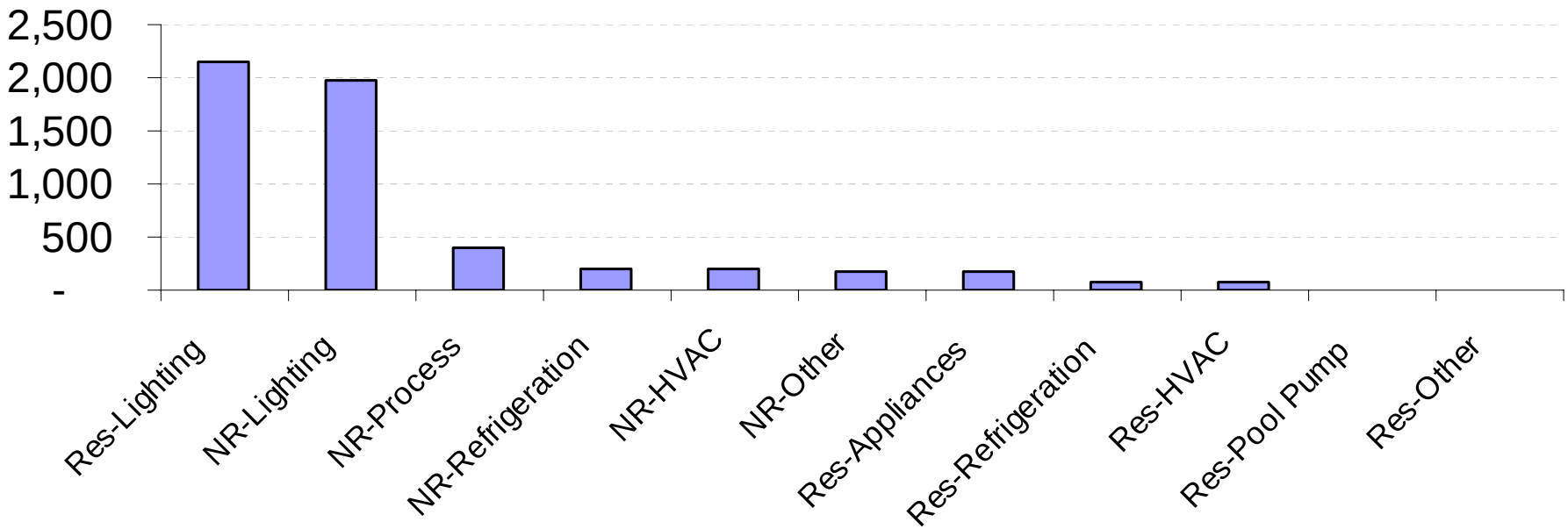
Top 87% of EE GWH Savings by End-Use

through January 2008



GWH Savings by End-Use

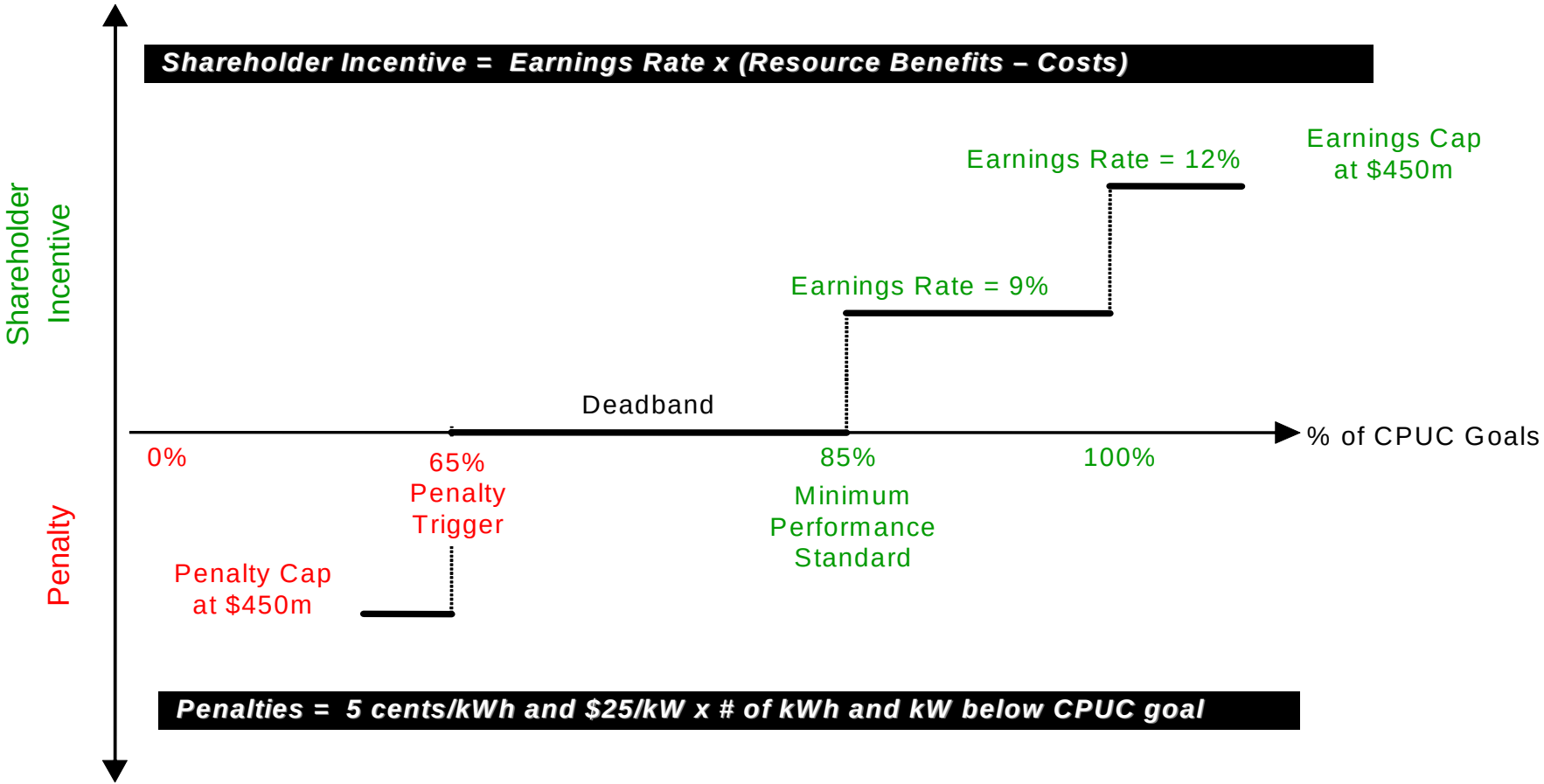
through January 2008



Performance-Based Incentives

California's New Incentive/Penalty Mechanism

