

# **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?

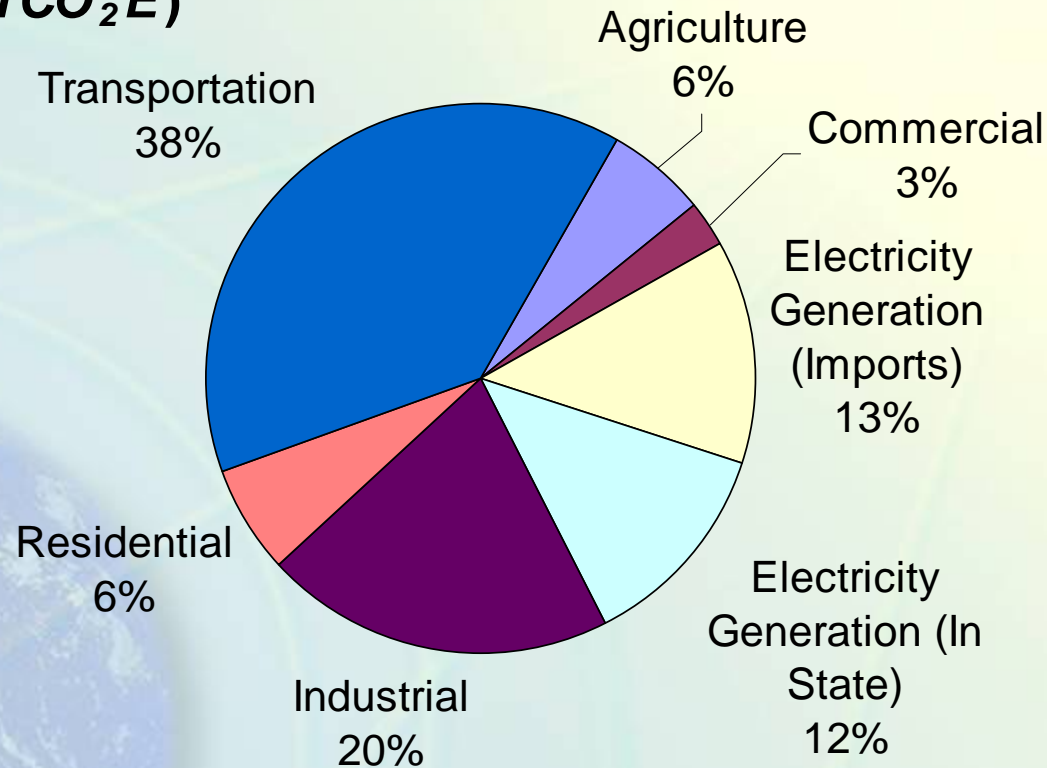
- Assembly Bill 32 sets in statute 2020 GHG emissions target to roll back to 1990 levels
- ARB to monitor/regulate GHG sources
  - GHG come from: 89% CO<sub>2</sub>, 6% CH<sub>4</sub>, 5% other
- Air Resources Board lead, but:
  - Cal/EPA and Climate Action Team continue coordinating statewide climate 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

