

# Getting Past Green to Zero Net Energy Buildings: *The California Long Term Energy Efficiency Strategic Plan*

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# ENERGY EFFICIENCY



California's highest priority resource to:

- Meet energy needs
- Save money
- Reduce GHG emissions

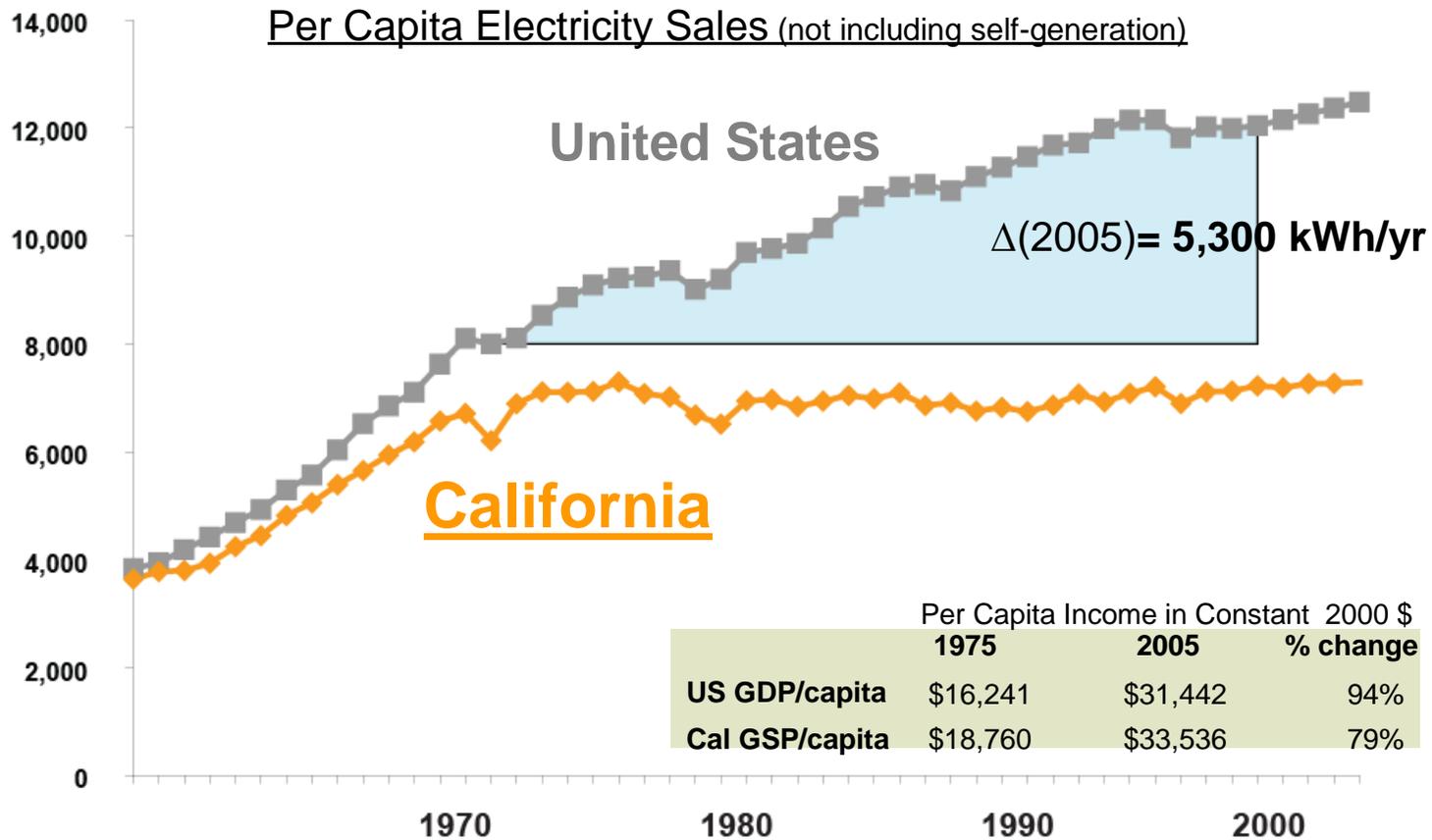
**Energy Efficiency is # 1 in the “loading order” for energy resources**

