

California Global Warming Solutions Act of 2006

Workshop on Mandatory Reporting of California GHG Emissions

Implementation of AB 32 Requirements

California Air Resources Board
August 15, 2007 - Cal/EPA Headquarters

Why We Are Here

- Discuss mandatory GHG reporting requirements
 - Reporting
 - Emission estimation
 - Verification
- Overview of draft regulatory language
- Receive your comments on regulation and requirements
- Comments needed by September 5

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Workshop Agenda

- Introduction
- Overview of Regulation and Reporting Requirements
- General Stationary Combustion Sources
- Verification Requirements
 - Break for Lunch
- Sector Specific Reporting Requirements and Calculation Methods₂

How We Got Here

- Continuing stakeholder involvement in ARB process
- 3 previous workshops
- 15 workgroup meetings
- Numerous meetings and teleconferences
- Coordination with State agencies
- Coordination with California Climate Action Registry

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Participation Information

- Workshop materials:
<http://www.arb.ca.gov/cc/ccei/ccei.htm>
- Draft regulation:
<http://www.arb.ca.gov/cc/ccei/reporting/reporting.htm>
- Webcast information:
<http://www.calepa.ca.gov/broadcast/>
- Email comments during webcast:
coastalm@calepa.ca.gov

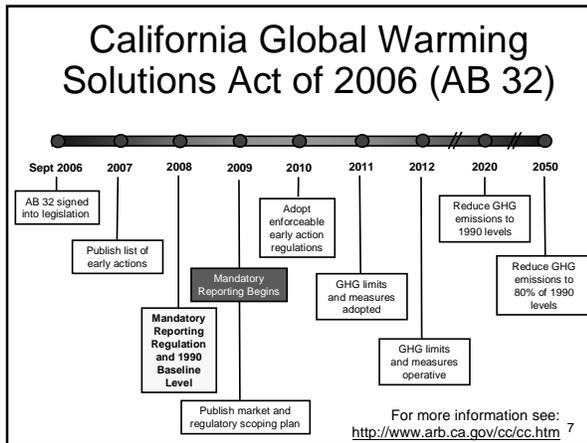
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The Process Ahead



- Collect comments on draft regulation language
- Prepare regulation proposal and staff report
- Release staff proposal for official 45 day comment period October 19
- Board Hearing in December to receive public testimony and consider staff proposal

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- ### Regulation Organization
- Applicability – Who has to report
 - Subarticle 1 – General Requirements
 - Definitions
 - General reporting requirements
 - Reporting and verification schedule
 - Record keeping, confidentiality, enforcement
 - Subarticle 2 – Sector Specific Requirements
 - Cement, electric generating, retail providers, cogeneration, refineries, hydrogen plants, large stationary combustion sources
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- ### AB 32 Statutory Requirements for Reporting
- 
- Reporting regulation by January 1, 2008
 - Begin with sources contributing the most to statewide emissions
 - Account for all electricity consumed, including imports
 - Use CCAR protocols as appropriate
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- ### Regulation Organization (continued)
- Subarticle 3 – Calculation Methods for Multiple Sectors
 - CO₂ emissions from combustion using emission factors, heat content, carbon content, CEMS, etc.
 - Fugitive CH₄ emissions from coal storage
 - Indirect energy use
 - Subarticle 4 – Verification Requirements
 - Appendices – Detailed data reporting, SF₆ and HFC reporting
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Draft Regulatory Language

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- ### Applicability (§95101) Reporting Facilities
- Cement plants
 - Oil refineries
 - Hydrogen plants ≥ 25,000 MT CO₂/yr
 - Electric generating facilities and electric retail providers
 - Cogeneration facilities
 - Stationary combustion sources emitting ≥ 25,000 MT CO₂/yr
- 94% of point source CO₂ emissions
- 

Major GSC Sectors Affected

(only if $\geq 25,000$ metric tonnes/yr CO₂ from combustion)

- Natural gas transmission
- Industrial gases
- Paperboard manufacture
- Colleges and universities
- Oil production
- Food processing
- Steel foundries
- Mineral processes
- Glass container
- Malt beverages

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Defining a Facility

(definition #50)

