ISSUE BRIEF

Pricing Carbon in Oregon:

Carbon Offset Aggregation

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HIGHLIGHTS

This brief offers a review of existing approaches to carbon offset aggregation. The purpose is to identify key questions pertaining to an Oregon carbon market and its use of aggregated carbon offsets. Rules for aggregation in existing protocols are covered here in brief, and references to specific guidance on aggregation methodologies are included. Issue areas and related questions pertaining to aggregation that need to be addressed include:

1. Defining eligibility
    a. Defining offset project types eligible for aggregation and further specifying rules related to size of aggregations (number of participants and minimum/maximum acreages).
2. Defining legal responsibility
    a. Develop rules that clearly articulate assignment of legal responsibility and inform how aggregates are to be contractually bound together.
    b. Define whether members of an aggregation are considered their own independent offset project, or whether the aggregation is the legal entity.
    c. Identify how aggregations can address invalidation and other reversal risks.
3. Quantification and verification of carbon stocks and additionality
    a. Which aspects of existing aggregation approaches. i.e., baselines and additionality calculations, and inventory design, are satisfactory for a potential Oregon compliance carbon market?

BACKGROUND

Among offset discussions in Oregon's 2018 Clean Energy Jobs Bill's cap and invest proposal was a call for rules that allow aggregation of small to medium sized operations for aggregated carbon offsets projects.[1] This interest exists in part because small to medium sized forests and farm operations often have land ownership and management objectives that align with carbon sequestration and storage, but face significant financial and administrative barriers to developing offset projects.

Due to current market structure (carbon price, offset protocol design, verification costs), developing forest and agriculture carbon offsets for the compliance market tends only to be economically feasible at large

[1] Participants in the Agriculture, Forestry, Tribes, and Rural Communities legislative workgroup, tied to the 2018 Clean Energy Jobs bill, offered that the policy should: "*prioritize small landowners in development of offset protocols*;" "*create significant new resources for small and mid-sized farms and ranches to adopt practices that promote soil health and soil carbon sequestration*;" "*be designed to: (1) ensure that emission reductions are real, additional, and as permanent as possible, and (2) accessible for smaller scale non-industrial forest and farm properties*."

scales, e.g. +5,000 acres for most California Air Resources Board (ARB) forest projects. Aggregating smaller parcels into joint projects may help distribute transaction costs and administrative burdens and enable smaller parcels to engage, allowing for greater overall participation and market diversity.

While the potential benefits are many, a series of challenges exist; e.g. facilitating working relationships among several entities, handling inventory and verification requirements for several parcels, managing risks, and distributing offset credit revenue among participants. Rules for aggregation must also decide whether each individual project must demonstrate additionality or if additionality must be demonstrated by the aggregate as a whole. These and other issues will need to be wrestled with if aggregation is to be feasible for compliance offsets in Oregon.

DEFINING ELIGIBILITY

Almost any land-based emission reduction activity for which carbon offset protocols exist could conceptually be aggregated. However, given the varied offset types in the land sector, it will be ideal to define aggregation eligibility criteria for each project type based on some financial analysis of the model aggregations. For instance, based on their knowledge of forest offset protocols and finances, the Climate Action Reserve (CAR) designed a protocol for aggregation that limits individual projects to less than 25,000 acres; no individual forest owner may enroll more than 5,000 acres; and no individual forest owner may comprise more than 50% of the total combined acreage in an aggregate.

Action needed for Oregon:

- Define which offset project types should be eligible for aggregation and further specify any rules related to size of aggregations in terms of the number of participants and minimum/maximum acreages.
- Identify whether multiple offset project types can exist within a single aggregation, e.g. improved forest management and avoided conversion.

DEFINING LEGAL RESPONSIBILITY

Critical to all carbon offset projects is the assignment of legal responsibility for regulatory compliance. Aggregation raises questions related to who is ultimately legally responsible for delivering the specified volume of CO_2e reductions of an offset purchase. In non-aggregated projects there is a linear relationship, with a single set of contracts with a single landowner, while in aggregation projects there may be several contracts between a carbon purchaser, a carbon aggregator, and several landowners. Consequentially, assignment of legal responsibility has a strong bearing on eligibility criteria, allowable aggregation structures, and subsequently roles and responsibilities for actors within the aggregation, i.e. forest landowners, agricultural operators, and the aggregator.

In order to aggregate multiple parcels of land together to receive forest carbon offset credits, all existing aggregation frameworks require designating one entity as the *aggregator*, also commonly referred to also as a *project proponent* or *project developer*. This entity must coordinate among the relevant parties and can be a for profit or non-profit corporation, city, county, land trust, a landowner cooperative, or an individual landowner grouping one or more additional ownerships together with their own. The aggregator may assume part of the legal responsibility for the offset project, but this is specified by the protocol and regulations within the carbon market.

