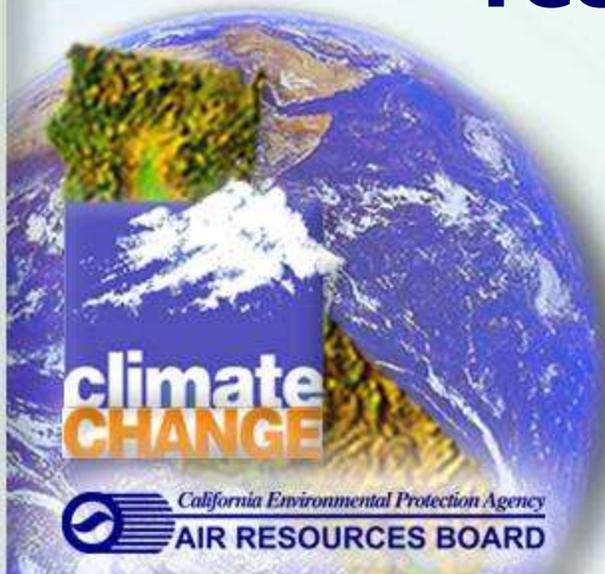


# **Greenhouse Gas Mandatory Emissions Reporting**

## **Power/Utilities Sector Technical Discussion**



**April 10, 2006  
Sacramento**

# Discussion Topics

- AB 32 Reporting Requirements
- How ARB Mandatory Reporting Interfaces with the CCAR Power/Utilities Protocol and the CPUC/CEC Process
- Update on CPUC/CEC Process
- Who Would Report
- What Emission Sources to Report
- Discuss Methodologies
- A Concept for Characterizing Emissions from Power Purchases
- Upcoming Dates

# AB 32 Reporting Requirements

- Mandatory GHG reporting regulation due by January 1, 2008
- Start with sources that contribute most to California GHG emissions
- Account for GHGs from all electricity consumed in CA including T&D losses from electricity generated within the state or imported from outside the state



# **AB 32 Reporting Requirements (continued)**

- Annual reporting
- Ensure rigorous and consistent accounting of emissions
- Where appropriate, incorporate standards and protocols developed by the California Climate Action Registry
- Sources to maintain comprehensive records

# ARB Mandatory Reporting Interface with CCAR and CEC/CPUC

## **CCAR Power/Utilities Protocol**

Voluntary GHG reporting  
Entity Level Carbon Footprint

Provides CARB with methodologies to estimate GHGs from combustion sources, processes, fugitive emissions, indirect emissions, etc.

## **CPUC/CEC Phase 2 Proceedings**

Implementation of Load-Based GHG Emissions Cap Program for the Electric Sector

Provides CARB with characterization of emissions associated with purchases from unknown facilities or unknown suppliers

## **CARB Mandatory Reporting of GHGs**

AB32 Requires Load-Based Reporting

Reporting must support inventory development, sector analysis and strategy development

# Who Would Report

## Draft Approach

All CA facilities that provide power to the grid  
All Load Serving Entities (LSEs)

Overlap in reported emissions is inherent in this approach.

Reporting would include:

Annual Power Generated (MWh), Fuel Usage, and  
GHGs (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, HFCs, PFCs) by fuel type  
(fossil fuels, geothermal, nuclear, biomass, wind etc.)

For LSEs, also--Power (MWh) Delivered to End Users

# Potential Sources of Emissions to Report

Source	GHG
Stationary Combustion by facility (Power Generated)	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
SO <sub>2</sub> Scrubbers	CO <sub>2</sub>
Transmission and Distribution (T&D) Fugitive Emissions	SF <sub>6</sub>
Coal Handling & Storage	CH <sub>4</sub>
Air Conditioning/Refrigeration	HFC
Fire Suppression Equipment	PFCs, HFCs
Co-generation/CHP	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
Mobile Combustion	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
Stationary Combustion (Power Generation Purchases – In-State and Out-of-State)	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
Stationary Combustion (Power Exported Out-of-State)	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
Indirect Electricity	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
T&D Losses (Indirect Emissions from power purchased or wheeled)	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
T&D Losses from Out-of-State Purchases	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O
Other Sources?	

