

# State Building Measures to Reduce Greenhouse Gas Emissions

State Operations Group Public Workshop

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STATE OF CALIFORNIA



Department of General Services

BUILDING GREEN • BUYING GREEN • WORKING GREEN

# California State Metrics

- **\$10 Billion** annual State Gov't purchases
- **\$3-4 Billion** annual design & construction
- 38 Million population
  - 22,500 structures > 205 M sq. ft.
  - 21 Million sq. ft. of Building Leases
  - 212,000 State Employees
  - 315,000 Corrections “Residents”
  - 5,000 patients of State Mental Hospitals
- 2.1 million acres of State land
- 16,000 miles of state highways

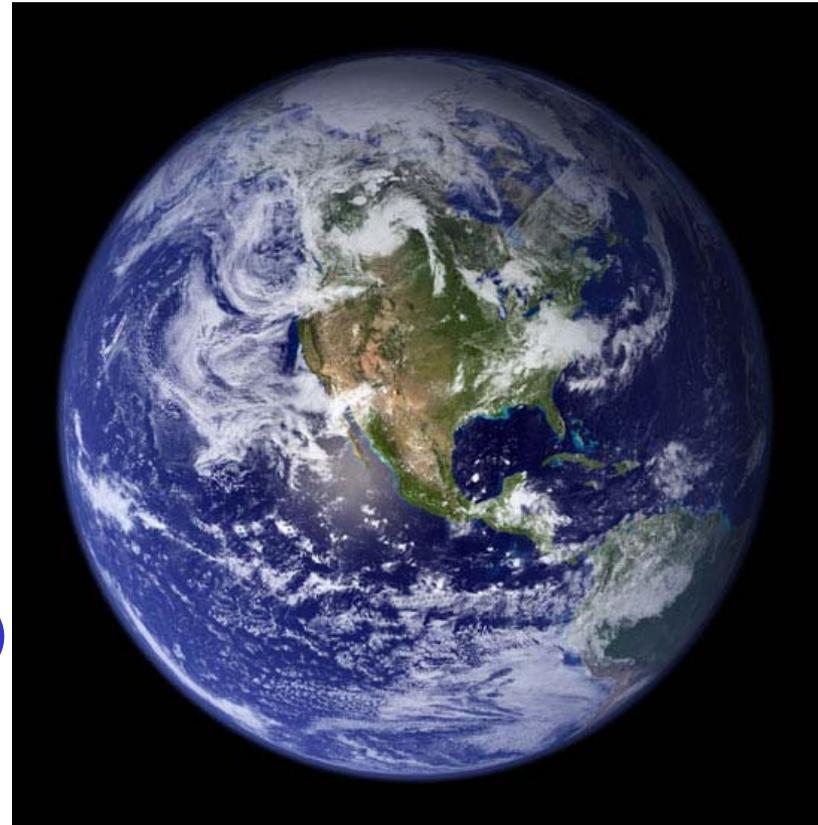
# California's Economy

## 8<sup>th</sup> Largest Economy in the World

1. United States
2. Japan
3. China
4. Germany
5. France
6. United Kingdom
7. Italy
8. **California**
  - **\$2 Trillion (13% of US GDP)**

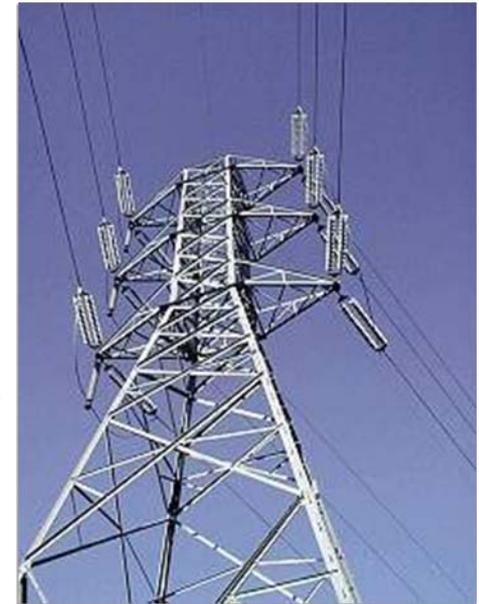
## 35<sup>th</sup> Largest by population