- Financial rewards balanced by penalties for poor performance, tied to Commission-adopted kW, kWh and therm savings goals
- Utility administered programs



Can we go further…?

"Big Bold" Planning Begins 2007

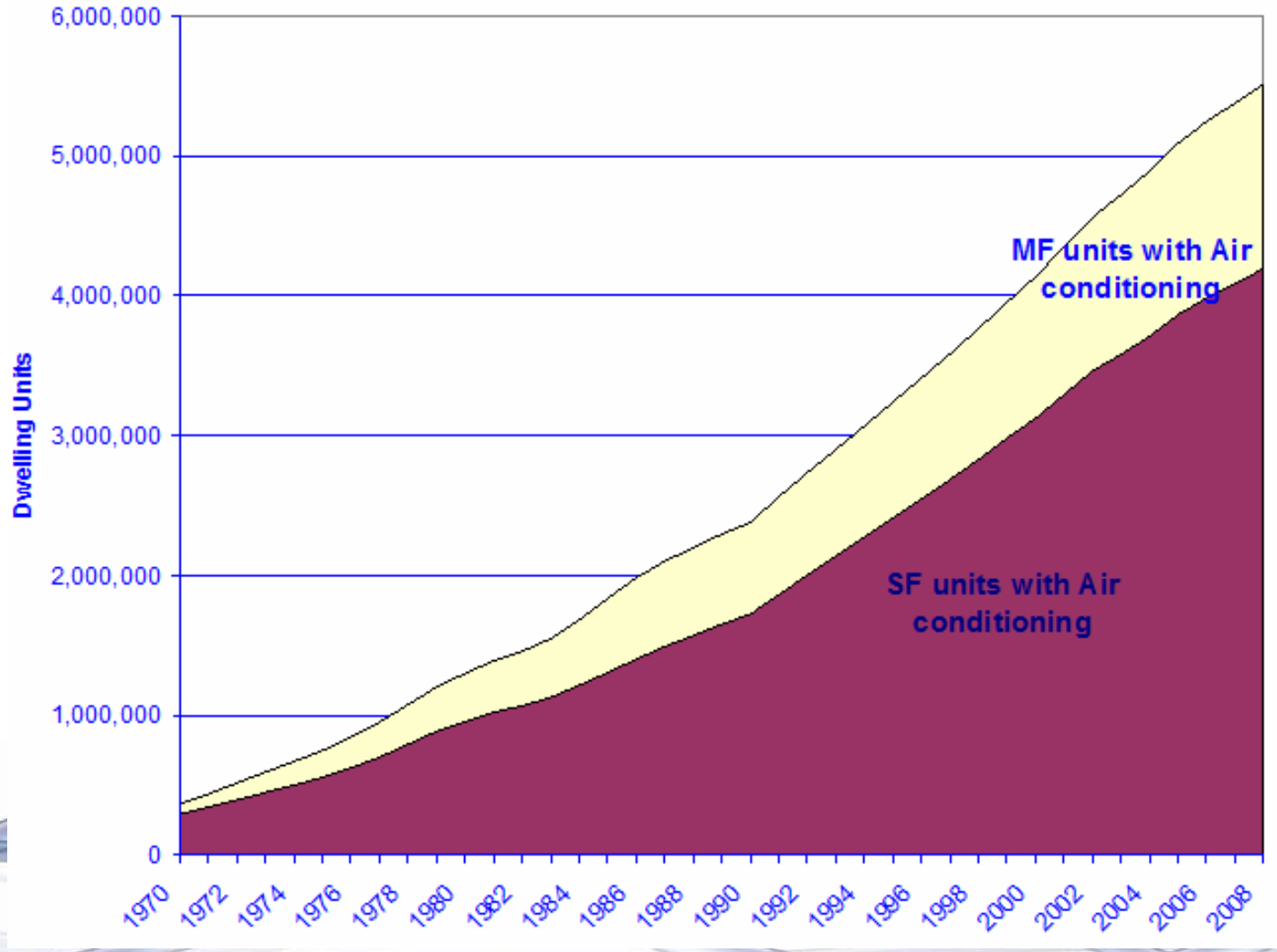
Energy Consumption & Estimated Savings for Candidate Strategies

