Renewable Energy Certificates, Carbon Offsets, and Carbon Claims

Best Practices and Frequently Asked Questions

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Center for Resource Solutions
1012 Torney Ave. 2nd Floor
San Francisco, CA 94129
www.resource-solutions.org

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I. INTRODUCTION

Many consumers and businesses have questions about the role of renewable energy in reducing one's carbon footprint. North American Renewable Energy Certificates (RECs) and carbon offsets are both environmental commodities that can be used to address greenhouse gas (GHG) emissions. This Q&A provides answers to questions about the difference between RECs and carbon offsets, how the markets for these commodities interact, and the extent to which each can be used to address GHG emissions. It examines REC definitions and renewable attributes, additionality as it relates to RECs, and ownership of reductions from renewable energy. It also answers questions about carbon offsets that are derived from U.S. renewable energy projects, including questions relating to additionality, the quantification of reductions, and double-counting.

This document is organized as a series of questions and answers. Readers that are beginners in renewable energy and carbon markets can read through from beginning to end, or more advanced readers can search and skip to answers to specific questions.

II. GENERAL QUESTIONS

Does renewable energy reduce greenhouse gas (GHG) emissions?

Yes. Renewable energy reduces GHG emissions by displacing emitting generation on the electricity grid, provided that emissions from the electricity sector are not capped under a cap-and-trade system, and by reducing the need to build new power plants that emit GHGs. The addition of renewable electricity generation results in power generators that emit GHGs (e.g. fossil-fueled power plants) reducing their output, with an associated reduction in emissions.

What is the difference between a renewable energy certificate (REC) and a carbon offset?

A North American REC is an environmental commodity representing all of the environmental and social attributes of renewable energy generation. One REC embodies the full suite of renewable attributes of one megawatt-hour (MWh) of renewable electricity generation, including the zero-carbon emissions attribute. RECs can be bought and sold along with or separately from the underlying electricity, enabling the purchaser/owner of the REC to claim the use of renewable electricity and all the environmental benefits

that come with it. One of those benefits is the claim to emissions-free electricity. As such, RECs serve as the currency for renewable energy claims in both compliance and voluntary markets[1] in the U.S. In voluntary markets, RECs are intended to provide electricity consumers choice in terms of the sources of their electricity, no matter where they are located or what the local mix of electricity generation sources looks like in their area.

A carbon offset represents a quantity of GHG emissions reductions, measured in units (usually metric tons) of carbon dioxide–equivalent (CO_2e), that occur as a result of a discrete project. The emissions reductions from that project can be sold to enable the purchaser/owner to claim those GHG reductions as their own. These reductions can then be used to reduce, or offset, any GHG emissions for which the purchaser is responsible. Renewable energy is one of many possible offset project types.

Both commodities can reduce one's carbon footprint, but RECs can only address the GHG emissions from electricity use (known as "Scope 2" emissions[2]), though RECs also convey a suite of non-carbon environmental benefits. A U.S. renewable energy project must meet different requirements to produce either RECs or offsets because the commodities are different and are meant to be used in different ways. If the project can be shown to meet requirements for both, it can produce both, though not from the same MWh of generation. A single MWh can either be claimed as a REC or the reductions associated with it can be claimed as an offset, provided the project meets criteria for both commodities.

What claims can I make with a REC, and can I use a REC to make a carbon claim?

RECs can be used to show the use of renewable energy, and that no carbon emissions are associated with that electricity consumption. A REC purchaser therefore can claim to use zero-emissions electricity, claim zero emissions for their electricity consumption, or claim to have avoided the carbon emissions associated with consumption of conventional electricity use. A REC purchaser can also claim and report the emissions that are avoided on the electricity grid as a result of the generation of that MWh of renewable energy as a (Scope 2) benefit of their purchase. But RECs do not serve the same function or convey the same claim as carbon offsets. RECs cannot be used to claim ownership of GHG reductions that can be separated from the electricity sector and used to offset non-electricity-related GHG emissions, and there is no claim to have caused reductions to occur beyond a business-as-usual scenario. Rather, RECs convey a claim of ownership of zero-emissions energy, the generation of which avoided emissions on the grid, provided there is no cap on emissions.