- Property, plant, structure, installation, equipment, sources on one or more contiguous or adjacent properties
- Under common ownership or control
- Emits GHGs
- Considered a single major industrial source grouping



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Landfills Reporting

- Energy production or combustion would bring in about 45 of 205 gas-collecting landfills
 - Power plants (≥ 1 MW)
 - Combustion emissions ($\geq 25,000$ MT/yr)
- Methods for site-specific methane estimation under development through:
 - ARB Early Action regulatory measures
 - CEC landfill study

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Operator & Operational Control

(definitions #92 & #93)

- “operator” means the company or organization having operational control of the facility that is the subject of the report
- “operational control” means the authority to introduce and implement operating, environmental, health and safety policies; or, whole ownership of the facility;

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Definitions (§95102)

- Regulation includes an extensive list of definitions used in regulation
- Please review and comment as these pertain to your sector and interest

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Reporting: General Requirements (§95103(a))

- Annual reporting for each facility subject to regulation
- Responsible party with facility “operational control” must report
- Report emissions for specified facility sources and gases
- Report all purchased energy use



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Reporting Requirements

- Report CO₂, N₂O, CH₄ from stationary source combustion
 - Report GHGs separately for each fuel used and each process unit (where feasible)
 - Use methods specified in regulation
 - Biomass emissions separately identified

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Reporting Use of High-GWP Gases

- All facilities would report production, purchase or sale \geq 50 pounds of HFCs, PFCs, or SF₆
- Regulation will include list of compounds
- Mass balance approach like U.S. EPA Partnership Program
 - Sample form in Appendix B

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Reporting Requirements (continued)

- Report process emissions as specified
- Report fugitive emissions as specified
- Report purchased energy consumption
- Report SF₆, HFC, PFC production, purchase and sale if applicable (50 lbs. or more)

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Reporting Process Overview

- Reporting
 - Facility submits required data to ARB by reporting deadline
- Verification
 - Verifier conducts verification and submits:
 - Detailed verification report to facility
 - Verification opinion to facility and ARB by verification deadline
 - Detailed verification report is available to ARB as part of ARB's oversight process

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Reporting Indirect Energy Use

- Electricity usage from utility bills
- Methodology
 - Facility operator provides annual electricity usage purchased and consumed
 - ARB to apply electricity emission factor specific to power provider
 - Indirect emissions = emission factor * annual electricity usage
- Imported steam, heating, cooling
 - Methods provided

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Reporting and Verification Schedule (§95103(b))



- Generating Facilities and Cogeneration Facilities not operated by other reporters
 - Emissions reports due by April 30
 - Verification complete by August 31
- Retail Providers, and all other facilities
 - Emissions reports due by August 31
 - Verification complete by December 31

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GHG Emissions Data Report (§95104)

- Facility identification info
- Facility contacts
- Emissions data
- Energy consumption
- Efficiency metrics as required
- Statement of compliance with requirements and certification of accuracy

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Confidentiality (§95106)

- Not Confidential
 - Reported GHG emissions at facility level
 - Reported energy use data
 - Reported performance metrics
- Other data may be claimed as confidential during reporting
- Data not included in emissions report not required to be made public

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GHG Emissions Data Report (continued)

- Maintain program to estimate GHG emissions
- Maintain transparent and independently verifiable data
- Certify report is accurate
- Provide internal audits and quality assurance of data

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Enforcement (§95107)

- Late submittal or false information would be a violation
- We will work closely with stakeholders to ensure compliance
- ARB will provide training for reporters and verifiers to assist with compliance

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Document Retention (§95105)

- Maintain procedures for document retention and record keeping
- ARB may request data used to generate emission estimates
- ARB may request full verification report and data
- Maintain all data used for emission calculations for seven years
- Detailed specifications in regulation

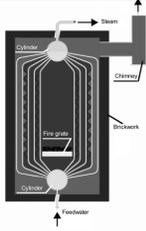
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Comments on general reporting requirements?



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General Stationary Combustion Sources (GSCs) (§95115)




How Will You Know If You Are a GSC Source?