# Energy Efficiency is a Resource

- **Generation Benefits**
  - Saves capacity and energy
  - Lowers fuel costs
  - Reduces required reserves
- **Transmission and Distribution Benefits**
  - Defers new investment
  - Improves reliability
- **Resource Benefits**
  - Promotes Integrated Resource Planning
- **Environmental Benefits**
  - Paves the way for sustainable growth
  - Reduces GHG emissions

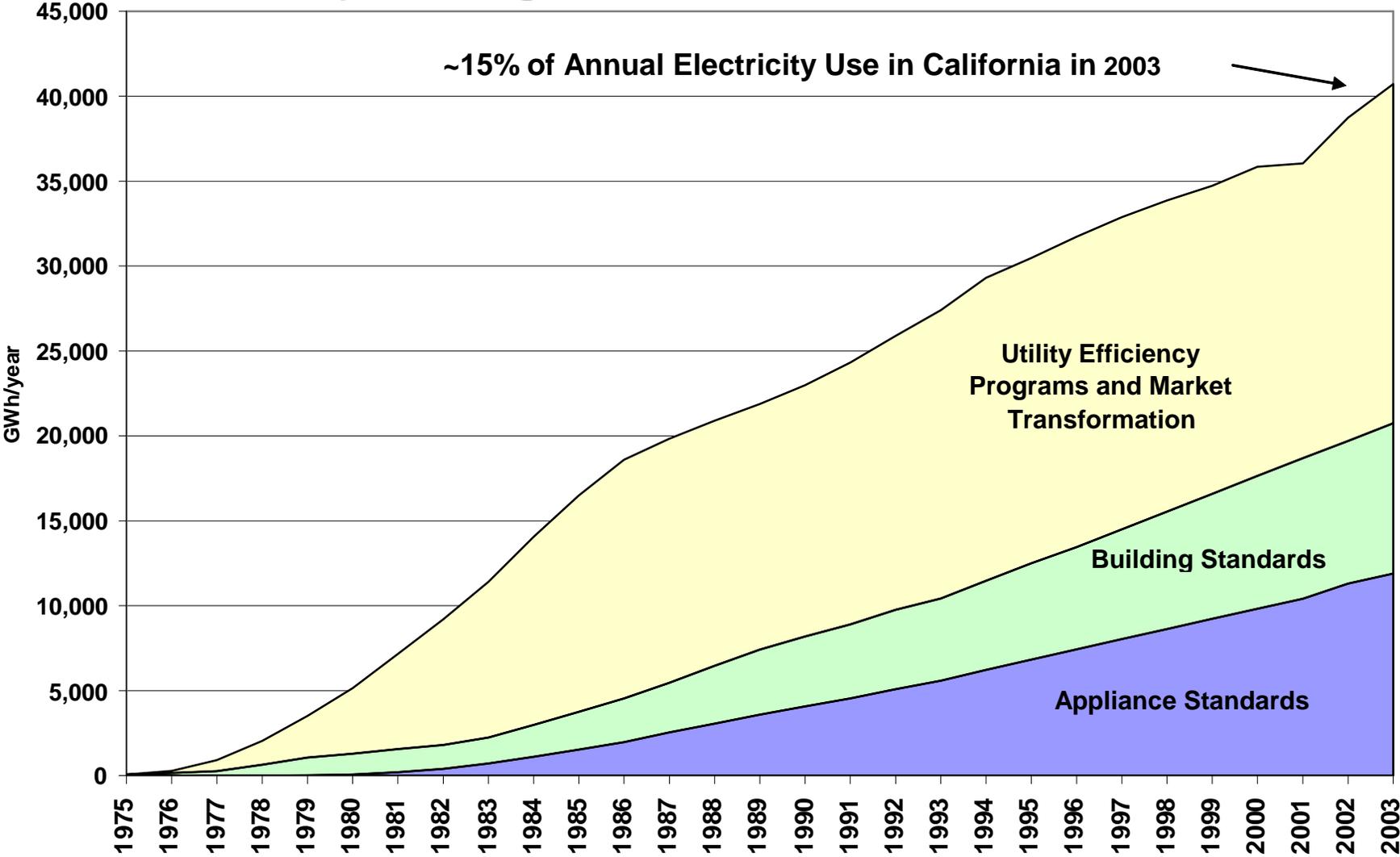


# Per Capita Electricity Use



While the nation's appetite for electricity has steadily grown  
 California's demonstrated economic growth correlates with energy efficiency.