It is inappropriate for projects or marketers to sell RECs as offsets, which would be to sell or market them as a commodity that can address non-electricity-related (Scope 1 or 3)[3] emissions, since the facility and emissions reductions associated with that MWh of generation have not necessarily been proven to meet offset standards, specifically additionality. It is likewise also inappropriate to sell offsets as renewable energy or RECs, as offsets do not convey the suite of benefits associated with renewable energy (see the following question for more information). Center for Resource Solutions (CRS) administers consumer

[1] Compliance markets include state Renewable Portfolio Standard (RPS) policies that require that a minimum amount of electricity supply provided by each regulated entity (utilities and other electricity providers) is to come from renewable energy. The voluntary market is not mandated by statute or regulation and is made up of individuals and organizations purchasing renewable energy.

[2] Scope 2 emissions are indirect, and associated with the generation of purchased electricity, heating/cooling, or steam for the entity's own consumption.

[3] Scope 1 emissions are direct greenhouse gas emissions from sources owned or controlled by the entity. Scope 3 emissions are all other indirect emissions not covered in Scope 2, including employee business travel; transportation of products, materials, and waste; outsourced activities; and production of imported materials.

protection programs that help protect against inappropriate or misleading marketing claims for both RECs—Green-e® Energy—and offsets—Green-e Climate[4].

This role for RECs is well established in the market. In addition to CRS, organizations that endorse using RECs for Scope 2 carbon claims include the U.S. Environmental Protection Agency (EPA)[5], the World Resources Institute (WRI)[6], the U.S. Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) program[7], the U.S. Department of Energy (DOE)[8], The Climate Registry[9], the Carbon Disclosure Project (CDP)[10], and others.

Can a REC be used as or converted into an offset, and vice-versa?

No. The two commodities include different benefits and convey different claims to the purchaser. Offsets are GHG emissions reductions from an additional[11] project that can be applied to any scope of emissions. Beyond the zero-emissions claim and avoided grid emissions benefits, RECs include a variety of non-carbon attributes that communicate the effect and benefits of renewable energy in the area where it is generated–for example, reduced pollutants to air, land, and water, the lack of impacts associated with the mining of fuel, development of local jobs and businesses, increased energy security and social equity, and other environmental and social benefits—just as these would be conveyed to a user of on-site renewable energy generation. While renewable energy facilities generating RECs do not necessarily meet all requirements for offsets, specifically additionality, offsets do not include ownership of (or account for) the non-GHG benefits of renewable energy. So, one cannot simply convert tons of CO_2e to MWh and call it renewable energy, even if the tons are from a renewable energy offset project.

Where a U.S. renewable energy project has been shown to meet both offset and REC criteria, it can produce both commodities, but not for the same MWh. Some methane capture and electricity generation projects can generate offsets associated with the capture of the methane, and then RECs for the generation of electricity from that methane, but in this case the carbon benefit included in each commodity is associated with a different set of reductions (one with the reduction of methane emissions, and the other with the reductions that occur on the grid as a result of biogas electricity production).

In the case that a renewable energy facility has been shown to meet offset criteria, RECs and the existing REC market infrastructure (specifically electronic tracking systems) can be used to track the

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[4] More information on the Green-e programs can be found at www.green-e.org.

[5] U.S. EPA Green Power Partnership, *The Environmental Value of Purchasing Renewable Energy Certificates Voluntarily, Discussion Draft*, October 2010, http://www.epa.gov/greenpower/documents/gpp_basics-recs_voluntary.pdf. And U.S. EPA, EPA's *Green Power Partnership's Partnership Requirements*, Dec 2010, http://www.epa.gov/greenpower/documents/gpp_partnership_reqs.pdf.

[6] C. Hanson and V. Van Son. September 2003. *Corporate Guide to Green Power Markets, Installment 5. Renewable Energy Certificates: An Attractive Means for Corporate Customers to Purchase Renewable Energy*. World Resources Institute, Sustainable Enterprise Program, http://pdf.wri.org/gpmdg_corporate_guide_05.pdf.

[7] U.S. Green Building Council. *LEED Reference Guide for Green Building Operations and Maintenance*, 2009, pg. 207

[8] L. Bird and J. Sumner. January 2011. *Using Renewable Energy Purchases to Achieve Institutional Carbon Goals: A Review of Current Practices and Considerations*. National Renewable Energy Laboratory, Department of Energy. Prepared under Task No. SA09.3102. Technical Report, NREL/TP-6A20-4993. http://www.nrel.gov/docs/fy11osti/49938.pdf. And March 2010. *Guide to Purchasing Green Power: Renewable Electricity, Renewable Energy Certificates, and On-Site Renewable Generation*. A collaboration of U.S. DOE, U.S. EPA, WRI, and CRS. DOE/EE-0307, http://www1.eere.energy.gov/femp/pdfs/purchase_green_power.pdf.

