

Greenhouse Gas Emission Reduction through Energy Efficient Building Retrofit

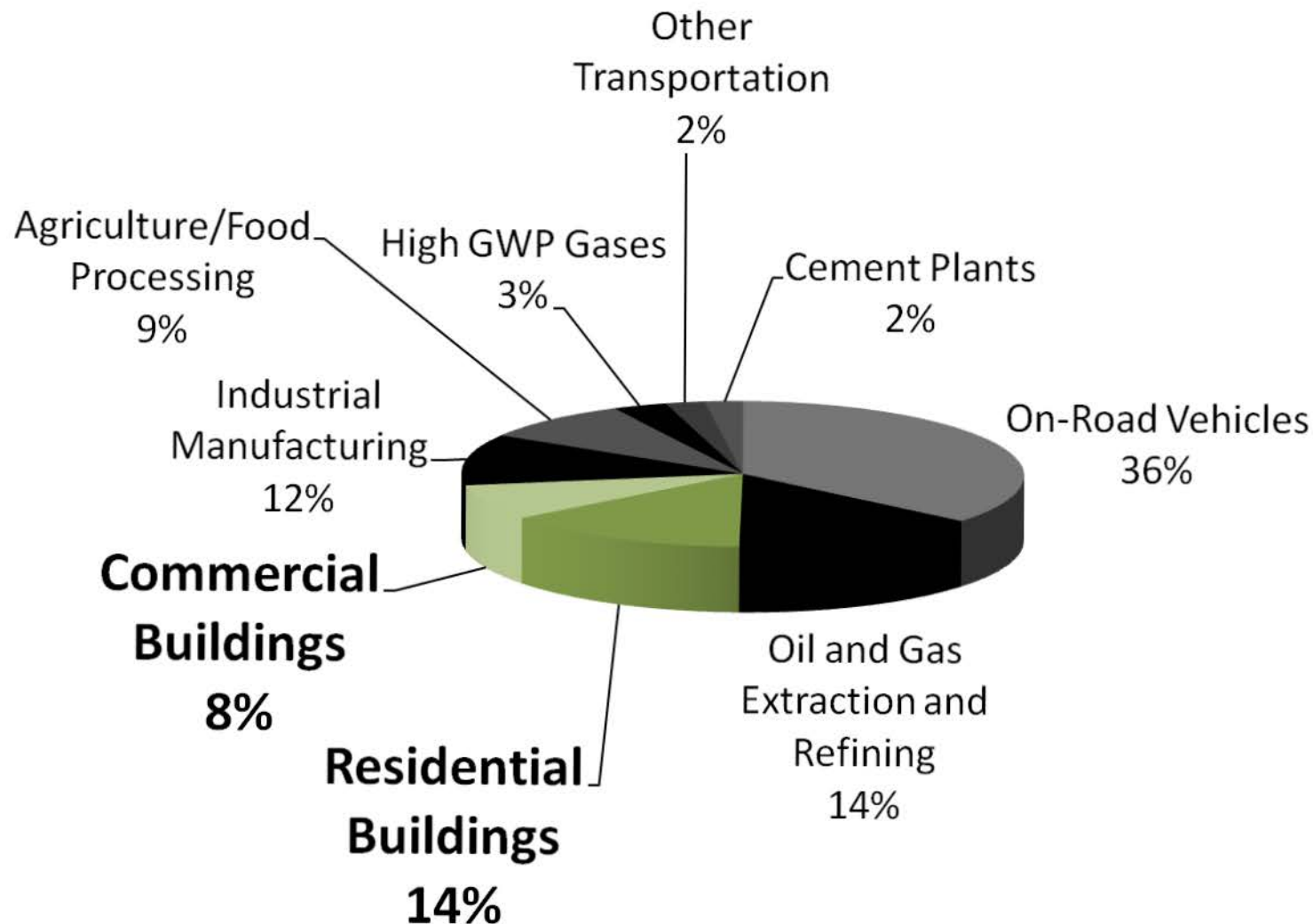


Assembly Natural Resources
Committee
Informational Hearing on Climate
Change
12/8/09
Oakland, CA

