Major U.S. GHG Registries and Their Rules for Coal Mine Methane Projects

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Capturing and utilizing methane from coal mines that would otherwise be vented into the atmosphere creates the opportunity to generate a significant number of greenhouse gas (GHG) emission reduction credits. Coal mine methane (CMM) projects are eligible for several voluntary GHG registries that register carbon credits or offsets. Major GHG registries that accept CMM projects include the Climate Action Reserve, Voluntary Carbon Standard, Chicago Climate Exchange, and American Carbon Registry.

The purchase of voluntary carbon credits (mainly motivated by corporate social responsibility) saw a downturn in 2009, while the increase in the pre-compliance segment somewhat offset the overall decrease. Compliance credits typically require the use of third party GHG registries that serve to collect, verify, and track corporate emissions and emission reduction data. As a result, more than half of all voluntary carbon offset transactions were listed with registries in 2009, up from approximately 30% in 2008.
Whether or not a CMM emission reduction project is eligible for GHG credits depends on a number of project specifics, such as project start-up date, end utilization technology (i.e., electricity generation vs. pipeline sales), origin of methane (i.e., active vs. abandoned mines and surface vs. underground mines), and monitoring and metering techniques. Each GHG registry has its own rules governing project eligibility, additionality, and registration. For example, some registries include ventilation air methane (VAM) projects while others do not. Moreover, some accept methane recovered from abandoned or surface coal mines, while others only accept methane recovered from active underground mines. This report summarizes and compares the key features of these programs as they pertain to CMM emission reduction projects.

Climate Action Reserve (CAR)

CAR, a nonprofit registry and trading system based in California, was launched in 2008 and is the newest voluntary offset program within the U.S. carbon market. The program establishes standards to develop, quantify, and verify GHG emission reduction projects for a variety of project types in the United States, as well as livestock and landfill projects in Mexico. The registry's standards are outlined in project-specific protocols for various sectors: forest, livestock, landfill, urban forest, CMM, organic waste digestion, nitric acid production, and ozone depleting substances. CAR also issues offset credits – Climate Reserve Tonnes or CRTs – for these projects and monitors the trading of these credits, which are publicly accessible in an online registry. One CRT is equal to 1 metric tonne of carbon dioxide equivalent (CO_2e).

CAR's current CMM protocol is the *Coal Mine Methane Project Protocol Version 1.0*, issued on October 7, 2009; however, the protocol is being revised to include drainage projects that recover pipeline quality methane. The revised protocol is expected in late 2010. To date, CAR has registered one CMM project and has issued CRTs for its emission reductions. Currently, CMM projects that can be registered with CAR are limited to those with electricity generation, flaring, or VAM destruction as end utilization.

Rather than using additionality tests (i.e., financial, technological, common practice, etc.) for eligibility, CAR uses a performance standard approach. The CMM protocol requires that projects satisfy the Legal Requirement Test and the Performance Standard Test. The Legal Requirement Test confirms that a project's GHG reductions would not have occurred due to federal, state, or local regulations or other legally binding mandates. Project developers must attest that there are no laws, statutes, regulations, court orders, environmental mitigation agreements, permitting conditions, or other legally binding mandates requiring the destruction of CMM at the project site. The Performance Standard Test confirms that the project meets a standard of performance applicable to all CMM destruction projects. In this protocol, the standard of performance is based on "common practice" for managing CMM.

Under the current protocol, Version 1.0, CAR issues CRTs only for the destruction of methane that would otherwise have been emitted into the atmosphere. Thus, projects capturing methane and using that methane to generate electricity will only receive credit for the methane that is destroyed in the process but

do not receive additional credits for displacing GHG emissions associated with any fossil fuels that otherwise would have been combusted to produce grid-based electricity or on-site energy. Additionally, the current protocol does not consider projects that send CMM off-site through a commercial pipeline as eligible to receive credits. As a result, only methane destroyed on site is eligible.

The CAR CMM working group is developing a revised protocol, Version 2.0, which is expected to modify the current performance standard test to include some gas pipeline projects. The new standard, if approved, could include CMM sent to pipelines based on various parameter thresholds for pre-mine drainage and gob wells. Parameters could be based on the age of the well, CMM gas quality (% CH_4), or other measurable attributes. CAR is currently the only registry that does not include pipeline projects; CAR also does not accept CMM projects outside the borders of the United States and its territories.