# Annual Energy Savings from Efficiency Programs and Standards



# Financial Incentive



## Decoupling of profits from sales

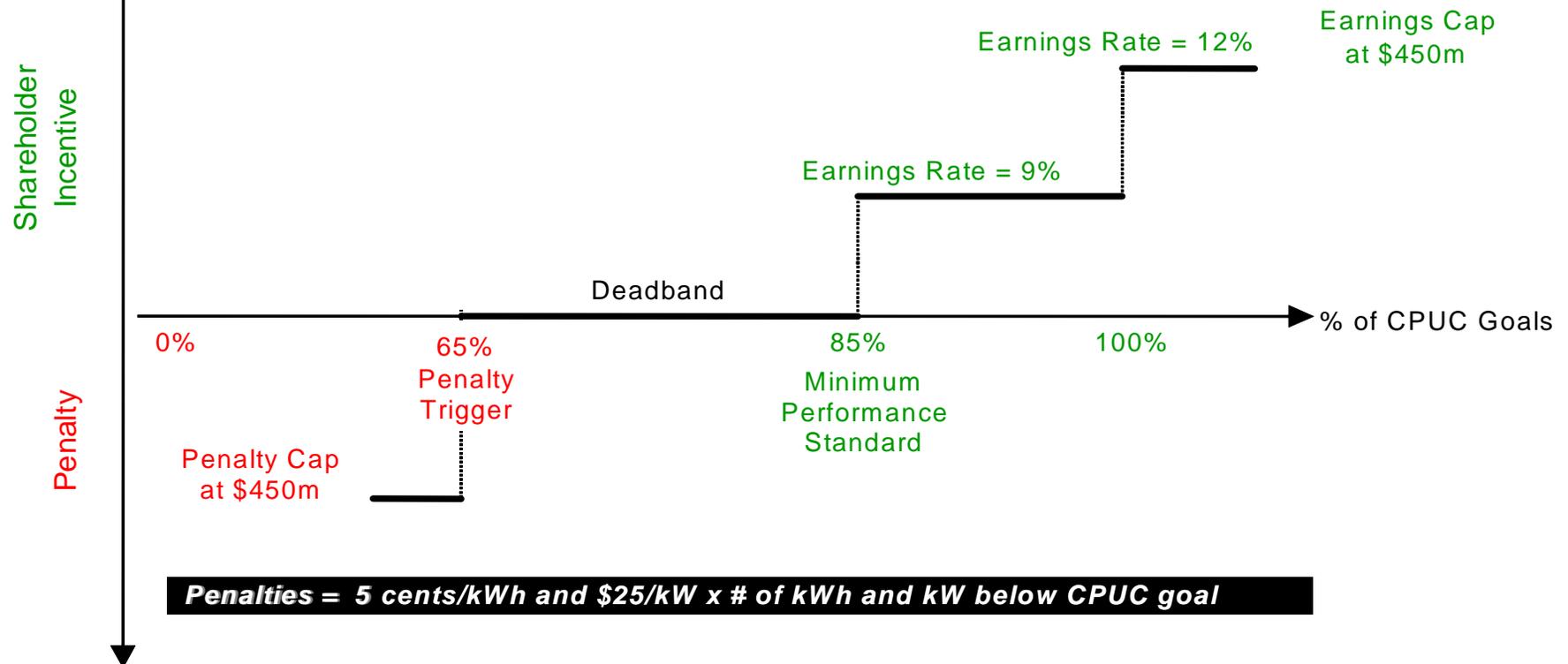
- Decoupling of profits from sales was the first step (1982).
  - Now, the California Public Utilities Commission is adding financial incentives for energy efficiency savings. **“Decoupling Plus”**
- If savings targets are met or exceeded utilities will earn additional money for their shareholders.
  - Penalties for missing targets
  - Provides opportunity for utilities to earn same profit as supply-side investment