Karen Douglas
Chairman,
California Energy Commission

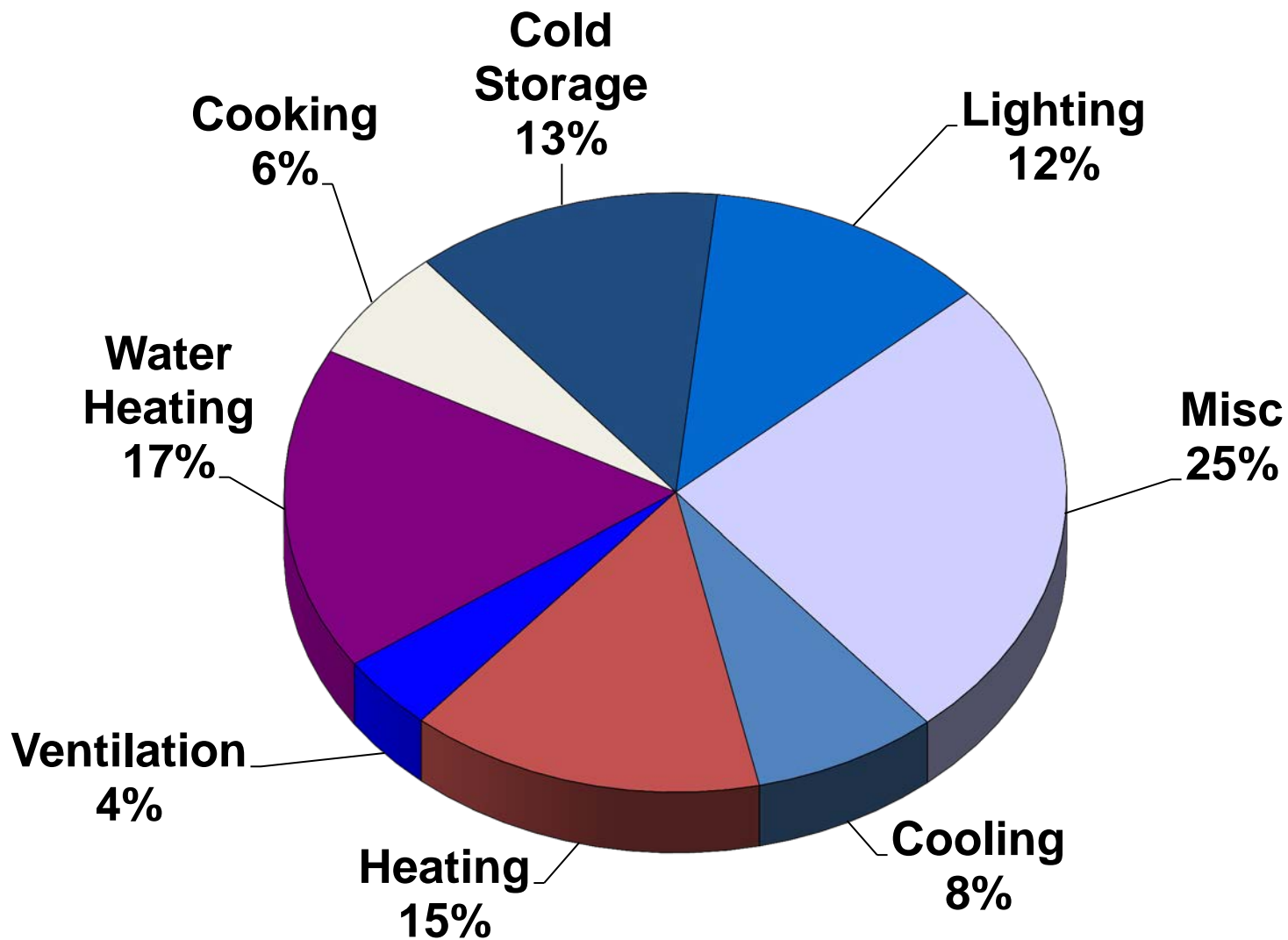


California Greenhouse Emissions by End-uses



