DOCKETED

Docket Number:	16-OIR-05
Project Title:	Power Source Disclosure - AB 1110 Implementation Rulemaking
TN #:	222713
Document Title:	CRS Comments on Feb 1 Workshop and Jan 17 Revised AB 1110 Implementation Proposal for PSD
Description:	THIS DOCUMENT SUPERSEDES TN 222711
Filer:	Patty Paul
Organization:	CRS
Submitter Role:	Public
Submission Date:	2/23/2018 4:29:45 PM
Docketed Date:	2/23/2018

February 23, 2017

Jordan Scavo
Renewable Energy Office
California Energy Commission
1516 Ninth Street, MS 45
Sacramento, CA 95814-5512

Docket No. 16-OIR-05: Comments of Center for Resource Solutions (CRS) on February 1, 2018 Pre-Rulemaking Workshop on Updates to the Power Source Disclosure (PSD) Regulations and the January 17, 2018 Revised Assembly Bill 1110 Implementation Proposal for PSD Draft Staff Paper

Mr. Scavo:

CRS appreciates this opportunity to submit comments on the February 1, 2018 Pre-Rulemaking Workshop on Updates to the PSD Regulations ("February 1 Workshop") and the January 17, 2018 Revised Assembly Bill 1110 Implementation Proposal for PSD, Draft Staff Paper ("Revised Proposal").

Background on CRS & Green-e®

CRS is a 501(c)(3) nonprofit organization that creates policy and market solutions to advance sustainable energy. CRS has broad expertise in renewable energy policy design and implementation, electricity product disclosures and consumer protection, and greenhouse gas (GHG) reporting and accounting. CRS administers the Green-e programs. Green-e is the leading certification program for voluntary renewable electricity products in North America. For over 20 years, Green-e Staff have worked with independent third-party auditors to annually verify renewable energy purchases in the voluntary market and ensure purchasers receive full environmental benefits and sole ownership of each megawatt-hour (MWh) of renewable energy they purchase. Verification procedures ensure there is no double counting between voluntary and compliance markets, and that other renewable energy or carbon policies do not claim any of the environmental benefits of certified renewable energy. In 2016, Green-e certified retail sales of over 48 million MWh, representing over 1.3% of the total U.S. electricity mix. In 2016, there were over 963,000 retail purchasers of Green-e certified renewable energy, including 53,000 businesses.

Introduction

Fundamental misunderstandings and conflations of important concepts persist and are again reflected in the Revised Proposal. We refer you to our previous set of comments on the initial June 27, 2017 Proposal ("Initial Proposal") submitted on July 28, 2017 ("July 28, 2017 Comments"),[1] which do not appear to have been addressed. In particular, we urge you to review and consider the first section on Accuracy in those comments. We respectfully request a response to these comments along with those contained herein.

[1] Available at: http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-05/TN220437_20170728T091728_Todd_Jones_Comments_CRS_comment_on_July_14_Workshop_and_June_27.pdf.

1012 torney avenue
2nd floor
san francisco, ca 94129
tel 415.561.2100
fax 415.561.2105
web www.resource-solutions.org

These comments on the Revised Proposal are divided into General and Detailed Comments below. Following that, we have repeated our preferred general approach to power source and emissions disclosure, including key requirements and an example power content label (PCL), from our July 28, 2017 Comments, as we continue to support this approach. Finally, we have attached an excerpt from a recent report, *Corporate and Voluntary Renewable Energy in State Greenhouse Gas Policy: An Air Regulator's Guide* (pg. 7-18), with additional information and background on GHG regulation and renewable energy markets that is relevant to AB 1110 implementation.

CRS is providing this information as an independent party concerned with renewable energy certificate (REC) integrity for accurate accounting and reporting and clear and exclusive consumer claims. We are a non-profit organization and we do not buy or sell electricity or RECs. Through the Green-e certification program, we provide independent certification services and enforce power source disclosure requirements on over 300 suppliers of voluntary renewable energy products across the country, including over 30 suppliers selling renewable energy to California customers, 14 suppliers that source from renewable energy facilities located in California, and 11 retail electricity suppliers in California that are also regulated under PSD, including community choice aggregation programs (CCAs), municipal utilities, and investor-owned utilities (IOUs).

General Comments

In this section, we have provided comments on the overall Revised Proposal by subject area.

Power source disclosure and implementation of AB 1110 determines how specified generation and emissions are allocated to retail electricity customers and what claims customers can make about their electricity usage in California. As a result, it directly affects the Renewable Portfolio Standard (RPS), which is the only other state program that tracks and allocates specified power (generation attributes) to retail customers. It also directly affects corporate and other voluntary purchasers, who are claiming use of specified renewable energy and its emissions, along with the business of suppliers of renewable energy and hundreds of facilities in California and across the West supplying certified renewable energy to voluntary customers. In fact, it will impact the effectiveness of entire markets for renewable energy, both voluntary and compliance, to advance renewable energy development and emissions reductions.

The Revised Proposal, if implemented, would have significant negative consequences for both compliance and voluntary renewable energy markets in the West. It would undermine voluntary and corporate purchasing options, shrink demand, make renewable energy more expensive, and push investment out of state. It would also diminish the RPS as a tool to achieve emissions reductions in the state. It conflicts with federal guidance and international best practices on RECs and GHG accounting for consumer claims. It infringes on the property rights of REC owners. And, ultimately, it produces less accurate, inconsistent, and confusing disclosure to customers.

The Revised Proposal includes a number of contradictions and inconsistencies. In particular, it conflates source-based and consumption-based accounting (i.e. accounting for production and consumption), as well as avoided emissions and direct emissions. As a result, it reflects a misunderstanding of the role of RECs in both types of accounting.

<u>The Role of the Mandatory Reporting Regulation (MRR) in PSD</u>

AB 1110 pertains to, and PSD will determine retail consumer GHG claims. On the other hand, the MRR is a source-based reporting methodology that is not intended for this purpose. However, it is nevertheless presented as the guiding methodology for retail GHG claims in the Revised Proposal.

The Revised Proposal states that the MRR and the state's GHG Emissions Inventory, a public GHG emissions accounting system that provides an annual accounting of California's GHG emissions, are similar in purpose to AB 1110. In fact, the MRR and GHG emissions inventory represent generated emissions,[2,3] whereas AB 1110 is intended to account for emissions of retail supplier electricity portfolios—emissions that have been allocated to suppliers and consumers. This is an important dissimilarity. The MRR does not meet international guidance and best practices for market-based GHG accounting for delivered or purchased electricity.[4]

The MRR can provide generator data, emissions factors for Asset-controlling Suppliers (ACSs), and emissions factors for unspecified power. The MRR does not address retail delivery of emissions or power;[5] it does not provide a method for allocating generation emissions (i.e. attributes) to suppliers or customers, which is needed for implementation of AB 1110. Energy Commission and CARB Staff have chosen physical electricity, rather than RECs (except in the case of the adjustment for Publically Owned Utilities [POUs]), for tracking and allocating the emissions attributes of renewable generation under the Revised Proposal, which is not required by the MRR and undermines the integrity of RECs.

RECs are the existing instrument for tracking and allocating attributes of renewable energy to retail customers under the RPS, which is the only state program that does so. Choosing instead to use the physical power to track and allocate emissions is not only inefficient but also risks double counting. It does not represent a more accurate distribution of emissions since emissions are not delivered to customers with power, and this program is not intended to measure or report the impact or effect of consumption on emissions at a specific point and time on the grid (the causal effect of consumption). A decision not to use RECs in retail GHG emissions accounting cannot be defended on the basis of accuracy.

