California Forestry Association
2007 Annual Meeting

California’s Latest Greenhouse Gas Emissions Inventory

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Summary

- Types of GHG Inventories
- 1990-2004 GHG Inventory
- Comparison to Climate Action Team (CAT) GHG Inventory
- Forest-related GHG abatement opportunities
Types of GHG Inventories

- “Top-Down” GHG inventory
  - Sum up activities
  - Calculate emissions from sums

- “Bottoms-Up” GHG inventory
  - Calculate detailed emissions at a site
  - Sum up emissions
GHG Inventory Scope

- Anthropogenic only
- In-State GHG emissions only (does include imported electricity)
- Does not include fuels used in international shipping or travel
- Not a “fuel-cycle” analysis of strategies
1990-2004 GHG Inventory

- Major gases
- GHG emissions trends
- Major emissions categories
1990-2004 GHG Inventory by Gas

- Fossil Fuel Combustion CO₂: 81.0%
- Non-Fossil Fuel CO₂: 2.8%
- Nitrous Oxide: 6.8%
- Methane: 5.7%
- High GWP Gases: 2.9%
Forest-related GHG Emissions Calculations

Calculations include:

- Sinks (removals) from acreage remaining & growing, continuing to absorb carbon dioxide from atmosphere
- Emissions from reduced acreage of lands devoted to timber, mostly due to fires and harvest (changes in canopy)
Forest Calculations Cause of Change

- Fires
- Harvest
- Development (land conversions)
- Other or unverified
Forest and Range Land Calculations
(Emissions and Sinks)


- 1990-93: Extend backward using FRAP value of -0.17%/year

- 2001-04: Extend forward using US Sec. of Ag estimate for Pacific of -0.07%/year
1990-2004 GHG Inventory

California's Gross Forestry, Range Lands & Agriculture
GHG Emissions Trends

Million Metric Tons Carbon Dioxide Equivalent

Agriculture
Range Lands

1990-2004 GHG Inventory

California's GHG Sinks Trends


Million Metric Tons Carbon Dioxide Equivalent

-25 -20 -15 -10 0 5 10 15 20 25

Forestry

Range Lands

Landfill Lumber Disposal

Landfill Yard Waste Disposal

California's GHG Sinks Trends
California’s 2004 GHG Emissions by Sector

- Transportation: 40.7%
- Electric Power: 22.2%
- Industrial: 20.5%
- Ag & Forestry: 8.3%
- Others: 8.3%
California Energy Commission

2002 GHG Emissions (top 30)

United States of America
Russian Federation
India
Japan
Germany
Brazil
Canada
China
Korea (South)
Mexico
France
Indonesia
United Kingdom
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United States of America (excluding electricity imports)
2006 GHG Inventory to US EPA CA Inventory Comparison (fossil fuels only)

Source: http://yosemite.epa.gov/OAR/globalw... Electricity Generation (In State)--CEC 2006  
Electricity Generation--US EPA  
Totals--CEC 2006  
Totals--US EPA  
Residential--CEC 2006  
Commercial--CEC 2006  
Industrial--CEC 2006  
Transportation--CEC 2006  
Electricity Generation (In State)--CEC 2006  
Totals--CEC 2006  
Residential--US EPA  
Commercial--US EPA  
Industrial--US EPA  
Transportation (w/o Intl. Bunkers from CEC calc's)--US EPA  
Electricity Generation--US EPA  
Totals--US EPA
Climate Action Team (CAT)

- Created by Governor’s Executive Order S-3-05 on June 1, 2005, with goals to reduce GHG emissions as follows:
  - Reduce to 2000 by 2010
  - Reduce to 1990 by 2020
  - Reduce to 80% below 1990 by 2050
1990-2004 GHG Inventory

California GHG Reduction Goals
Climate Action Team (CAT)

- Composed of executives from:
  - Business, Transportation & Housing
  - Department of Food & Agriculture
  - Resources Agency (includes Dept. of Forestry)
  - Air Resources Board
  - Energy Commission
  - Integrated Waste Management Board
  - Public Utilities Commission
Climate Action Team (CAT)

- Department of Forestry strategies and associated 2020 reductions in million metric tons of carbon dioxide:
  - Forest management (2-4)
  - Forest conservation (8.4)
  - Fuels management/biomass (6.8)
  - Urban forestry (3.5)
  - Afforestation/Reforestation (12.5)
2006 Inventory To CAT Inventory Comparison

All GHG Emissions--CAT vs 2006 GHG Inventory

MMTCO₂ Equivalent

Direct Fuel Use--CAT
Transportation--CAT
Non-Carbon--CAT
In-State Electricity--CAT
Imported Electricity--CAT
Total Elec. --CAT
Total GHG Increases from Target Year--CAT

Direct Fuel Use--2006 Inventory
Transportation--2006 Inventory
Non-Carbon--2006 Inventory
In-State Electricity--2006 Inventory
Imported Electricity--2006 Inventory
Total Elec. --2006 Inventory
Total GHG Increases from Target Year--2006 Inventory

Ca mera Readable Text:

2006 Inventory To CAT Inventory Comparison

All GHG Emissions--CAT vs 2006 GHG Inventory

MMTCO₂ Equivalent

Direct Fuel Use--CAT
Transportation--CAT
Non-Carbon--CAT
In-State Electricity--CAT
Imported Electricity--CAT
Total Elec. --CAT
Total GHG Increases from Target Year--CAT

Direct Fuel Use--2006 Inventory
Transportation--2006 Inventory
Non-Carbon--2006 Inventory
In-State Electricity--2006 Inventory
Imported Electricity--2006 Inventory
Total Elec. --2006 Inventory
Total GHG Increases from Target Year--2006 Inventory
Forest-related Abatement Opportunities

- Reforestation
- Afforestation
- Modified forest management
- Conservation of carbon stocks:
  - Modify harvest practices
  - Prevent deforestation
  - Implement sustainable forest management
  - Fire suppression & management

Source: Agricultural & Forestlands: U.S. Carbon Policy Strategies, Pew Center on Global Climate Change, page 13
Forest-related Abatement Opportunities (cont’d.)

• Offsite Options:
  ◆ Wood fuel substitution for fossil fuels
  ◆ Expanded use of wood products
  ◆ Extended wood product life
  ◆ Substitute wood products for concrete or steel
  ◆ Expanded recycling of wood and paper products

Source: Agricultural & Forestlands: U.S. Carbon Policy Strategies, Pew Center on Global Climate Change, page 13
For More Information:

- Contact Gerry Bemis at 916-654-4960
- Visit the California Climate Change website: http://www.climatechange.ca.gov/