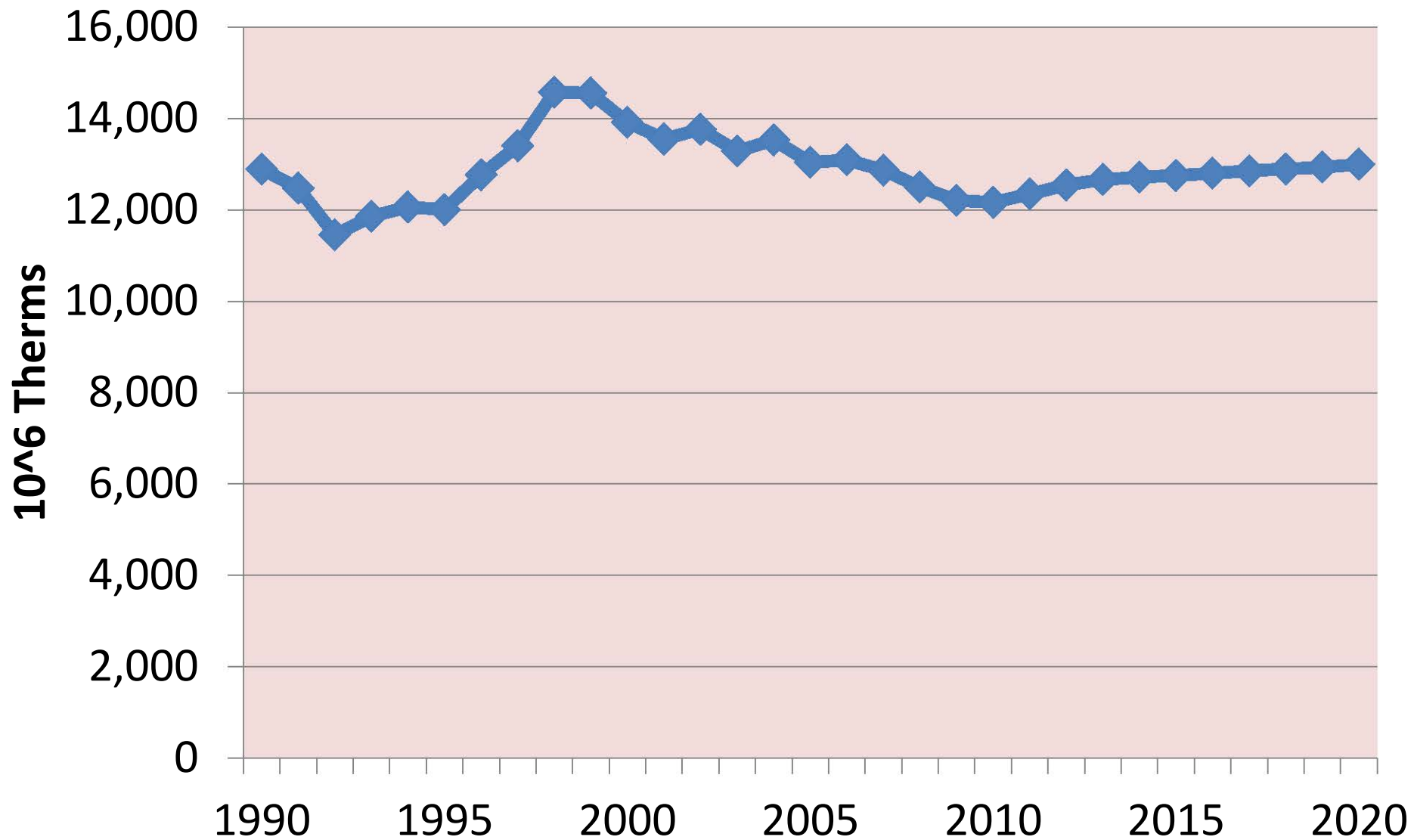


CA Buildings End Use GHG Emissions 2004



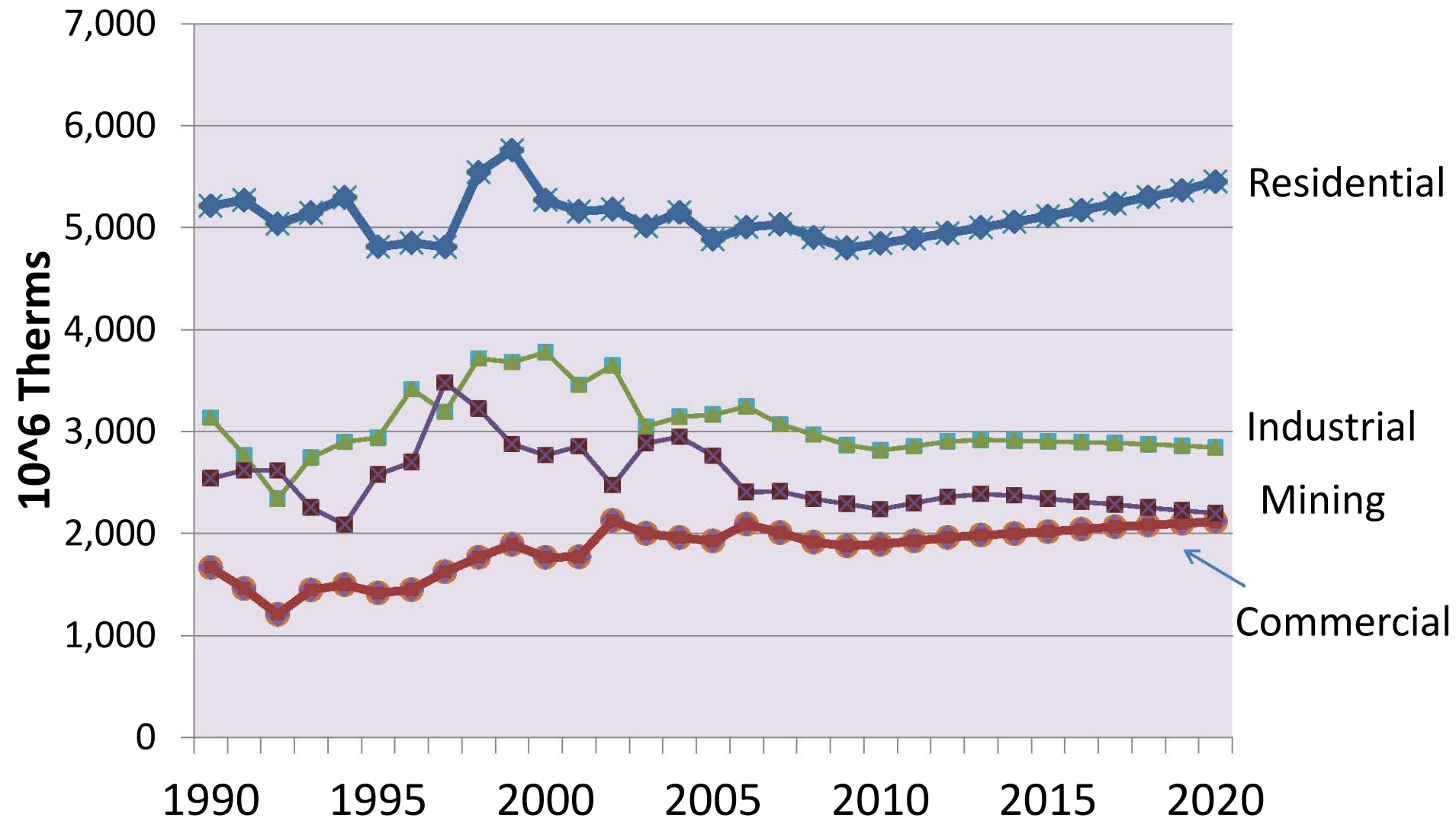


Statewide Natural Gas Consumption