Sector	CEC Estimate of Sector or Segment Consumption Magnitude			Estimated EE Potential			Other Considerations	
Commercial	**TWH**	**MW**	**Million Therms**	**TWH**	**MW**	**Therms**	**Peak Benefit?**	**Planned for Codes and Standards (C&S)?**
Existing Commercial Bldgs	95	21,000	2,200	12	4,600	300	Large	NA
New Commercial - Zero Net Energy	9	1,900	50	4.5	950	25	Medium	Some – 2008
Residential				**TWH**	**MW**	**Therms**	**Peak Benefit?**	**Planned for C&S?**
SEGWHAI	6	500	2,000	NA	NA	50-100	NA	2008*
New Residential Construction	6	2,900	500	1	500	100-200	Small	Some – 2008
Cross Cutting				**TWH**	**MW**	**Therms**	**Peak Benefit?**	**Planned for C&S?**
HVAC Residential and Small Commercial	19	14,400	3,000	2	1,400	300	Medium	Some – 2008**
Lighting	46	8,000	NA	10-16	1,000 - 1,500	NA	Medium	Some - 2009 - 2010 ***
Electronics	17	2,400	NA	7	400	NA	Small	Some - 2010
Industrial				**TWH**	**MW**	**Therms**	**Peak Benefit?**	**Planned for C&S?**
Industrial	40	7,400	2,900	5	650	500	Small	

CPUC Staff's Qualitative Assessment of Strategies for "Big Bold"

Sector	Big Energy Savings	Bold: Significant market penetration targeted	Bold: Unique opportunity -- not likely "but for" this focus	Big: $ Leverage in actions by others	Big: Scale leverage potential beyond Calif.
Commercial					
Existing Commercial Bldgs	**Huge**	Very high, if achievable, but tough market to reach	**Not otherwise likely**	Unknown, modest leverage?	Limited
New Commercial - Zero Net Energy	Moderate energy and peak savings	**Very High**	Some savings likely, but not all savings otherwise likely	**High leverage**	**Very high**
Residential					
SEGWHAI	Small	Medium	Could do via standards	**High leverage**	**High**
New Residential Construction	Small energy, moderate peak	**Very high**	Some likely via CEC-NSHP, but balance not otherwise likely	**High leverage**	**Moderate -to-high w/ neighbor states; varies by climate zone**
Cross Cutting					
HVAC Residential and Small Commercial	**High peak demand savings**; small energy savings?	**Very high, but must change HVAC business**	**Not otherwise likely**	Limited leverage	Moderate potential on installer business
Lighting	**Huge**	**Very high**	*State/national legislation or standards could achieve some/much separately; ACEEE and NRDC in national advocacy*	**High leverage**	**Potential for national action**
Electronics	Moderate	**Very high**	*State/ national legislation, standards, or industry consensus could achieve much separately*	**High leverage**	**Potential for national action**
Industrial					
Industrial	**Large**	**Very High, if achievable**	**Appears unique opportunity for comprehensive systems approach & coordination w/ AB 32**	Unknown; moderate to substantial?	Depends on national action, GHG reduction policies, and other state policies

Growth in Residential Dwellings with Central Air Conditioning- Single Family and Mulit Family Units from 1970 to 2007



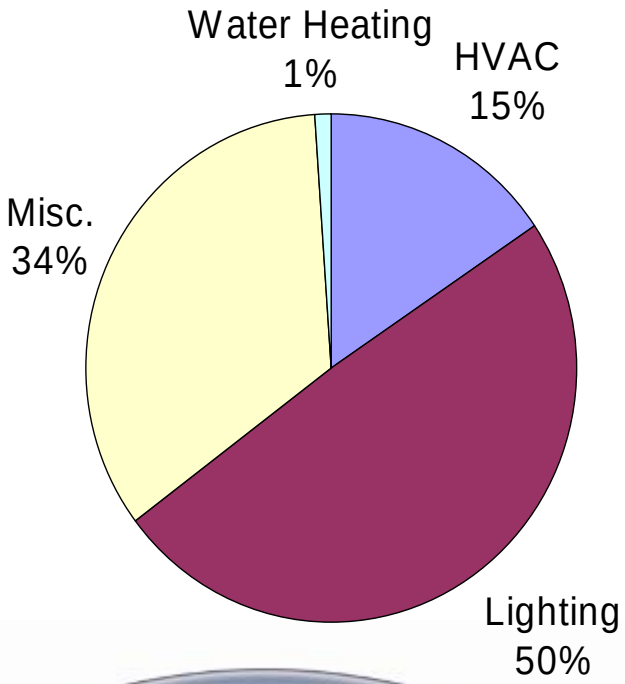
California Residential and Small Commercial HVAC Demand

