

Funding Energy Efficiency Research

Public Interest Energy Research (PIER) California Energy Commission

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Buildings End-Use Efficiency Program**

SCAQMD
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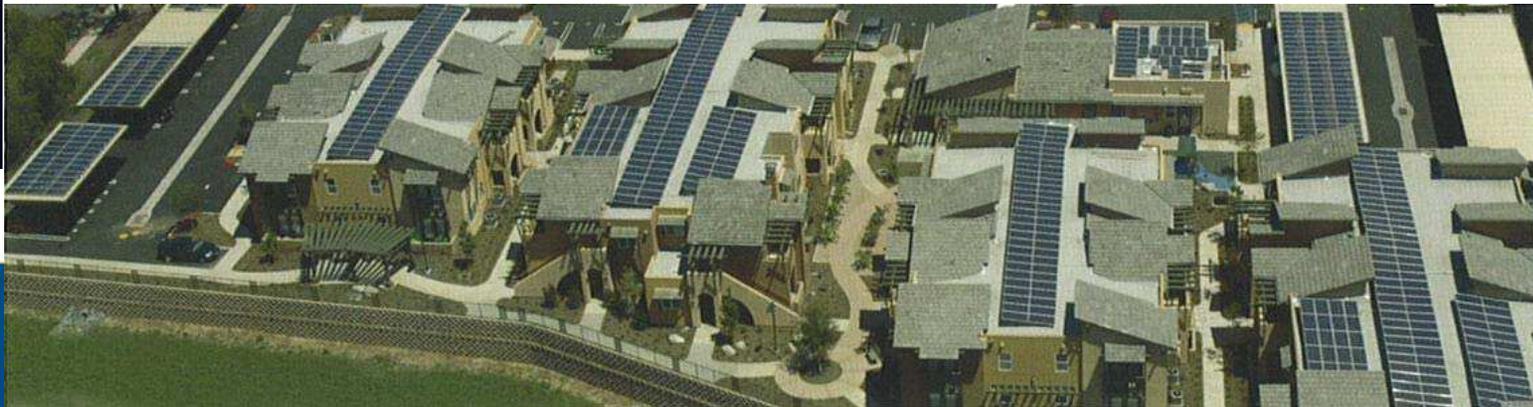
Intro: Energy Commission Functions

- ❑ Develop state energy policy; advise Governor and Legislature
- ❑ License power plants
- ❑ Assess energy supply and demand
- ❑ Administer various renewable energy programs; provide education on renewables
- ❑ Administer building & appliance efficiency standards; provide financial and technical assistance to public agencies for energy efficiency improvements
- ❑ **Advance energy technologies**



Advancing Technology through Research: Public Interest Energy Research (PIER) Program

- ❑ Initiated in 1998 w/electricity deregulation; funded at \$62.5M/yr
- ❑ Today, \$83.5M/yr includes natural gas research
- ❑ Funds come from a small surcharge on electric bills
- ❑ PIER Mission: improve quality of life for Californians
 - ❑ Environmentally safe, sound, reliable, affordable energy services and products



"Research Powers the Future"