# Risk/Reward Mechanism

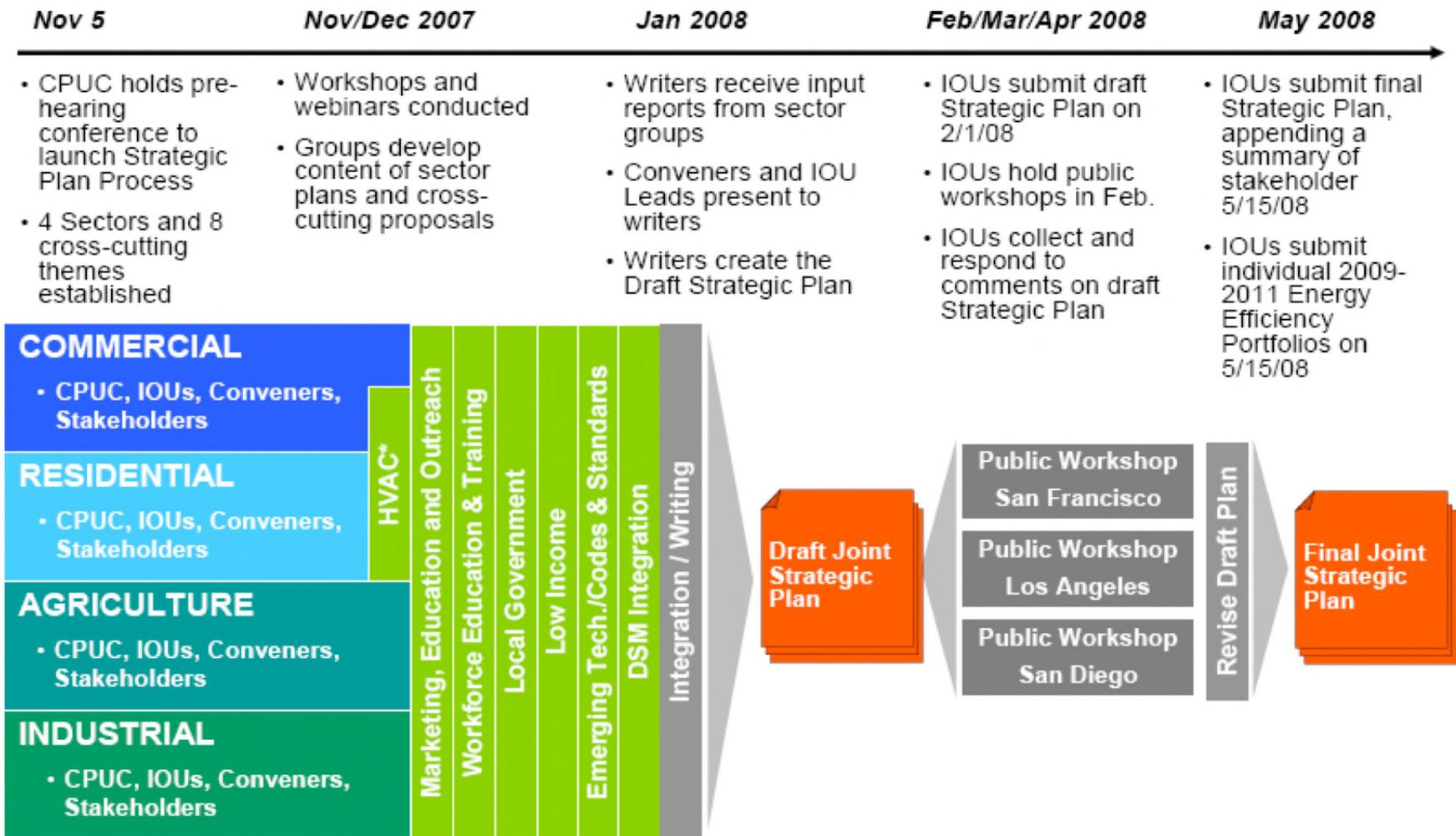
## California's Risk/Reward (Incentive/Penalty) Mechanism