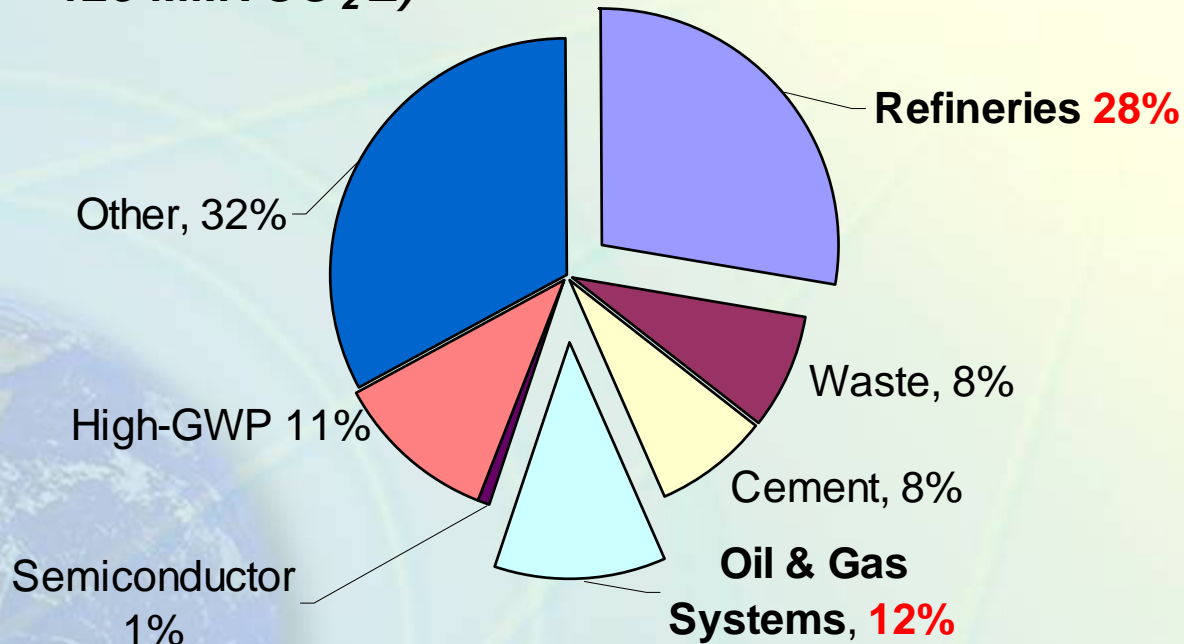
# California GHG Emissions

## 2004 GHG Emissions (480 MMTCO<sub>2</sub>E)



# Business and Industry Breakdown of GHGs

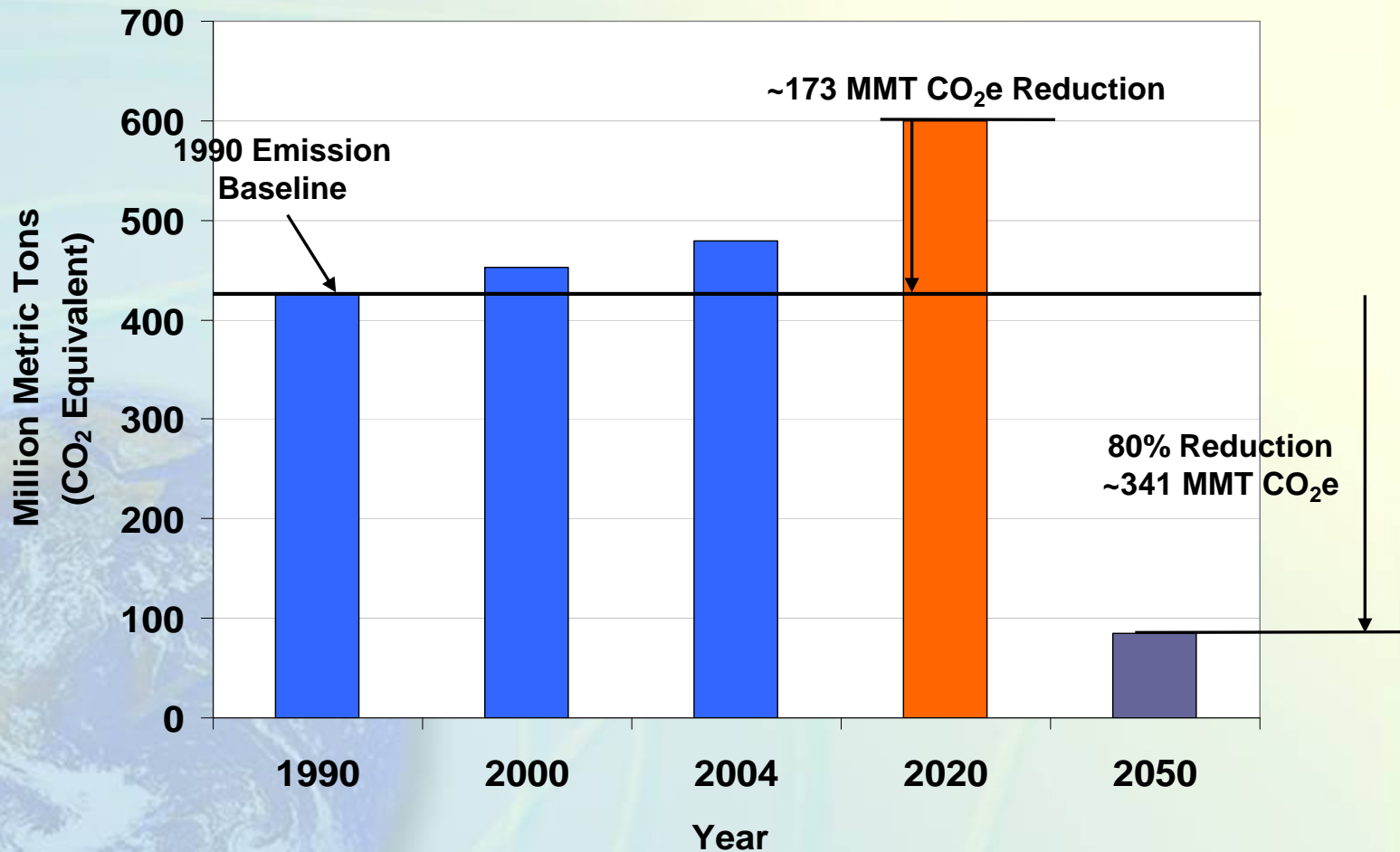
**2004 Inventory by Subsector**  
**(Total = 125 MMTCO<sub>2</sub>E)**





