California Air Resources Board

Evaluation of the Relationships between Emissions Quantification, Scope and Points of Regulation for the AB 32 Cap-and-Trade Program

Issue Summary

ARB has held an extensive public process, in conjunction with the Western Climate Initiative (WCI), to determine which sources of emissions should be covered by the cap-and-trade program. Both California's Climate Change Scoping Plan and the Design Recommendations of the Western Climate Initiative contain a summary of the scope of the program.[1]

ARB needs to determine in greater detail who is a covered entity in the program as we develop the cap-and-trade regulation. ARB staff has compiled the attached table to provide compare ARB's current mandatory reporting regulation and the WCI Essential Requirements for Mandatory Reporting, and to summarize the anticipated changes to ARB's mandatory reporting regulation to support the proposed scope of the cap-and-trade regulation.[2]

We provide this discussion to explain the preliminary staff thinking included in the attached table. Staff will continue to work with stakeholders to determine which emissions sources will be included in the scope of the cap-and-trade program.

Background on Scope and Point of Regulation Decisions for the Cap-and-Trade Program

The term 'scope' defines the greenhouse gas (GHG) emissions that are covered by the cap-and-trade program, including:

- The emissions sources that fall under the cap.
- The greenhouses gases that fall under the cap.
- The point(s) of regulation where the program would be enforced.

The "point of regulation" is a portion of the scope definition that identifies the covered entities that have the obligation to surrender GHG compliance instruments (emission allowances or allowable offsets) equal to their GHG emissions.

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[1] **Climate Change Scoping Plan** page 31 (December 2008)
http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm
Design Recommendations for the WCI Regional Cap-and-Trade Program pages 1-3 (September 2008)
http://www.westernclimateinitiative.org/the-wci-cap-and-trade-program/design-recommendations

[2] Information about ARB's mandatory reporting program for GHG emissions is available here:
http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm
The WCI's **Final Essential Requirements for Mandatory Reporting** is available here:
http://www.westernclimateinitiative.org/component/remository/Reporting-Committee-Documents/Final-Essential-Requirements-for-Mandatory-Reporting/

Several key terms are used to describe the point of regulation:

- **Downstream, at the point of emission:** The point of regulation can be where the emissions occur, such as where coal is combusted. This point of regulation is typically referred to as "downstream." Examples of downstream points of regulation include: (a) stationary source combustion of coal, natural gas, and oil; and (b) process and fugitive emissions from industrial facilities.
- **Upstream, where carbon enters the California economy:** The point of regulation can be at the point where carbon enters into the economy. This point is typically referred to as "upstream." Examples of upstream points of regulation for fossil fuels include: (a) where natural gas is processed and upgraded to pipeline quality; (b) where oil products are refined or imported; and (c) where coal is mined. For some high global warming potential (GWP) gases (such as sulfur hexafluoride, SF_6), an upstream point of regulation may be the point at which the gas is manufactured.
- **Midstream:** The point of regulation can be between the upstream and downstream. This is referred to as midstream. Midstream regulation for fossil fuel may be where the fuel is distributed, examples include: (a) natural gas transmission pipelines; (b) natural gas local distribution companies (LDCs); and (c) gasoline and diesel terminal racks, fuel distributors or wholesalers.

From the scope and point of regulation definitions, any covered entity must be able to tell whether it has a surrender obligation under the cap, and which of its emissions are subject to this obligation.[3] The attached detailed scope document compiles staff's current thinking about these questions for all sources in a concise tabular form. Preliminary staff thinking on program scope is based on the principles discussed below.

Evaluating Quantification Methodologies for Inclusion in the Scope of the Cap-and-Trade Program

To ensure that the cap-and-trade program meets the AB 32 criteria of 'quantifiable', ARB staff developed the following principles for evaluating whether individual quantification methodologies are appropriate for calculating 'surrender obligation' within the scope of the cap-and-trade program[4]:

- The quantification methodology provides accurate and consistent quantification of emissions across all reporters

[3] This discussion of scope is borrowed from the **WCI Draft Program Scope Recommendations** (March 2008). Available from: http://www.midwesternaccord.org/Meeting%20material%20pages/Scope%20and%20Electricity%20Meeting%201/Draft_WCI_Scope_Recommendation.pdf

[4] AB 32 requires that all Greenhouse Gas Emission reductions achieved be real, permanent, quantifiable, verifiable, enforceable, and additional.