By asserting that the source-based MRR determines retail GHG claims and denying double counting with REC markets in this case, Energy Commission Staff effectively argues that carbon policy should be the basis of retail customer claims to specified power and emissions, which reduces the importance of both the RPS and consumer preference (voluntary markets) as tools to meet state clean energy and carbon goals.

[2] See pgs. 5, 10, and 12 of the Revised Proposal.

[3] One possible exception is the MRR's treatment of imports, though California Air Resources Board (CARB) Staff has argued that even its accounting policy for imports is a proxy for source-based accounting and has denied that this policy interacts at all with delivery- or consumption-based accounting systems like REC markets (see pg. 10 of the Revised Proposal). We have argued that it does and urged CARB to synchronize its accounting policy for imports with those REC-based accounting systems. If MRR is not purely source- or generation-based and reflects delivery and consumption of emissions by consumers, then its accounting policy for imports double counts with REC-based programs where the RECs convey emissions attributes.

[4] See Sotos, M. (2015) *GHG Protocol Scope 2 Guidance: An Amendment to the GHG Protocol Corporate Standard*. World Resources Institute. Available online: http://www.wri.org/sites/default/files/Scope_2_Guidance_Final.pdf.

[5] See pg. 12 of the Revised Proposal: "MRR does not calculate an electric power entity's GHG emissions of generation based on retail sales." Also See pg. 10 and 21 of the Revised Proposal.

The Treatment of RECs in Retail GHG Emissions Intensity Accounting

By not using RECs to track GHG emissions associated with renewable energy under PSD, the Revised Proposal either double counts, or it determines that RECs in California do not convey the GHG characteristics of the electricity portfolios sold to retail customers. This fundamentally changes the value of RECs and REC markets. It also contradicts language in the Revised Proposal about the role of the RPS in reducing emissions.[6]

There are three possible outcomes if the Revised Proposal were to be implemented:

1. Double counting. If no changes are made to the RPS or the current REC definition in California, because the RPS is a program "that aim[s] to reduce GHG emissions,"[7] both the REC under RPS and the physical electricity as allocated to suppliers under the Revised Proposal will convey the GHG emissions characteristics of electricity sold to customers. In this case, the state violates AB 1110 (PUC 398.4(k)(2)(E)), which prohibits double counting, and renewable energy reported under PSD would not meet leading standards for voluntary renewable energy.
2. To avoid double counting, the state must change the REC definition and clarify the intent of the RPS. The state must change the current REC definition to specify that a REC does not include the emissions characteristics of the renewable generation.[8] In this case, the state should also clarify the intent of the RPS with respect to GHG emissions and AB 32, as it would no longer be true that the RPS necessarily delivers the emissions associated with renewable energy to customers (e.g. zero emissions for wind and solar). Also, in this case, a primary driver of voluntary demand for RE is lost—the Scope 2 GHG emissions value.[9]
3. To avoid double counting, the state must amend the RPS to align it with GHG emissions accounting for electricity procurement under the Revised Proposal. To align with the Revised Proposal, the RPS must recognize only bundled power contracts for compliance, removing portfolio content category (PCC) 3. The proposed treatment of null power and firmed-and-shaped power in the power mix in the Revised Proposal should also be aligned with their treatment in the GHG emissions intensity calculations.

None of these three possible outcomes are as desirable as rejecting the Revised Proposal in favor of one where GHG accounting for delivered electricity is aligned with the only other state program that tracks and allocates attributes of renewable energy to retail customers, the RPS and the existing REC system, which we have recommended.

The Revised Proposal would also have a significant negative impact on voluntary and corporate renewable energy purchasing and investment in California. If the Revised Proposal were to be implemented, as a result of any of the three outcomes listed above, the following important voluntary

[6] See pg. 15 of the Revised Proposal.
[7] See pg. 15 of the Revised Proposal.
[8] Such a change would not affect the avoided emissions associated with renewable energy generation or California Public Utilities Commission (CPUC) Decision 08-08-028. See our July 28, 2017 Comments, pg. 4-8, for an explanation of the difference between direct and avoided emissions, available at: http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-05/TN220437_20170728T091728_Todd_Jones_Comments_CRS_comment_on_July_14_Workshop_and_June_27.pdf.
[9] See our July 28, 2017 Comments as well as pages 7 and 14-16 of the attached excerpt of *Corporate and Voluntary Renewable Energy in State Greenhouse Gas Policy: An Air Regulator's Guide*.

renewable energy purchasing options would no longer meet corporate emissions reporting and credible renewable energy usage claims criteria (e.g. no double counting and full attribute aggregation), and as a result, they would be effectively invalidated as credible options for voluntary and corporate buyers:[10]

1. Virtual power purchase agreements (VPPAs) with facilities serving California load;
2. Utility green pricing programs and community choice aggregation (CCAs) that are supplied with any renewable energy that is RECs paired with local system power, or where the RECs and electricity were not procured together by the supplier;
3. Unbundled RECs from California;
4. Self-generated renewable energy (e.g. onsite solar) where the REC is retained by the customer, but the power is delivered to a California supplier; and
5. Private contracts for renewable energy from California suppliers, which would be aggregated with a supplier's other retail sales and claimed by that supplier's collective customers receiving the default electricity portfolio as proposed in the Revised Proposal.

Limiting voluntary and corporate purchasing options and flexibility in this way makes renewable energy more expensive and difficult to purchase, reduces voluntary demand, and pushes private investment in renewable energy out of state.

In fact, it is unclear how any corporate carbon footprint (Scope 2) claim in California could be verified under the Revised Proposal. There is no guidance, from GHG Protocol or elsewhere, for situations in the U.S. where the REC is issued but does not convey exclusive claim to the emissions factor of generation, due either to double counting or implicit removal of that attribute. Contracts for electricity, for example, can only be used as proxies for attribute purchases where electricity attribute certificates do not exist or are not required for a usage claim, meaning where attributes are not otherwise tracked or claimed.[11] Neither is necessarily true in this case, and nor would this be consistent between California and other states. Regardless, implementation of the Revised Proposal would force companies to verify exclusive delivery of zero-emissions power without a verifiable and trackable instrument.

Green-e verification data, covering only a portion of the voluntary market, shows that 190 facilities in the Western Electricity Coordinating Council (WECC) region and 114 facilities in California sold unbundled RECs for Green-e certified products in 2016. Those facilities would no longer be able to claim to be delivering renewable energy under the Revised Proposal. At least five different retail suppliers are currently sourcing unbundled RECs and pairing them with system power from the same region for Green-e certified voluntary renewable energy products. They would no longer be able to do this if the Revised Proposal were implemented. Their business would be directly affected by this decision.