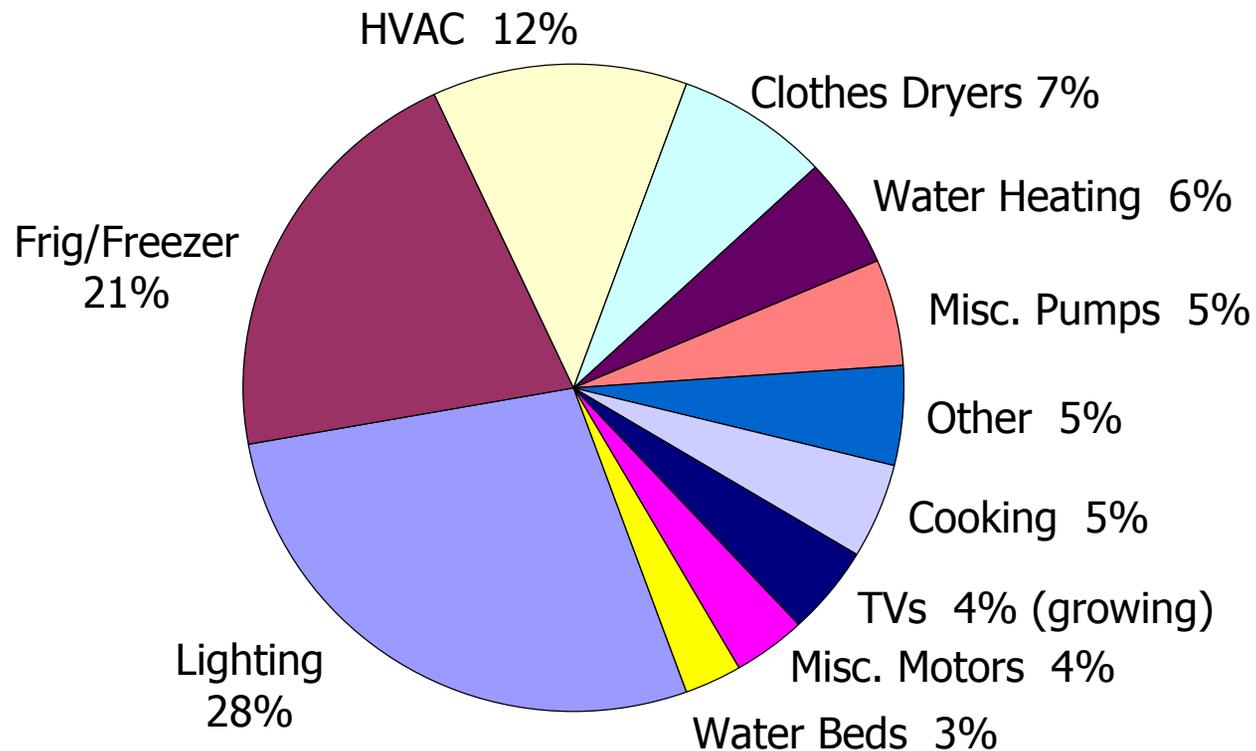


PIER Research Areas

- ❑ Buildings, Appliances, & Consumer Electronics
- ❑ Demand Response
- ❑ Clean Advanced Electricity Generation
- ❑ Electricity Transmission/Advanced Grid Technol.
- ❑ Renewable Energy
- ❑ Energy-Related Environmental Research
- ❑ Industrial/Agriculture/Water End-Use Efficiency
- ❑ Transportation
- ❑ Climate Science
- ❑ Energy Innovations (Small Grants Program)