- Behind Kenya



# California's Motivations for Building Green

- **Lower Operating Costs**
  - Reduced energy use
  - Conserve water, lower maintenance
- **Customer / Occupant Satisfaction**
  - Improved comfort and indoor air quality
- **Good for the Environment**
  - Reduced greenhouse gas emissions
  - Reduced environmental impact
  - Reduce Waste
- **Government Regulation**

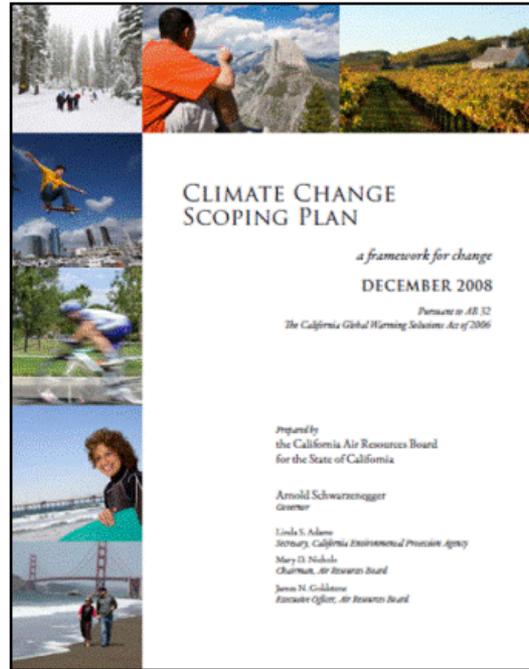


# CA Gov't. Green Building Directives

1. California Executive Order S-20-04 & Green Building Action Plan

2. California Global Warming Solutions Act of 2006 AB-32

3. 2010 California Green Building Standards Code



**CAL Green**

# Executive Order S-20-04

– Signed December 14, 2004



# Executive Order S-20-04

- Reduce grid-based energy purchases for state-owned buildings by 20% by 2015
  - For executive branch agencies, departments, and other entities
  - Design, construct, and operate all new and renovated state-owned and state-funded facilities to LEED Silver or higher certification.
  - Identify appropriate financing and project delivery mechanisms to achieve goals
  - Seek out U.S. EPA Energy Star office leases

# LEED-NC (for New Construction)

- LEED Silver Certification for buildings >10K s.f.
- 18 buildings LEED-NC certified (4 M sq.ft.)
- 218 buildings pursuing LEED-NC (>6 M sq.ft.)
- Other agencies pursuing LEED-NC (13.5 M sq.ft.)
  - Dept. of Corrections and Rehabilitations (CDCR)
  - Water Resources (DWR)
  - Transportation (CalTrans)
  - CalSTRS
  - Courts
  - Higher Education





# LEED-NC (Continued)

- Buildings statewide under 10,000 sq.ft. are also built to LEED-NC standards; formal certification is not required.
- Average energy savings > 25% Title 24.
- Non-energy benefits-reduced GHG (green house gases), water, waste, and improved air quality.



# Build-to-Suit Leases

- All build-to-suit Leases LEED-NC Silver or Higher
  - 3 projects already LEED certified-all of them DMV (Dept. of Motor Vehicles).
  - Multiple other projects through State on the road to LEED certification



# CA Requirements: LEED-EB

- Existing State Buildings >50,000 sq. ft.
- Status - 23 Buildings Certified
  - >200 buildings next 7 years



Dept. of Education  
LEED-EB Platinum  
(June 2006)



Dept. Public Health – 4 bldgs.  
LEED-EB Gold (Feb 2008)



Cal EPA Headquarters  
LEED-EB Platinum  
(2003, 2010)

# Benefits of Building Commissioning

- **Cost and Energy Savings**
  - Energy - 10 to 15 Percent savings over non-commissioned buildings
  - Reduced change orders
- **Customer / Occupant Satisfaction**
  - Improved comfort and indoor air quality
- **Smoother Construction Process**
  - Avoided construction problems, reduced callbacks
- **Meet LEED certification requirements**

# LBNL Commissioning Study

<http://cx.lbl.gov/2009-assessment.html>

- “The Cost Effectiveness of Commercial Building Commissioning”
- 643 Buildings Studied (both new and existing)
  - >99M sq. ft. in 26 States
- Commissioning Costs/Benefits
  - Exist. Bldgs - 16% energy savings
    - Cost: \$0.30/s.f. – Energy payback 1.1 years
  - New Bldgs – 13% energy savings
    - Cost: \$1.16/s.f. (~0.4% of total const. cost)
    - Energy payback 4.2 years
  - Extensive non-energy benefits often offset part or all of the commissioning cost



