Oil & Gas / Petroleum Refining Sector

AB 32 Scoping Plan Development Public Workshop

California Air Resources Board
Sacramento, CA
April 11, 2008

Purpose of Workshop

- Present background information on the sector
- Propose potential options to reduce GHG emissions
- Solicit public comments

Agenda

10:00-12:00am	Oil & Gas Systems: Extraction, Processing, Transmission & Storage
12:00-1.00pm	Lunch Break
1:00-3:00pm	Petroleum Refining

AB 32: The California Global Warming Solutions Act of 2006

Overview
&
Implementation Status

What Is AB 32?

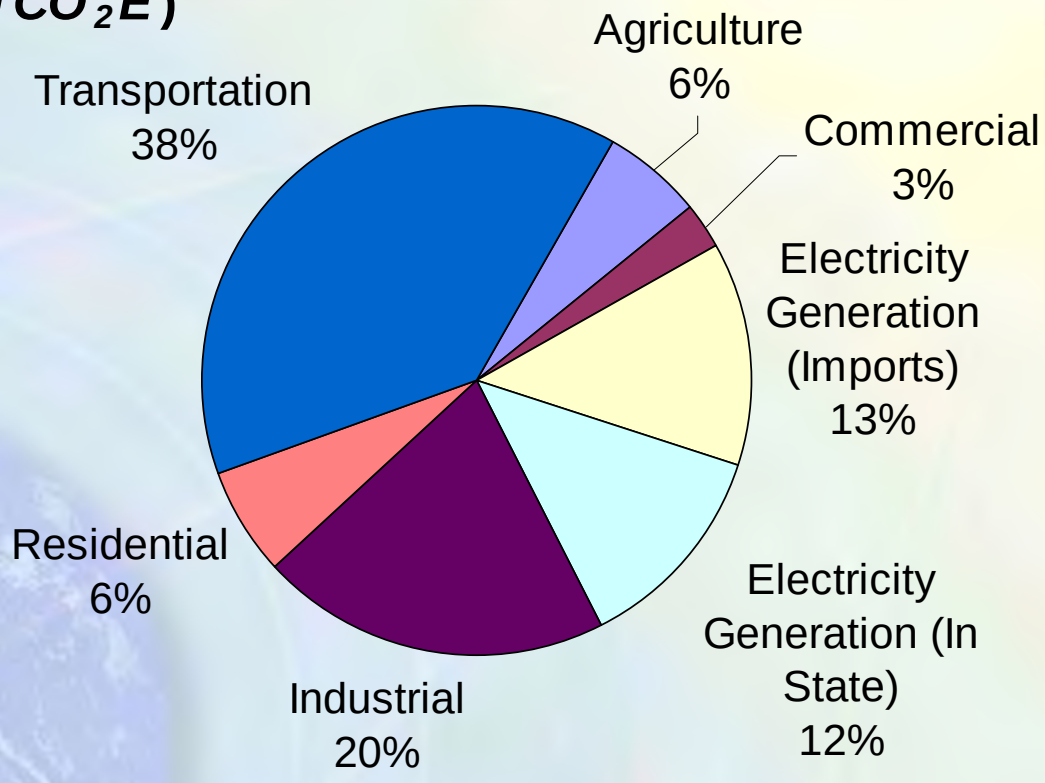
- Assembly Bill 32 sets in statute 2020 GHG emissions target to roll back to 1990 levels
- ARB to monitor/regulate GHG sources
  - GHG come from: 89% CO_2, 6% CH_4, 5% other
- Air Resources Board lead, but:
  - Cal/EPA and Climate Action Team continue coordinating statewide climate policy
  - Other agency authorities preserved

Sectors

- Agriculture
- Forests
- Business/Industry
  - Cement
  - Semiconductor Manufacturing
  - Oil and Gas/Refining
  - General Combustion
- Energy (Electricity/Natural Gas)
- Water
- Transportation
  - Land Use/VMT
  - Vehicles
  - Fuels
- High GWP Gases
- Recycling and Waste Management
- State Government
  - Green buildings
  - State fleet