- Residential A/C in new homes: 25% (1976) → 95% (2007)
- Home sizes up 55%: 1,560 ft^2 → 2,390 ft^2.
- Generating capacity needed to meet demand:
  - 1,950 MW (~2 nuclear units) 1976
  - 12,000 MW (~12 nuclear units) 2006
- Major contributor to peak electrical demand:
  - From 6% in 1976 to 25% in 2006 for residential systems alone

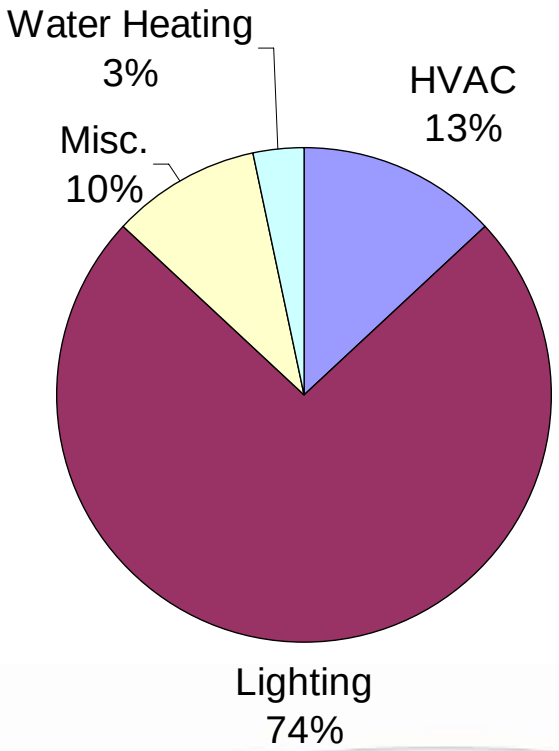
End use Residential Potential (full)

(Itron, 2007)

2006 Residential Enduse



2007 Residential Enduse Distribution



CPUC~ October, 2007

- Adopts ‘Big Bold Targets

- Adopts ee goals ‘till 2013

- Launches ee- DSM Strategic Plan
  - For 2009-2020 → Market Transformation
  - Statewide brand and workforce training
  - “Integration, innovation, collaboration !”

Big Bold Energy Efficiency Strategies

Commercial New Construction

- All new commercial construction in California will be zero net energy by 2030.

Residential New Construction

- All new residential construction in California will be zero net energy by 2020.