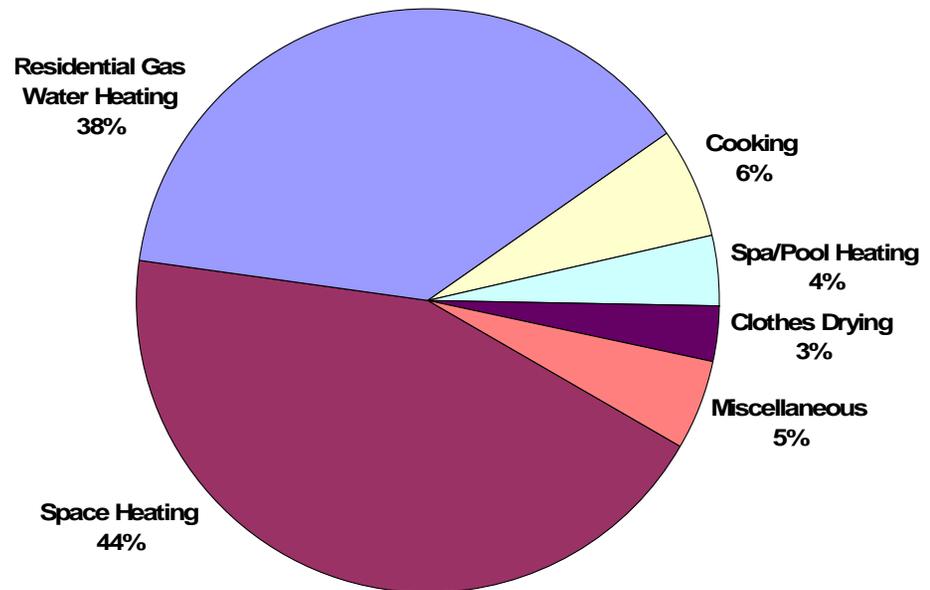
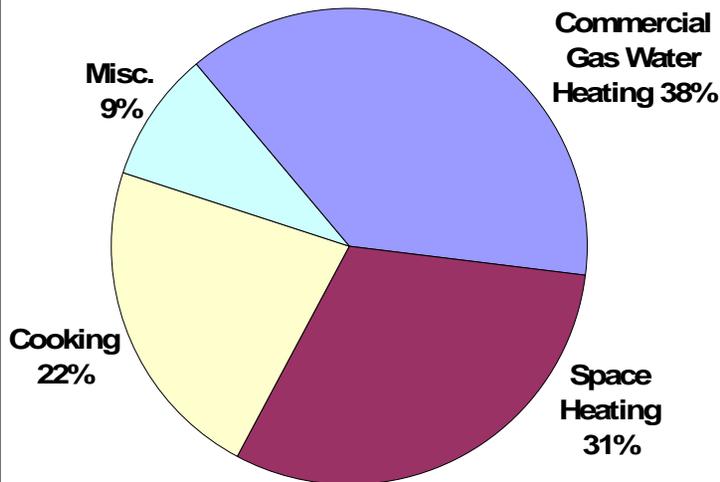
California's Residential Electricity Use



2007 CA consumption (GWh/yr): Statewide - 250,000
(Commercial - 90,000, Residential - 75,000, Industry - 54,000, Other - 33,000)

California's Natural Gas Energy Use

Gas water heating is the largest gas end use in California with 38% for commercial and residential or ~2,700 million therms/yr (space heating is in close second place)



PIER Research Centers & Collaborative Partnerships

- ❑ California Lighting Technology Center – UC Davis (CLTC)
- ❑ Western Cooling Efficiency Center – UC Davis (WCEC)
- ❑ Center for the Built Environment – UC Berkeley (CBE)
- ❑ Lighting Research Center – New York (LRC)
- ❑ California Commissioning Collaborative (CaCx)
- ❑ Consortium for Energy Efficiency (CEE)
- ❑ National Lighting Product Information Program (NLPIP)
- ❑ National Building Controls Information Program (NBCIP)
- ❑ National Association of State Energy Offices (NASEO)



PIER Lighting Research

Decorative (and Energy Efficient) Residential Light Fixtures



Lighting (cont'd)