[9] The Climate Registry. *Climate Registered Leadership Program, Draft Accounting and Reporting Requirements*. August 2010. http://www.theclimateregistry.org/downloads/2010/08/Draft-Climate-Registered-Leadership-Program-Reporting-Requirements.pdf.

[10] The Carbon Disclosure Project. *Guidance for responding companies, Investor CDP 2011, CDP Supply Chain 2011, CDP Public Procurement 2011*. 2011. https://www.cdproject.net/Documents/Guidance/CDP2011ReportingGuidance.pdf.

[11] For more information on additionality, see the Additionality Section below.

ownership of the emissions reductions associated with each MWh of renewable energy, and the retirement of RECs is needed to substantiate the creation of offsets associated with that generation.[12] But this is not equivalent to "converting" RECs to offsets or "using RECs as offsets."

Why do companies use RECs to make carbon claims?

Many companies, as well as individuals, are looking to reduce their total impact or "footprint." One's carbon footprint is made up of direct (Scope 1) as well as indirect (Scope 2 and 3) emissions.[13] Reducing indirect emissions, such as the emissions associated with electricity consumption (Scope 2) and the emissions associated with airline travel and other products we consume (Scope 3) is a meaningful way to reduce one's total GHG impact. This is especially important for organizations, companies, and individuals with very low direct (Scope 1) emissions, whose footprint is mostly Scope 2 emissions from electricity consumption and Scope 3 emissions embodied in the products and services they use. For these companies, addressing Scope 2 emissions by buying renewable energy is an important way to reduce their impact and affect demand-side change to encourage new renewable development.

Can REC and offset markets coexist?

Yes. Only renewable energy facilities that are additional can generate offsets, and RECs and offsets cannot both be sold for the same MWh of generation. Coordination between markets, monitoring and enforcement of claims, and tracking of ownership by offset and renewable energy certification programs and electronic tracking systems ensure that emissions reductions are not double-counted.

Inter-market transparency and cooperation help substantiate ownership and strengthen the respective markets for offsets and RECs. In cases where a renewable energy project in the U.S. has been proven additional in accordance with an offset project standard and is generating offsets, the RECs for the MWh of generation for which the project received carbon credits should always be retired to prevent RECs and offsets being sold for the same MWh. RECs from that facility can be used to track and substantiate proper retirement of the emissions reductions associated with the renewable energy generation.

Using RECs to substantiate carbon claims associated with renewable energy generation from a facility that meets carbon offset additionality standards can significantly lower transaction costs because it uses existing infrastructure and mechanisms for tracking and verification. RECs are not being "sold as offsets" in this case, but are merely being used to track and ensure proper retirement of emissions reductions associated with the renewable energy generation. This can be done as long as the additionality of the facility has been established using a credible test through an offset project standard.

Is U.S. renewable energy a valid offset project type?

Yes. Renewable energy is widely considered to be a valid offset project type around the world by voluntary and compliance offset mechanisms alike. The largest and most prominent GHG project certification programs in the world allow renewable energy as an eligible offset project type, including the Clean Development Mechanism (CDM), the Verified Carbon Standard (VCS), and the Gold Standard. The latter

[12] For more information on using REC market infrastructure to substantiate carbon claims, see the question "Can REC and offset markets coexist?" below.

[13] See footnote no. 3 for a review of emissions categories or "scopes."

two programs include the U.S. in their areas of operation. In fact, renewable energy projects have historically represented a large proportion of projects registered under these programs.

All credible certification standards for offset projects should be designed to ensure what are called P.A.V.E.R. criteria.[14] P.A.V.E.R. stands for Permanent, Additional, Verified, Enforceable, and Real. Permanent means that emissions reductions must last in perpetuity, and cannot be reversed. Additional, as described further in a separate section below, means that the facility must be spurred by the carbon market, or mark a change in behavior from a business-as-usual scenario ("beyond business-as-usual"). Verified means that the emissions reductions must be confirmed to have occurred as described from projects whose performance has been monitored. Enforceable means that emissions reductions must be backed by contracts or legal instruments that define their creation and ensure exclusive ownership. And Real means that the emissions reductions must represent actual reductions that are not artifacts of incomplete or flawed accounting.