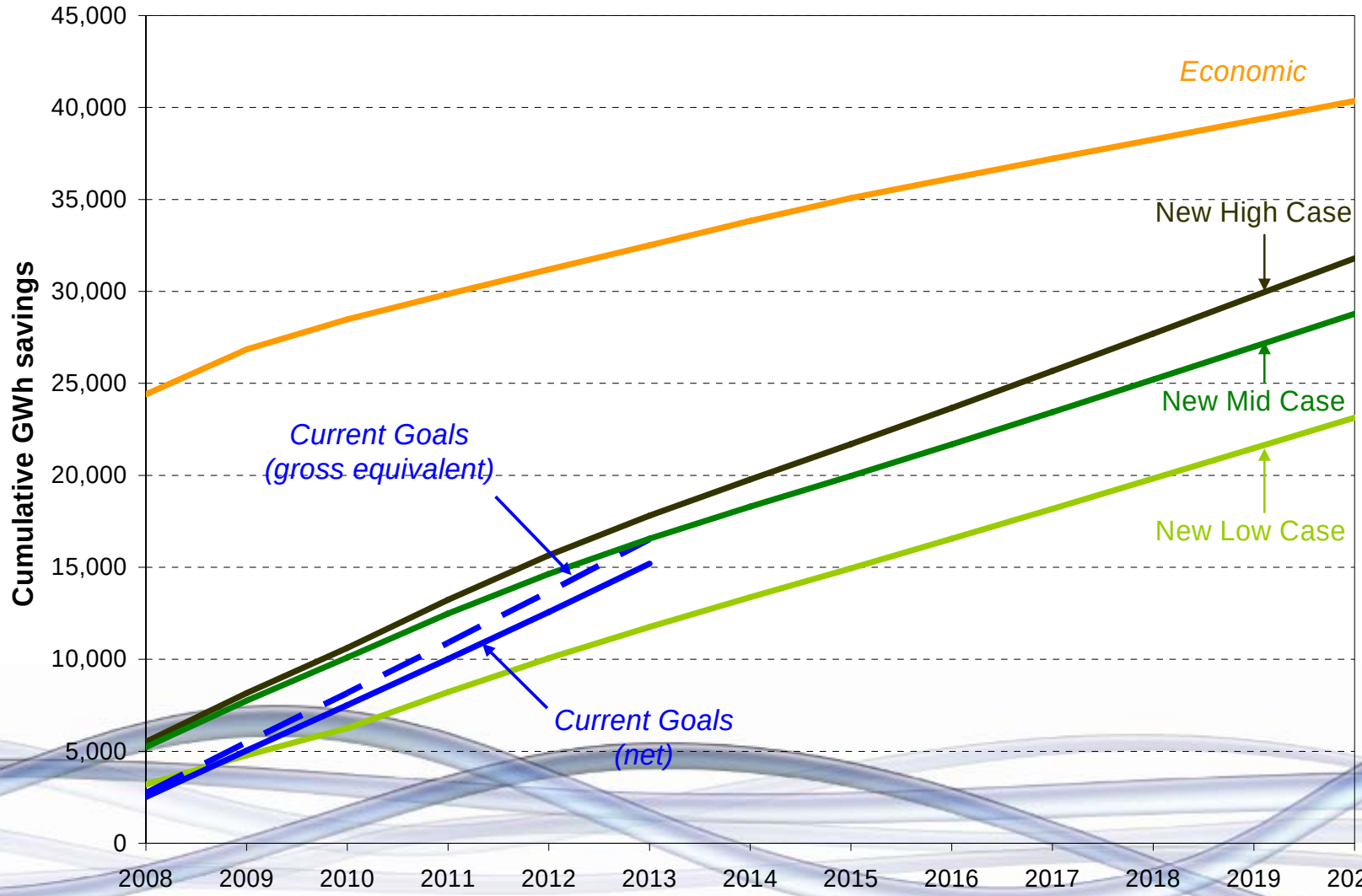
Residential / Small Commercial HVAC

- Heating, Ventilation, and Air Conditioning (HVAC) industry will be reshaped

Low-Income Energy Efficiency

- All eligible homes energy-efficient by

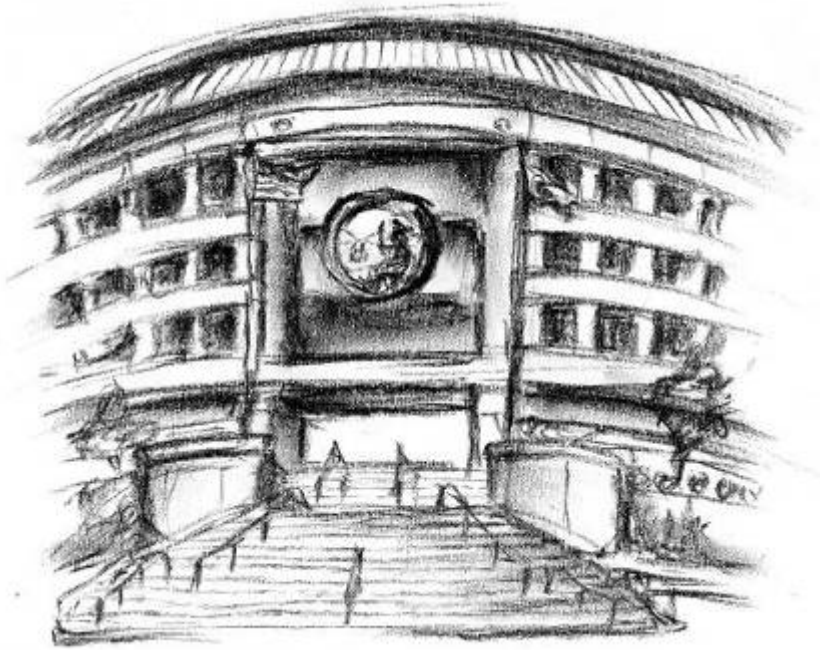
Adopted Goals ‘till 2013 (Oct, 2007)
Considering goals ‘till 2020 (now) (Itron, 2008)



Organization of Strategic Plan Process

Sectors			
Residential	**Commercial**	**Agriculture**	**Industrial**
☐Small HVAC BBEES			
☐New Residential Construction BBEES	☐New Commercial Construction BBEES		
Residential Low Income Strategies			
Local Government Roles			
Emerging Technologies, Market transformation, and/or Code & Standards			
Integrated DSM & EE program development & delivery			
Integrated Marketing, Education & Outreach			
Training & Work Force Development			

New Participants



- Alliance to Save Energy
- American Council for an Energy Efficient Economy
- Better Buildings Incorporated
- California Apartment Coalition
- California Building Performance Contractors Association
- California Natural Gas Vehicle Coalition
- Conservation Services Group
- Ecology Action
- Energy Coalition
- EP Investments Incorporated
- Global Energy Partners LLC
- Heller Manus Architects
- ICE Energy, Inc.
- Inland Empire Utilities Agency
- Northwest Energy Efficiency Alliance
- Quantum Energy Services & Technologies, Inc.
- Robert Mowris and Associates
- Sacramento Municipal Utility District
- Schweitzer and Associates
- Small Business California
- University of California, Davis Energy Efficiency Center
- Western Cooling Efficiency Center