Common duties of an aggregator include organizing carbon inventory, issuing calls for 3rd party verification, project registration, and brokerage and distribution of revenues from offset sales. In addition, aggregators may be responsible for outreach efforts aimed at attracting and informing potential project participants. Finally, an aggregator must also consolidate and deliver all relevant project information to the appropriate registry and/or regulatory bodies. Most project development firms, whether serving an

aggregate or an individual project, have a fee structure to deliver services needed to develop and transact carbon offsets, including those listed above. Roles and responsibilities of aggregators may vary slightly based on the offset protocol used:

- The Verified Carbon Standard (VCS) protocol requires the aggregator to set the geographic boundaries for aggregated projects, including conditions for adding future projects. In addition, the aggregator must arrange verification and monitoring of emission reductions.
- In CAR, aggregators are required to first establish an account with CAR, execute contracts with forest owners, select a verification body for enrolled projects, arrange verification schedules, and manage a CAR account for transacting offset credits. CAR also specifies that aggregators may engage in the following activities: managing the monitoring and verification reports to CAR, developing projects, providing inventory services, and/or other services as outlined in the contract between forest owners and the aggregator. The CAR protocol allows aggregators to assist forest owners in preparing project documentation, but the legal responsibility for monitoring, verification, and documentation ultimately lies with individual forest owners in the aggregation. The protocol requires each project (an aggregation or otherwise) register with CAR and that each forest owner in an aggregation use a separate account on CAR's registry software. The protocol also requires each individual forest owner to sign a project implementation agreement (PIA) with CAR specifying that, "*liability for reversal lies with each individual forest owner*."
- Under Alberta's offset credit protocols, an aggregated project is defined as two or more offset subprojects submitted to the Alberta Emission Offset Registry as an aggregation and subject to the same quantification protocol. The aggregator is defined as the person or entity tasked with grouping together small projects in one large pool to oversee project development, verification, and associated costs. The aggregator leads in engaging the Alberta Emissions Offset Registry regarding offset credit sales.

Actions Needed for Oregon:

- Develop rules that clearly articulate assignment of legal responsibility and inform how aggregation will be bound together by contracts between registries, landowners, and aggregators.
- Define whether members of an aggregation are considered their own independent offset project, or whether the aggregation is the legal entity.

MECHANISMS FOR ADDRESSING INVALIDATION AND REVERSALS

Oregon will need to develop guidance for aggregation structures pertaining to the initial formations of aggregations and identify whether landowners may join and/or leave aggregations after initial formation. The process of developing carbon offsets credits is lengthy. The process involves developing or implementing the project, securing 3rd party verification, submitting projects to regulators for review and approval, having credits issued, and marketing and transacting credits. This can take years to complete.

One significant question about aggregation is what happens when a member of an aggregation decides to exit the aggregate and/or intentionally reverses their carbon offsets, e.g. harvests more above ground biomass volume than permissible within a forestry offset. In the voluntary market, ACR and CAR address risk of such intentional reversals differently within their approach to aggregation.

CAR requires each individual parcel have its own carbon inventory and baseline, whereas under ACR, projects in an aggregation share a common baseline or a programmatic baseline (see discussion on programmatic aggregation below) and a single aggregate inventory. In ACR, offsets are calculated at the aggregate-level rather than at the individual project level, with the aggregator distributing credits in a manner deemed equitable by members of the aggregation.

In ACR, if a landowner intentionally reverses their carbon, it is up to the project proponent, i.e. the aggregator, to fill the hole with replacement credits, but these can come from offset project types that are much less expensive. ACR allows insurance as a reversal risk mitigation tool, and also allows aggregators to offer landowners contract terms of less than the permanence commitment of ACR (40-years). Currently, none of these mechanisms are applied in the compliance market.

As the leader in the compliance offset market, California rules are precedent setting in the cap and trade compliance offset market. As the regulatory agency overseeing the offset market, the ARB has adopted an invalidation rule requiring offset purchasers to assume full liability in the event that an offset project is invalidated (by ARB) during a project reporting period, i.e. post verification and offset credit issuance.[2] While such rules are needed to maintain the rigor of the offset mechanism, the ARB invalidation rule has important implications for forestry projects and aggregation.