Renewable energy does not pose the threat of impermanence—once the renewable energy is generated, the emissions reduction occurs and cannot be reversed. The quality criteria of real, verified, and enforceable can all be easily addressed for U.S. renewable energy projects through utilization of region-specific and updated U.S. Energy Information Administration (EIA) and Environmental Protection Agency (EPA) data, verification standards and programs, electronic tracking systems, and contractual documents. Renewable energy offsets also present little threat of emission leakage[15] (which would affect the Real criterion). There are a number of accepted approaches to substantiated additionality that can be applied to renewable energy projects (discussed in the Additionality section below).

Are there inherent differences in quality between indirect and direct emissions offsets?

No. On the whole, the sources of error associated with direct reduction projects (e.g. methane capture, forestry) are no more or less significant than those associated with indirect reductions projects (e.g. renewable energy, energy efficiency). It is illusory to attempt to simplify accounting or improve offset credibility by limiting offset project types to either direct or indirect reduction project types.

What happens to voluntary renewable energy and offsets from renewable energy once there is cap-and-trade?

Cap-and-trade is a regulatory system in which the level of total GHG emissions from regulated sectors of the economy is limited by the number of tradable emission allowances or permits issued by the government. The number of allowances, which makes up the "cap," is lowered over time and so total GHGs from the system are reduced. As long as regulated emitters do not exceed the cap and the cap is sufficiently tight (i.e. there is not an over-allocation of allowances), only the retirement of allowances will result in real emissions reductions.

Under such a system, the amount of renewable energy, energy efficiency, or other clean activities has no automatic impact on the overall level of emissions unless allowances are retired on behalf of these activities. Where the electricity sector is included under the cap, renewable energy generation would merely "free up" room under the cap, having the effect of reducing allowance prices but not total emissions in the

[14] Sometimes referred to as R.S.V.P.E. criteria, for Real, Surplus (Additional), Verified, Permanent, and Enforceable.

[15] "Leakage" occurs when a project or its output causes emissions to increase elsewhere or creates incentives for emissions to increase elsewhere.

capped sector(s). Renewable energy offsets therefore will not reduce overall emissions and RECs will contain an avoided grid emissions attribute of zero under a cap-and-trade scenario unless there are regulatory mechanisms in place to lower the cap (by reducing the number of available allowances) to account for reductions on behalf of renewable energy generation. Such a mechanism is called a renewable energy "set aside" since allowances are set aside for voluntary renewable energy purchases, or an "off-the-top" mechanism because allowances are taken off the top of the cap on behalf of voluntary purchases.

Both of the existing cap-and-trade programs in the U.S.—the Regional Greenhouse Gas Initiative (RGGI) (except for Delaware) in the northeast and the California cap-and-trade system—include a voluntary renewable energy set-aside. So, voluntary renewable energy within the capped regions in the U.S. (except for Delaware) continues to reduce greenhouse gas emissions within the capped region.

III. QUANTIFICATION AND ACCOUNTING

What "environmental attributes" are included in a voluntary REC, and can they be enumerated or quantified?

Green-e Energy, the leading North American renewable energy certification program, certified 99% of total retail REC sales in 2010,[16] and defines a REC as including the full suite of environmental and social attributes of the renewable generation. Though state REC definitions sometimes vary, most states that use RECs for Renewable Portfolio Standard (RPS) policy also require that all renewable energy attributes or claims remain bundled with the REC.

A REC is a multi-attribute commodity[17] that embodies all of the non-energy benefits associated with the generation of renewable energy.[18] A REC can be separated from the underlying electricity and applied to other electricity use to substantiate renewable electricity use and ownership. This is different than a carbon offset, which is a single-attribute commodity,[19] in that it represents only GHG emissions reductions, which can be separated from an offset project and applied to any other GHG-emitting activity.

Though the owner of a REC may claim to own all and each of the attributes, individual REC attributes cannot be separated out for use without retiring the entire REC. This is one reason why RECs are denoted in MWh of generation instead of tons of pollutant, for example. In other words, RECs cannot be disaggregated. Whether purchasing the REC in order to claim the use of renewable energy (the full suite of renewable attributes) or just the avoided Scope 2 emissions associated with renewable energy (the carbon attribute), the whole REC must be retained or retired in order to make the claim; individual attributes cannot be transferred or owned separately.

Because RECs are fully aggregated, quantification and verification of individual attributes is not necessary in order to effectively transfer or communicate a claim to the whole package (though this can be done for many individual attributes, such as the carbon attribute). In fact, though the quantity or magnitude of certain individual attributes may vary between MWh (like the number of clean energy jobs created), RECs remain homogenous—1 verified MWh of renewable energy. Because of well-developed U.S. REC

[16] According to the *2010 Green-e Verification Report*, available online at: www.resource-solutions.org

[17] Sometimes also called a "bundled" commodity, but since the terms "bundled" and "unbundled" are used in REC markets to describe the relationship of the REC (attributes) to the underlying electricity (where a bundled REC comes with the electricity, and an unbundled REC is alone), the term "multi-attribute" is used here to describe the nature of the commodity.