- The methodology facilitates third-party verification
- The methodology is enforceable by ARB
- The methodology is related to a meaningful portion of the GHG emissions from California sources
- The methodology facilitates implementation of the intended incentives of the cap-and-trade program
- Emissions can be cost-effectively measured or calculated and reported using the quantification methodology

Provide Accurate and Consistent Quantification of GHG Emissions

Emission accounting methodologies should provide an accurate measure of the current magnitude of GHG emissions from a source. Reliable methods must capture and incorporate the variability in key input parameters over the course of the reporting period. In addition, it is critical to the success of a cap-and-trade program that the methods provide the same level of accuracy of source emissions after emission reduction strategies have been implemented.

False emission reductions which could unintentionally result from a shift between alternate quantification methodologies must be avoided to the extent feasible.[5]

In short, methods must accurately quantify both current and future emissions from a source. Wherever possible, reporters should use the same quantification methodology for each type of source to ensure consistency across reporting entities.

Provide Verifiable GHG Emissions Data

Consistent and reliable verification of all GHG emissions is an essential part of a viable regulatory cap-and-trade program. Participants must have confidence that a common metric is employed (i.e. a ton of carbon is a ton of carbon) as they buy and sell carbon allowances. Reporting regulations must provide independent third party verifiers with the ability to confidently judge the veracity of facility emissions reports. Reporting regulations based on accepted quantification methods (e.g. ASTM, ISO) provide verifiers with a standard with which to objectively judge the validity of reported emissions. Consistent and accurate accounting requires that as little as possible is left to the verifier's subjective judgment.

Provide Enforceable Methodologies

Reporting regulations must be formulated and written to provide enforcement bodies with the ability to identify and potentially prosecute any infractions in

[5] These emission reductions are sometimes labeled as 'paper reductions' because reductions appear to have resulted 'on paper' due to the accounting methodologies employed but no actual environmental benefit occurs.

facility emission reports. Reporting methods must provide concrete and unambiguous criteria against which the validity of the report may be judged.

Quantify Most Meaningful Sources of GHGs

In selecting the quantification methodologies that apply in the cap-and-trade program staff places a priority on methods that can be used in a consistent fashion across a variety of sources.

In addition, the point of regulation will be moved upstream for GHG sources that are difficult to regulate at the point of emission (e.g., combustion of transportation fuels in passenger vehicles). The result of this upstream regulation may lead to a decrease in accuracy or precision due to greater reliance on default emission factors rather than direct measurement at the emissions source. Also, upstream regulation may lead to different quantification methodologies for the same fuel type in different end uses.

Creation of the Correct Incentives to Motivate GHG Emissions Reduction

A trade-off may exist between striving for accuracy and precision in emission quantification and creating the correct incentives for low-lifecycle emissions from products with complex supply chains. This may be especially true where a significant portion of the emissions associated with delivering a product to the end consumer exist outside of California.

In general the cap-and-trade program has not taken a ‘full lifecycle’ accounting approach to emissions quantification. ARB may consider a form of lifecycle emissions accounting in some cases to create the correct incentives for a switch to low-lifecycle emissions products.

Cost-effectiveness

To balance accuracy with reporting costs we must consider the costs associated with any quantification methodology. An example is the frequency of fuel carbon content sampling. More frequent sampling increases accuracy of emissions calculations but also increases the costs of the specified quantification methodology.