- ARB will work to ensure all $\geq 25,000$ metric tonnes GSC facilities know of requirements
- Fuel usage can be used to quickly approximate CO₂ emissions

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Defining a General Stationary Combustion (GSC) Source

- Proposed facility threshold:

25,000 metric tonnes CO₂ per year
- Requirements separate from refineries, power and cement sectors
- Threshold consistent with EU reporting

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Producing 25,000 Metric Tonnes of CO₂

Approximately equivalent to:

- ~ 2,800,000 gallons gasoline burned
- ~ 2,460,000 gallons diesel burned
- ~ 472,000 MMBtu natural gas burned
- ~ 263,000 MMBtu coal burned

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Meeting the Threshold

- Emissions based on single facility emissions only
 - Each facility counted separately even if multiple facilities under common ownership
- Threshold determination based only on CO₂ emissions from stationary combustion
 - Does not include purchased electricity, heating, cooling
 - Does not include mobile, fugitive, or others

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GSC Requirements

- Calculate CO₂ from stationary source fuel combustion using ARB provided emission factors
 - Oil and gas production sources would conduct fuel tests must use more stringent method
- Report production/use of high GWP compounds
- Report indirect energy use
- Cogeneration facilities would use cogeneration methods for estimates

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Calculating GSC Emissions

- Non-mobile sources:
 - Turbines, boilers, internal combustion engines, flares, any backup generators or auxiliary equipment, etc.
- Basic methodology:
 - Fuel use calculation

$$\text{Total annual emissions} = \text{emission factor} * \text{amount of annually consumed fuel}$$

- ARB will provide emission factors for various fuels

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Verification

(§95130-33)

- Requirements
- Accreditation
- Conflict of Interest



Emission Factors for GSCs

- CO₂, CH₄ and N₂O emission factors will be provided for each fuel type
 - Example: 53.05 kg CO₂/MMBtu for natural gas
- Separate document posted with draft emission factors; comments welcome

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Why Verification?



- AB 32 requires it
- Expected under international standards
- Experience with voluntary reporting shows the need
- Complexity of emissions estimation
- Critical for credibility of program

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Comments on requirements for stationary combustion sources?



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Verification

- Annual third-party verification for:
 - Refineries
 - Hydrogen plants
 - Oil and gas production facilities
 - Retail providers
 - Fossil-fueled power plants and cogeneration facilities ≥ 10 MW (if selling power)
- Triennial third-party verification for other sources

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Third Party Verification

- Consistent with existing standards, including ISO
 - Already required for CCAR members
- Third party verifiers will assure data quality and reduce enforcement burdens
- Verifiers to be trained under ARB approved curriculum
 - Demonstrate expertise
 - Consistency in verification

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Detailed Verification Report

- Verification Plan
- Sampling Plan
 - Assess uncertainty risk of data management system, data acquisition equipment, emissions calculations
- Data checks focus on areas with high risk of uncertainty as determined in sampling plan
- Comparison of verifier data checks with reported data

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Regulation to Specify

- Core GHG data verification requirements
- Accreditation requirements for verifiers
- Conflict-of-interest limitations

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Accreditation: Firms

- Only an accredited verification firm may submit a verification opinion.
 - Two lead verifiers
 - At least five total staff
 - Professional liability insurance
 - May subcontract with other ARB-accredited individual or firm verifiers

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Verification Activities

- Site visits, Identify sources, and review data management systems
- Focus on most significant and uncertain sources
- Differences exceeding 5 percent considered significant
- Verification products
 - Detailed report to facility
 - Verification opinion to both facility and ARB

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Accreditation: Lead Verifiers

- Lead verifier under CCAR and completed 3 verifications by 12/31/07; or,
- History of 3 yrs as State accredited verifier, completed 3 verifications as an apprentice lead, and passed an audit by the State; or,
- Project manager or lead developing GHG or emissions related inventories for 5 yrs, 2 yrs may be graduate level work; or,
- All must take State approved verification training and pass an exit exam, those that come in under previous criteria will have to take additional 'auditing' training.