# What Emission Sources to Report

## Draft Approach

### For Facilities and LSEs

Stationary Combustion from Power Generated

Mobile Combustion

Air Conditioning/Refrigeration

Fire Suppression Equipment

Indirect Emissions from Power Purchased and Consumed  
(e.g., consumed at office buildings, not from power generation)

### Additional For Coal Facilities

SO<sub>2</sub> Scrubbers

Coal Handling and Storage



# What Emission Sources to Report (continued)

Draft Approach

## Additional for LSEs

Stationary Combustion from Power Purchased  
(Inside and Outside CA)

Transmission and Distribution (T&D) Fugitive SF6

T&D Losses Outside CA Associated with Imports  
(T&D Losses from Power Generated Inside CA  
is included in Power Generation Calculations)

# Methods to Discuss Today

- Stationary Combustion
- Transmission & Distribution Losses
- SO2 Scrubbers
- Coal Handling and Storage
- Indirect Emissions from Power Purchased from Cogeneration
- Indirect Emissions from Power Purchased and Consumed
- Exported Power
- LSE Power Purchases

# Methods to Discuss Next Time

- T&D Fugitive SF6
- Mobile Combustion
- Air Condition/Refrigeration
- Fire Suppression Equipment
- Others?

## Continue to Discuss

- LSE Power Purchases
- T&D Losses
- Indirect Emissions from Power Purchased and Consumed
- Exported Power

# Stationary Combustion

## Draft Approach for CA Facilities

EPA Part 75 Fuel-Based Methodology for facilities required to report to EPA

Fuel-Based methodology for all other facilities using conservative default emission factors.

$$\begin{array}{l} \text{Total Emissions} \\ \text{(metric tons)} \end{array} = \begin{array}{l} \text{Emission Factor} \\ \text{(GHG kg/MMBtu)} \end{array} * \begin{array}{l} \text{Fuel Consumed} \\ \text{(MMBtu)} \end{array} * \begin{array}{l} \text{0.001} \\ \text{(metric tons/kg)} \end{array}$$

Issue: Requiring Fuel Sampling/Carbon Content in place of default emission factors

# T & D Losses

## Draft Approach

No separate reporting of T&D losses from in-state power purchases. Load-based reporting would account for T&D losses in the combustion calculations for power generated and power purchased.

Standardized convention may be needed to add T&D losses to out-of-state purchases from unknown facilities.

# SO2 Scrubbers

## Draft Approach

$$\text{CO2}_{\text{Metric Tons}} = 0.44 * (\text{CaCO3}_{\text{tons Used}}) * 0.907 \text{ metric tons}$$

Where "CaCO3 Used" is based on sorbent inventory at the beginning of the year plus total sorbent purchases during the year minus total sorbent inventory at the year end

This formula is based on limestone as sorbent. Do we use other kinds of sorbents?

Note:  $\text{SO}_2 + \text{CaCO}_3 = \text{CaSO}_3 + \text{CO}_2$

Molecular Weight of CO2 is 44, CaCO3 is 100

# Fugitive CH4 From Coal Handling and Storage

## Draft Approach

$$\text{CH4}_{\text{MT}} = \text{Purchased Coal}_{\text{tons}} * \text{Emission Factor}_{\text{scf CH4/ton}} \\ * .04228_{\text{lbs CH4/scf}} / 2,204.6_{\text{lbs/MT}}$$

Where EF for Fugitive CH4 is based on Coal origin.

# Indirect Emissions from Power Purchased from Cogeneration

## Draft Approach

$$\text{CO}_2 = \text{CO}_2_{\text{stationary combustion}} / \text{kWh}_{\text{all energy generated}} * \text{kWh}_{\text{consumed}}$$

Where  $\text{kWh}_{\text{all energy generated}}$  equals power output (kWh) plus the usable thermal energy output (expressed in kWh). Thermal energy output is converted from Btu into a kWh equivalent using the standard conversion factor of 3413 Btu per kWh.