Full-spectrum desk lamp



LED task lamp

Hybrid Bi-Level Exterior Porch Lighting



**2-watt LED on during nighttime
Motion sensor activates CFL (compact fluor.)
50-75% energy savings**

Residential Kitchen Lighting



Fluorescent, energy code compliant: 300-400 watts



Coming: LED, 100-150 watts

Examples of Nonresidential Research: Integrated Office Lighting System



Task Illuminance 40-60fc

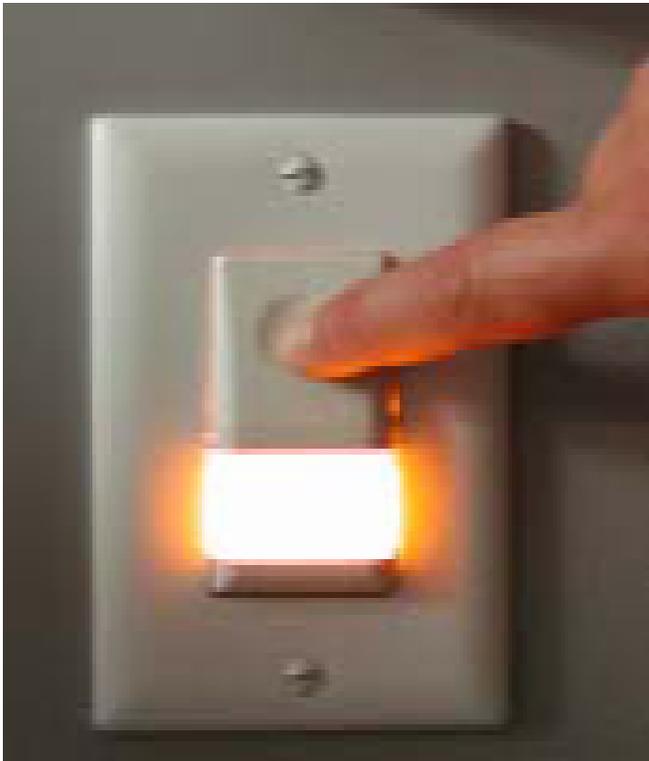
Before RETROFIT / 80watts



Task Illuminance 45-55fc