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

$$\text{Shareholder Incentive} = \text{Earnings Rate} \times (\text{Resource Benefits} - \text{Costs})$$



# Strategic Planning Process



\*HVAC Big Bold Energy Efficiency Strategy spans Residential and Small Commercial sectors

# Scope of the Strategic Plan

- **Residential, including Low Income**
- **Commercial**
- **Industrial**
- **Agricultural**
- **Heating, Ventilation & Air Conditioning**
- **Codes & Standards**
- **DSM Coordination & Integration**
- **Workforce Education & Training**
- **Marketing, Education & Outreach**
- **Research & Technology**
- **Local Governments**

# “BIG BOLD” ENERGY EFFICIENCY STRATEGIES

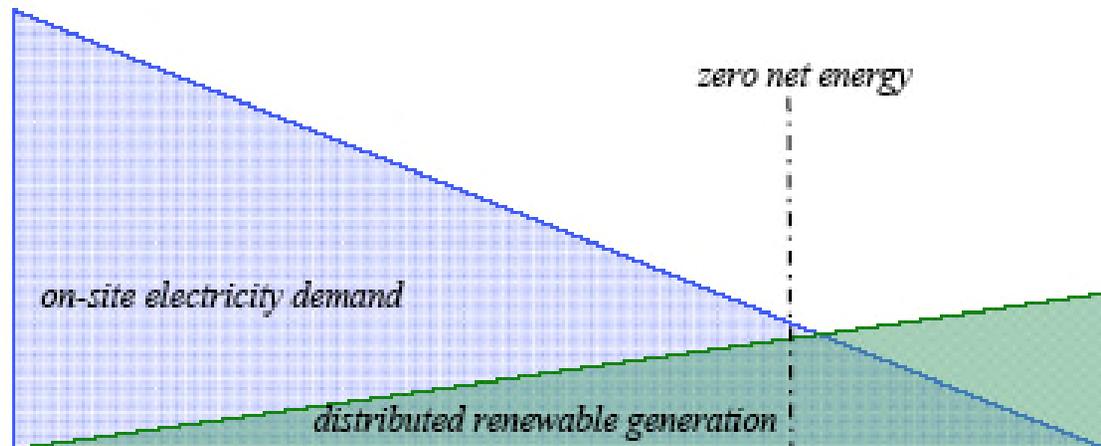


*In order to guide market transformation in a number of key sectors, this Plan embraces four specific programmatic goals, known as the “Big Bold Energy Efficiency Strategies,” established by the CPUC in D.07-10-032 and D.07-12-051. These goals were selected not only for their potential impact, but also for their easy comprehension and their ability to galvanize market players.*

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) will be transformed to ensure that its energy performance is optimal for California's climate; and
4. All eligible low-income customers will be given the opportunity to participate in the low income energy efficiency program by 2020.

## WHAT IS ZERO NET ENERGY?

Zero net energy is a general term applied to a building with a net energy consumption of zero over a typical year. To cope with fluctuations in demand, zero energy buildings are typically envisioned as connected to the grid, exporting electricity to the grid when there is a surplus, and drawing electricity when not enough electricity is being produced.



- The amount of energy provided by on-site renewable energy sources is equal to the amount of energy used by the building.
- A ZNE building may also consider embodied energy – the quantity of energy required to manufacture and supply to the point of use, the materials utilized for its building.<sup>29</sup>