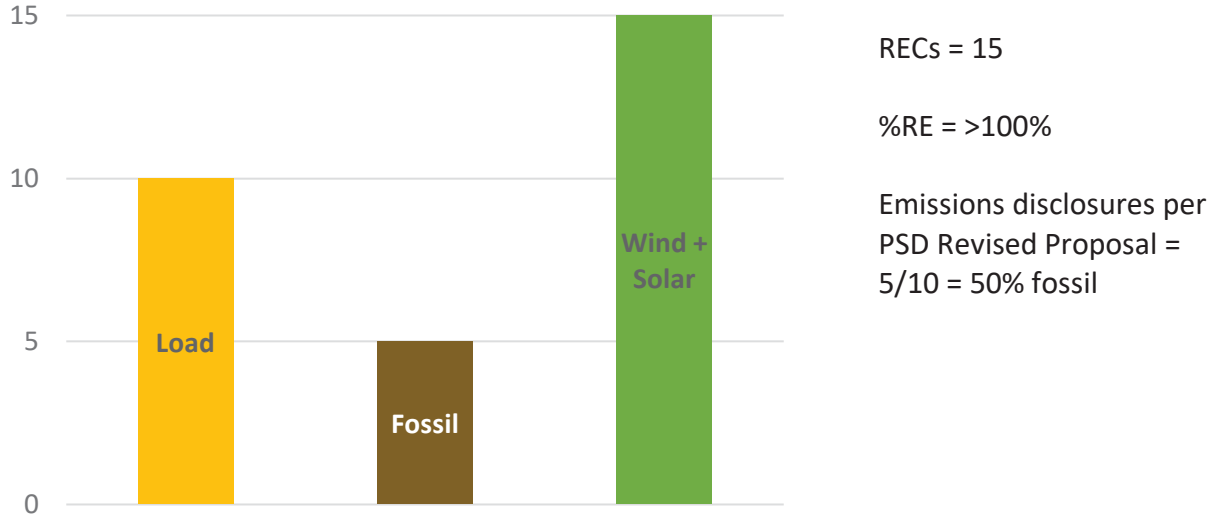
Finally, the Revised Proposal may also negatively affect regional wholesale power markets. According to nearly every forecast model, California will export significant amounts of renewable power to the

[10] These criteria can be found in the *GHG Protocol Scope 2 Guidance* (http://www.wri.org/sites/default/files/Scope_2_Guidance_Final.pdf), the *Green-e Renewable Energy Standard for Canada and the United States* (https://www.green-e.org/docs/energy/Green-e%20Standard%20v3.1%20US.pdf), as well as the RE100 publication, *Making Credible Renewable Electricity Usage Claims* (http://media.virbcdn.com/files/62/53dc80177b9cc962-RE100CREDIBLECLAIMS.pdf).

[11] Sotos, M. (2015) *GHG Protocol Scope 2 Guidance: An Amendment to the GHG Protocol Corporate Standard*. World Resources Institute. Table 6.3. Pg. 48.

western grid in the future. Though these exports are not reflected in accounting of state emissions under the MRR, and suppliers can keep the RECs associated with this power for RPS compliance, under the Revised Proposal, suppliers would not be able to claim the emissions benefits for California customers using the RECs because emissions follow the electricity. This means that with the growth of solar and expansion of regional markets, the emissions disclosures of California retail suppliers could worsen (or at best lag behind) while renewables penetration in the state is making significant progress (as shown in Figure 1 below).

Figure 1. Example Emissions Disclosure Scenario



In addition, neighboring states receiving this power will be faced with a confusing situation where they are asked to accept zero-emissions power that does not meet any state-level requirements for renewable energy (neighboring states require RECs to account for zero-emissions renewable power) or any GHG accounting scheme accepted in the private sector. This may stymie growth of a regional market for renewables and inadvertently slow the development and use of renewable energy in California and across the western region.

Treatment of Unbundled RECs

By denying that unbundled RECs and system power sourced from the same North American Electric Reliability Corporation (NERC) region can be reported as renewable energy delivered by suppliers and claimed as renewable energy received by customers, the Revised Proposal contradicts federal guidance from the U.S. Federal Trade Commission (FTC)[12] and may infringe on the legal rights and claims of REC

[12] See 16 C.F.R. § 260.15(a) and (d). And US Federal Trade Commission (FTC). (2012). *Guides for the Use of Environmental Marketing Claims; Final Rule*. 260.15(a) and (d).
Also see U.S. Federal Trade Commission (FTC). (2012). The Green Guides Statement of Basis and Purpose, pg. 218. Available online: https://www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguidesstatement.pdf.
Also see US Federal Trade Commission (FTC). (2015). *Letter from James A. Kohm, Associate Director, Division of Enforcement, Bureau of Consumer Protection, to R. Jeffrey Behm, Esq., Sheehey, Furlong & Behm, P.C.* February 5, 2015. Available at: https://www.ftc.gov/system/files/documents/public_statements/624571/150205gmpletter.pdf.

owners, under California law[13] and per the terms of use of REC tracking systems[14] and bilateral contracts for power and attributes.

Customer Disclosure

With all of these negative outcomes—to the RPS, to the voluntary market, to facilities and especially small suppliers—the disclosure to retail customers produced according to the Revised Proposal is confusing and inconsistent. Most notably, suppliers can report wind with positive emissions under firmed and shaped procurements, and they can report unspecified power with zero emissions under null power procurements. That is unquestionably confusing to customers, and it again conflicts with guidance from the FTC.

General Recommendations

CRS's recommendations for power source and emissions disclosure are:

1. Renewable energy and the emissions associated with renewable energy can only be reported as delivered to retail customers with REC retirement. RECs convey the GHG emissions profile of renewable generation for consumer claims.
2. Null power and unspecified power should be assigned a residual mix emissions factor.
3. All purchases by suppliers of RECs, bundled or unbundled, for retail sales should be reported in power source disclosure. Unbundled REC purchases should be included in reported renewable energy deliveries. Disclosure about unbundled RECs purchases by suppliers should be provided outside of the fuel mix.

Detailed Comments

In this section, we have provided comments by section subheading in the Revised Proposal.

Electricity Portfolio and Electricity Offering (pg. 7)

We support that the Revised Proposal's clarification that each electricity portfolio offered to a retail supplier's customers should be disclosed separately in annual filings and on power content labels.

Electricity Sources Serving Private Contracts (pg. 7)

By requiring that a supplier's default electricity portfolio include the aggregated generation sources and emissions from private contracts, rather than reporting those separately, the Revised Proposal allows double claiming of generation attributes from sources serving private contracts.

RECs in Power Mix Accounting (pg. 14-15)

By requiring that renewable energy be reported according to the year it was generated, rather than the year that the REC is retired, the Revised Proposal creates a risk of double counting between PSD and RPS, where the RECs may be sold after generation and used for RPS compliance (a renewable energy sales/delivery compliance claim) by a different entity.

[13] See CAL. PUB. UTIL. CODE § 399.12 (h)(2) and § 399.21(a)(2).
[14] See Western Electricity Coordinating Council, WREGIS Operating Rules (July 15, 2013). Section 2, pg. 2, 4-5. Available at: https://www.wecc.biz/Corporate/WREGIS%20Operating%20Rules%20072013%20Final.pdf.

We disagree that differences in reporting time frames between PSD and the RPS prevent eligible renewable energy resource reporting under PSD to align with reporting of REC retirements for the RPS. Our July 28, 2017 Comments (as well as previous comments submitted under Docket No. 14-OIR-01) include solutions to the difference in reporting time frames.[15]

Contrary to what is written in the Revised Proposal, there is no discrepancy between annual sales and electricity procurement if renewable energy deliveries were to be reported according to the REC retirement year. If a supplier makes annual sales of 100 MWh, including nonrenewable sales of 50 MWh and retirement of 45 RECs, it would report 50 MWh of nonrenewable energy, 45 MWh of renewable energy, and 5 MWh of null power. Total sales = total procurement = 100 MWh. It does not matter if nonrenewable generation is reported in the year of generation and renewable is reported in the year of REC retirement.

It is flawed logic to assert that PSD is for reporting retail consumption, and so reporting for the year of generation more closely aligns with the purpose of PSD. Reporting the year of consumption most closely aligns with the purpose of the program. Renewable energy is not consumed until the renewable attributes are consumed. Renewable energy attributes cannot be said to be consumed until the REC is retired.

RECs in GHG Emissions Accounting (pg. 15-16)

Contrary to what is written in the Revised Proposal, the joint agency letter cited in this section does not express a consistent understanding of the role of RECs in GHG emissions accounting. Rather, it expresses a misunderstanding of the role of RECs in source-based vs. consumption-based GHG accounting, based on a misunderstanding of the different GHG attributes included in a REC.