California GHG Emissions

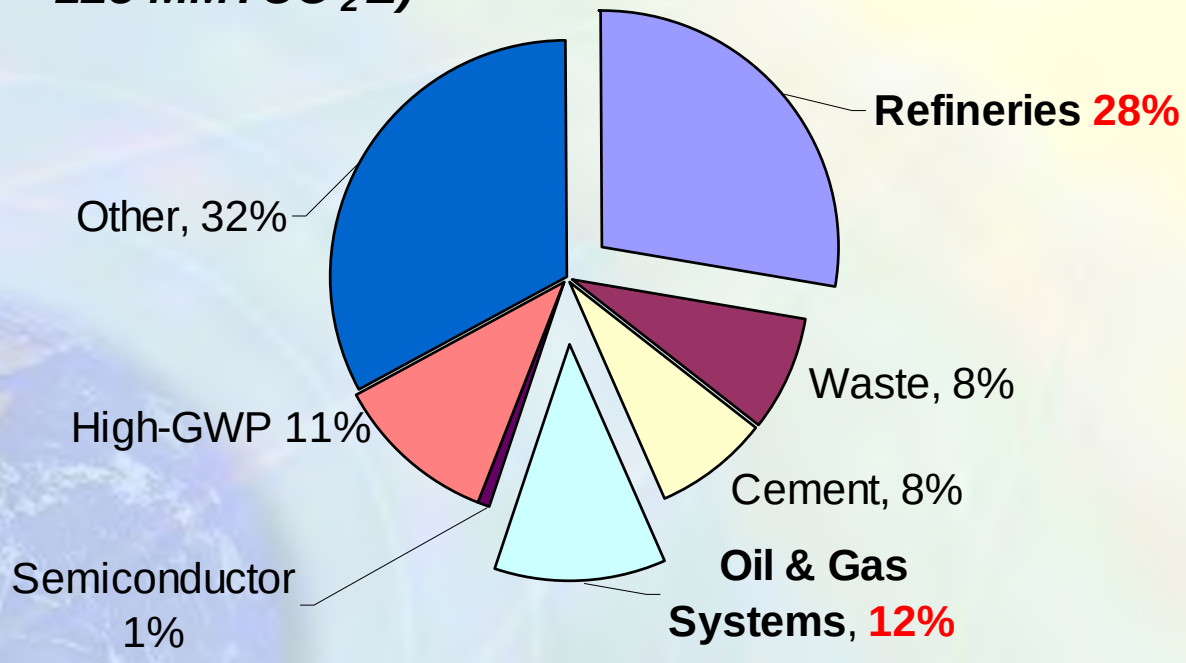
2004 GHG Emissions
(480 MMTCO$_2$E)



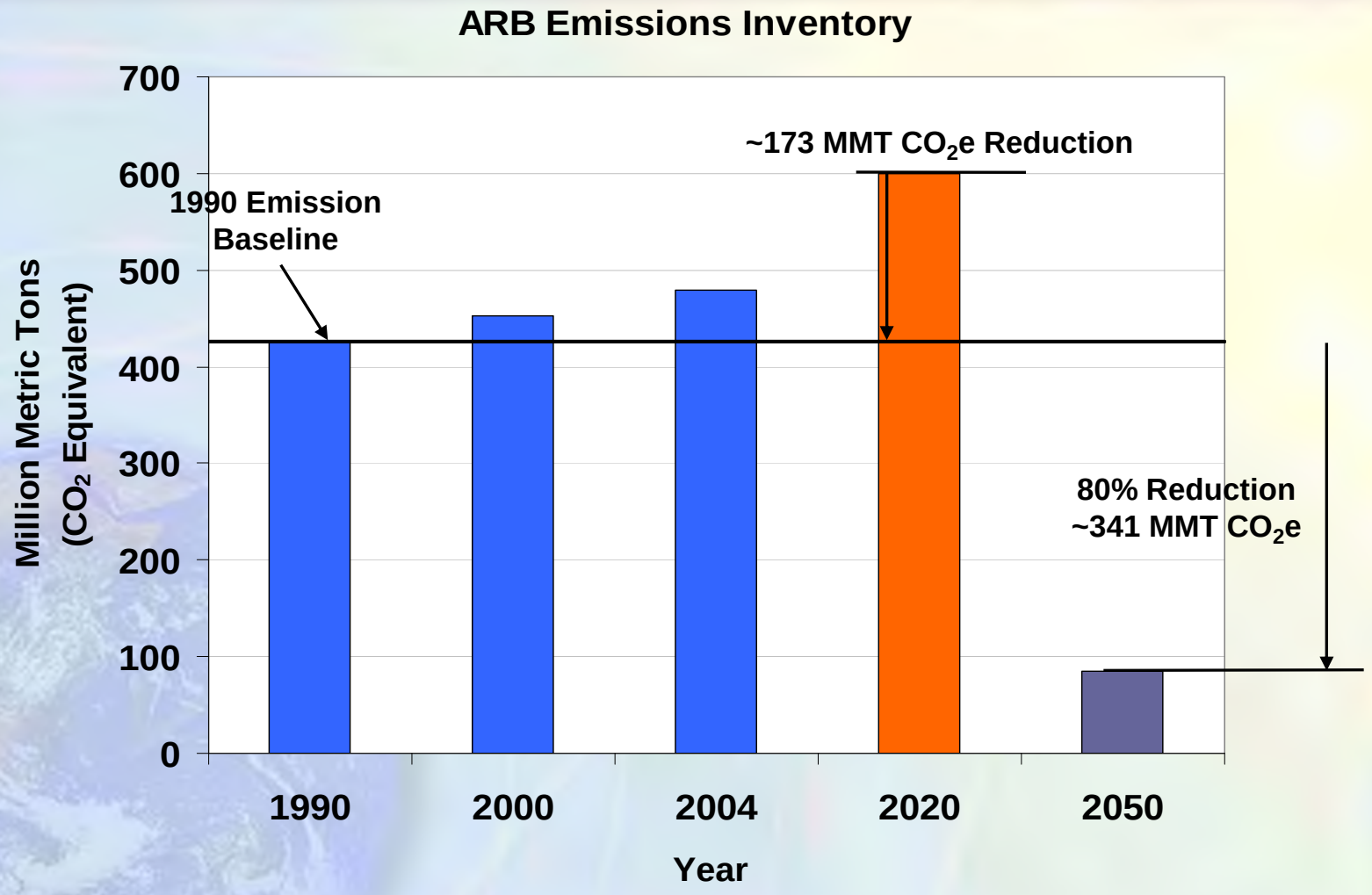
ARB, "California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit" (2007), www.arb.ca.gov/cc/ccei/inventory/1990_level.htm