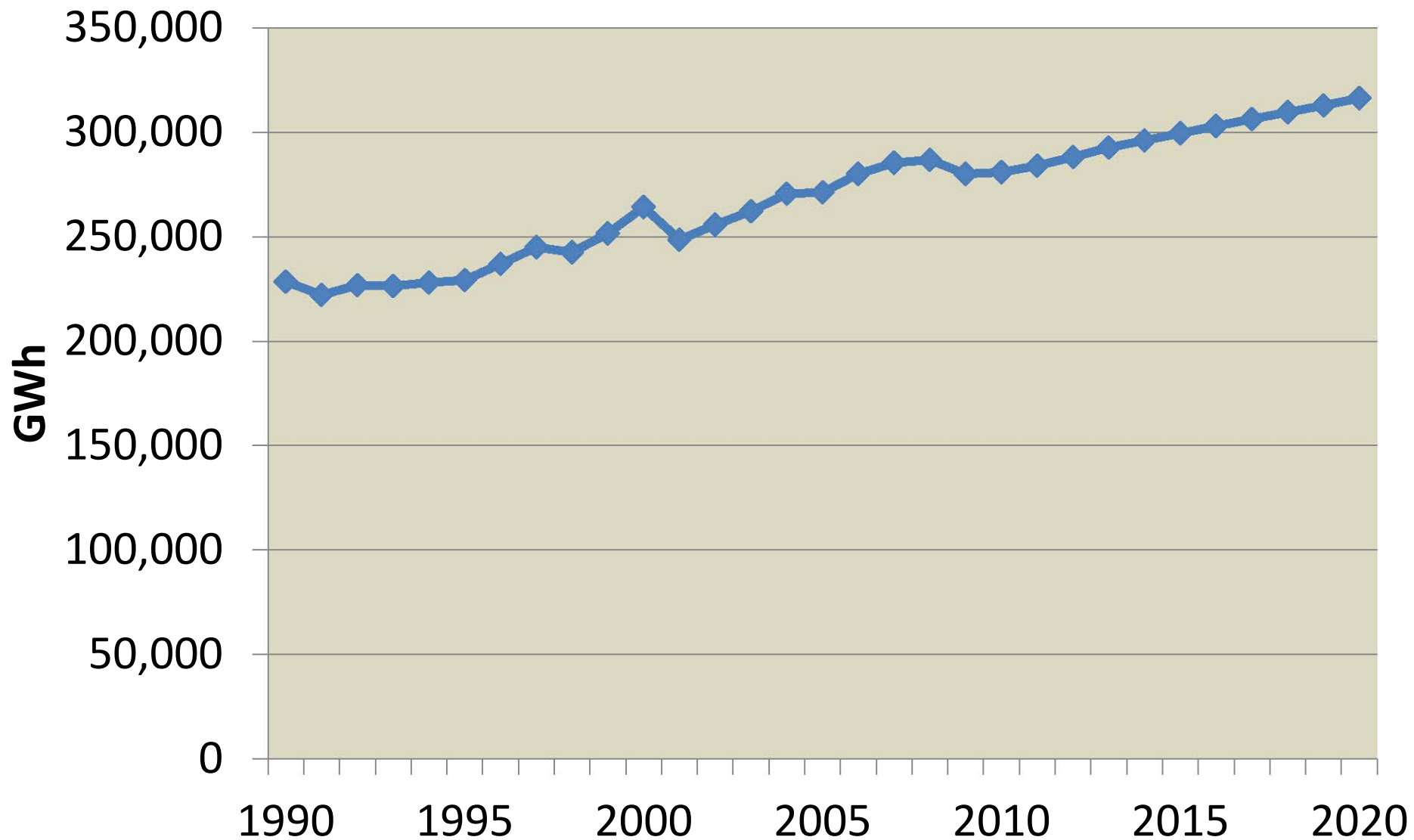


Statewide Natural Gas Consumption by Sector



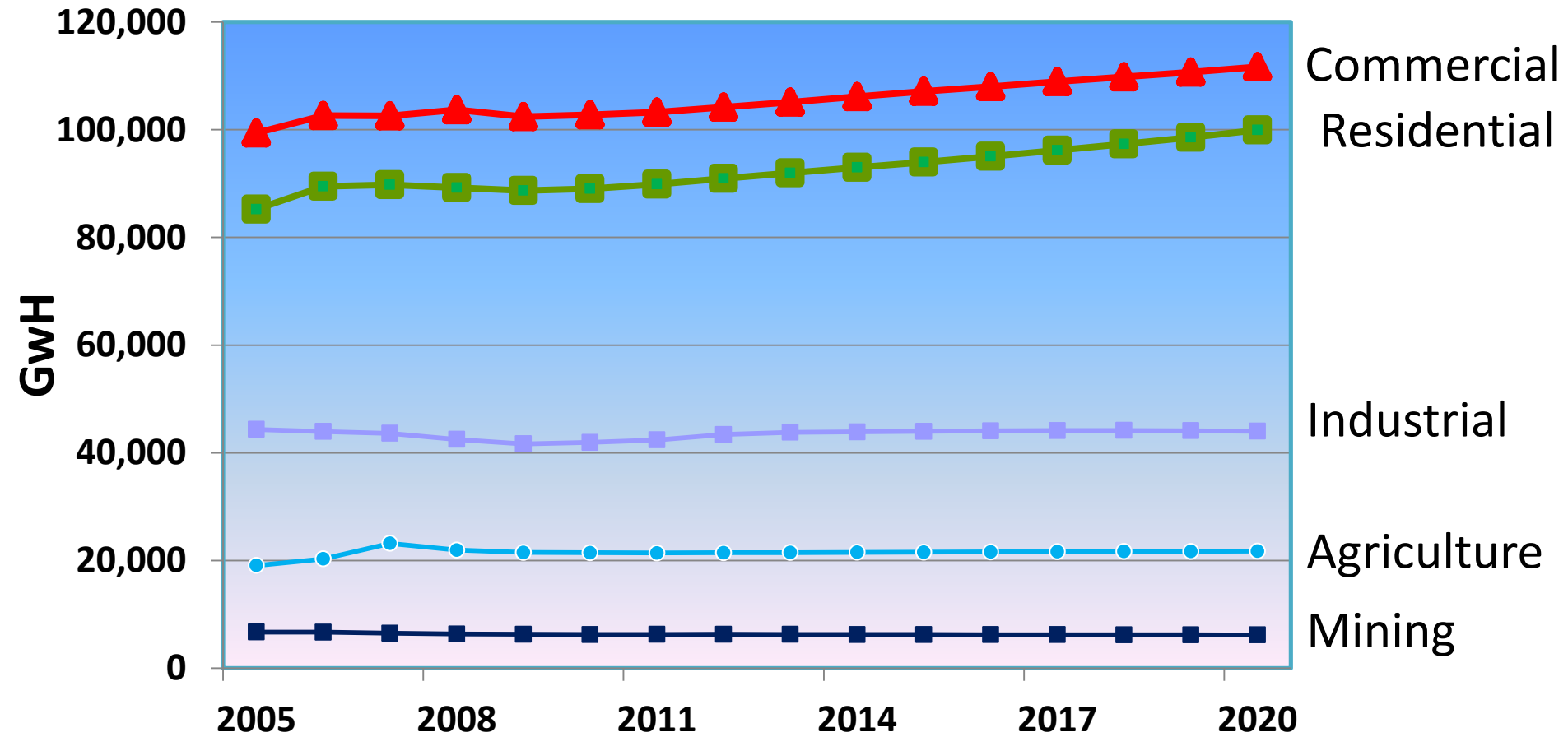