Only one CMM project has been issued CRTs from CAR: Biothermica Technologies' VAMOX Demonstration Project, located at Jim Walter Resources No. 4 Mine in Alabama. There is one additional project listed with the registry – the Green River Trona Mine Methane Destruction and Utilization Project in Wyoming.

Voluntary Carbon Standard (VCS)

The VCS program, launched in 2006 as a pilot program, sets a global standard and provides a framework to verify voluntary GHG emissions reductions. The full-scale VCS standard was released on November 19, 2007. The VCS Registry System is the first multiple registry system within the voluntary carbon market. It includes three international registries: APX Inc., in North America; Caisse des Depots in Europe; and Markit in the United States, United Kingdom, and Asia Pacific regions. These registries work with the VCS Project Database to issue, hold, transfer, and retire Voluntary Carbon Units (VCUs). One VCU is equal to 1 tonne of CO_2e.

Unlike other U.S. registries, VCS follows the use of Clean Development Mechanism (CDM) methodologies established through the Kyoto Protocol rules. In addition, VCS provides a framework to develop new methodologies or develop revisions to existing CDM methodologies. For CMM projects, VCS uses methodology elements from CDM's approved consolidated baseline and monitoring methodology (ACM0008) – "Consolidated methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction through flaring or flameless oxidation;" VCS will also accept projects that use the CAR protocol. VCS will accept CMM project types including pipeline sales, boiler use, electricity generation, flaring, and VAM.

In March 2009, VCS approved a modification to the CDM methodology ACM0008 to accept surface mine methane (SMM) projects.[1] This methodology (VMR0001) allows pre-mine drainage wells drilled in advance of surface (or open cast) mine highwalls to become eligible once the wells come in contact with air egress from the mine face. This differs somewhat from the underground mine scenario, where wells drilled in advance of longwalls must either be mined through (per CAR and Chicago Climate Exchange) or enter a calculated zone of influence (ACM0008) with the mine. Under VMR0001, VCS currently accepts CMM that is removed at five different stages of mining: from coalbed methane (CBM) wells prior to mining or from underground pre-mining CMM drainage; during mining via surface or underground post-mining CMM drainage techniques; during mining via ventilation air; after mining via drainage from sealed goaf wells before the mine is closed; or as CBM from an open cast mine face, defined as "that area of an open cast (surface excavation mine) coal mine that has been exposed to the atmosphere through the removal of overburden and coal."

In August 2009, another modification to ACM0008 was proposed to include methane recovery and use/destruction from abandoned coal mines.[2] The methodology revision to include abandoned mine methane (AMM) is currently undergoing VCS's "double approval process" required for all new methodologies and CDM methodology revisions. The revisions proposed include AMM, which is defined as "methane which has been extracted from open or sealed vents, shafts, portals or gob wells at locations

[1] http://www.v-c-s.org/VMR0001.html

[2] http://www.v-c-s.org/methodology_rtatimcadfacm.html

where active mining operations and/or ventilation have ceased." Thus, the revised methodology will apply to new, existing, and post-mining activities. A decision regarding the revised methodology is expected to be released in the summer of 2010.
CMM projects that use CDM methodology ACM0008 must also follow all of the applicable CDM tools, such as:

- Tool to demonstrate and assess additionality;
- Tool to calculate the emission factor for an electricity system; and
- Tool to determine project emissions from flaring gases containing methane.

The CDM additionality tool requires an assessment of alternatives to the project activities, barrier analysis, and common practice analysis. More importantly, the tool includes the application of financial additionality, which requires an investment analysis to determine the economic attractiveness of the project. It can be difficult for economically viable CMM projects to qualify under the methodology if revenues from energy sales (electricity or gas sales) show the projects to be profitable without carbon credit revenues. Furthermore, correctly applying the tool for calculating the emission factor for grid-based electricity in the United States is challenging due to lack of available recent operating margin[3] data or accurate build margin[4] data from the U.S. EPA or U.S. DOE. A slightly modified approach is required to determine the emission factor.

To date, VCS has registered a total of 42 CMM/AMM/SMM projects, mostly from Germany. Of these projects, one SMM project is located in the United States, and three CMM projects are located in China. Of the 38 projects registered from Germany, 18 are AMM projects. Interestingly, VCS has not yet approved an AMM methodology modification to ACM0008, but chose to accept the projects as either "renewable energy" project or Joint Implementation project allowed under the VCS V1 standard from 2006. Energy produced from CMM/AMM is considered renewable energy by German law. Approximately 11 million VCUs have been issued for CMM/AMM projects during the 2005-2009 reporting period.