Business and Industry Breakdown of GHGs

2004 Inventory by Subsector
(Total = 125 MMTCO$_2$E)

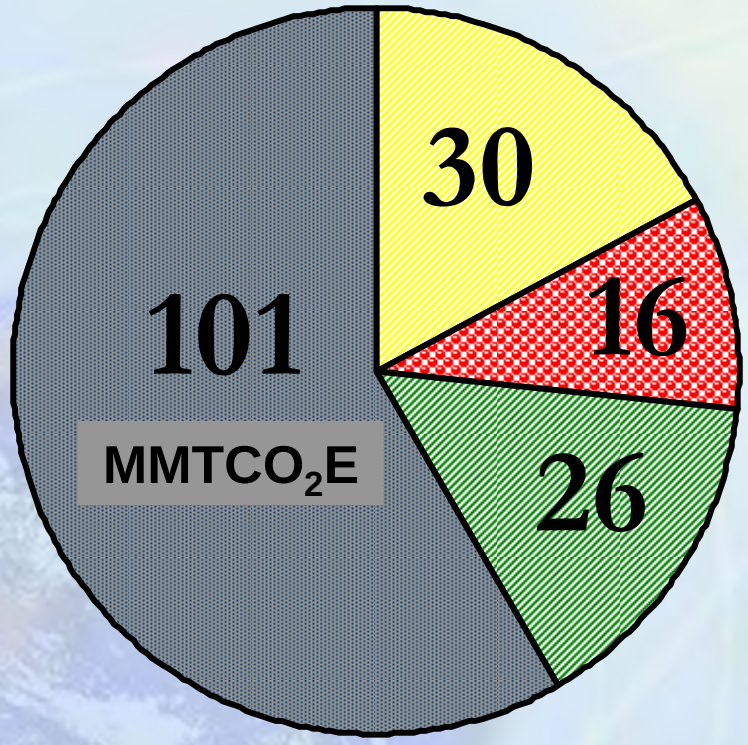


Magnitude of the Challenge



ARB 2020 Emission Reductions Needed

(AT LEAST 72 of 173 $MMTCO_2E$)



- Adopted Strategies (AB 1493, Anti-Idling)
- Discrete Early Action Measures
- Other Early Actions
- Remaining Reductions (scoping plan, CAT)

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What Is the Scoping Plan?

- Tell how CA meets GHG level by 2020
- Provide vision for low carbon future 2050+
  - Reduction goal of 80% below 1990 levels
- Establish CA leadership on addressing climate change
- Maximize benefits to CA
  - Criteria and toxic air pollutant co-benefits
  - Economic development (green technologies)

How Will the Scoping Plan Be Developed?