CA Electricity Demand Forecast 2020





CA Electricity Demand Forecast 2020





Zero Net-energy New Buildings

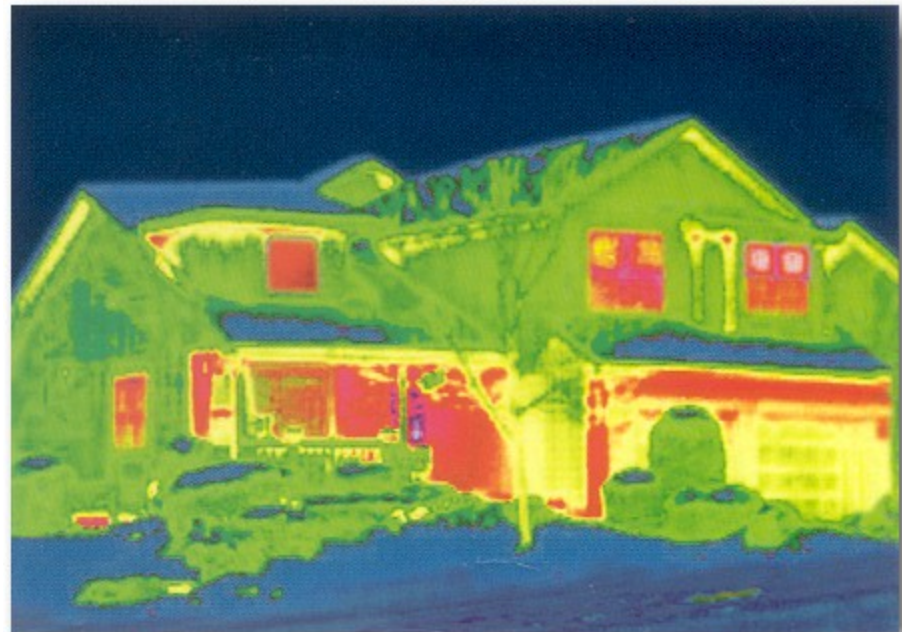
- All homes built after 2020 will produce as much energy as they consume
- All commercial buildings built after 2030 will produce as much energy as they consume