# **Indirect Emissions from Power Purchased and Consumed**

## **Draft Approach**

LSEs would provide emission factors for downstream end users and exported power based on a standardized convention to determine power source or system mix

**Issue: Providing EFs in time for reporting/Circular Needs**

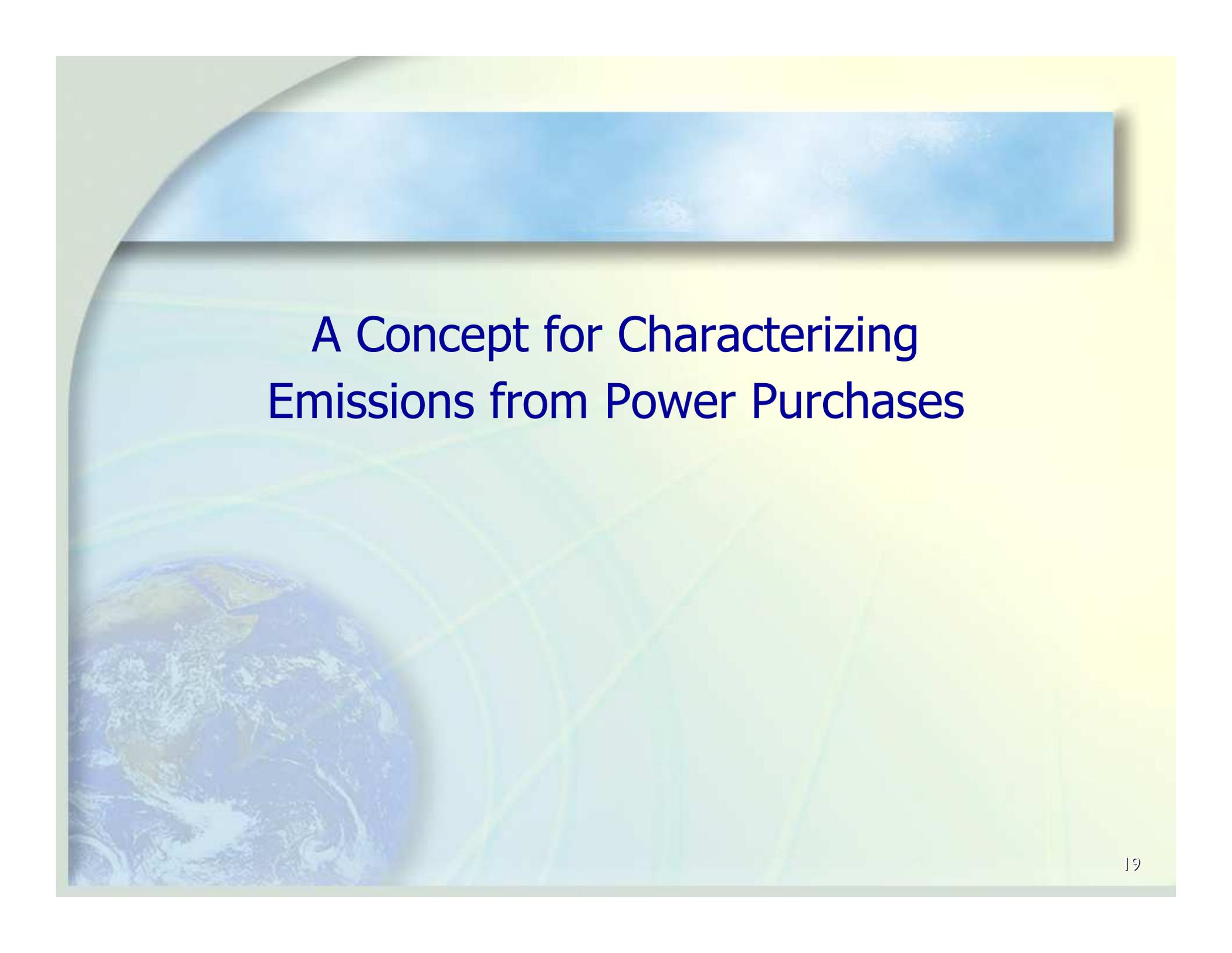
# LSE Power Purchases

## Draft Approach

Coordinate with CPUC/CEC process  
Develop standardized conventions  
to characterize power source or power mix.

- A. Known Facility (i.e., QFs or Merchant)
- B. Known Supplier/Unknown Facility  
Including Utilities, Federal agency purchases, and  
Independent Power Producers
- C. Unknown Suppliers  
Includes unspecified CAISO spot market and  
market brokers

ISSUE: How to separate CA emissions from imported power  
for inventory purposes.



# A Concept for Characterizing Emissions from Power Purchases

# Other Issues

Are other methodologies needed?

Other issues from participants?

# Upcoming Dates

## Power/Utilities Technical Discussions

May 8, 2007 in El Monte

May 29, 2007 (Hold the date)

June 21, 2007 (Hold the date)

## Mandatory Reporting Workshop

May 23, 2007

July 26, 2007

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