The joint letter contains a number of errors, most notably using a CPUC Decision regarding avoided emissions attributes in RECs to support a conclusion that RECs do not convey the direct emissions factor of renewable energy and have no role in GHG emissions accounting under AB 1110. The joint letter reiterates that RECs may not be used for GHG emissions reduction purposes and that they do not confer avoided emissions value under the cap-and-trade program. The Revised Proposal repeats that a REC is not an emissions reduction credit and cannot be used for that purpose. As we have stated in previous written and oral comments, we agree that RECs/renewable energy has no avoided emissions value under cap-and-trade and we are not proposing that RECs be used for GHG reduction purposes based on avoided grid emissions or that they be used as emissions reduction credits. But this has no bearing on whether RECs should be required to report delivery of the emissions profile of renewable energy to customers, or in Commission Staff's words, the "GHG emissions characteristics of the electricity portfolios sold to retail customers."[16] Direct emissions (emissions factor) of generation and avoided emissions are two different attributes. By definition and to avoid double counting, the direct emissions of renewable energy are not affected by cap-and-trade. RECs should be required to demonstrate delivery and consumption of electricity with the emissions profile (direct emissions, or emissions factor) of renewable energy, as a renewable generation attribute.

[15] See pg. 11-12 of our July 28, 2017 Comments: http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-05/TN220437_20170728T091728_Todd_Jones_Comments_CRS_comment_on_July_14_Workshop_and_June_27.pdf. Also See CRS's April 12, 2016 comments to CEC under DOCKET NO. 14-OIR-01. https://resource-solutions.org/wp-content/uploads/2016/04/CRScomment_15-DayPSD_4-12-2016.pdf.

[16] Pg. 4 of the Revised Proposal.

The joint letter argues that entities report emissions from specified sources under the MRR irrespective of RECs. We again agree that this is appropriate for a source-based accounting protocol like the MRR. But this again has no bearing on whether or not suppliers should be able to report delivery of emissions associated with renewable energy under PSD irrespective of RECs. The MRR tracks emissions attributable to the state, but not necessarily to specific retail consumers. If it is intended to track emissions attributes to consumers, and RECs are not required for renewable energy, then there is the potential for double counting where the REC is sold separately from the electricity. In fact, the only state program that tracks specified power to suppliers and consumers in the state is the RPS, which is a REC-based program. Contrary to what is stated in the Revised Proposal, the Revised Proposal is actually inconsistent with state policy.

Commission Staff proposes to calculate GHG emissions intensities according to delivered electricity, which it distinguishes from RECs. However, the emissions associated with *delivered* electricity can only be determined contractually, cannot be measured at the point of delivery or consumption, and cannot be determined based on the source of those emissions (where it can be measured), which is all the MRR can provide. Therefore, by proposing not to use RECs in calculations of GHG emissions intensities, Commission Staff is simply choosing an alternative contractual instrument to track delivered emissions from renewable energy, the contract for physical power. This is no more accurate than using RECs. In fact, it is less verifiable and leads to double counting.

Commission Staff proposes not to use RECs to track or reduce GHG emissions under PSD. As we have also stated in previous written and oral comments, we are not asking for RECs to reduce emissions based on avoided emissions. We are, however, asking that RECs be used to track the GHG characteristics (emissions factor) of the renewable energy sold to retail customers, and therefore to reduce the emissions associated with an electricity portfolio to the extent that renewable energy has a lower direct emissions factor than other sources. In other words, Commission Staff should include the same requirement for RECs to report both a renewable fuel type and the emissions associated with generation using that renewable fuel type. This is the intended purpose of RECs: to track fuel type, emissions characteristics, and other generation attributes of renewable energy to verify compliance with RPS and delivery of renewable energy in retail product claims.

RPS Adjustment Under the Cap-and-trade Program (pg. 16)

Though it is not recognition of avoided emissions associated with renewable energy, contrary to what is written in the Revised Proposal, the RPS Adjustment does represent recognition of the emissions characteristics of those RECs, as long as the RPS has a role in reducing emissions for the state, which according to the Revised Proposal, it does.[17]

Unbundled RECs Under the PSD Program (pg.16-17)

According to the Revised Proposal, allowing suppliers to report unbundled REC purchases as renewable energy in the power mix, "produces accounting discrepancies under the PSD program as the inclusion of unbundled RECs inflates the reported total electricity procurement for an electricity portfolio."[18] This reflects a fundamental misunderstanding of RECs. It assumes that, rather than matching RECs (attributes) with procured electricity (e.g. local system power), suppliers report them as additional,

[17] See pg. 15 of the Revised Proposal.
[18] Pg. 17 of the Revised Proposal.

stand-alone power procurement. This is not the case. RECs may be paired with unspecified or other renewable power, and this is does not represent an erroneous reduction of the amount of unspecified power. It represents the application of tracked and accounted for, specified attributes to unspecified power. Unbundled RECs do not represent electricity procurement; they represent specified renewable electricity procurement when paired with electricity. There is no accounting discrepancy.

The Revised Proposal describes concerns about use of unbundled RECs "to misrepresent the actual sources of electricity used to serve customers."[19] Our July 28, 2017 Comments respond in detail to similar comments made at the July 14, 2017 workshop about RECs and "actual electricity." Despite our comments, the misperception that RECs distort some "actual" delivery of specified power or emissions appears to persist in the Revised Proposal. The actual sources of electricity used to serve customers can only be determined contractually and RECs are the contractual accounting instrument used in the state to verify that a renewable energy source was used to serve customers. Contrary to misrepresenting the actual sources of electricity use to serve customers, RECs are the only credible way to verify them. We have submitted detailed explanations in previous comments of why it does not matter whether RECs are procured bundled or unbundled with the underlying power. Furthermore, if unbundled RECs do misrepresent the sources of electricity delivered to customers, then the RPS does as well. We respectfully request an explanation as to why unbundled RECs misrepresent the sources of electricity in PSD but not in RPS. And if necessary, we request a clarification of the intent of the RPS.

There is a discrepancy between RPS and PSD if unbundled RECs are used for RPS compliance. The RPS will show a different renewable energy mix than the PCL. We respectfully request a justification for this discrepancy with respect to AB 1110's requirement to present information to customers that is consistent and clear.

Procurement Types and PSD Program Accounting (pg. 19)

Proposed accounting for specified firmed-and-shaped procurement, where it is assigned the resource type of the REC for power mix but the GHG emissions of the substitute power, results in irrational outcomes. For example, suppliers can report wind with positive emissions. This is confusing to customers. Please provide a justification for this possible outcome with respect to AB 1110's requirement to present information to customers that is consistent and clear.

Proposed accounting for specified null power, where it is classified as unspecified in the power mix but assigned the emissions of the renewable generator, also results in irrational outcomes. For example, suppliers can report unspecified power with zero emissions—unspecified power with specified emissions. This is also confusing to customers. As detailed in our July 28,2017 Comments, this also conflicts with U.S. FTC guidance. Furthermore, there is no basis for this proposed accounting for null power in the MRR, which does not address null power precisely because the MRR is not for accounting for electricity deliveries or delivered emissions.[20]

Specified Sources of Electricity (pg. 20)

The definition of Specified Sources of Electricity references a tradable commodity system that provides commercial verification of exclusive ("once and only once") retail delivery.[21] This cannot be true for

[19] Pg. 17 of the Revised Proposal.
[20] See pg. 21 of the Revised Proposal.
[21] Pg. 20 of the Revised Proposal.

renewable energy without requiring RECs for both power mix and GHG emissions, since otherwise there would be double counting.