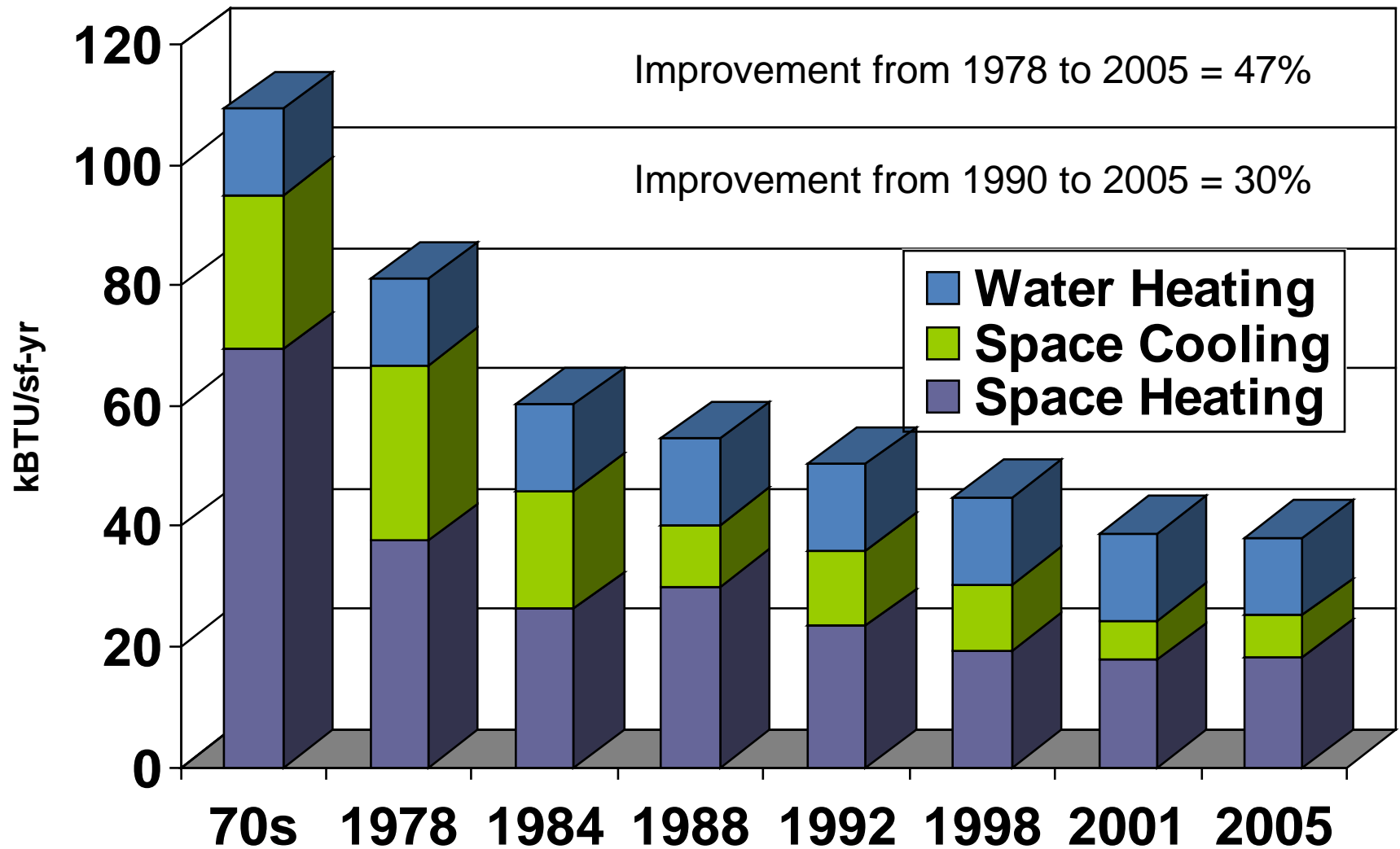
Existing Buildings

- 75% of CA's residential buildings and 5.25 billion square feet of commercial buildings were built before 1978's energy efficiency standards





Home Energy Use by Vintage





Existing Buildings Goals

| Building-type | Goal |
|---------------|--|
| Single Family | By 2020 <ul style="list-style-type: none">•25% of existing homes have a 70% decrease in purchased energy from 2008•75% have a 30% decrease |
| Multi-family | By 2020 <p>100% of existing multi-family homes have a 40% decrease in energy from 2008 levels</p> |
| Commercial | By 2030 <p>50 percent of existing buildings will be retrofit to zero net energy</p> |

California's Long Term Energy Efficiency Strategic Plan
<http://www.californiaenergyefficiency.com/docs/EEStrategicPlan.pdf>



Green Building

GHG Reduction Potential (26 MMT CO₂e)

| Green Building Strategies | New Construction | | Existing Buildings | Totals |
|---------------------------|---------------------|-------------|--------------------|--------|
| | Green Building Code | Beyond Code | Retrofits | |
| State | 0.02 | 0.09 | 0.9 | 1.0 |
| Public Schools | 0.08 | 0.1 | 1.2 | 1.4 |
| Residential | 1.1 | 0.4 | 10.4 | 11.9 |
| Commercial | 1.7 | 3.0 | 7.5 | 12.2 |
| Totals | 2.9 | 3.6 | 20 | 26 |



Present Barriers

Policy:

Lack of effective retrofit trigger mechanisms

Technical:

Fragmented existing building stock requires complex solutions

Consumer:

Widespread lack of awareness of costs and benefits

Financing:

Not widely available and tied to owner not property

Workforce:

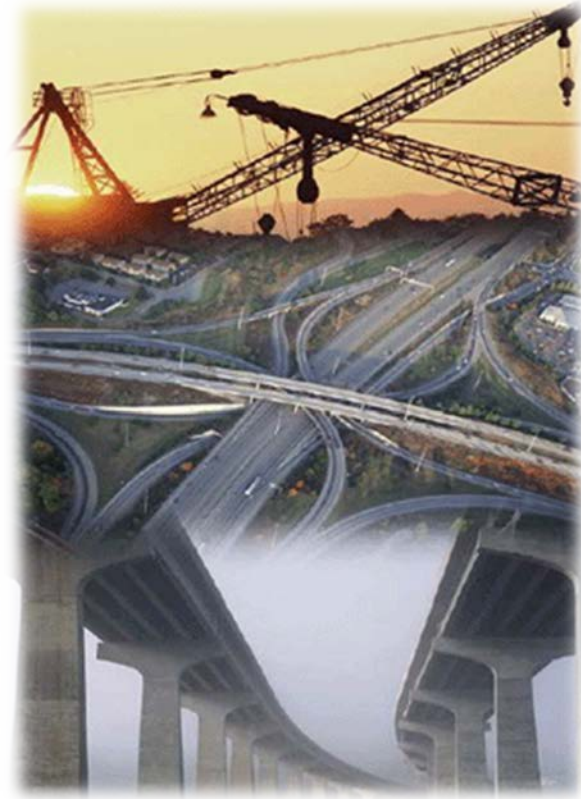
Gaps in knowledge, skills, and experience limit scale

Delivery:

Lack of coordination between existing low, moderate, and upper income programs

Existing Infrastructure

- HERS II and 1000+ HERS Raters
- CPUC Energy Efficiency Strategic Plan
- 2010-12 CPUC EE Decision



And Now.....