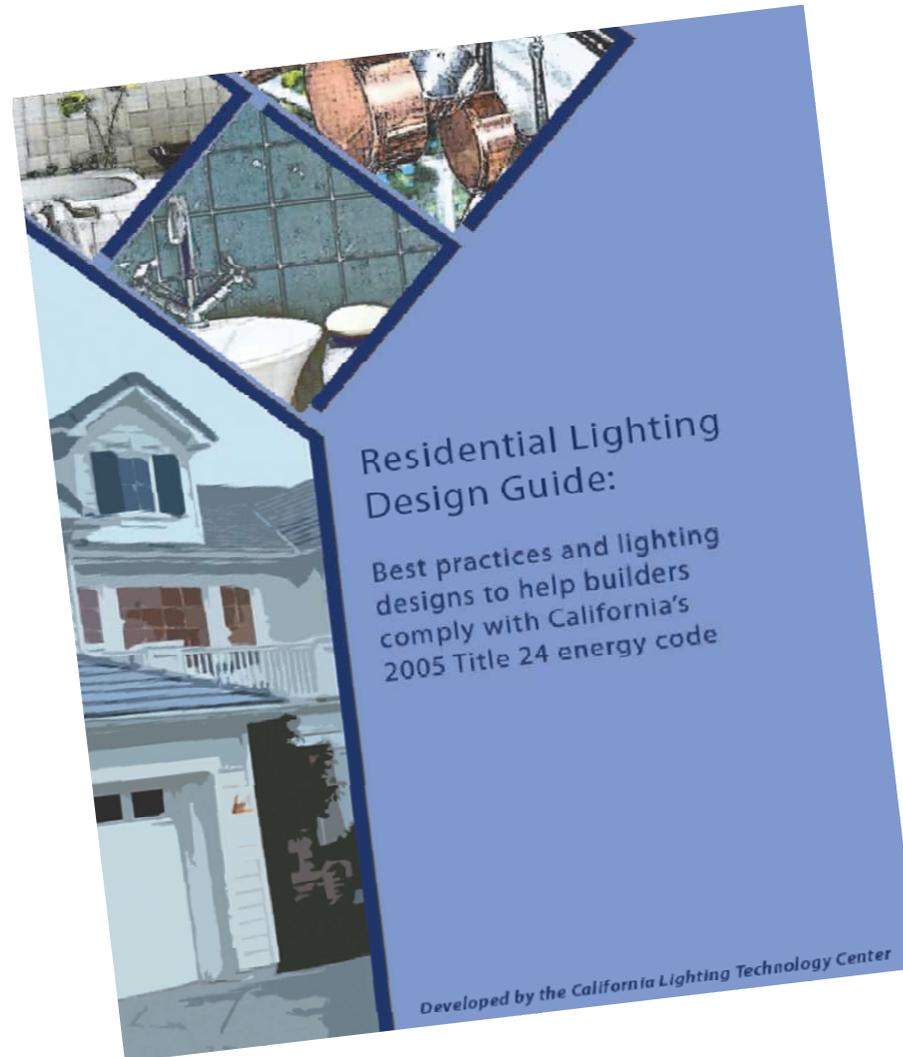
After RETROFIT / 13.65watts

Hotel Bathroom or Room Lighting



- ❑ Low-wattage light on switch provides enough light to see by
- ❑ Can manually or automatically turn on (energy-efficient) overhead light if needed
- ❑ Automatically turns overhead light off

Outreach to California Home Builders



Building Envelope Research

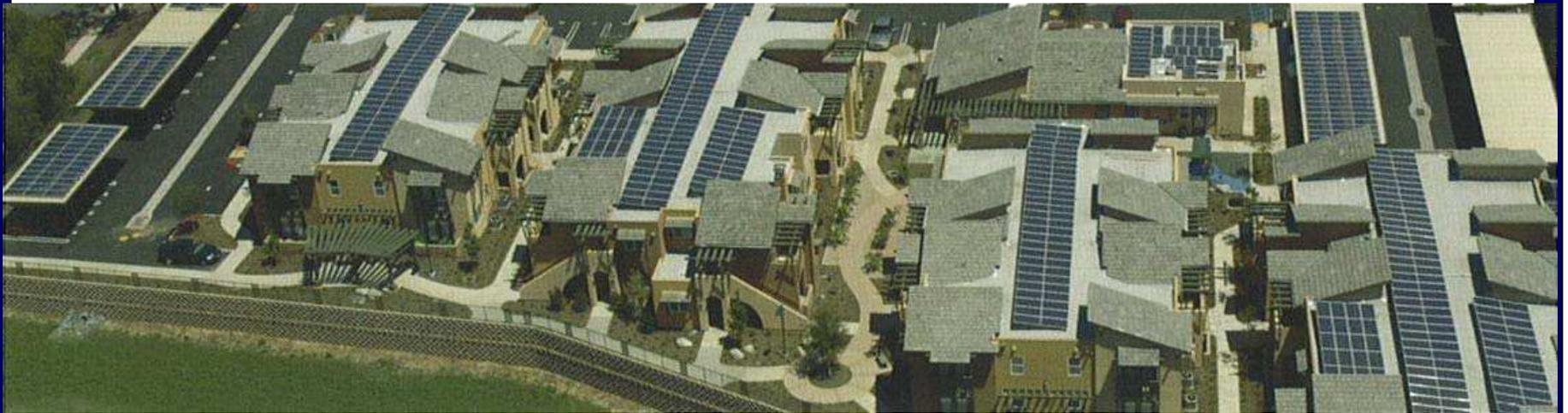
Mold Prevention



Vapor retarder and air sealant – from ***A California Builder's Guide to Reducing Mold Risk***