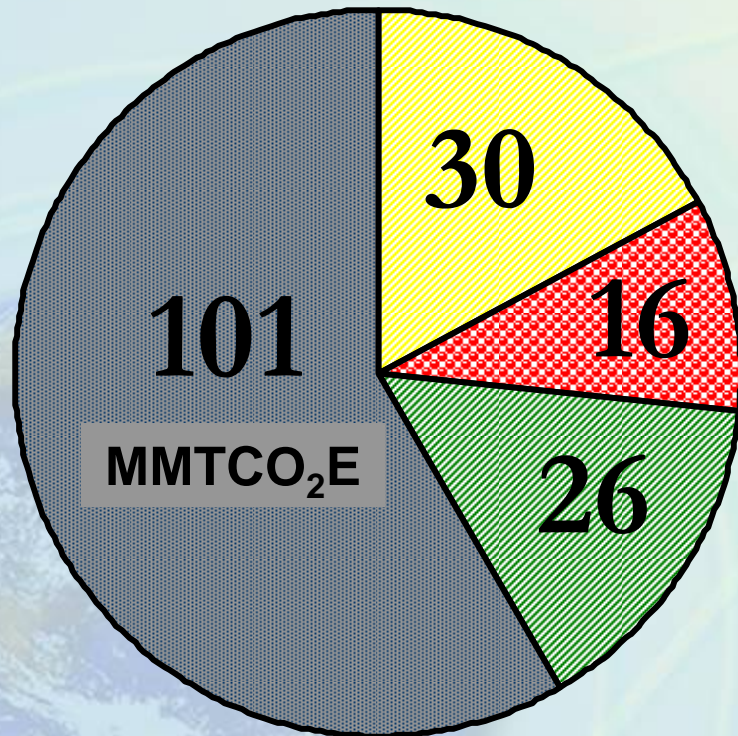
# Magnitude of the Challenge

ARB Emissions Inventory



# ARB 2020 Emission Reductions Needed

(AT LEAST 72 of 173 MMTCO<sub>2</sub>E)



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

# 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

# Contacts

- Bill Blackburn (916) 322-7154  
[bblackbu@arb.ca.gov](mailto:bblackbu@arb.ca.gov)
- Bruce Tuter (916) 324-5932  
[btuter@arb.ca.gov](mailto:btuter@arb.ca.gov)
- Climate Change website  
[www.arb.ca.gov/cc/cc.htm](http://www.arb.ca.gov/cc/cc.htm)
- Program Design workshop  
[www.arb.ca.gov/cc/scopingplan/pgmdesign-sp/meetings/2008\\_Meeting\\_Schedule.pdf](http://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<sub>2</sub>):
  - Boilers
  - ICEs (pumps, compressors)
  - Steam generators
  - Dehydrators
  - Flaring
- Fugitive Emissions (mainly CH<sub>4</sub>):
  - 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<sub>2</sub>E)

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

\*Revised values (February 28, 2008)

# 1990-2020 GHG Emissions Extraction and Processing Activities

(in MMTCO<sub>2</sub>E)

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



# 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”)

# ARB Points of Contact

Barbara Fry, Chief  
Measures Assessment Branch  
[bfry@arb.ca.gov](mailto:bfry@arb.ca.gov)  
(916)324-8023

Jim Nyarady, Manager  
Strategy Evaluation Section  
[jnyarady@arb.ca.gov](mailto:jnyarady@arb.ca.gov)  
(916)322-8273

Win Setiawan, Lead  
[wsetiawa@arb.ca.gov](mailto:wsetiawa@arb.ca.gov)  
(916)324-0337

# Questions & Comments

Please send your question or comment to:

[auditorium@calepa.ca.gov](mailto:auditorium@calepa.ca.gov)