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Accreditation: Verifiers

- 4 yr degree: science, technology, statistics, business, environmental policy or economics
 - Or, work experience that provides technical skills to do verification
- 2 yrs in professional role in emissions management, technology, or other technical field with skills to conduct verification
- Must take part in ARB approved verification training and pass an exit exam 49

Verification Oversight

- ARB staff responsible for enforcing regulation
- Verification process will assist efforts to enforce compliance
- Targeted review of submitted data and verifiers 52

Conflict of Interest

- Term Limit
 - Verifiers to be changed after 6 years of conducting verification activities
 - Allowed to resume with client after 1 year off cycle for verification
- Conflict of Interest Policy
 - Must agree not to act on behalf of reporting facility as both consultant and verifier concurrently or within any 3 year period 50

Reporting and Verification Schedule (§95103(b))



- Generating Facilities and Cogeneration Facilities not operated by other reporters
 - Emissions reports due by April 30
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 - Emissions reports due by August 31
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Pre-verification Process

- ARB will approve verification teams before verification activities take place.
- Teams must demonstrate acceptable level of conflict-of-interest and expertise for verifying the type of facility they contract with. 51

Verification Comments?



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Cement Plants

(\$95110)



CO₂ Process Emissions TOC Content in Raw Materials

- Organic carbon content of raw material
 - 0.2% Default Value
- Raw material consumed annually
- Convert carbon to CO₂
 - Molar Ratio (3.664)
- Proposed Additional Requirement
 - Plant-specific method to calculate TOC_{R.M.}



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Reporting Requirements

- Report CO₂, CH₄, and N₂O Emissions
- Direct Process Emissions
 - Clinker-Based Methodology
 - Total Organic Carbon (TOC) in Raw Materials
- Stationary Combustion
- Fugitive Emissions from Fuel Storage
- Indirect Energy Use
- Cogeneration
- Efficiency Metric

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Stationary Combustion

- Quantity and Type of Fuel
- Cement kiln and non-kiln units
- Plant-specific emission factors
 - Natural Gas – HHV or Carbon Content
 - Coal, PET Coke & Other Fossil Fuels – Carbon Content
- Default emission factors
 - Other fuel types
 - N₂O and CH₄ emissions
- Option to Report Using CEMs

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CO₂ Process Emissions Clinker Based Methodology

- Consistency with other Protocols
 - California Climate Action Registry
 - WBCSD Protocol
 - U.S. EPA Climate Leaders
- Plant-specific emission factors
 - Clinker
 - Cement Kiln Dust (CKD)



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Efficiency Metric

- CO₂ emissions per metric tonne of cementitious product
- Direct CO₂ emissions
 - Process-related
 - Stationary combustion
- Cementitious Product
 - Clinker consumed or added to stock
 - Clinker sold
 - Gypsum, limestone, CKD, and clinker substitutes
 - Cement substitutes

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Comments on Cement Plant Proposals?



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Stationary Combustion – CO₂

- Refinery Fuel Gas
 - Calculate a fuel specific EF
 - Hourly average HHV, CC daily
 - Use EF and daily average HHV to calculate CO₂ emissions
- Natural Gas
 - (Regulation to be updated to reflect the following)
 - Stationary combustion - CO₂ monthly HHV when HHV range is 975-1100 Btu/scf
 - Outside Pipeline range – monthly carbon content to calculate CO₂ emissions

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Petroleum Refining, Hydrogen Plants, Oil and Gas Production

(§95113, 95114, 95115(b))



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Process Emissions

- Asphalt blowing
 - Default EF uncontrolled emissions (2,555 scf CH₄/10⁶ bbl) EPA derived EF
- Sulfur Recovery
 - Default molar fraction CO₂ in gas to SRU (0.20) EPA EIIP based approach

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Refineries – Reporting Basics

- Annual reporting and verification for each facility
- Stationary combustion, process, fugitives
- Indirect energy usage (steam/heat, electricity, hydrogen)
- No mobile source requirements
- Gases as specified in the regulation
 - CO₂, CH₄, N₂O, HFCs

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Fugitive CH₄ Emissions

- Wastewater Treatment
 - IPCC 2006 – COD based CH₄ methodology
 - CH₄ conversion factor (0 – 1.0)
- Oil-Water separators
 - CONCAWE 2007 based methodology
 - Separator specific emission factors
- Storage Tanks
 - E&P Tank model (API)
- Equipment Fugitive Emissions
 - CAPCOA/CARB base methodology
 - Use component count, LDAR SV measurement, EF and correlation equation inputs

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Flaring Emissions

- EPA EIIA based methodology
- AQMD/APCD flare reporting
 - Inputs
 - NMHC, CH₄ and ROG emissions
 - Assumed flare destruction efficiency
 - Assumed NMHC and ROG carbon fraction
- If flare reporting not required by AQMD/APCD
 - Use default EF based on refinery throughput

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Comments on Refineries, Oil/Gas Production or Hydrogen Plants?