Chicago Climate Exchange (CCX)

Launched in 2000, CCX is a cap-and-trade system that requires its members to make legally binding commitments to reduce their emissions. In order to participate in the CCX voluntary carbon market, a company must be a member of the Exchange, make a legally binding commitment to its reduction schedule, and be subjected to annual emissions verifications. Members must meet established reduction targets based on their emissions baselines and are allowed to sell or bank any reductions beyond the target. Conversely, if a member fails to meet any emission reduction target, it must purchase allowances from other members to make up any shortfall.

Reduction schedules are separated into Phase I and Phase II. Under Phase I, CCX members are committed to reducing emissions by a minimum of 1% per year by 2006, for a total reduction of 4% below their baselines. Phase II members are committed to reducing emissions to 6% below baseline by 2010. Phase I members are also subject to the 6% emission reduction below baseline by 2010. As of January 2010, there were 110 full members of CCX committed to the Phase II goal. The CCX tradable commodity is the Carbon Financial Instrument (CFI), with 1 CFI equal to 100 tonnes of CO_2e.

CCX's current CMM protocol is the *Chicago Climate Exchange Offset Project Protocol: Coal Mine Methane Collection & Combustion Offset Projects*. The protocol was originally released in April 2006 and was updated on August 20, 2009. CMM projects registered with CCX must be located in the United States or in a non-Annex I country as designated by the Kyoto Protocol. CCX has registered both CMM and AMM projects. Under the current CCX protocol, project additionality must be demonstrated through two

[3] Operating margin: the emission factor that refers to the group of existing power plants whose current electricity generation would be affected by the proposed project activity (CDM Methodological Tool Version 02: Tool to calculate the emission factor for an electricity system)

[4] Build margin: the emission factor that refers to the group of prospective power plants whose construction and future operation would be affected by the proposed project activity (CDM Methodological Tool Version 02: Tool to calculate the emission factor for an electricity system)

performance benchmarks: regulatory criteria and common practice criteria. The previous version of the protocol, under which most CMM projects were registered, did not require a common practice benchmark. CMM project types that can be registered with CCX include pipeline sales, electricity generation, boiler use, and flares. VAM projects are not included in the current protocol. According to the CCX protocol, methane must be recovered from an active or abandoned coal mine using one of the following extraction techniques: 1) pre-mining drainage wells—either from the surface or underground—associated with mining activities at active coal mines; or 2) post-mining drainage wells—either from the surface or underground—associated with mining activities including from sealed mine areas. Extraction techniques for active mines must meet Mine Safety & Health Administration (MSHA) standards. Projects that recover methane from surface mines are not eligible under the CCX protocol. As with all other CMM protocols, CBM—defined as "methane produced from coal seams unrelated to mining activities"—is ineligible under CCX rules.

CDM-approved projects may be eligible under CCX provided that the emission reduction credits are only used once for compliance. In addition, any projects registered under CDM that generated emission reductions prior to CDM acceptance but still adhere to CDM project standards must satisfy CCX rules in order to be eligible to register at CCX.

Through 2009, CCX had 11 CMM projects registered, including 5 international projects from China and Germany; the registered projects also list 4 AMM projects, including 2 from Germany. CMM offsets registered through CCX total nearly 18 million tonnes of CO2e. This represents approximately 22% of all offset types registered as of December 31, 2009, second only to agricultural soil carbon projects (33%). Although an early leader in GHG registries in the United States, the uncertainty as to CCX's eventual acceptance into a federal cap-and-trade system led to a CFI price collapse in early 2009. As a result, less than 3 million of the registry's 82 million tonnes of CO_2e were registered in 2009. Less than 3,000 tonnes have been registered in 2010 through June 25, 2010.

American Carbon Registry (ACR)

Launched in 1996, ACR is a voluntary offset program and was the first private voluntary GHG registry in the United States. ACR partners with Environmental Resources Trust (ERT-Winrock), an organization that provides carbon technical services. ACR publishes standards, methodologies, and protocols, which are all based on International Standards Organization (ISO) 14064 and sound scientific practices. ACR has developed its own standards and methodologies for certain sectors, such as forestry, livestock, landfill, and carbon sequestration; however, a CMM standard has not been developed to date. Instead, ACR considers methodologies from other standards and systems—including CDM, VCS, and U.S. EPA Climate Leaders—to the extent that they are found to be consistent with the ACR Technical Standard. As a result, the registry accepts CMM projects from active underground and surface coal mines (via the CDM and VCS protocols), but it has not yet done so.