Under ARB's current invalidation guidelines, offsets issued for an entire reporting period can be invalidated. As the party bearing this risk, the buyer would then need to find new offsets to purchase. The seller bears a significant financial risk as well given the significant upfront costs involved in developing offset projects. For forestry offsets, most of the offsets are generated in the first reporting period, so invalidation during this reporting period potentially jeopardizes the entire project. For complex projects involving multiple landowners, the risk of invalidation increases. Under ARB's rule, an entire aggregated project could be invalidated for infractions occurring on a single ownership within the project. Oregon will need to consider mechanisms to deal with invalidation risks, particularly how they apply in aggregations. Potential options could be:

- Allow aggregators to drop parcels from aggregations without invalidating the entire project, if suitable verified tons can be added to the aggregation within a certain time period.
- Follow Ontario's example by creating a market-wide buffer pool of reserve carbon offsets (3-4% of every offset generated) specifically dedicated to addressing invalidation risk for all projects.

QUANTIFICATION AND VERIFICATION OF CARBON STOCKS AND ADDITIONALITY

For forestry offsets, aggregation could allow for efficiencies and cost-savings in the two most significant transaction costs—carbon stock quantification via forest inventory and the subsequent verification, which includes a review of individualized inventory plots, measurements, and calculations. The conceptual benefit of aggregation is the ability to treat many forest inventories as a single inventory, effectively reducing the number of measurements needed while maintaining a satisfactory statistical representation of the overall forest carbon stock. Existing aggregation methodologies approach inventory design and the establishment of an aggregation's baseline differently.

For instance, the CAR approach recognizes that achieving the requisite statistical accuracy in a carbon inventory for smaller parcels (i.e. +/- 5 percent of the mean at the 90 percent confidence level) is likely cost-prohibitive because it requires a large number of plots relative to the project area. CAR's aggregation approach thus allows for forest owners enrolled in an aggregation to submit project inventories with reduced sampling requirements based on the statistical principle that the targeted standard error (+/- 5 percent of the mean at the 90 percent confidence level) is achieved across the entire aggregate rather than across each

[2] ARB's invalidation rule focuses on activities within the project area that directly affect carbon stocks. For forestry projects, the ARB specifies that these activities include "site preparation, planting, harvesting, and monitoring." Activities external to the project area, such as transportation of logs to mills, mill operations, and landfilling, are outside the project regulatory conformance assessment. See the ARB invalidation rule here: https://www.arb.ca.gov/cc/capandtrade/offsets/arboc_guide_regul_conform_invalidation.pdf

parcel within that aggregate. CAR's aggregation guidelines include a table delineating a sliding scale of allowable sampling error for inventory data associated with individual forest parcels participating in an aggregation. The sliding scale is based on the number of individual parcels making up the aggregated inventory.

The CAR Forest Aggregation Protocol specifies that projects may join or leave aggregates for any reason, however, within a year of a project leaving, a replacement project must be joined to the aggregate. The American Carbon Registry (ACR), another voluntary protocol, takes a similar stance on this issue. In CAR, if a replacement project is not added, the statistical targets associated with the remaining projects will be recalculated to account for the lower number of projects in the aggregate. ACR has a similar requirement to recalculate project carbon stocks which, for forest projects, may involve installing additional inventory plots, doing additional modelling, and submitting the project for review again.

Another issue to explore is the overall structure of the aggregation. Certain aggregation protocols require all projects to share a baseline scenario and crediting period. Other proposals are for aggregation to be more flexible and function in a programmatic manner, allowing lands to come in and out of the aggregation, with some variation in baselines and additionality quantification to exist within an aggregate.

In a standard aggregation, every offset project contained in the aggregate has the same overall baseline and project start date, while in a programmatic aggregation individual offset projects within aggregate may have different start dates, most likely resulting in multiple baseline durations, crediting periods, verification dates, etc. within the project, which could result in more complexity. The advantage of a programmatic approach is that eases the front end work of the aggregator to engage with multiple landowners and allows an aggregation to grow over time.

Points of considerations for Oregon:

- Which existing aggregation approaches to baseline establishment, inventory design, and additionality calculations are satisfactory for a potential Oregon compliance carbon market?
- Is a programmatic aggregation approach feasible?

CURRENT AGGREGATION PROTOCOLS

Climate Action Reserve (CAR) guidance on aggregating forest offsets

In 2010, CAR introduced its guidelines for aggregating smaller forest projects (eligible for projects submitted under Version 3.0-3.2 of the Forest Project Protocol).[3] CAR provides for projects smaller than 5,000 acres to join aggregation pools designed to reduce transaction costs by: 1) enabling economies of scale in statistical sampling; 2) requiring on-site verification every 12 years; and 3) allowing for a desk verification for a subset of projects in aggregation (equal to the square root of total participating projects) and issuing credits for the aggregate based on this number. Every 12 years on-site verifications must be conducted for each project within the aggregate and between on-site verifications forest owners must submit annual monitoring reports to CAR. These verifications occur less frequently than disaggregated projects which occur every 6 years.