[18] For more information, see the following question and answer.

[19] Sometimes also called a "stacked" commodity.

markets, standardized contracts, and prevalent tracking systems, a consumer can easily be assured through legal documentation or third-party certification (e.g. Green-e Energy certification) that RECs are fully aggregated, and that the environmental benefits are unambiguous and delivered. And since the GHG emissions reduction attribute is transferred with the REC, there is no ambiguity regarding ownership or claim to this specific attribute.

Do RECs contain attributes related to SO_2 and NO_x?

Yes. In the U.S., sulfur dioxide (SO_2) is capped nationally and mono-nitrogen oxides (NO_x) are capped regionally. For both, the cap means that RECs convey zero direct emissions of SO_2 and NO_x, but no avoided SO_2 or NO_x attribute.

How can you quantify the GHG reductions associated with renewable energy generation?

Multiple studies and grid simulations conducted for various regions across the U.S.[20] have provided ample evidence that renewable energy generation reduces fossil fuel power generation. They have all shown that it is fossil-fuel generation, as opposed to other renewable energy facilities or nothing at all, that is being displaced by renewable energy generation (even in the Northwest, for example, where hydropower represents a large part of the fuel mix), resulting in real emissions reductions.

As opposed to performing expensive and time-intensive grid simulations to pinpoint the emitting units being backed down, it is standard practice to use regional emission rates to conservatively estimate the emission reductions. In the U.S., the availability of data from the electricity sector strengthens the accuracy of such calculations. Plant-level data collected by the U.S. Energy Information Administration (EIA), the Federal Energy Regulatory Commission (FERC), and the U.S. EPA is compiled into the EPA's Emissions & Generation Resource Integrated Database (eGRID). eGRID calculates total U.S. electricity average emission rates, fossil-fuel emission rates, and non-baseload emission rates for regions and sub-regions covering the whole country.

Using regional emissions rates as a conservative and data-driven estimate of the emissions displaced by renewable energy generation is an internationally-accepted practice in carbon markets (see, for example, the World Resources Institute's GHG Protocol). And in the U.S., these rates are based on reliable data from authoritative and credible sources.

How can I account for voluntary renewable energy and REC purchases in a voluntary GHG inventory or reporting system?

Voluntary GHG inventories or registries are mechanisms that allow various entities (typically businesses but also utilities, load-serving entities, and other energy generation facility owners) to voluntarily record their

[20] For a sample: *Final Report - 2006 Minnesota Wind Integration Study, Volume 1*, EnerNex Corporation in collaboration with the Midwest Independent System Operator for the Minnesota Public Utilities Commission, November 2006; *Estimated Marginal Fuel Displacement By Wind Generation in PJM*, Monitoring Analytics, 2009; and *Power System Marginal CO2 Production Factors.* Northwest Power and Conservation Council. April 2006.

GHG emissions and track improvement over time. While each registry develops its own rules within its reporting protocols, RECs can generally be used to show use of low or zero-emitting electricity.[21]

Since a REC represents one MWh of emissions-free generation, the MWh of RECs purchased can be subtracted from the number of MWh of electricity consumed before calculation of Scope 2 GHG emissions. The only Scope 2 emissions that need to be calculated are those associated with remaining consumption. For example, if usage equals 100 MWh of electricity, and there is a purchase of 100 RECs, the Scope 2 emissions could be recorded as zero.

A supplemental approach involves taking the extra step of calculating and reporting the amount of grid emissions avoided as a result of the purchased MWh of renewable energy also under Scope 2. This approach recognizes the GHG effect of the purchased renewable energy on the grid.

IV. ADDITIONALITY

What is additionality?

Additionality is a term of art used in GHG reduction (carbon offset) markets and regimes that means a project is "additional" to what would have happened in a business-as-usual scenario. Additionality ensures that the project can affect the level of emissions relative to the status quo. It ensures that purchases are driving change and not going towards projects that would have happened anyway. Additionality also makes it possible to separate the GHG emissions reductions from the project producing them (e.g. methane capture, renewable electricity generation, forestry) and apply them to emissions from another source (e.g. driving your car), selling or exchanging them as a distinct commodity.