- AB 758 (2009, Skinner)
- Property Assessed Clean Energy (PACE) or AB 811 Programs
- American Recovery and Reinvestment Act (ARRA)

PACE

- Financing for commercial and residential property owners for energy and water retrofits
- Loans repaid over 20 years via annual property tax assessment
- PACE financing can be offered by municipal financing districts or finance companies

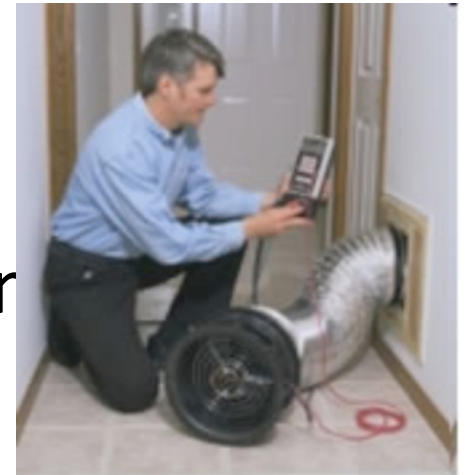


PACE

- Every major metropolitan areas in CA developing a PACE district
 - Los Angeles County (with all 88 jurisdictions in the County)
 - Association of Bay Area Governments
 - San Diego County and San Diego Association of Governments
 - Sacramento County and City and Sacramento Area Council of Governments
- California Communities JPA developing Statewide PACE program
 - Over 95 municipalities signed up for pilot program

Energy Commission ARRA Programs

- \$226 million - State Energy Program
- \$49.6 million - Energy Efficiency & Conservation Block Grant Program (for small jurisdictions only)
- \$35.6 million - State Energy Efficiency Appliance Rebate Program



www.energy.state.gov/recovery

State Energy Program - \$226 million

Funds Allocated for Energy Efficiency Include:

- \$95 million - Energy Efficiency Retrofit Programs
- \$25 million - Revolving Loan Program to retrofit state owned buildings
- \$20 million - Clean Energy Workforce Training Program
- \$25 million - local government loans





SEP Energy Efficiency Retrofit Program - \$95 million

- Municipal Financing Programs (PACE)
- Municipal/Commercial Retrofits
- Comprehensive Residential Retrofits





Green Workforce Training



www.energy.state.gov/greenjobs

AB 758 – Energy Efficiency Retrofits




AB 758

- Calls for a comprehensive program to achieve energy savings in CA's existing building stock



California Home Energy Rating Certificate

| | | | |
|--|--|--|---|
| Poor Energy Performance | 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 | Best Energy Performance | |
| YOUR HOME 155 | | | |
| Range for typical existing home 181-250 | | | |
| 2008 Standards New Home | | | |
| High Energy Efficiency / Solar Home | | | |
| Net Zero Energy Home | | | |
| Information goes here on compliance with other programs: | Energy Impact Greenhouse Gas Emissions Carbon Dioxide xxx tons/year Energy Consumption Electricity (kWh/year) --- Cooling --- Lights --- Appliances --- Total --- Natural Gas (therms/year) --- Space Heating --- Water Heating --- Total --- Operating Cost (\$/year) Electricity --- Gas --- Total --- Renewable Energy Production None Ancillary Energy Uses Swimming pool --- Spa --- Landscape lighting --- | Site Information Address 123 Jones Street Anywhere, California 9410x General Information Conditioned Floor Area 2,200 ft ² Bedrooms 4 House Type Single Family Foundation Type Slab-on-Grade Energy Efficiency Features Insulation Ceiling R-19 Wall R-11 Floor over crawlspace None Slab Edge None Windows Frame Aluminum Glazing Single Heating System Gas furnace, 0.80 AFUE Unsealed air distribution ducts Cooling System None Water Heating System Gas storage type, 0.52 EF | Official Home Energy Rating in conformance with the requirements of the California Energy Commission www.energy.ca.gov  HERS Provider: Acme Energy Rated Homes 934 Energy Efficient Way Power Junction, California www.AcmeEnergyRatedHomes.com Rating Information Rating Number xxxx-yyyy Certified Rater EPA, Inc. Stockton, CA Rating Date: January 04, yyyy Rater Signature _____ Date _____ |

Next Steps on AB 758:



- Use ARRA SEP to pilot workforce development, financing and retrofit concepts
- Pilot rating, retrofit and financing program concepts with utility partners
- Complete concept paper & discuss with key partners
- Open formal rulemaking by March 2010
- Conduct workshops throughout 2010

Summation

- California's existing building stock is the second largest contributor to the State's emissions profile
- State has adopted ambitious goals for existing buildings
- AB 758, HERS and ARRA give the State new tools to implement a model existing buildings program