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Oil and Gas Exploration and Production Sector

- Subject to reporting as a major source under the 25,000 metric ton threshold
 - Combustion sources only (CO₂, CH₄, N₂O)
 - Process, fugitives may be added later
- Methods and fuel sampling requirements would be identical to refinery sector
 - Associated gas also highly variable
- Cogeneration emissions per section 95112
 - Facility-specific efficiency values
- Hydrogen Plant emissions per section 95114

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Electric Generating Facilities and Electric Retail Providers

(§95111)



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Hydrogen Production Facilities

- Report if combustion + process emissions ≥ 25,000 metric tonnes
- Operational control determines whether hydrogen plants report as:
 - Part of a refinery or a stand-alone facility
- Report
 - Stationary combustion emissions – CO₂, CH₄, N₂O
 - H₂ Plant Process Emissions
 - weekly carbon test if natural gas only
 - daily carbon test if feedstock mixture
 - Hydrogen sales

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Pending Issues

- “First Seller” Approach
- Consistent Use of CEMS vs Fuel-Based Data
- Additional Methods to be Explored
 - Combustion of Biomass and MSW
 - Fugitive CO₂ from Geothermal
 - N₂O and CH₄ from Fuel Combustion
 - Others

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Who Would Report

- **Generating Facilities ≥ 1 MW**
 - Fossil Fuels, Landfill Gas, Biogas, Biomass, Municipal Solid Waste, Geothermal (excludes hydro, solar, wind, and nuclear)
- **Retail Providers**
 - IOUs, POUs, ESPs, CCAs, WAPA

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Retail Providers

- **Facility Level and Generating Unit Information**
 - Add Requirement to report Facility ID for hydro, wind, solar, nuclear?
- **Fugitive SF₆ from Transmission and Distribution facilities maintained by Retail Provider**
- **Power Purchases (MWh)**
 - Specified Sources Scaled to Reflect T&D
 - T&D Losses Also Reported as Subset (MWh)
 - Unspecified Sources by PNW, PSW, CAISO Markets, Other In-state, Unknown

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Generating Facilities Would Report

- Nameplate Generating Capacity (MW)
- Annual Net Power Generation (MWh)
- Annual Fuel Consumption by Fuel Type
- Annual CO₂, N₂O, CH₄ from Fuel Combustion
- CO₂ from Acid Gas Scrubbers
- CH₄ from Coal Storage
- HFCs from Cooling that supports power generation
- CO₂ from Geothermal
- Wholesale Sales Exported Out-of-State (MWh) when known

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Retail Providers (continued)

- **Power Sales (MWh)**
 - Retail Sales
 - Specified Wholesale Sales by Counterparty
 - Add Requirement to Report Facility ID
 - Unspecified Wholesale Sales by Region
- **Indirect Electricity and Thermal Energy Purchased & Consumed (MWh and MMBtu) for Buildings**

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Generating Units Would Report

- Nameplate Generating Capacity (MW)
- Annual Net Power Generation (MWh)
- Annual Fuel Consumption by Fuel Type
- Average Annual High Heat Value or Annual Steam Production
- Average Annual Carbon Content (if known)
- Annual CO₂, N₂O, CH₄ from Fuel Combustion

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Methodologies CO₂ from Fuel Combustion

- **Natural Gas**
 - 40 CFR Part 75
 - Monthly Heat Content or Carbon Content or CEMS for others
- **Coal and Petroleum Coke**
 - 40 CFR Part 75 (including Appendix G)
 - Monthly Carbon Content or CEMS (CO₂ or O₂) for others
- **Middle Distillates, Residual Oil, LPG**
 - 40 CFR Part 75
 - Per delivery Heat Content or Carbon Content or CEMS for others