Complying Entity Information	Emissions Source Description (GHG Type)	Current Staff Thinking: Generates a C&T Surrender Obligation?	In Current ARB Reporting Regulation?	Modification/Addition expected as part of ARB cap and trade regulation package?	In WCI Essential Reporting Requirements?	Other Current Staff Thinking
Narrow Scope Sources in Current ARB Reporting Regulation						
Stationary Combustion (Section 95115 in current ARB Reporting Regulation)						
Operators of All Facilities with Stationary Combustion Emissions						
Reporting Threshold			25 k/year CO2	Y	10 k/year CO2e	Recommend lowering to 10k/year CO2e
C&T Inclusion Threshold				Y		Recommend 25k/yr CO2e
	Stationary Combustion					Staff expects to propose modifications consistent with federal reporting requirements. Some quantification options may be limited to assure consistency and rigor in emissions accounting.
	Fossil Fuel Combustion (CO2)	Y	Y	Y	Y	
	Biomass-Derived Fuel Combustion (CO2)	N	Y	Y	Y	
	Fuel Combustion (CH4, N2O)	Y	Y	Y	Y	
Cement (95110)						
Cement Manufacturing Facility Operator						
Reporting Threshold			No Threshold	Y	10 k/year CO2e	Recommend setting at 10k/yr CO2e
C&T Inclusion Threshold				Y		Recommend 25k/yr CO2e
	Process					Staff expects to propose modifications consistent with federal reporting requirements. Some quantification options may be limited to assure consistency and rigor in emissions accounting.
	Clinker Production (CO2)	Y	Y	Y	Y	
	TOC Content (CO2)	Y	Y	Y	Y	
Electricity Generating Deliverers (95111a)						
Electrical Generating Facility Operator						
Reporting Threshold			2.5 k/year CO2 and > 1 MW	Y	10 k/year CO2e	
C&T Inclusion Threshold				Y		Recommend 25 k/yr CO2e
	Process					Staff to review for consistency with federal reporting requirements, may propose modifications.
	Acid Gas Scrubbers (CO2)	Y	Y	?	Y	
	Fugitives					
	Coal Storage (CH4)	N	Y	?	Y	
	Cooling Units (HFCs)	N	Y	?	Y	
	Geothermal (CO2)	N	Y	?	Y	
	SF6 equipment	N	Y	?	N	Reporting requirements may defer to new SF6 regulation.
Electricity Importing Deliverers (95111b)						
First Jurisdictional Importing Deliverer (Retail Provider or Marketer)						

Complying Entity Information	Emissions Source Description (GHG Type)	Current Staff Thinking: Generates a C&T Surrender Obligation?	In Current ARB Reporting Regulation?	Modification/Addition expected as part of ARB cap and trade regulation package?	In WCI Essential Reporting Requirements?	Other Current Staff Thinking
Reporting Threshold			No Threshold	?	No Threshold	Staff to consider threshold.
C&T Inclusion Threshold				Y		Recommend 25 k/yr CO2e
Activity Downstream of Emissions						Staff to consider modifications as needed to support first jurisdictional deliverer point of regulation.
	Emissions Assigned to Imported Power Transactions (CO2, CH4, N2O)	Y	Y	Y	Y	
	SF6 equipment	N	Y	?	N	
Cogeneration (95112)						
Cogeneration Facility Operator						
Reporting Threshold			2.5 k/year CO2 and > 1 MW	Y	10 k/year CO2e	
C&T Inclusion Threshold				Y		Recommend 25 k/yr CO2e
Include Distribution of Fossil CO2 to Electricity and Thermal Uses (per current regulation)?						Staff to consider changes to emissions distribution requirements to support cap-and-trade regulation and Scoping Plan objectives.
	Process					Staff to review for consistency with federal reporting requirements, may propose modifications.
	Acid Gas Scrubbers (CO2)	Y	Y	?	Y	
	Fugitives					
	Coal Storage (CH4)	N	Y	?	Y	
	Cooling Units (HFCs)	N	Y	?	Y	
	SF6 equipment	N	Y	?	N	
Petroleum Refining (95113)						
Refining Facility Operator						
Reporting Threshold			25 k/year CO2	Y	10 k/year CO2e	Recommend lowering to 10k/year CO2e
C&T Inclusion Threshold				Y		Recommend 25k/yr CO2e
	Process					Staff may propose modifications consistent with federal reporting requirements. Some quantification options may be limited to assure consistency and rigor in emissions accounting.
	Calciners (CO2)	Y	N	Y	N	
	Cat Cracking (CO2)	Y	Y	?	Y	
	Other Cat Regen (CO2)	Y	Y	?	Y	
	Process Vents (CO2, CH4, N2O)	Y	Y	?	Y	
	Asphalt production (CO2, CH4)	N	Y	?	Y	
	Sulfur Recovery (CO2)	Y	Y	Y	Y	
	Fugitives					
	Wastewater (CH4, N2O)	N	Y	?	Y	
	Oil/Water seps (CH4)	N	Y	?	Y	