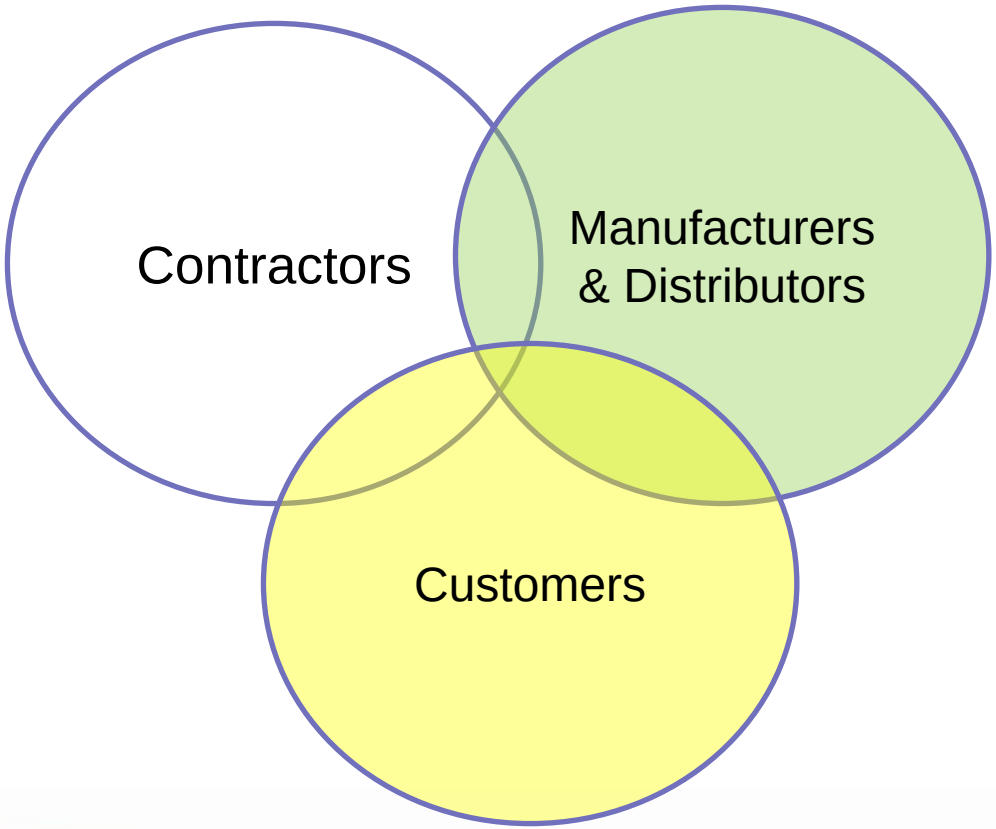
Commercial Sector (draft utility actions)

Strategy	2009-2011 Program Plan (Near-Term Activities)
1- Support aggressive enhancement and enforcement of California building energy Codes & Standards	*** Support CEC (i.e. establishing two tiers of voluntary standards ("silver" and "gold") more efficient than the minimum mandatory standards ("bronze"), developing a process to adjust the code on a triennial schedule, etc.**
2- Align commercial building labels, benchmarking and Operations & Maintenance practices to address energy efficiency	*** Establish benchmark-driven incentives.**
	*** Develop additional tools and strategies for using information and behavioral strategies to reduce energy usage and improve commissioning/retrocommissioning practices.**
3- Target financing and incentives	*** Develop innovative financing tools; Expand on-bill financing offerings to all DSM programs: EE,DR, CSI.**
	*** Build and quantify strong business case for DSM/GHG reduction.**
4- Promote Integrated Design for new zero net energy commercial buildings, and renovations of existing buildings	*** Work with building industry to develop tools to enable integrated design thereby advancing the practice of integrated design (ID).**

Residential Sector (draft utility actions)

Strategy	2009-2011 Program Plan (Near-Term Activities)
1- Advance Residential New Construction Whole-House Solutions toward Zero Net Energy	* Develop initial market research aimed at stimulating demand for lower energy using, eventually ZNE, homes (by 12/09). Begin campaign to raise demand for lower energy homes.
	* Conduct solicitation for new home pilot designs in specific locations to prove technologies for next generation of lower energy homes in specific climates; monitor performance of selected lower energy homes.
	* Align CSI requirements to enable reaching 2011 targets of 50% of all residential homes attain current New Solar Homes Tier II standards.
2- Pursue Whole-House Solutions in Existing Homes	* Initial market research completed 12/09 to determine homeowner "decision triggers" to improving home EE. Campaign to raise demand for home energy usage reductions.
	* Conduct solicitation for home pilot whole house designs in specific locations to develop technologies for next generation of lower energy homes in specific climates; including increasing penetration of cost-effective appliances.
3- Raise Plug Load Efficiency	* Work with manufacturers to identify efficient products and develop more efficient product leading to increased market penetration.
4- Provide Monitoring and Visual Display Tools	* Over the 2009-2020 period, work with metering/display providers to expand capability of in-home displays. Progressively enable deployment of smarter equipment.