American Carbon Registry (ACR) guidance on aggregation

The ACR currently allows for aggregation of multiple project participants into a single project in the following categories: reduced use of nitrogen fertilizer on agricultural crops, rice management systems, improved forest management for non-federal US forestlands, and avoided conversion of grasslands and

[3] http://www.climateactionreserve.org/how/protocols/forest/aggregation/

shrublands to crop production.[4] Under the ACR Forest Aggregation Protocol, activities must be pooled together into a single project with uniform design, baseline definition, inventory method, monitoring and verification, and registration standards. Under the ACR Protocol, any carbon offsets sold by the aggregator must be guaranteed as permanent and the aggregator must find replacement projects should a credit be reversed.

Verified Carbon Standard (VCS) guidance on aggregation

VCS provides guidance for aggregate projects under the title "grouped projects." The requirements for grouped projects allow for new projects to be added to the aggregate project without undergoing a full validation, helping scale up projects while reducing transaction costs. All projects in aggregate, even those added later on, are also required to possess the same crediting period defined in the project planning documents. In addition, the VCS standard subjects all aggregated parcels to the same baseline scenario and requires all involved projects to demonstrate additionality.

California Air Resources Board (ARB)

The state of California's Forest Offset Protocol provides for multiple forest owners to participate in aggregated projects if the project is subject to one baseline and the aggregator submits one cumulative inventory for the whole project. The protocol also specifies that projects "*may extend across multiple assessment areas within an ecosection or supersection, but may not extend across more than two adjacent ecosections or supersections*." Supersections, also referred to as ecosections, are defined as geographical units that contain 1-6 assessment areas that provide standardized regional data for offset project development.

Alberta, Canada guidance on aggregation

Alberta's offset project development standards[5] prohibits aggregators from adding new, individual offset projects to an aggregate after the date the overall project is submitted to the Alberta Emission Offset Project Registry, unless the aggregator resubmits an updated project planning sheet to the Registry. Aggregators are also required to include reporting requirements, locations, activity start date, and unique site identifiers. Under Alberta's Conservation Cropping Protocol, an aggregator is responsible for retaining copies of the farm operator's records and obtaining records to support GHG calculations for the project. Liability for projects is assigned to the aggregator unless an agreement is reached between the aggregator and individual farmers/landowners.

For Alberta's Agricultural Nitrous Oxide Emissions Reductions Protocol, aggregate projects must cover all farms for an entire 8-year crediting period. For farms that span multiple EcoDistricts, offset quantification must be completed for each separate EcoDistrict. The aggregator is required to develop the procedures for managing data and information and the timelines for project verification. Aggregators and individual farmers are required to obtain individual records (invoices, contracts, metered results, maintenance logs, calculations, databases, photographs, calibration records, farm record sheets, 4R Plans, soil testing results, etc.) necessary to support greenhouse gas reduction assertions.

Ontario, Canada

Offset developers may aggregate projects of the same offset type. Ontario is prioritizing the adaptation of landfill gas, mine methane, and ozone depleting substances capture and destruction protocols with the

[4] https://americancarbonregistry.org/carbon-accounting/old/carbon-accounting/ACR%20Forest%20Carbon%20Project%20Standard%20v2.0%20June%202010.pdf

[5] https://open.alberta.ca/dataset/ef170a34-f8c3-4b8d-bad6-51884c59ec13/resource/f7d54aaf-21c6-469f-a19c-6d9a4f1da4af/download/standardghgemissionoffset-dec18-2017.pdf

intention of adapting 10 additional protocols, including afforestation, forest projects, and avoided grassland conversion.

CONCLUSION

Aggregating carbon offset projects has the potential to allow a broader range of stakeholders to participate in carbon markets. This would be beneficial to Oregon for a variety of reasons including increasing carbon sequestration and providing alternative revenue streams for landowners. While aggregating projects does present some significant technical, administrative, and legal challenges, experts within various carbon registries have been wrestling with these issues for years and have developed some solutions that could be adopted in Oregon. Privately owned farms, ranches, and forests represent an important portion of the land and carbon base in Oregon. Carbon projects represent a potential mechanism for realizing multiple public and private benefits from these lands, but only if project development can be streamlined and made more financially feasible. Aggregation, along with technological advances in inventory and modeling methods, shows a lot of promise in achieving these goals and merits more research and development should Oregon pursue development of offset protocols.

For further reading on aggregation see: EPRI (2012). *Benefits, Existing Methods and Key Challenges to Aggregating Greenhouse Gas Emission Offsets.* Electric Power Research Institute.[6]

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[6] http://eea.epri.com/pdf/ghg-offset-policy-dialogue/workshop12/Background-Paper_EPRI%20Offsets-W12_031512_GHG-Offset-Aggregation_Final.pdf