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Methodologies CO₂ from Fuel Combustion

- Landfill Gas or Biogas
 - Measured Heat Content or Carbon Content
- Biomass or MSW
 - If available, CO₂ CEMS and flue gas flow meter
 - If not, Default Emission Factor
- Co-Firing
 - Report by Fuel Type
- Start-Up Fuels for Biomass
 - Default Emission Factor

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ARB Database Subroutines

- Match facility emissions to specified purchases and specified sales
- Match unspecified purchases to unspecified emission factors for
 - PNW, PSW, CAISO Markets, Other In-State, or Unknown
 - Description of how factors are determined to be included in regulation
- Calculate emission factors for each retail provider for
 - Unspecified Wholesale Sales and Exports
 - Retail Sales

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Methodologies for Other Emissions

- Methods Using Default Emission Factors
 - N₂O & CH₄ from Fuel Combustion
 - Fugitive CH₄ from Coal Storage
 - Fugitive CO₂ from Geothermal
- Process SO₂ from Acid Gas Scrubber if no CEMS
- Fugitive SF₆ and HFCs
 - Mass Balance

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Comments on Retail Providers and Electrical Generating Facilities Proposals?



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Other Requirements

- Use of ASTM Method D6866 to Determine Biomass-Derived Portion of MSW
- Optional Reporting from Out-of-State Facilities
- Optional Additional Reporting for Asset Owning Suppliers
 - Add requirement to file "intention to report"?
- Annual Verification for most
- Triennial Verification for Biomass-Derived Facilities and Facilities ≤ 10 MW

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Cogeneration Facilities (§95112)



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Definitions and Terminology

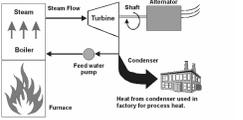
- Cogeneration Facility Definition
 - Industrial structure, installation, plant, building, or self-generating facility
 - Simultaneous generation of multiple forms of useful energy in a single, integrated system.
- Cogeneration vs. Combined Heat and Power (CHP)
- Distributed (Allocated) Emissions

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CO₂, N₂O, and CH₄ Emissions Methodologies

- Electric Generating Facility Requirements
- CO₂ from Fuel Combustion
 - Fuel Type
- CO₂ Process Emissions
 - Acid Gas Scrubbers
- GHG Fugitive Emissions
 - HFC from Cooling Units
 - CH₄ from Coal Storage
- N₂O and CH₄ from Fuel Combustion
 - Default Emission Factors

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Cogeneration Facilities

- Topping Cycle Plant
 - Electric generation at the top or beginning of the cycle
 - Thermal energy sent to the process after electricity production
- Bottoming Cycle Plant
 - Recovers steam or heat from a process stream to produce electricity.

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Distributed Emissions

- CO₂ Emissions from Fuel Combustion
 - Distributed between Thermal Energy and Electricity Generation
 - Distributed between Multiple Product Outputs
- Efficiency Method
 - Topping Cycle Plant
 - Facility-Specific Electricity Generation Efficiency
 - Default Value for Thermal Energy Efficiency
 - Option to calculate or use manufacturer rating
 - Bottoming Cycle Plant
 - ARB Request Comments for Requirements
- Detailed Efficiency Method
 - To Be Developed

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Reporting Requirements

- Report CO₂, CH₄, and N₂O Emissions
- Facility and Generating Unit Information
- Electricity Generation
- Thermal Energy Production
- Distributed Emissions
- Indirect Energy Use

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Comments on cogeneration facilities?



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Other Comments Today?

- Schedule
- Verification
- Methods
- Others?
- Comments by phone, email, writing are also encouraged
- Comments by September 5 will be most effective for staff proposal



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Next Steps

- Collect comments on draft regulation language
- Prepare regulation proposal and staff report
- Release staff proposal for official 45 day comment period on October 19
- Board Hearing in December to receive public testimony and consider staff proposal



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Thank you for attending.

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GHG Mandatory Reporting Website
<http://www.arb.ca.gov/cc/ccei/ccei.htm>