Firmed-and-Shaped Procurements (pg. 20-21)

Contrary to what is written in the Revised Proposal, it is less accurate to account for the GHG emissions associated with firmed-and-shaped procurements based on the substitute power rather than the RECs since there is no verifiable contractual path from the generator of the substitute electricity to consumers, and the verifiable contractual instrument for the renewable energy generation, the REC, is not being used for these calculations.

Null Power (pg.21)

If the state wishes to recognize only bundled power contracts for PSD, it should be consistent and require this for both fuel type and emissions. In that case, Commission Staff should change its proposal for treatment of null power in the power mix, and the state should remove PCC 3 in the RPS.

The concept of null power is a result of the fact that attributes (e.g. fuel type) can be traded separately from physical power (since the source of electricity on the grid cannot be physically determined). This concept does not exist in the MRR either because, unlike fuel type, the emissions associated with power production cannot be traded separately from physical power, or alternatively, because the MRR does not have a method for tracking and allocating emissions to consumers and is merely concerned with measuring and reporting emissions from generators. In the first case, we respectfully request an explanation of why different tracking/verification instruments are used for fuel type and emissions for null power procurements and why attributes can be trading separately in one instance and not the other. In the second case, we respectfully request an explanation for why Commission Staff concludes that it must assign the GHG emissions intensity of the generator to null power procurements to be consistent with the MRR.

Emissions Adjustment for Excess GHG-Free Generation of Publically Owned Utilities (pg. 24)

By allowing a qualifying POU to annually generate emissions credits for eligible generation in excess of its retail and wholesale sales of specified sources that is sold as unspecified electricity and apply these credits to reported GHG emissions under PSD,[22] Commission Staff is effectively proposing that the qualifying POU can adjust its emissions based on its retention of the environmental attributes though it has sold the physical "null" power. This directly contradicts the approach to GHG emissions intensity accounting outlined in the rest of the Revised Proposal—where emissions follow the physical power rather than the REC—along with all arguments in the Revised Proposal made about the limited role of RECs. This is unbundling: selling the power as unspecified and reporting/counting the specified generation on the basis of their ownership of the facility or retention of the attributes. We respectfully request an explanation for this apparent contradiction and a justification for this adjustment given the limited role of RECs in GHG accounting in all other instances.

Rather than create "emissions credits," we recommend that the CEC simply require that this generation register in WREGIS to have RECs issued, in which case Commission Staff can require that the POU retain the RECs and report its delivered emissions based on the RECs that it owns, in which case this should be the consistent rule applied to all reporting retail suppliers.

[22] Pg. 24 of the Revised Proposal.

It is unclear whether emissions credits are denominated in MWh or tons. The text in the Revised Proposal says credits are "denominated in MWh" but that credits are equal to generation multiplied by the unspecified power emissions factor, the product of which would be tons. The example provided also shows a result in tons of credits.

CRS's Recommended Power Source and Emissions Disclosure Approach and Example PCL

We recommend the following power source and emissions disclosure requirements.

1. Renewable energy cannot be reported as delivered without REC retirement.

In the case of bundled renewable energy purchases where the REC is retired in a different calendar year, the REC is effectively unbundled, meaning the electricity should be reported as null in the year of purchase, and the REC would then be paired with a MWh of unspecified power and reported as specified renewable (re-bundled) in the year in which it is retired. Retail sellers will therefore wait to report renewable energy on PCLs until RECs have been issued and retired.

Reporting entities always have the option to simply make annual retirements of RECs for RPS in order to report deliveries of renewable energy for PSD—independently aligning the two programs. But to address the effect of banking or holding RECs for RPS compliance, where this is necessary, load-serving entities (LSEs) can have the option to true up older labels based on retirements of RECs held from previous years, provided that they disclose on the PCL that the specified renewable energy number could change *and* that this is only permitted for the RPS component of the PCL (not all renewable energy).

2. Null power and unspecified power get assigned a residual mix emissions factor.

In a place without all-generation tracking like the West, residual mix can be calculated as the system mix minus everything that was sold as specified generation (including null power). It could also be calculated as the aggregated mix of generation that was sold on the spot market or purchased in the Energy Imbalance Market (EIM) by California LSEs but not included in specified contracts. Any specific contracts for renewable energy should not be included in residual mix. In particular, any renewable energy purchases that are intended for RPS, whether or not the RECs are retired, should be excluded from the residual mix. In other words, renewable energy for which the RECs have been sold, held, or otherwise not retired (null power) in that reporting year should not be included in the residual mix calculation. This effectively means that the emissions attributes of this power (including banked RECs) would not be included anywhere in emissions disclosure—not reported as specified renewable energy or included in the residual mix. If a significant amount of RECs are held or banked, this may result in residual mix emissions that in combination with emissions from all other generation are slightly dirtier than actual grid emissions, but this just reflects the fact that zero-emissions attributes are being held and not being delivered.

In order to calculate this residual mix, reporting entities need to identify all renewable energy purchases they made that are intended for the RPS (those are the only purchases for which they should be holding and not retiring RECs), even if they have not retired the RECs yet.

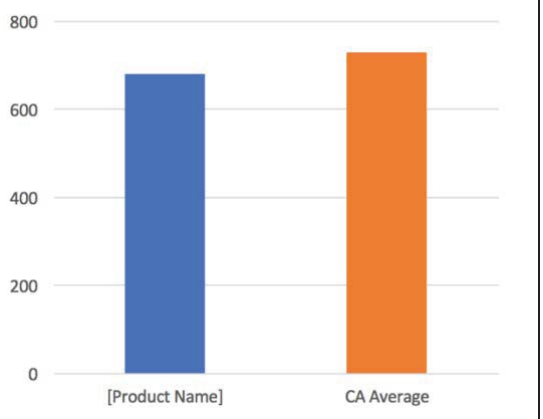
3. All REC purchases for retail sales get reported.

Unbundled REC purchases will be included in reported renewable energy deliveries, and required disclosure about unbundled RECs will be provided outside of the fuel-type percentages.

Figure 2. Example of Recommended PCL

POWER CONTENT LABEL

POWER MIX			GREENHOUSE GAS EMISSIONS INTENSITY (in lbs CO_2e/MWh)	
ENERGY RESOURCES	[PRODUCT NAME]	CA TOTAL (for comparison)	[PRODUCT NAME]	CA AVERAGE (for comparison)
Eligible Renewable[1,2]	**17%**	**12%**	**680**	**729**
Biomass & Biowaste	3%	2%		
Geothermal	5%	3%		
Small Hydroelectric	3%	2%		
Solar	1%	<1%		
Wind	5%	3%		
Other Renewable	0%	0%		
Coal	**8%**	**8%**		
Large Hydroelectric	**15%**	**9%**		
Natural Gas	**32%**	**42%**		
Nuclear	**8%**	**13%**		
Other	**<1%**	**0%**		
Unspecified sources of power and null power[3]	**20%**	**16%**		
TOTAL	**100%**	**100%**		



[1] Eligible renewable energy resources are based on eligibility under California's Renewable Portfolio Standard. For more, see http://www.energy.ca.gov/renewables/documents/#rps.
[2] 5% of this product's (17%) eligible renewable electricity was provided by purchases of "unbundled" renewable energy credits that were purchased by [Entity Name] separate from the electricity associated with those credits. Renewable energy credits are a certificate of proof that one unit of electricity was generated and delivered by an eligible renewable energy resource, and it includes all renewable and environmental attributes associated with the production of electricity from the eligible renewable energy resource.
[3] Unspecified sources of power means electricity from transactions that are not traceable to specific generation sources. Null power means electricity from specified generation sources for which the renewable energy credits have been sold and therefore cannot be classified as specified renewable.
For specific information about this electricity product, contact [Entity Name] at [Entity phone number] and/or visit [Entity Website]. For general information about the Power Content Label, contact the California Energy Commission at 1-844-217-4925 or www.energy.ca.gov/pcl.