Additionality is a fundamental requirement for offset projects. It must be demonstrated or tested in a credible fashion; it cannot be assumed. There are several types of additionality tests and no single test alone is sufficient to determine additionality. Each test has limitations. The combination of tests chosen by an offset project standard should ensure conservative[22] conclusions regarding actual additionality of a project.

Is U.S. renewable energy additional?

U.S. renewable energy facilities can be additional; not all are (and therefore not all can generate offsets). Determining additionality requires application of robust additionality tests.

Does a renewable energy project need to be additional in order to generate RECs?

No. Project additionality is a requirement for carbon offsets, not for RECs. A renewable energy project does not need to be proven additional in order to generate RECs due to the nature of the REC commodity itself as well as the limitations of the carbon claim conveyed by a REC (Scope 2 only). Since RECs are separated from and recombined with electricity at two ends of essentially the same activity (i.e. electricity generation and use), additionality is not required in order to convey the claim to use of renewable energy and its

[21] See the previous question, "What claims can I make with a REC, and can I use a REC to make a carbon claim?"

[22] Conservative, in this case, means protecting against crediting of non-additional projects.

benefits on the grid. For voluntary REC claims, RECs do need to pass what is sometimes called regulatory surplus, which simply requires that the RECs were not created or generated as a result of law or regulation, though this alone is not sufficient to demonstrate additionality for carbon offsets. The Green-e Energy certification program includes a check for regulatory surplus in its program criteria.

With a REC, purchasers are not pairing emissions reductions with emissions; rather, they are pairing renewable, emissions-free electricity generation with electricity usage and its associated emissions profile. By buying the claim to a MWh of zero-emitting generation, REC purchasers are essentially buying a zero-emissions electricity product. REC purchasers can also claim to be purchasing electricity that avoids GHG emissions on the grid since even generation from non-additional renewable energy facilities displaces emitting generation, or avoids the fossil generation that would, or is available to, generate in place of the purchased MWh, though these avoided emissions do not necessarily represent a reduction beyond a global business-as-usual scenario and therefore cannot be traded as emissions reductions or used to address emissions outside of the electricity sector.

If a purchaser wishes to take the emissions reductions associated with the renewable generation and use them to offset emissions from an activity of their choosing (typically something other than electricity use), then they would need assurances that the reductions meet offset criteria, including that the project has passed additionality tests.

The lack of project additionality in no way affects the appropriateness of RECs for addressing Scope 2 GHG claims, since additionality is only necessary when the emissions avoided real-time on the grid as the renewable generator operates and fossil fuel plants are backed down or are not put online are applied outside of Scope 2.

What kinds of additionality tests are most (and least) suitable for renewable energy?

Certain additionality tests are more suitable than others for renewable energy, but ultimately, it is always best to employ a combination of tests to assess additionality.

Financial (or investment analysis) additionality tests ask whether the revenue that a project would see from the sale of offsets into the voluntary market is needed in order for the project to occur (not necessarily whether carbon revenue is the only source of revenue for a project). This type of test is meant to be applied on a project-specific, not a sector-wide basis, since project financing decisions themselves are project-specific. Since there are so many different ways renewable energy projects are built, it is especially important that generalities about project financing not serve as the basis of standardized additionality tests for renewable energy.

The financial additionality test is difficult to apply to projects for which the carbon offset is not the only revenue stream for the project, like renewable energy projects which must sell their electricity in order to create carbon reductions. In order to recoup a rate of return that will be acceptable to debt and equity holders, many renewable energy project developers need multiple revenue streams to make the projects financially attractive, namely the sale of electricity, federal and other incentives, and the sale of environmental commodities. Even where revenue from the sale of offsets or RECs does represent a relatively small proportion of total income for a project, this revenue can still move a project from a nonviable internal rate of return to one that can attract investment and allow project development to go forward.

There are several major market barriers faced by renewable generators that can increase the importance of offset revenue, including lack of low-cost transmission access near renewable resources; transmission pricing policies that cause certain renewable technology types to pay more per unit of energy

delivered to the grid than fossil-fuel plants; and financial, administrative, and planning disincentives for regulated utilities to contract with new renewable power generators beyond those required through state-mandated procurements.