Complying Entity Information	Emissions Source Description (GHG Type)	Current Staff Thinking: Generates a C&T Surrender Obligation?	In Current ARB Reporting Regulation?	Modification/Addition expected as part of ARB cap and trade regulation package?	In WCI Essential Reporting Requirements?	Other Current Staff Thinking
	Storage Tanks (CH4)	N	Y	?	Y	
	Equipment leaks (CH4)	N	Y	?	Y	
	Flares and destruction devices					
	Flares (CO2)	Y	Y	Y	Y	
	Destruction devices--low Btu gases (CO2)	Y	Y	Y	Y	
Hydrogen Production (95114)						
Hydrogen Production Facility Operator						
Reporting Threshold			25 k/year CO2	Y	10 k/year CO2e	Recommend lowering to 10k/year CO2e
C&T Inclusion Threshold				Y		Recommend 25k/yr CO2e
	Process					Staff may propose modifications consistent with federal reporting requirements. Some quantification options may be limited to assure consistency and rigor in emissions accounting.
	Process CO2	Y	Y	?	Y	
	Process Vent (CO2, CH4, N2O)	Y	Y	?		
	Sulfur Recovery (CO2)	Y	Y	Y	N	
	Flares and Destruction Devices					
	Flares (CO2)	Y	Y	Y	Y	
	Destruction devices--low Btu gases (CO2)	Y	Y	Y	N	
Additional Narrow Scope Sources Under Consideration (Not in Current ARB Reporting Regulation)						
Aluminum Production						
Aluminum Manufacturing Facility Operator						
	Process CO2	Y	N	Y	Y	
Glass Production						
Glass Production Facility Operator						
	Process CO2	Y	N	Y	N	
Iron and Steel Production						
Iron and Steel Manufacturing Facility Operator						
	Process CO2	Y	N	Y	Y	
Lime Production						
Lime Production Facility Operator						
	Quick Lime Production (CO2)	Y	N	Y	Y	
Magnesium Production						
Magnesium Production Facility Operator						

Complying Entity Information	Emissions Source Description (GHG Type)	Current Staff Thinking: Generates a C&T Surrender Obligation?	In Current ARB Reporting Regulation?	Modification/Addition expected as part of ARB cap and trade regulation package?	In WCI Essential Reporting Requirements?	Other Current Staff Thinking
	Process (cover gas) SF6, HFC-134a, FK 5-1-12, fluorinated GHGs, CO2	Y	N	Y	N	
Miscellaneous Uses of Carbonates						
Facility Operators Calcining Carbonates						
	Process CO2	Y	N	Y	N	
Nitric Acid Production						
Nitric Acid Facility Operator						
	Process N2O	Y	N	Y	N	
Oil & Natural Gas Systems						
Oil and Gas Field Operators						
	Fugitive CH4	N	N	Y	N	
	CH4 from pipe blow downs	Y	N	Y	N	
Pulp and Paper Manufacturing						
Pulp and Paper Manufacturing Facility Operator						
	Recovery Furnace and Kiln Systems (fossil CO2)	Y	N	Y	Y	
	Recovery Furnace and Kiln Systems (bio CO2)	N	N	Y	Y	
	Wastewater treatment CH4	N	N	?	Y	
Soda Ash Manufacturing						
Soda Ash Manufacturing Facility Operator						
	Process CO2	Y	N	Y	N	
Suppliers and Recipients of Carbon Dioxide						
CO2 Supplier or Transfer Recipient						
	Fugitive CO2	?	N	Y	N	
Suppliers of Industrial GHGs						
Producers, Importers and Exporters of N2O or Fluorinated GHGs						
	N2O, fluorinated GHGs	?	N	Y	N	