Please let me know if we can provide any further information or answer any other questions.

Sincerely,

Todd Jones
Director, Policy and Climate Change Programs

Attachment

- Excerpt from *Corporate and Voluntary Renewable Energy in State Greenhouse Gas Policy: An Air Regulator's Guide*, pg. 7-18. Full report available at: https://resource-solutions.org/document/101717/.

economy-wide emissions cap under the Program, substitution of voluntary renewable electricity for power purchased from a utility results in emissions reductions only for the electric sector, but statewide emissions are not necessarily reduced. Instead, when the electric sector requires fewer allowances for compliance, allowances are freed up for use to meet compliance obligations in other sectors, and statewide emissions remain at the level of the cap."[7]

It is important to note that GHG Regulations have this same effect on avoided emissions associated with energy efficiency, non-renewable (including emitting) power generation, and any other activity that reduces generation or emissions at regulated units.

4. GHG Regulation and Renewable Energy Markets

The effect of GHG Regulation on the GHG attributes of renewable electricity generation described in Sections 2 and 3 helps determine how GHG Regulation will affect renewable energy markets. But this also depends on how these attributes are accounted for and transacted in existing markets, and the value that the markets place on those attributes to sustain demand. In this section, we consider how the GHG attributes of renewable electricity generation are accounted for and the market mechanisms used to track and transact those attributes for different purposes, i.e. for accounting, reporting, and claims related to either production or consumption of renewable energy and associated GHG emissions.

4.1 Production vs. Consumption GHG Claims

As shown in Table 2, the GHG attributes of electricity generation relate to electricity producers and consumers differently. The direct emissions associated with generation are emitted by the generator or producer and also consumed by the consumer. They are at once the direct emissions of the generator or producer and the indirect emissions (i.e. also part of the "carbon footprint") of the consumer. There is no inherent conflict between production and consumption claims on these attributes. Direct emissions can be reported by generators to regulators (for compliance with production-based emissions reporting requirements or regulations) or voluntarily. They can also be reported by suppliers or consumers as emissions delivered or consumed (again, either voluntarily or for compliance with delivery- or consumption-based emissions reporting requirements, such as power source and emissions disclosure rules).

Likewise, a single MWh of electricity generation can have a single producer and a single consumer. In the case of renewable energy generation, a generator can claim to be producing zero-emissions power, an offtaking utility/supplier can claim to be delivering that zero-emissions power, and a consumer can claim receipt or use of that power. There is no double counting between these entities in this case. The GHG Protocol[8], a joint initiative of the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) that creates international standards for GHG accounting and reporting, has created different emissions categories, or "Scopes" of emissions, to clarify this distinction. Scope 1 emissions are the direct emissions of electricity generators, and Scope 2 emissions are the indirect emissions of electricity consumers.[9] They are the same emissions. All Scope 2 emissions are the Scope 1 emissions of someone else, and the grand total of Scope 1 emissions represent the grand total of all emissions. Scope 2 and other indirect emissions (Scope 3) are reported by consumers of products and services so that they can be managed from a demand-side perspective. There is no double counting between Scope 1 and Scope 2 emissions.

The avoided emissions associated with generation are also at once the emissions effect or impact of the generation for the generator and the emissions effect of delivered or consumed generation for the consumer.

The distinction between production and consumption means that GHG Regulations that affect the GHG attributes of generation will affect both renewable energy producers and consumers. This distinction is also important because it is reflected in a difference between production- and consumption-based accounting and markets for electricity and emissions. Accounting for the emissions associated with consumed or delivered electricity is different than accounting for the emissions associated with electricity production. GHG Regulations will have a different effect on renewable energy producers and consumers in part based on how the GHG attributes of renewable energy generation are tracked and accounted for in each case.

4.2 Production- vs. Consumption-based GHG Accounting

How one accounts for GHG emissions from the power sector depends on what one is measuring or regulating. If one is regulating emissions from production or generation sources, then the GHG accounting is very simple. Simply measure emissions at the

7. State of California Air Resources Board (CARB). Staff Report: Initial Statement of Reasons (ISOR). August 2, 2016. Public Hearing to Consider the Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms. Pg. 53. www.arb.ca.gov/regact/2016/capandtrade16/isor.pdf

8. For more information, visit: www.ghgprotocol.org.

9. Scopes are defined in the GHG Protocol's Corporate Standard, available here: www.ghgprotocol.org/corporate-standard.

Table 2. The Two GHG Attributes of Electricity Generation and How They Relate to Producers and Consumers

		Producers/Generators		Consumers			
				Delivery and consumption of generation attributes can only be contractually determined or verified. For renewable energy, it is determined and verified via the REC.			
GHG Attribute	**Description**	**How it is related to producers/ generators**	**Producer/ generator uses**	**How it is related to suppliers and consumers**	**Supplier and consumer uses**	**Supplier Claims**	**Consumer Claims**
Direct emissions	The direct emissions, emissions profile, or emissions factor associated with the generation.	Direct emissions at point of generation. The direct (Scope 1) emissions of the generation owner.	Emissions reporting to regulators. Compliance with source-based (or production- or generation-based) emissions regulations.	Delivered and consumed emissions. The indirect (Scope 2) emissions (part of the carbon footprint) of the consumer.	Emissions disclosure to customers. Scope 2 emissions (carbon footprint) accounting/ reporting by consumers. Supplier-specific emissions factor calculations by suppliers. Tracking emissions for imported electricity.	"The emissions associated with our electricity supply, product or retail sales are X." "The emissions associated with this electricity import are X." "You are receiving/we are delivering zero-emissions electricity."	"By purchasing renewable energy, I've reduced my carbon footprint by X tons of CO_2e." "I buy 100% zero-emissions energy."
Avoided grid emissions	The net change in emissions on the grid due to the generation.	The grid emissions effect of generation.	Impact statements primarily by low- or zero-emitting sources. Generating RE-derived carbon offsets (where permitted and in regions without carbon regulations for the power sector).	The grid emissions effect of delivered and consumed generation. The grid GHG emissions impact of the generation of the consumer's electricity.	Calculating the GHG reduction benefits of RE. Voluntary RE set-aside calculations. Impact statements by suppliers and consumers. Characterizing the impact of RE policies. Designing policies to create impact in terms of emissions.	"You are receiving/we are delivering electricity that avoids X tons of CO_2e." "Our renewable energy facilities avoid X tons of CO_2e annually."	"The renewable energy I purchase avoids X tons of CO_2e annually." "The renewable energy I use has a GHG benefit equivalent to taking X cars off the road for one year."

smokestack, directly at the source, and those emissions are assigned to that source and can be evaluated against a compliance obligation for that source. There is no need for a specific accounting or tracking instrument to determine who is responsible for which emissions.[10] This is how all current GHG regulations in the U.S. and most around the world work, including direct regulation of stationary GHG sources (e.g. in Washington State) and cap-and-trade or emissions trading schemes (ETS) (e.g. in California and the Regional Greenhouse Gas Initiative [RGGI]). They are "production-based" (also called source-based or generation-based) regulations and accounting protocols. This is also how we define and use GHG Regulations generally in this guide—to refer to production-based regulations (see Section 3). As explained previously, production-based accounting systems do not determine delivery or consumption of the GHG emissions associated with electricity generation, which may be by different entities than those producing those emissions and that are reporting and regulated under a production-based scheme.