Wind, for example, is an intermittent resource. Because of the variability of energy output, dispatchers cannot pre-schedule the energy from these resources and often they must provide or buy some form of back-up supply to draw from when the wind isn't blowing. In addition, wind power cannot be turned on and off to suit the needs of the grid in the same way that fossil-fuel generators can. This lack of "dispatchability" means that buyers may pay less for non-dispatchable resources like wind. There is also a penalty paid by wind farms in how they pay for transmission access. Intermittent resources that require firm or guaranteed delivery often have to pay a higher cost per MWh delivered for transmission access than fossil resources, which can predict with much more certainty exactly how much transmission capacity they need to reserve. Both of these factors—the lower value of non-dispatchable power and the higher transmission costs—mean that intermittent renewables are at a competitive disadvantage in wholesale power markets, and this can make the revenue from offset sales all the more important in project finance.

As a result of these complexities and the subjectivity inherent to investment analysis, CRS finds that standardized approaches to additionality are preferable for U.S. renewable energy. Standardized methods that evaluate additionality on a sector-wide basis for classes of projects are data-driven and can have significant advantages in terms of both rigor and transparency, while also lowering barriers to entry for certain projects (particularly small-scale projects) and the administrative burden for projects and verification programs.

A performance standard approach, for example, establishes a GHG baseline scenario for the project activity, representing a performance level that is common practice or business-as-usual in the sector, against which the performance of any individual project can be evaluated. Projects emitting below (or performing better than) the baseline can be considered beyond business-as-usual. Since renewable energy projects are zero-emitting, where it can be shown that the GHG baseline scenario for the electricity sector is above a certain percent emitting, renewable energy can be considered beyond business-as-usual. In other words, a performance test for renewable energy involves establishing whether zero-emitting generation is common practice among electricity generation activities in the electricity sector, or evaluating the representation or penetration of renewable technology types in the sector against a threshold for business-as-usual (representing the penetration level that would indicate the activity is commercially viable and competitive without carbon finance). In this way, a performance standard test attempts to account for the full set of market forces that influence project development—including technical, resource, and institutional barriers in addition to financial ones.

Transparency in the U.S. electricity sector makes the additionality of renewable energy projects in the U.S. easier to assess than in many other countries. Performance tests may be informed by readily accessible, frequently updated, high-quality, and region-specific data on the prevalence of renewable energy generation and generation facilities.

How does the existence of a Renewable Portfolio Standard (RPS) affect the additionality of U.S. renewable energy in that state?

While state-level RPS mandates, under which utilities and other electricity providers in the state are required to provide a certain percentage of their electricity supply or deliveries from renewable generation, continue to drive renewable energy development, the voluntary renewable energy and offset markets can also be important catalysts for new construction, as evidenced by the historically large size of the voluntary

market compared to the compliance markets from new facilities.[23] In fact, because demand and prices for renewable energy are high in most states with RPSs, when renewable facilities in these states are selling into the voluntary market this can indicate that these facilities require levels of support from the voluntary market that exceed the value they could get from the compliance market. The presence of a RPS doesn't necessarily determine additionality or non-additionality of facilities in that state.

How does the existence of various financial incentives for renewable energy affect the additionality of U.S. renewable energy?

Many countries have renewable energy goals and policies to support the development of new renewable energy facilities. While such policies exist in the U.S., the data on the prevalence of renewable energy in the power sector shows that these policies have not resulted in growth of renewables to the extent that these resources provide a large share of the U.S. electricity mix.[24] Furthermore, renewables are not the only electricity generation resources to receive financial support. In fact, some fossil fuel and nuclear facilities receive greater support on a total fuel cycle basis. The existence of financial incentives and even the utilization of them in the financing of a specific project is not enough to demonstrate non-additionality.

V. OWNERSHIP AND DOUBLE COUNTING

How can purchasers of RECs and offsets derived from renewable energy claim the carbon reductions when those reductions actually occur at fossil-fuel facilities on the grid?

With respect to renewable energy offsets, fossil-fuel plants cannot "get credit" for emissions reductions or report reductions as climate change "mitigation" until there is a cap on carbon emissions. Until there is a cap, the owner of a fossil-fuel plant receives no credit or benefit from reducing output, and thus the credit remains with the renewable energy generator that is causing the reductions to occur. This is consistent with carbon accounting in the global voluntary and global compliance carbon markets, where ownership of indirect emissions reductions is assigned to the renewable generator. Ownership of the reduction can be demonstrated through use of contracts and offset certification programs, which also ensure that ownership is not contested. Furthermore, rules can be developed to properly account for renewable energy offsets and avoid double-counting within scopes in voluntary GHG inventory systems.