# Retro-commissioning (RCx) Program

- All state-owned buildings > 50,000 ft.sq. RCx and recommissioned on a 5-year cycle
- Projects Completed to date:
  - Avg. >10% verified electrical savings-avg. payback < 3 years
  - Avg. projected electrical savings for measures yet to be implemented-approx 15% with avg. payback approx 4 years
  - Avg. natural gas savings approx. 16%

# Small Building Retrofit Model

- Bldgs. < 50,000 ft.sq. make up 2/3 of state-owned office space
- Strategies include:
  - Rooftop packaged unit tune-up program
  - New HVAC (Heating, Ventilation & Air Conditioning) technology; duct sealing
  - LED lighting for work and parking lots
  - Load shifting to off-peak usage
  - Monitor, track, and calculate GHG (greenhouse gas) emissions

# 2010 California Green Building Standards Code



- CA Code of Regulations, Title 24, Part 11
- 2008 code took effect August 1, 2009
  - Mostly voluntary measures, some mandatory
- 2010 Code takes effect January 1, 2011
  - Includes numerous mandatory measures
    - 20% less water use
    - 50% C&D waste diversion
    - Building commissioning
    - Low emitting materials

– [www.bsc.ca.gov/CALGreen](http://www.bsc.ca.gov/CALGreen)



# Clean On-site Power Generation



# Clean On-site generation – Solar Power Purchase Agreements

- Phase I - 4.2 MW; 8 facilities
  - CDCR, DOT, State Universities
  - >10 M kWh generated to date.
  - >12 M pounds of CO2 reduction (5,500 metric tons).
- Phase II -12 MW;
  - State Universities solar projects awarded: expected completion 1<sup>st</sup> Quarter 2013
  - CDCR & Dept. of Mental Health facilities

# Clean On-Site Generation

- Being Evaluated – Power Purchase Agreements for:
  - Fuel Cells
  - Wind
  - Solar Heating & Cooling
  - Geothermal
  - Biomass

# State Purchasing Policies

- Environmental Preferable Purchasing 12400
  - “...**environmentally preferable purchasing** means the procurement or acquisition of goods and services that **have a lesser or reduced effect on human health and the environment when compared with competing goods or services that serve the same purpose.**”
  - California Public Contract Code Section 12400-12404 ([www.leginfo.ca.gov](http://www.leginfo.ca.gov) )

# Environmentally Preferable Products

Consider entire product life cycle:

- Raw Materials Acquisition
- Production
- Manufacturing
- Packaging
- Distribution
- Energy Efficiency
- Needs of Purchaser
- Product Performance
- Operation
- Maintenance
- Durability
- Safety
- Cost
- Reuse
- Disposal

# Environmentally Preferred Purchasing (EPP)

- Training and outreach programs:
  - EPP Best Practices Manual, user-friendly website
  - Contracts available for local government & public schools
  - See: [www.green.ca.gov/EPP](http://www.green.ca.gov/EPP)
- Successes include:
  - “CA Gold” carpet standard NSF 140 Platinum Standard
  - Lamps: lowest mercury levels in U.S.A.
  - Systems furniture with low VOC (Volatile Organic Compounds), high recycled content & energy efficient lighting

# EPP (Cont.)

- Paper products
  - process chlorine-free, high post-consumer recycled content
- Cleaning and janitorial supplies:
  - 3<sup>rd</sup> party certified
- PC (personal computer) goods
  - EPEAT (Electronic Product Environmental Assessment Tool) process Silver certified or better.
- Vehicles: Best Value purchasing
  - Low emissions standards
  - “Best Value” bids consider fuel cost & emissions

# State of California Online Resources

- Green Building Database

[www.greenbuildings.dgs.ca.gov](http://www.greenbuildings.dgs.ca.gov)

- Interactive Map
- Spreadsheet

- Green California Website [www.green.ca.gov](http://www.green.ca.gov)

- Commissioning Toolkit [www.green.ca.gov/CxToolKit](http://www.green.ca.gov/CxToolKit)
- Green Building Executive Order & Green Building Action Plan
- LCCA Model
- Many other programs

- USGBC Government Resources

[www.usgbc.org/DisplayPage.aspx?CMSPageID=1779](http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1779)

# Thank You – Any Questions?

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