Zero Energy Homes Research

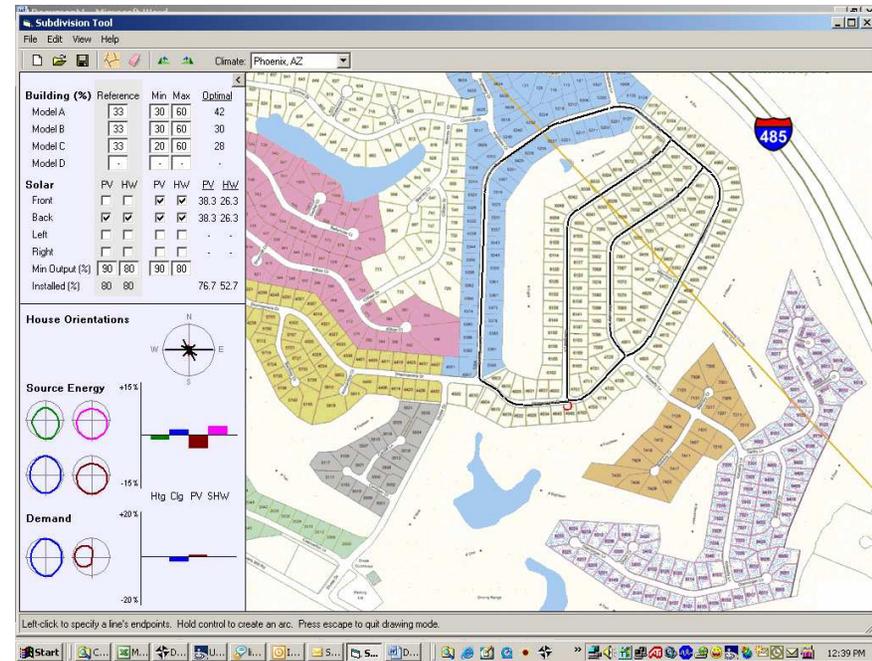
**Combining super-energy efficiency with
electricity generation onsite (mostly solar)**



Solara affordable housing
(apartment complex), Poway, CA

Community-Level Design Tools Research

- ❑ **Subdivision Energy Analysis Tool (SEAT)**
 - ❑ Optimize house orientation & use of solar
- ❑ **Energy Efficient Community Development Research Project**
 - ❑ Build land use scenarios, model energy use and overall enviro'l impacts

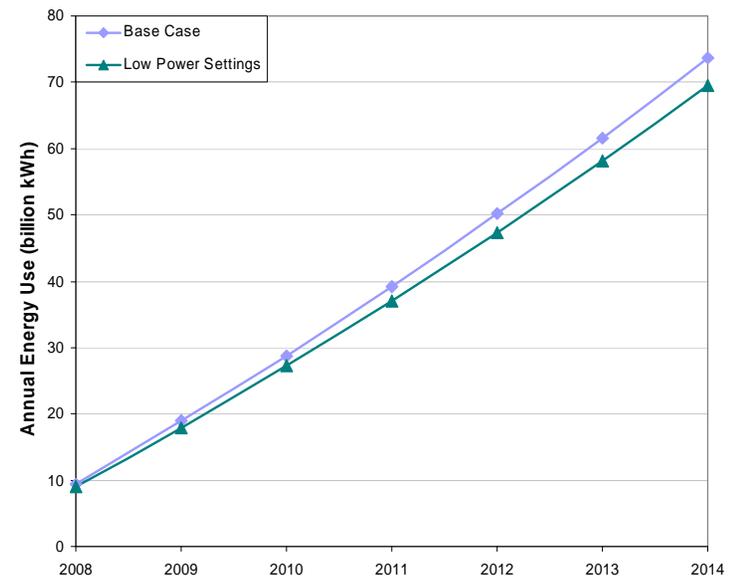


Emerging Issue for 2008

Federally mandated switch to digital TV by 2/09

- ❑ Conventional TV ~ 45 W
- ❑ Conventional TV w/digital tuner ~ 80 W
- ❑ 42" LCD TV ~ 90 W
- ❑ 42" Plasma TV ~ **340 W**

Projected National Annual
Energy Use of New TVs
2008-2014



Other PIER Buildings Research Topics

- Residential Duct Systems
- Evaporative Cooling
- Thermostats
- Water Heating
- HVAC and controls
- Parking Lot Lighting
- Thermal Comfort Modeling
- Occupant Satisfaction Surveys for Comfort
- Many, many more...



We released a \$9M Request
for Proposals in June 2008



Thank You!

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PIER Buildings End-use Efficiency Program
California Energy Commission

www.energy.ca.gov/research