The HVAC Market



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Customers

Customers do not yet value energy efficiency, load reduction, and lifecycle costs

- HVAC systems are purchased on low first cost
- HVAC systems are often not properly sized
- Customers assume that their unit is being installed properly, but installation quality is often poor

Contractors

Contractors do not sell energy efficiency, quality installation, load reduction, and lifecycle costs

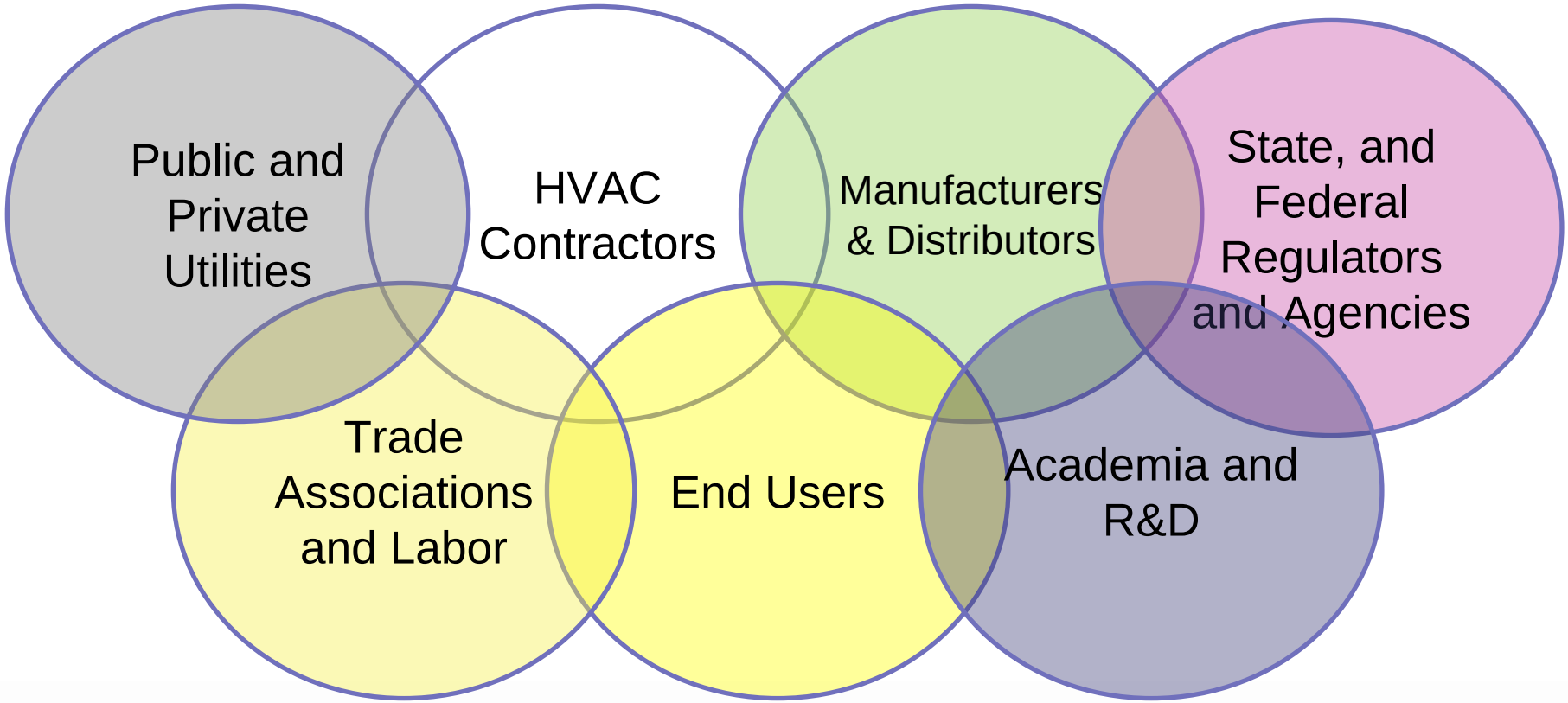
- Competitive business model driven by low first cost
- Lack of trained technicians and contractors
- Installation quality is often poor for new or replacement systems
- **Over 90% of HVAC installations are not permitted nor have been inspected**

Manufacturers & Distributors

Manufacturers are not developing high efficiency equipment and not requiring quality installation

- HVAC parameters are not optimized for Southwestern climates
  - National standards set to 82°F; mild and humid climates
  - Efficiency performance degrades as ambient temperatures increase
- Development of next generation High Efficiency HVAC systems is slow

The Solution



The Solution

- Success requires close collaboration among stakeholders in developing and implementing sound strategies
- Progress requires a commitment of long-term funding
- Reaching the vision requires leadership at the highest levels within California and the region

Strategic Plan (draft)
Heating, Ventilation & Air Conditioning (HVAC)

Training and Education –

- Partnering with the industry (community colleges, vocational/tech schools, unions, associations, etc.) to train contractors/technicians on quality installation and maintenance practices

- Creating a quality brand for firms with 100% of their employees with quality certification.

Marketing and Branding –

- Developing a statewide brand for HVAC quality installation practices and teaching customers to look for the brand as part of a finished installation job.

- This would be accomplished by developing a brand or decal and introducing it in a long-term consumer education campaign.

Strategic Plan (draft)
Heating, Ventilation & Air Conditioning (HVAC)

Research and Development–

- Creating an incubation process to fast track the development and implementation of more energy and demand efficient HVAC equipment that is appropriate for California's climate

- Developing pilot programs and standards for onboard diagnostics.

Policy and Enforcement –

- Increasing current level of compliance with HVAC quality certification requirements from 10% to 90% by creating a new compliance tracking system

- Working with building officials to improve compliance and making sure utility training and education programs get credit for the energy savings caused by increases in enforcement and quality control.