Climate Leaders is a partnership between the U.S. government (EPA) and industry that works with companies to develop climate change strategies. The program was launched in February 2002 and had 11 initial partners. That number has grown to more than 190 today. A partner first conducts a corporate-wide inventory of its GHG emissions and then sets an emission reduction goal to be achieved over a 5- to 10-year period. Partners may choose to go beyond the basic requirements of the program and expand their GHG inventories to include emission reductions from offsets and renewable energy purchases. Climate Leaders has developed offset project methodologies for several sectors but has yet to develop a CMM protocol, although they are likely to develop one in the future.

Summary

The following summarizes the eligibility criteria for acceptance of coal mine methane projects by the four major GHG registries – CAR, VCS, CCX, and ACR. Further, Table 1 lists CMM projects registered under each registry , while Table 2 provides a quick comparison of the four GHG registries.

Project Location

CMM projects located in the United States are eligible to be included in any of the four GHG registries. CAR accepts only CMM projects located in the United States and its territories. VCS and ACR accept projects

worldwide. CCX accepts projects from the United States and non-Annex I countries (as identified by the Kyoto protocol). Prior to 2007, CCX accepted CMM projects from Germany (Annex I country).

Start Date
For older existing CMM projects, GHG registry selection will be limited to just two of the registries due to eligibility requirements for start-up date. Projects more than two years old are limited to the CCX (after 2003) or ACR (after 2000) registries. Older projects dating back to 2002 were allowed in VCS under the previous version of registry rules but are no longer eligible.

Coal Mine Type
Methane recovered from underground coal mines is eligible under all four GHG registry rules, assuming other eligibility parameters are met. VCS also includes methane recovered during surface mining operations. SMM projects would also become eligible under ACR as they accept VCS methodologies.

Currently, the recovery and use of methane from abandoned mines is only eligible for the CCX registry. Pending the approval of the proposed AMM methodology, VCS may soon accept abandoned mine projects (as will ACR). CAR has no plans at this time to develop an AMM methodology.

Methane Utilization Technology
CMM projects that combust or destroy methane on site through the use of an approved destruction technology, such as electric power generation units, boilers, heaters, and flares, are eligible in all four GHG registries.

CMM projects that either sell methane directly to commercial pipelines or process CMM prior to sending methane to a commercial pipeline are eligible for all registries except CAR.

VAM projects are eligible for all registries except CCX.

Table 1. CMM Projects Registered Under the Four Major U.S. GHG Registries

GHG Registry	Project Types Registered	Number of Projects	Number of Credits Issued To Date	Offset Unit and Equivalency	Project Locations
CCX	CMM, AMM	11	18,043,300	Carbon Financial Instrument (CFI) 1 CFI = 100 tonnes CO_2e	U.S., China, Germany
VCS	CMM, AMM, SMM	42	11,330,549	Voluntary Carbon Unit (VCU) 1 VCU = 1 tonne CO_2e	U.S., China, Germany
CAR	CMM (VAM)	1	25,931	Climate Reserve Tonne (CRT) 1 CRT = 1 tonne CO_2e	U.S.
ACR		0		Emission Reduction Ton (ERT) 1 ERT = 1 tonne CO_2e	

Table 2. Comparison of CMM Project Eligibility Requirements for the Four Major U.S. GHG Registries

GHG Registry	CMM Protocol Launch Date	Eligibility	Project Types	Project Locations	Earliest Project Start Date	Additionality
CCX	April 2006	CMM, AMM	Pipeline, Electricity, Flare	U.S., non-Annex I countries	On or after January 1, 2003	Performance Standard
VCS	November 2007	CMM, SMM	Pipeline, Electricity, Flare, VAM	Worldwide	For projects acceptable under VCS Version 1, project start date must be after January 1, 2002 and project validation and verification must be completed by October 1, 2010. For current projects, VCS 2007.1 validation shall be completed within two years of the project start date.	CDM Additionality Tool
CAR	October 2009	CMM	Electricity, Flare, VAM	U.S.	Projects must be registered with CAR within 6 months of start date. Until October 7, 2010, the following exceptions apply: 1) October 7, 2007 for projects not previously registered in a GHG registry; 2) January 1, 2001 for projects previously listed with another GHG registry if the project was registered after October 7, 2007	Performance Standard
ACR	Currently does not have stand-alone CMM protocol	CMM, SMM	Pipeline, Electricity, Flare, VAM	Worldwide	On or after January 1, 2000	CDM Additionality Tool or ACR Hybrid Additionality Approach