On the other hand, if one is regulating or measuring emissions in the power sector at the point of the supplier of power (e.g. utilities) or the consumer of power (e.g. large commercial and industrial consumers), then it becomes necessary to create an accounting mechanism or tracking instrument for generation attributes, to assign or allocate emissions that occur at the point of generation to suppliers and consumers on the grid. This is due to the nature of electricity and the shared grid: there is and can be no physical or "actual" delivery of specified generation, fuel type or emissions to grid customers. Whereas one can measure emissions and determine fuel type at the point of production, one cannot measure emissions or determine fuel type at the distribution substation or outlet, or indeed once electricity has been injected to the grid. Delivery and consumption of specified (e.g. renewable) power and associated emissions can only be determined contractually.

This means that accounting protocols for production-based GHG Regulations (e.g. cap-and-trade programs), such as the California Air Resource Board's (CARB's) Mandatory Reporting Regulation (MRR) for the state's cap-and-trade program, are accurate for determining who produces which emissions. But they are not accurate for determining who consumes those emissions in the state or the distribution of different sources of power among suppliers and consumers.

To account for the emissions associated with delivered or consumed electricity—that is, to determine the distribution of fuel type and emissions to electricity deliverers or customers on the grid (for example, in order to regulate them or in order to manage one's own demand-side impact or carbon footprint)—you can either embed generation emissions in electrons and use contracts for physical power as a proxy for delivery of specified generation emissions, or you can record generation attributes in a separate contractual accounting instrument or "certificate" and track those. Certificates represent a contractual instrument that embodies the emissions attributes of the power and can be used to convey those emissions (or in the case of most renewable generation, zero emissions and positive avoided emissions) to the owner of the certificate, allowing for a verifiable claim to delivery or use of those emissions.

The same is true for other generation attributes, including fuel type and location. Fuel type and location can be determined at the point of generation. They cannot be determined at the point of delivery or consumption. So, regulations regarding the fuel type used for electricity production that regulate generators would not require an accounting or tracking mechanism to verify the fuel type. But regulations that require that a certain amount of electricity generation from a certain fuel type be delivered or sold to customers (as opposed to generated)—i.e. regulations for utilities and other retail electricity suppliers—do require an accounting or compliance mechanism to demonstrate procurement and delivery of specified, renewable power on the grid. This includes nearly all of state RPS programs in the U.S. Of the 29 state RPS programs in the U.S. (plus Washington DC), all but two are this kind of "consumption-based" regulation, meaning they require that a certain percentage of electricity sales, or delivered or consumed electricity, is met or supplied with renewable resources.[11]

Apart from what is regulated, consumers that want to purchase and suppliers that want to sell specified, renewable power (i.e. power with renewable generation attributes), and/or customers that want to voluntarily measure and report what kind of power they use or consume and the emissions associated with the production of that power (e.g. for carbon footprinting purposes), also need an accounting or tracking instrument to verify their delivery and consumption claims.

4.3 The Role of RECs for Delivery and Consumption of Renewable Energy

Purchasing, delivering or selling green or renewable power means differentiating electricity based on how it was generated or the attributes of generation—that is, allocating the renewable attributes of generation to specific customers. Again, these attributes and specified generation are not physically delivered and are separate from physical electricity. Generation attributes cannot be tracked to suppliers or consumers with physical electricity. Electricity is indistinguishable based on how it was produced and untraceable on the grid. Nevertheless, differentiated electricity products, and specifically renewable energy products, are bought and sold in the U.S., both wholesale and retail. Specified electricity is transacted using contracts, and in the case of renewable electricity using

10. GHG Regulations may include allowances (permits) and/or credits, where trading is permitted. These instruments are not used to measure or verify emissions, determine baseline emissions, or establish compliance obligations.

11. Iowa and Texas have "capacity-based" RPS programs, which specify quotas in terms of megawatts (MW) of capacity. See dsireusa.org.

contractual instruments called renewable energy certificates (RECs)[12].

RECs are the only way to deliver or consume renewable energy in the U.S. They represent property rights to the fully-aggregated non-power generation attributes of renewable electricity generation. They are the essential accounting and tracking tool used to allocate renewable generation to specific customers and to purchase green power, either to demonstrate RPS compliance or meet voluntary demand. Each REC represents the generation attributes of one MWh of renewable electricity that has been added to the grid. These attributes include the renewable fuel type, location, and in almost all cases both GHG attributes described previously—the direct GHG emissions and the avoided grid emissions associated with generation—as well as all other environmental and social impacts and benefits of the generation.[13] This treatment and use of RECs is accepted and consistent across the U.S. Thirty-five (35) states and territories, along with voluntary buyers and sellers of renewable energy—including U.S. federal agencies, utilities and other electric service providers, thousands of companies and municipalities and millions of individuals—use RECs to verify and legally enforce delivery and consumption of renewable energy on the grid.[14] The exclusive use of RECs for this purpose is not contradicted by the remaining states and territories.[15]

As explained in the previous subsection, RECs are not needed for and do not affect renewable energy generation or production claims, precisely because generation attributes can be directly measured and because there is no double counting between production and consumption claims. Rather, RECs enable demand, purchasing, and supplier- or consumption-based compliance for renewable energy generation.

In RPS states, RECs are retired by load-serving entities (LSEs) and other regulated entities to verify that they are complying with state requirements to provide their customers with renewable energy. In addition, all options for voluntarily delivering, purchasing or otherwise using renewable electricity in the U.S., including onsite generation, must include RECs to substantiate a renewable energy usage or environmental claim. According to the U.S. Federal Trade Commission (FTC), the federal law enforcement agency responsible for oversight of marketing claims:

> "A marketer should not make unqualified renewable energy claims, directly or by implication, if fossil fuel, or electricity derived from fossil fuel, is used to manufacture any part of the advertised item or is used to power any part of the advertised service, unless the marketer has matched such non-renewable energy use with renewable energy certificates;"[16]

and,

> "If a marketer generates renewable electricity but sells renewable energy certificates for all of that electricity, it would be deceptive for the marketer to represent, directly or by implication, that it uses renewable energy."[17]

RECs are created at the point of generation, owned by the generator and then transacted to electricity distributors and suppliers (e.g. utilities) or directly to electricity consumers, either "bundled" with the electricity or separate from electricity ("unbundled"):

> "RECs have become an important tool for the renewable electricity market. Once renewable electricity is introduced into the grid, it is physically indistinguishable from electricity generated from conventional sources. Accordingly, consumers cannot determine the source of the electricity flowing into their homes and businesses. However, because electricity transactions can be tracked, entities can 'buy' renewable power by purchasing power bundled with RECs. Under the REC system, a renewable electricity generator splits its output into two components: (1) the electricity itself (i.e., 'null' electricity); and (2) certificates representing the renewable attributes of that electricity. Generators that produce renewable electricity sell their electricity at market prices for conventionally produced power and then sell the renewable attributes of that electricity through separate certificates. Organizations purchase these RECs to characterize all or a portion of their electricity usage as 'renewable' by matching the certificates with the conventionally-produced electricity they normally purchase. By allowing these certificates to be sold separately and not requiring the renewable attribute to