- Making changes to the standards to ensure quality certification is a mandatory measure for existing and new homes

The biggest and boldest ideas are…

- Equipment tracking database linking wholesale level sales to residential installations, to permits and QI verification.

- Creating market environment for whole building design.

- Certifying 100% of all HVAC technicians on QI/QM (Quality Installation / Quality Maintenance). Improving current contractor licensing to include QI/QM certification and re-certification by 2020.

For more on Strategic Plan…

- www.californiaenergyefficiency.com

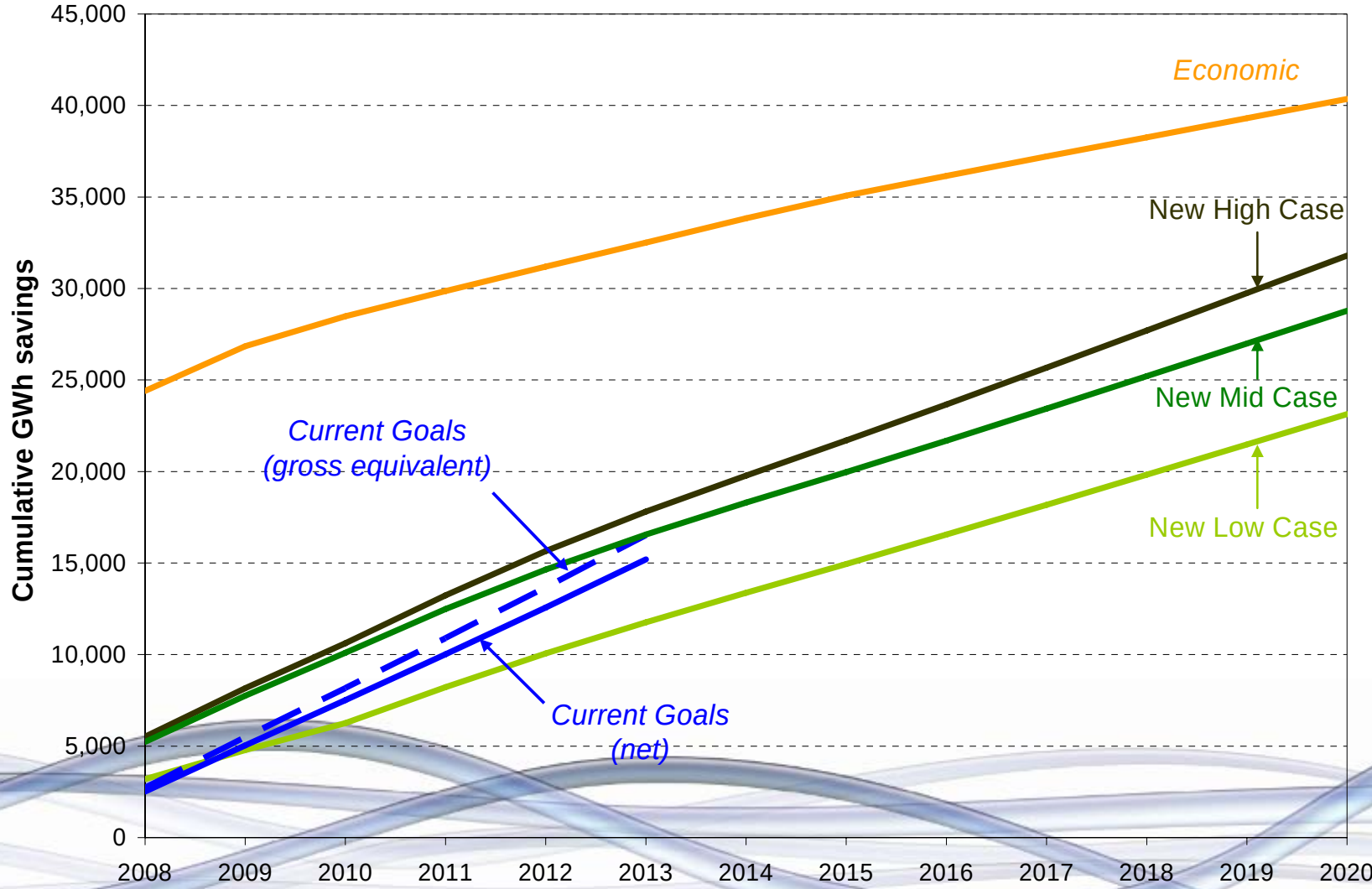
- Plan to be filed with CPUC May 15th
  - Formal review & comment period
  - Concurrent review of utility 09-11 Applications
  - SP adopted in late fall (tentative)

- Partner & stakeholder comments welcome

Energy efficiency and California GHG Goals…

- Modeling scenarios linked
  - CPUC energy efficiency goals
  - statewide modeling of sector GHG options
  - CEC long term forecasting, utility procurement
- CPUC/CEC recommendations to CARB
  - First deliverer- cap & trade (adopted in March)
  - Allocations, flexible mechanisms (June/July)
  - CARB Scoping Plan for California – fall

California's Energy Efficiency Economic Potential (CEC & CPUC Endorsed) (Itron, 2008)



Questions ?

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