

# California's 1990 GHG Emission Level and Emission Estimates from the Electricity Sector



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# Statewide GHG Emissions Level

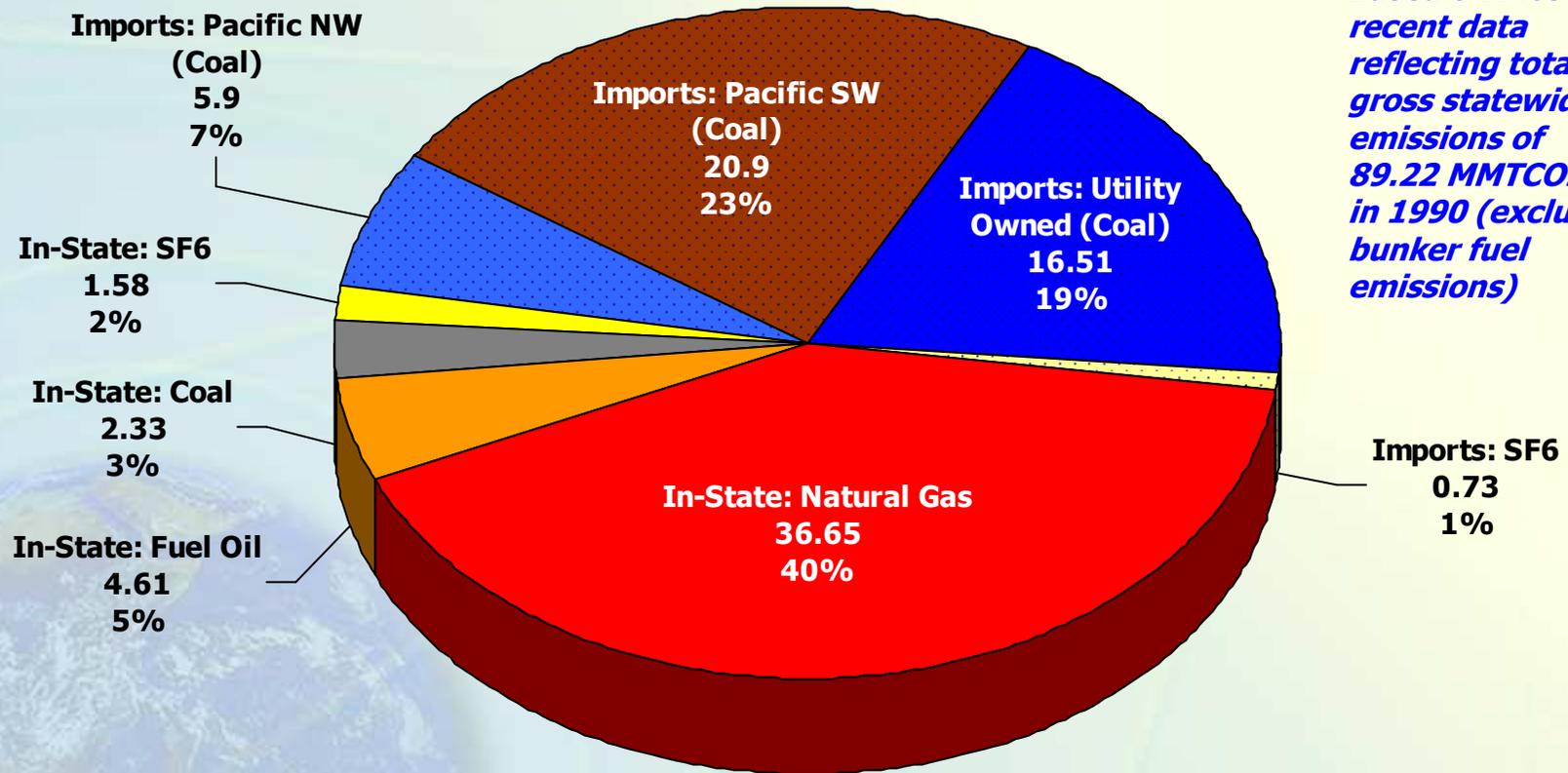
AB32 requires the Air Resources Board to:

- Determine 1990 statewide emissions level
- Consider all six Kyoto gases
- Establish 2020 limit equivalent to 1990 level
- Use best available data
- Present for ARB Board consideration by January 1, 2008

# The Electric Power Sector

- Electric power generation consists of In-State and Imported power
- In-State power GHG emissions based on fuel use (natural gas, fuel oil and coal)
- Imported power GHG emissions come from out-of-state coal plants, some owned by in-state utilities (Intermountain & Mojave)
- All electricity flows cause emissions of SF6 from the use of the power grid

# Electric Power Sector GHG Emissions in 1990



Source: California Energy Commission; Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004

# Existing 1990 Emissions Estimate for Electric Power Sector (In-State)

- Estimated using federal (EIA) data
- Based on fuel use
  - Natural Gas
  - Fuel Oil (Distillate & Residual)
  - Coal
- Estimates from utilities, merchant owned power, and CHP
- Estimates from utilities are plant-specific

# Existing 1990 Emissions Estimate for Electric Power Sector (Imports)

- Estimates based on MWhrs imported from Pacific SW, Pacific NW or out of state utility-owned coal plants
  - Determine average fuel mix from each region
  - Determine average heat rate (10,000 BTU/kW currently used)
  - Line losses not considered

# Existing Electric Power Sector Factors for Determining Emissions

MTCO2E=Fuel Use x Heat Content x EF		EF: MTCO2E/MMBTU		
Fuel (Units)	Heat Content (MMBTU/Unit)	CO2	CH4	N2O
Natural Gas (MMCF)	1,032	0.053	0.00002	0.00003
Distillate Oil (MGAL)	138.7	0.073	0.00007	0.00020
Residual Oil (MGAL)	149.7	0.079	0.00007	0.00020
Coal (TONS)	23.5	0.094	0.00002	0.00046

**MTCO2E**-Metric Tons of CO2 Equivalents (CH4-21 SAR GWP; N2O-310 SAR GWP)

**MMCF**-Million Cubic Feet

**MGAL**-Thousand Gallons

**MMBTU**-Million British Thermal Units

**Note:** Combustion emissions of CH4 and N2O, even with their GWP factored in as in the table above, are combined less than 0.5% of the CO2 emissions

**Source:** EIA (Heat Content & CO2 EFs), IPCC (CH4 & N2O EFs)

# Existing SF6 Emissions Estimates

- SF6 (MMTCO2E) =  
MWhrs Consumed (in state) x  
SF6 emissions (nationwide lbs) /  
MWhrs Consumed (nationwide) x  
Global Warming Potential x  
4.54 x 10<sup>-10</sup> MMT/lb
- Estimate for 1990: 2.32 MMTCO2E

# **Draft Improvements for 1990 Emissions Estimates (In-State)**

- Use EIA facility specific data for 1990 Utility Owned generation (completed)
- Use specific SF6 usage data from utility and other power line owners where available (pending)

## **Draft Improvements for 1990 Emissions Estimates (Imports)**

- Obtain actual emissions data for Intermountain Power & Mojave (out-of-state utility owned coal)
- Obtain plant specific emissions where known and available
- For remaining imports, use regional emission factors
- Incorporate line losses where possible

# Schedule

- Improved 1990 GHG estimate from electric power expected in early summer
- On-going stakeholder discussions of improved estimates
- Staff Report in October
- Board Hearing late 2007

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