INDUSTRIAL PROCESS EMISSIONS CATEGORIES IN THE FEDERAL REPORTING RULE THAT ARB DOES NOT INTEND TO INCLUDE IN CAP-AND-TRADE AND MANDATORY REPORTING REQUIREMENTS AT THIS TIME: Adipic Acid Production, Ammonia Manufacturing, Coal Mine Fugitive Emissions, Electronics Manufacturing, Ethanol Production, Ferroalloy Production, Food Processing, HCFC-22 Production and HFC-23 Destruction, Industrial Wastewater, Lead Production, Manure Management, Motor Vehicle Manufacturers, Municipal Solid Waste Landfills, Petrochemical Production, Phosphoric Acid Production, Silicon Carbide Production, Suppliers of Coal-Based Liquid Fuels, Titanium Dioxide Production, Zinc Production.

Complying Entity Information	Emissions Source Description (GHG Type)	Current Staff Thinking: Generates a C&T Surrender Obligation?	In Current ARB Reporting Regulation?	Modification/Addition expected as part of ARB cap and trade regulation package?	In WCI Essential Reporting Requirements?	Other Current Staff Thinking
Fuel Deliverers*						
Natural Gas and Natural Gas Liquids						
Local Distribution Company						
Reporting Threshold						Recommend setting at 10k/yr CO2e
C&T Inclusion Threshold						Recommend 25 k/year CO2e
Activity Upstream of Emissions						
	(a) Total NG deliveries by volume	Y	N	Y	N	
	(b) Deliveries to narrow-scope facilities	N, subtract from (a)	N	Y	N	
	(c) Non-combustion use of NG	N, subtract from (a)	N	Y	N	
	(d) Biomass-Derived NG deliveries (landfill- or digester-derived)	N	N	Y	N	
	(e) LNG-derived deliveries	May have an additional obligation for upstream emissions from LNG liquefaction	N	?	N	
Interstate Pipelines	List of customers (and quantities delivered?)	N, used for reconciling narrow scope sources?	N	?	N	
End users from interstate pipelines	NG receipts	Y, if not already assesed for surrender obligation				
Transportation Fuels						
Refinery, blendstock importer, distribution terminal rack (TBD)						
Reporting Threshold						Recommend setting at 10k/yr CO2e
C&T Inclusion Threshold						Recommend 25 k/year CO2e
Activity Upstream of Emissions						
	(a) CaRFG3 (gasoline) throughput/sales	Y	N	Y	N	

Complying Entity Information	Emissions Source Description (GHG Type)	Current Staff Thinking: Generates a C&T Surrender Obligation?	In Current ARB Reporting Regulation?	Modification/Addition expected as part of ARB cap and trade regulation package?	In WCI Essential Reporting Requirements?	Other Current Staff Thinking
	(b) ULSD (diesel) throughput/sales	Y	N	Y	N	
	(c) Deliveries to narrow scope facilities with a surrender obligation for gasoline/diesel combustion	N, subtract from (a), (b)	N	Y	N	
	(d) LCFS reporting for pathway emissions?	?	N	?	N	
Fuel Producers or Importers or Refineries (TBD)			N	Y	N	
Reporting Threshold						Recommend setting at 10k/yr CO2e
C&T Inclusion Threshold						Recommend 25 k/year CO2e
Activity Upstream of Emissions						
	(a) Quantity and composition of biofuel produced/sold	?	N	?	N	
	(b) LCFS reporting for pathway emissions?	?	N	?	N	
Propane						
Propane Provider (TBD)						
Reporting Threshold						Recommend setting at 10k/yr CO2e
C&T Inclusion Threshold						Recommend 25 k/year CO2e
Activity Upstream of Emissions						
	Emissions Assigned to Total LPG deliveries by volume	Y	N	Y	N	

Notes:
* 'Broad Scope' Emissions = 'Narrow Scope' Emissions plus Emissions from 'Fuel Deliverers'