The fact that RECs convey an emissions reduction claim that can address the Scope 2 emissions of the purchaser is not considered a double claim. Since all Scope 2 emissions are by definition someone else's Scope 1 emissions, a REC purchase is reflected as both a reduction of the purchaser's Scope 2 emissions *and* a reduction of a generator's Scope 1 emissions. The reduction is only recorded once within each scope, and as long as there is no double-counting within Scope 1, the total Scope 1 emissions will represent the total emissions by the electricity generation sector.

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[23] Bird, L. *et al.* October 2008. *Green Power Marketing in the United States: A Status Report (11th Edition)*. National Renewable Energy Laboratory (NREL). Technical Report, NREL/TP-6A2-44094. 44pp.

[24] According to the Energy Information Administration (EIA), renewables (minus large hydro) have been responsible for around 4% of net electricity generation for the past three years: http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_1.

REC ownership conveys property rights to the environmental, social, and other non-power qualities of renewable electricity generation, including avoided emissions. This has been demonstrated by the treatment of RECs in contracts and the through courts respecting and upholding these contracts. Policy, programmatic and/or regulatory decisions at the U.S. Environmental Protection Agency (EPA), the California Public Utilities Commission, the California Air Resources Board, and the Western Renewable Energy Generation Information System (WREGIS) also reinforce the property rights embodied in RECs, as does the National Association of Attorneys General.[25]

How can I avoid double-counting when accounting for offsets from renewable energy in a voluntary GHG inventory or reporting system?

First, it is important to emphasize that voluntary GHG registries are not regulatory mechanisms. The claim of a reduced carbon footprint in a voluntary registry does not provide the owner of a fossil-fuel facility with any type of sellable credit, so there is no "double count" per se. In fact, with regard to renewable energy emissions reductions, the voluntary markets for offsets and RECs and the state RPS systems and regional generation tracking systems are the only mechanisms that recognize reduction claims *and* establish ownership of reductions, and they all establish ownership with the renewable facilities that cause the reductions.

GHG reductions in offsets from renewable energy are derived from two sources: emissions reductions that occur because the renewable energy generator was built instead of a business-as-usual fossil-fuel plant (called the build margin) and emissions avoided real-time on the grid as the renewable generator operates and fossil fuel plants are backed down or are not put online (called the operating margin). There is no possibility of double counting the build margin because no party other than the offset purchaser claims or reports these reductions.

Voluntary GHG registries are sometimes intended to recognize claims. In order for double-counting or double-claiming of the operating margin benefits to happen, 1) there would need to be more than one reduction claim being made for the same reductions by the owner of the renewable generator, the owner of the fossil-fuel generator, or the purchaser of an offset from the renewable generator, 2) there would need to be some mechanism(s) to recognize or record the claims, and 3) each entity would need to be participating in such a mechanism.

Not all entities affecting or affected by renewable energy or energy efficiency are making a reduction claim. Mandatory reporting of generation and emissions by power facilities to U.S. regulatory authorities does not represent a claim, unless those agencies are regulating emissions.

Voluntary GHG registries can reduce the risk of double claiming by assigning emissions to "null" power, or the underlying electricity minus the REC from renewable energy facilities. Specifically, null power can be given the emissions value of the underlying system mix. This ensures that carbon benefits of grid-connected renewable energy are claimed only by the purchaser of the offset, and not also by a generator claiming zero-emissions power or the purchaser of the null power. Appropriate emission factors are used to account for null power in all-generation electronic tracking systems. For example, a generation information

[25] See Center for Resource Solutions *Comments on CARB's Renewable Electricity Standard Preliminary Draft Regulation* dated July 16, 2010. Available online at: http://www.resource-solutions.org/pub_pdfs/CRS%20Comment%20CARB%20RES%207.16.10.pdf.

system in use in the northeast (NEPOOL GIS) properly assigns null power emissions and uses that to calculate power source disclosures.

Though the chance still exists that owners of emitting generation in a voluntary registry might report Scope 1 reductions that were driven by renewable energy generation or energy efficiency projects that sold offsets to another purchaser in the registry, the impact of this can be considered *de minimis*, especially relative to other potential sources of error and approximation in voluntary GHG inventories. First, renewable energy generation is a relatively small driver of changes to any *individual* plant's output or emissions. Changes in local and regional economic activity or policy or regulatory changes, for example, tend to have a larger effect. Second, reductions associated with the build margin are not reported by owners of emitting generation. And finally, it is likely that not all entities affected will be participating in a voluntary GHG registry. The addition of renewable energy to the grid or reduced demand due to energy efficiency impact the transmission grid as a whole, and the reduced demand can result in reduced output from several different generators at different times and places.