ARB's Carbon Capture and Sequestration (CCS) Program

CCS Technical Discussion Series:
Accounting Protocols

Background on ARB's CCS Technical Discussions

ARB is currently developing a program to allow for the use of carbon capture and sequestration (CCS) in its climate change programs, and to advance the use of CCS as a greenhouse gas (GHG) reduction strategy generally. As part of this effort, ARB's CCS program staff seeks to better understand the ability of CCS to contribute to California's climate goals, the limitations or advantages of the technology, and the innovation and incentives necessary for adoption. To support this work, ARB is developing a quantification methodology (QM) for CCS projects. As with other QMs, the CCS QM may be adopted for use in the Cap-and-Trade and Low Carbon Fuel Standard programs as determined appropriate in rulemaking(s) specific to these programs. For more information on ARB's CCS program and development of the QM please visit our website at http://www.arb.ca.gov/cc/ccs/ccs.htm.

In order to ensure staff is using the best available information and understands stakeholder concerns, we will be hosting a series of technical discussions. The CCS technical discussions will be topic focused stakeholder-led discussions. The intent is to allow interested parties to provide input that will inform development of the CCS QM, as well as the CCS program generally. ARB will identify subject areas and specific questions, with the expectation that stakeholders will provide presentations, or other materials, and participate in an open discussion.

The CCS technical discussions will be accessible via webinar, conference call, and in-person at ARB headquarters in Sacramento, California. At the discussion, ARB will provide a short overview of the identified subject area, as well as other information pertinent to the discussion if applicable, but the primary focus will be on stakeholder presentations and discussion. ARB generally will not provide a presentation or formal meeting notes, but will post all stakeholder presentations or other submitted materials to ARB's CCS website at http://www.arb.ca.gov/cc/ccs/meetings/meetings.htm.

Accounting Protocol Technical Discussion

The accounting protocol technical discussion is meant to achieve a better understanding of the merits and shortcomings of existing CCS accounting protocols, as well as issues and uncertainties related to the development and implementation of CCS accounting protocols. This technical discussion will also offer a platform for the open exchange of information related to the development and implementation of CCS accounting protocols. CCS accounting protocols provide the methodology (e.g., equations and procedures) to quantify emissions reductions associated with capturing, processing, transporting, and permanently sequestering anthropogenic carbon dioxide (CO_2) in geologic formations. The accounting protocol is one of several components of the comprehensive CCS QM being developed by ARB that will ensure emissions reductions are real, permanent, quantifiable, verifiable, and enforceable.

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In the Cap-and-Trade Program, a covered entity that captures CO_2 for the purposes of geologic sequestration could reduce their annual compliance obligation by an amount equal to the CO_2 verified to be geologically sequestered through use of a Board-approved CCS quantification methodology. The quantification methodology must also be adopted into the Cap-and-Trade Regulation[1] for a covered entity to be able to reduce their compliance obligation through CCS. The QM accounting protocol for the Cap-and-Trade Program would, at a minimum, conform to the requirements of ARB's Cap-and-Trade Regulation and Mandatory Greenhouse Gas Reporting Regulation (MRR)[2]. The Cap-and-Trade Program is a market-based GHG emissions reduction program that measures and limits GHG emissions to the atmosphere. Reporting is done through MRR, which contains requirements for annual emissions reporting, including accuracy requirements and missing data provisions, and third-party verification. Further details on the fundamentals of emissions quantification in the Cap-and-Trade Program can be found on the MRR website.

The LCFS[3] provides three mechanisms by which CCS could be used for compliance:
1. Reduce the carbon intensity (CI) of a specific alternative fuel pathway (Tier 2 Fuel Pathway), where CO_2 capture can occur anywhere along the fuel production pathway.
2. Reduce the CI of crude oil, and then generate credits, when CO_2 capture occurs onsite at the crude production facility and the crude oil is then processed at a California refinery (innovative crude provision).
3. Refineries may use CCS to generate credits if the CO_2 capture occurs within the boundaries of the refinery and along the fuel production pathway (refinery investment provision).

The LCFS employs life cycle analysis (LCA) to determine the CI of a given fuel based on the GHG emissions associated with production, transportation, and use. The QM accounting protocol for LCFS would meet minimum LCA requirements, including, but not limited to, definition of the system boundary, defining all material inputs including chemicals and enzymes used during CO_2 capture and processing, identification of all combustion powered equipment and associated fuel combusted throughout the CCS project, references from information sources and documentation for all forms of energy consumed throughout the CCS project. Additionally, the LCFS includes requirements for quarterly progress reports and annual compliance reports. Emissions accounting for refinery investments rely on direct emissions data reported through MRR.

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[1] http://www.arb.ca.gov/cc/capandtrade/capandtrade/unofficial_ct_030116.pdf
[2] http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-2014-unofficial-02042015.pdf
[3] http://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf

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Participating in the Accounting Protocol Technical Discussion

DATE: Tuesday April 5, 2016
TIME: 9:30 a.m. to 1:30 p.m.