- Identify maximum technologically feasible and cost-effective measures
- Assess possible mechanisms to achieve reductions
  - Market-based, direct regs, incentives, etc.
- Evaluate scenarios to meet 2020 limit
- ARB is responsible for Scoping Plan
  - ARB working closely with Cal/EPA & Climate Action Team Subgroups & workshops

Tentative Scoping Plan Development Schedule

May 5, ‘08	Scoping Plan Scenarios Workshop (Sac)
June 26, ‘08	Draft Scoping Plan released
July ‘08	Workshops on draft plan (Statewide)
Oct ‘08	Final Staff Proposal Released
Nov 20-21, ’08	Board Hearing – Scoping Plan

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- Climate Change website
  www.arb.ca.gov/cc/cc.htm
- Program Design workshop
  www.arb.ca.gov/cc/scopingplan/pgmdesign-sp/meetings/2008_Meeting_Schedule.pdf

Oil & Gas Systems

Extraction, Processing, Transmission, and Storage

Outline

- Background
- Potential Options to Reduce GHG Emissions
- Recent & Future Activities
- Questions & Comments

Oil and Gas Systems in California

- 50,000 oil and 1,500 gas wells, including off-shore platforms
- Most oil wells located in the south, while most gas fields located in the north
- 250 million barrels of crude oil and 325 billion cubic feet of natural gas in 2005
- Over 3,000 miles of pipelines used for crude oil and 12,000 miles for natural gas
- Provides more than 20,000 direct and about 75,000 indirect jobs (CIPA and WSPA)

GHG Emission Sources

- Combustion Emissions (mainly CO_2):
  - Boilers
  - ICEs (pumps, compressors)
  - Steam generators
  - Dehydrators
  - Flaring
- Fugitive Emissions (mainly CH_4):
  - Leaks (valves, flanges, seals)
  - Venting (dehydrators, compressors)

Current Requirements

- District Rules
  - Vary by district
  - Combustion and fugitive emissions
  - Criteria pollutants and toxics
  - Permit requirements

Two Proposed Measures

- ‘Reduced Venting/Leaks from Oil and Gas Systems’
  - Approved by the Board October 25, 2007
  - Early action measure
  - Transmission and storage activities
  - Adopt by December 2010
- Propose second measure
  - AB 32 Scoping Plan development
  - Extraction and processing activities
  - Adopt in 2011

Potential Options to Reduce GHG Emissions

- Fugitive Emissions
  - U.S. EPA Natural Gas STAR Program
    - ✓Deploy cost-effective technologies

      (e.g., replace high-bleed pneumatics with low-bleed pneumatics, replace glycol dehydrators with desiccant dehydrators)
    - ✓Implement best management practices

      (e.g., practice enhanced directed inspection and maintenance at various facilities)

Potential Options to Reduce GHG Emissions

- Combustion Emissions
  - Repair
    - ✓Perform routine maintenance
  - Retrofit
    - ✓Add components to existing equipment
  - Repower
    - ✓Substitute parts without replacing the entire equipment
  - Replace
    - ✓Install new equipment or use new fuels

1990-2020 GHG Emissions Transmission and Storage Activities

(in $MMTCO_2E$)

Emissions Source	1990	2004	2020	2020 Reduction
Combustion*	0.8	0.8	0.6	0.1
Fugitive	1.5	1.4	1.7	0.9
T o t a l	**2.3**	**2.2**	**2.3**	**1.0**

*Revised values (February 28, 2008)

1990-2020 GHG Emissions Extraction and Processing Activities

(in $MMTCO_2E$)

Emissions Source	1990	2004	2020	2020 Reduction
Combustion	13.7	14.0	13.3	1.9
Fugitive	0.7	0.3	0.3	0.1
T o t a l	**14.4**	**14.3**	**13.6**	**2.0**

Recent Activities

- Literature study
  - API, U.S. EPA, DOE, IPCC, etc.
- Emissions inventory research
- Discussions with CEC, CPUC, DOGGR, and Air Districts
- Begin site visits

Future Activities

- More site visits
- Form a working group
- Conduct a survey
  - A snapshot of Oil & Gas Systems in California
  - Activity factors (equipment types & counts, fuel use)
- Improve emissions inventory
- Possible workshop: Fall 2008
- Develop regulations
- Board hearings
  - Transmission & Storage: December 2010
  - Extraction & Processing: 2011

For Further Information

- Oil &Gas/Refining Scoping Plan Development Website:
  http://www.arb.ca.gov/cc/scopingplan/oil-gas-sp/oil-gas-sp.htm
- Oil & Gas Systems Website:
  http://www.arb.ca.gov/cc/venting-leaks/venting-leaks.htm
- Subscribe to ARB List Serves:
  http://www.arb.ca.gov/listserv/listserv.php
  (Choose: “oil-gas-sp” and/or “venting-leaks”)

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Questions & Comments

Please send your question or comment to:

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