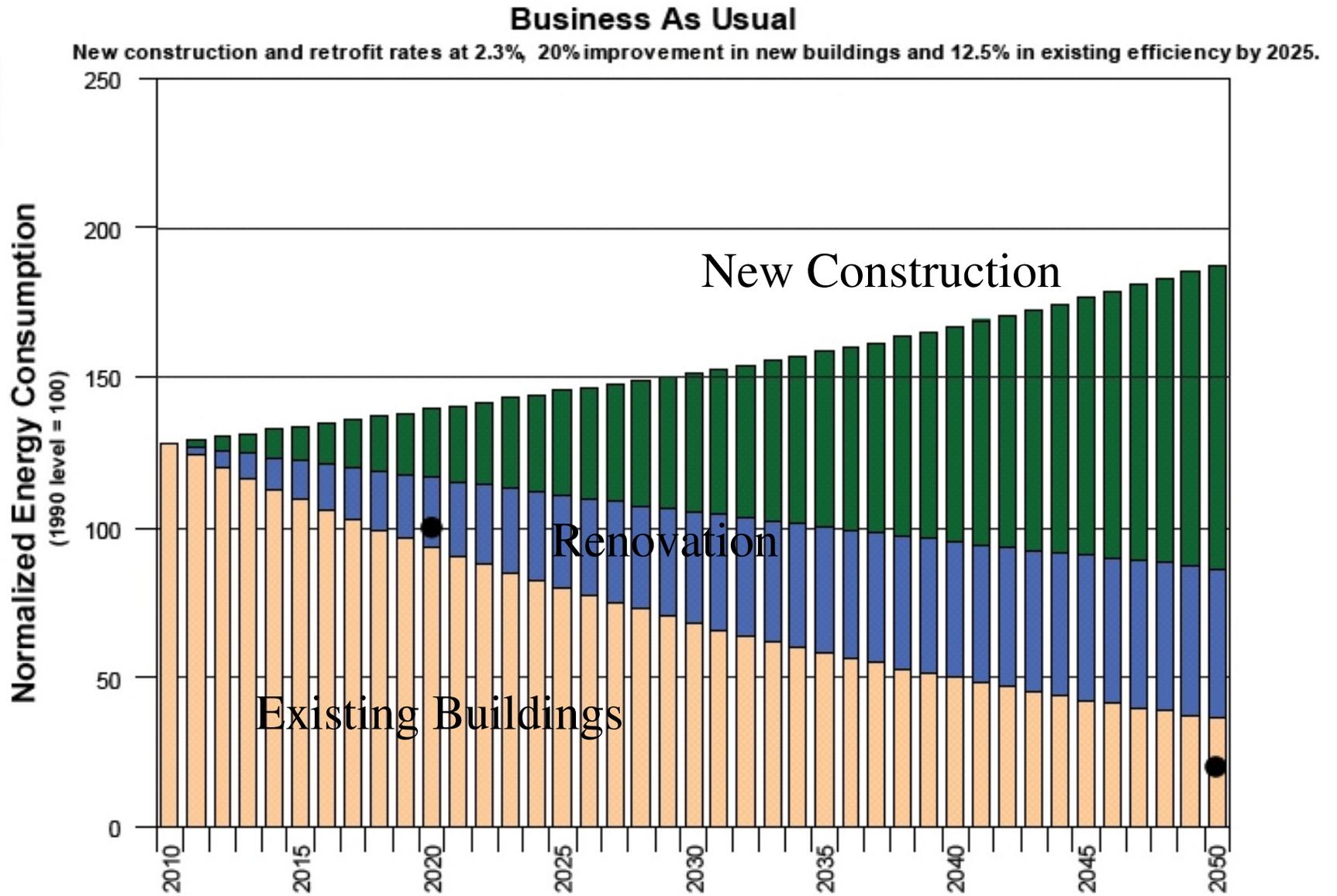
# Zero Net Energy Buildings Today (N=8)