To attend in person:
  LOCATION: Sierra Hearing Room
  ADDRESS: Cal/EPA Headquarters Building
      1001 "I" Street
      Sacramento, California 95814

To participate by webinar:
https://attendee.gotowebinar.com/register/8001336703643527683

To participate by teleconference:
  United States:+1 (562) 247-8321
  Access Code: 694-569-467
  Please note that this is a toll call.

Presenting at the Accounting Protocol Technical Discussion

If you would like to present at the Accounting Protocol Technical Discussion, please contact Ms. Sara King at (916) 323-1009 or Sara.King@arb.ca.gov by March 28, 2016. ARB is requesting that presentations be limited to 20 minutes. Depending on interest, ARB may adjust presentation length and will communicate this to presenters ahead of time.

If you require special accommodation for the scheduled meeting or need this document in an alternate format (e.g., Braille, large print) or another language, please contact Ms. Regina Cornish at (916) 327-1493, as soon as possible. TTY/TDD/Speech to Speech users may dial 711 for the California Relay Service.

If you have questions about the Accounting Protocol Technical Discussion, please contact Ms. Johanna Levine, Staff Air Pollution Specialist, at (916) 322-3499 or via email at Johanna.Levine@arb.ca.gov or Ms. Sara King, Air Pollution Specialist, at (916) 323-1009 or Sara.King@arb.ca.gov.

Questions to Guide the Accounting Protocol Technical Discussion

The following sections provide a list of questions that is intended to guide stakeholder presentations and the discussion generally. Please note that this list is not exhaustive either in topics or questions.

General approach

1. Existing CCS accounting standards/protocols may include different elements with varying levels of details. California requires regulations to be relatively detailed to ensure they are clear - meaning the requirements can be reasonably and logically interpreted to have only one meaning and readily understandable by those directly affected - and prefers performance standards over prescriptive standards (Title 1, California Code of Regulations, section 16 and California Government Code section 11340.1(a)). In this context, are there any specific comments on the level of detail for accounting methodologies provided in existing CCS accounting standards/protocols?

2. Are there any parts of existing accounting protocols that are appropriate for partial or whole adoption into a California CCS accounting protocol, or that serve as a model needing only minor modification?

3. For the Low Carbon Fuel Standard how should the physical (i.e., emissions sources) and assessment (i.e., emissions included or excluded) boundary be defined in a California CCS accounting protocol?

4. How do current protocols define the temporal boundary of a CCS project? For example, how is the project start date and project term be defined? Are there recommendations on how this be defined in California CCS accounting protocol?

5. How do current protocols address other, non-GHG emissions sources such as criteria pollutants or toxic air contaminants associated with the energy requirement for CCS projects?

Measurement and parameters

1. Are there any technical challenges regarding obtaining necessary emission factors and measuring other parameters in accounting for the actual CO_2 emission of a CCS project? If so, are there recommendations on how to address such challenges?

2. What are the minimum and reasonably stringent requirements that should be imposed on the emission factors and other parameters (e.g., measuring frequencies and accuracy requirements)? For example, MRR requires that emissions data be verified as accurate to within ±5%. What can/should the stringency level of this requirement be in the CCS context? Are there challenges or obstacles to achieving this level of stringency in the CSC context?

3. Are there recommendations on how the emission factors and other parameters be substantiated for CCS projects?

Leakage

These questions are focused on quantification of potential leaks and how leaks should be accounted for in a California CCS accounting protocol. ARB will be hosting a separate discussion on monitoring tools and techniques, leak detection, and monitoring plan development.

1. Are there any recommendations about the strategy that should be used for surface leakage pathway identification? Are there any technical challenges associated with surface leakage detection and quantification?

2. Are there recommendations on how the expected background CO_2 concentration for monitoring CO_2 surface leakage be established?

3. Are there recommendations on how subsurface leakage of CO_2 (i.e., CO_2 that has leaked out of the intended storage formation but that has not reached the atmosphere) be considered?

4. If subsurface leakage is considered, are there recommendations on how what strategy should be used for subsurface leakage detection and quantification?

5. Are there recommendations on how leakage be quantified in a California CCS accounting protocol? How accurately can surface and subsurface leakage be quantified?

6. Are there recommendations on how a California CCS accounting protocol address the fact that small leaks are difficult to detect and quantify yet need to be captured in the accounting framework?

Implementation

1. Is there any real world experience or lessons learned in implementing CCS accounting protocols? What are the potential or experienced challenges in implementing CCS accounting protocols?

2. How do existing protocols manage missing data that are necessary for accounting CO_2 stored? Are there recommendations on what procedures should be required to manage missing data?

3. Are there any issues related to developing and implementing CCS accounting protocols that are not covered by this document?