IDeAs Building, San Jose, California

# BAU will not get us there. New aggressive paradigms needed.

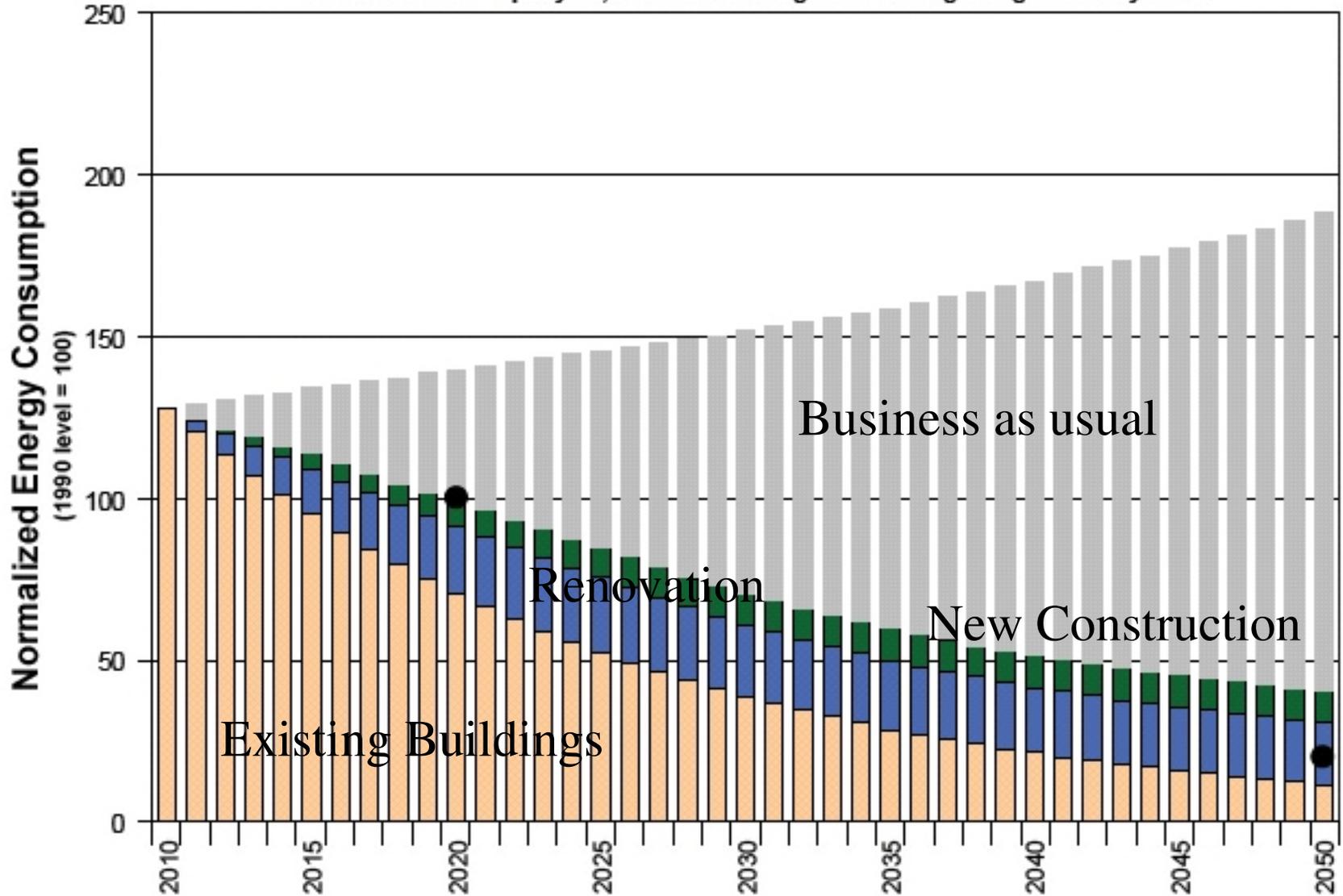
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*1 scenario: getting to 99% EE. Also look at 75-80% EE + 25-30% clean DG.*

### Aggressive Improvements to Both New and Existing Buildings

New buildings start at 60% energy savings and get to 99% by 2030,  
retrofit rate at 5% per year, retrofits starting at 50% and getting to 80% by 2030.

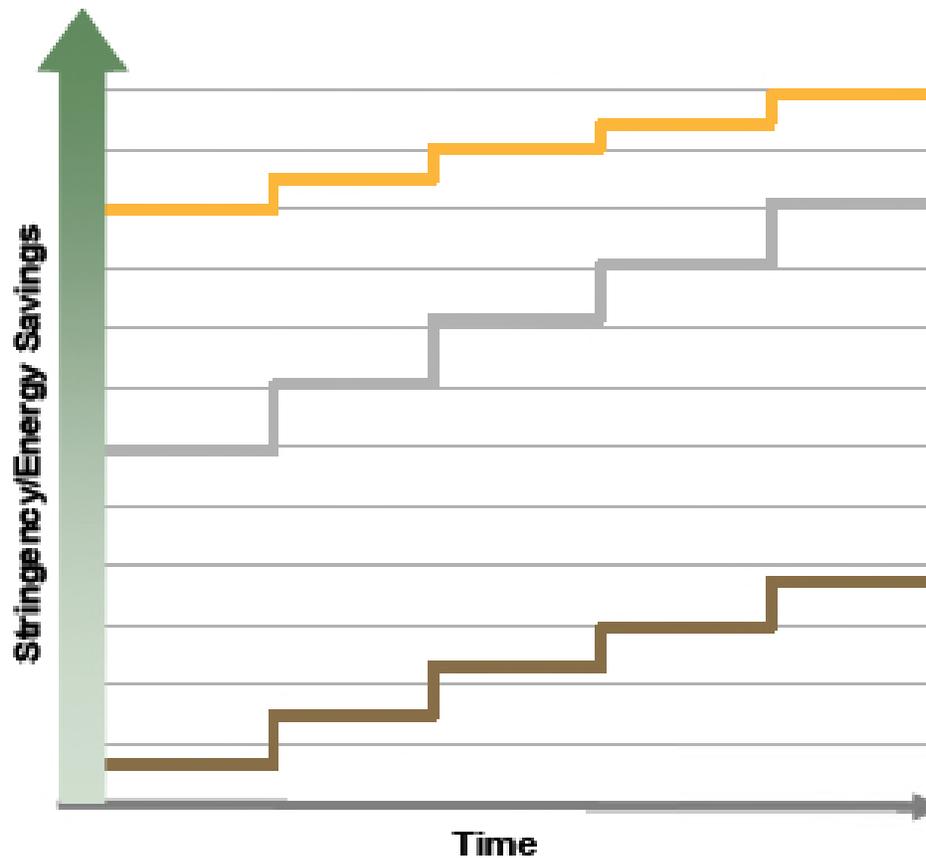


# Three *Strategic* Initiatives for the Commercial Sector



1. Adopt **aggressive enhancement of codes and standards** in California and their enforcement
2. **Align labels, benchmarking, and operations & maintenance** practices to motivate and address energy efficiency in existing buildings
3. Target **financing and incentives** to meet the objectives of the Strategic Plan

# California Building Codes



## **GOLD**

### *Silver plus:*

- Zero Net Energy Buildings
- Clean Energy Generation
- New Technologies
- Integrated Design
- Transaction Mandates

## **SILVER**

### *Bronze plus:*

- Higher Voluntary Energy Efficiency
- Local Government Push
- Labeling
- Incentives & Financing
- Broader Energy End-use Focus

## **BRONZE**

- Minimum T-24 Standards
- Strong Enforcement
- Building Energy Efficiency Benchmarks

# Three *Enabling or Supporting* Initiatives for the Commercial Sector



1. Promote *integrated design* as the basis for commercial building design, construction, renovations and occupancy
2. Support **targeted R&D and emerging technologies** for the most promising gains
3. Offer integrated **one-stop** program **delivery of DSM solutions** (EE, DG, DR)

# Three *Cross-Cutting* Initiatives for the Commercial Sector



1. Provide comprehensive training and certification to ensure **knowledge among building professionals and technical personnel**
2. Develop capabilities of **local governments to drive EE solutions** in communities
3. Target marketing, outreach, and education to **spur the commercial sector market**

# Conclusions

- Enthusiastic support for long-term goals & outcomes
- Productive to engage stakeholders (builders and designers, operators & managers, manufacturers & distributors) on California-wide or larger regions, not just single utility programs
- Utility 2009-2011 EE proposals take steps toward broader, multi-faceted programs
- Workforce development more prominent as vital public policy issue, connecting education & EE stakeholders

# FOR MORE INFORMATION...

**Strategic Plan documents and reference**

**material:** <http://www.californiaenergyefficiency.com>

**CPUC Efficiency proceeding documents:**

<http://www.cpuc.ca.gov/PUC/energy/electric/Energy+Efficiency/>

**For further information:**

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