12. The term renewable energy certificate (REC) is used in this guide in place of slightly different names as used by some state, regional, and voluntary programs (e.g. renewable energy credit), which have the same basic features as described here.
13. In most state and tracking system definitions of RECs and green attributes, these GHG attributes are either explicitly included in definitions of RECs or attributes, or they are implicitly included in "all environmental benefits," "whole certificate," or similar inclusive language. But, slight variations in state REC or attribute definitions do not significantly affect the uniformity of the REC instrument as used across the U.S., and certainly do not affect their use in the voluntary renewable energy market. We are aware of only one state, North Carolina, that allows the avoided emissions attribute to be traded separately from the REC for RPS compliance. Though Delaware and Pennsylvania do not appear to require avoided emissions with RECs for compliance, the PJM-GATS tracking system used for compliance in these states includes avoided emissions attributes as a part of a "whole certificate." In the case of North Carolina, the contracting parties can specify that the avoided emissions attribute is attached to the REC if they so choose.
14. Jones, T. (2015). The Legal Basis of Renewable Energy Certificates. Center for Resource Solutions. Available online at: www.resource-solutions.org/pub_pdfs/The%20Legal%20Basis%20for%20RECs.pdf. Also see U.S. Environmental Protection Agency. (2008) Renewable Energy Certificates. Available online at: www.epa.gov/greenpower/documents/gpp_basics-recs.pdf.
15. Jones, T. (2015). The Legal Basis of Renewable Energy Certificates. Center for Resource Solutions. Available online at: www.resource-solutions.org/pub_pdfs/The%20Legal%20Basis%20for%20RECs.pdf.
16. U.S. Federal Trade Commission (FTC). (2012). Guides for the Use of Environmental Marketing Claims; Final Rule. Sec. 260.15(a). Available at: www.ftc.gov/sites/default/files/documents/federal_register_notices/guides-use-environmental-marketing-claims-green-guides/greenguidesfrn.pdf.
17. Ibid. Sec. 260.15(d).

Figure 2. REC Illustration

remain attached to the generated electricity, the REC approach provides flexibility and efficiency for the renewable electricity market."[18]

RECs are either created by a generator or issued to generators by one of several electronic certificate tracking systems ("REC tracking systems") that cover different regions of the U.S. Even in the case that a renewable generator is not registered with a tracking system, RECs are de facto created for each MWh of generation and may be transferred and retired contractually.

Trading a REC in the U.S., whether bundled or unbundled with underlying electricity, effectively transfers ownership rights to all of the attributes of the associated renewable electricity generation to the REC purchaser. Therefore, power without the renewable attributes, or "null power" where the renewable attributes have been sold to a different purchaser, is not renewable power and cannot be claimed as renewable or zero-emissions energy:

> "In addressing these issues in the Green Guides, the Commission [...] did warn that power providers that sell null electricity to their customers, but sell RECs based on that electricity to another party, should keep in mind that their customers may mistakenly believe the electricity they purchase is renewable, when legally it is not. Accordingly, it advised such generators to exercise caution and qualify claims about their generation by disclosing that their electricity is not renewable.[19]"[20]

In this way, RECs prevent double counting of the same renewable generation by multiple consumers or more than once by a particular consumer:

> "[T]he operation of the renewable energy market relies heavily on the expectation of all market participants that these certificates have not been counted or claimed twice (i.e., double counted). Such double-counting can occur, for instance, through [...] renewable energy claims made by a company that already sold the RECs for its renewable generation. [...] Such double counting, in turn, not only risks deceiving consumers but also threatens the integrity of the entire REC market. By selling RECs, a company has transferred its right to characterize its electricity as renewable."[21]

18. U.S. Federal Trade Commission. (2015). Letter from James A. Kohm, Associate Director, Division of Enforcement, Bureau of Consumer Protection, to R. Jeffrey Behm, Esq., Sheehey, Furlong & Behm, P.C. February 5, 2015. Available at: www.ftc.gov/system/files/documents/public_statements/624571/150205gmpletter.pdf.

19. See Statement of Basis and Purpose at 225, available at: wwwftc.gov/sites/default/files/attachmentslpress-releases/ftc-issues-revised-green-guides/greenguidesstatement.pdf.

20. U.S. Federal Trade Commission (FTC). (2015). Letter from James A. Kohm, Associate Director, Division of Enforcement, Bureau of Consumer Protection, to R. Jeffrey Behm, Esq., Sheehey, Furlong & Behm, P.C. February 5, 2015. Available at: www.ftc.gov/system/files/documents/public_statements/624571/150205gmpletter.pdf

21. Ibid.

Besides allowing suppliers and grid customers to verify delivery and use of renewable energy and preventing double counting, RECs also facilitate consumer demand and create access to renewable energy. RECs represent a standardized currency for renewable energy. They facilitate trading, creating market efficiencies, which creates a more vigorous market for renewable energy.

4.4 U.S. Renewable Energy Markets

Markets (or sources of demand) for renewable energy in the U.S. are markets for RECs, since RECs are used to verify delivery and consumption of specified renewable energy. These markets drive the development (supply) of renewable energy generation as it is needed to meet demand. There are two primary markets: state compliance (or RPS) markets and the voluntary market. As noted in Section 4.2, all but two (Iowa and Texas) of the 29 state RPS markets are consumption-based, meaning they regulate sales of renewable electricity to customers and ensure that electricity customers in the state receive or consume a certain percentage of renewable power. RECs sold into RPS markets are ultimately used (or "retired") by regulated entities (e.g. utilities) on behalf of (or to demonstrate delivery to) their customers to meet the state's requirement.

Separate from regulatory mandates, the voluntary renewable energy market leverages private, non-ratepayer funding to support renewable energy sources, and it provides a pathway whereby the appetite for voluntary action can be channeled to clean energy development. The voluntary market for renewable energy is also consumption-based. Driven by businesses, individuals, and other electricity consumers looking to demonstrate environmental leadership, reduce their carbon footprint, and/or get recognition from programs like the EPA's Green Power Partnership and Leadership Awards[22] and the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification for buildings, the voluntary market delivers renewable energy specifically to those customers who voluntarily purchase or consume renewable energy in excess or outside of what is required by law. The voluntary market may also include renewable energy that is economical and provided by a supplier to its customers in excess of the RPS as a part of its standard mix. RECs sold into the voluntary market are either retired by the voluntary user/buyer or retired on their behalf by a supplier.

Since both markets are consumption-based, in order to avoid double counting (consumption of the same MWh by more than one consumer), a REC can only be used once for either RPS compliance or a voluntary use, purchase or delivery.

Renewable energy projects may also sell their electricity into the broader wholesale power market, in which case it becomes part of the regional mix and is sold and purchased as unspecified power. However, since there is a REC associated with each MWh of renewable energy generation in the U.S., the RECs associated with that power are either retained by the generator and not used for a specified use claim, or they are unbundled and sold into either the compliance or voluntary market, in which case, again, the customer purchasing the REC or on whose behalf the REC was retired is claiming use of that renewable generation and its attributes.

Both markets are served by REC Tracking Systems. Although it is not necessary to use tracking systems to issue, transfer and retire RECs, most if not all RPS and voluntary programs require them, and the vast majority of volume transacted in renewable energy markets occurs in REC tracking systems. In these tracking systems, RECs are electronically serialized and issued to registered generators with accounts. They can be transferred and tracked between account holders and ultimately permanently retired or cancelled electronically by the entity making the claim or on behalf of an end-user making a claim. Account holders indicate whether the RECs have been retired on behalf of an RPS program, a Green-e certified voluntary sale or purchase, or even a specific voluntary customer, allowing compliance and voluntary retirements in the system to be reported. Each registered generator has certificates issued for all its renewable production. These tracking systems do not operate as trading platforms or exchanges. All REC sales and purchases are executed bilaterally or otherwise "over the counter" between contracting parties, and the REC transfers and retirements are reflected in the tracking system, similar to currency tracked in bank accounts. REC tracking systems provide exclusive issuance, trading, and retirement of RECs, as well as verification of static and dynamic generation data. Although they may have been initially built to serve either RPS programs or the voluntary market, the same REC tracking systems, like the RECs themselves, are now used for both markets.

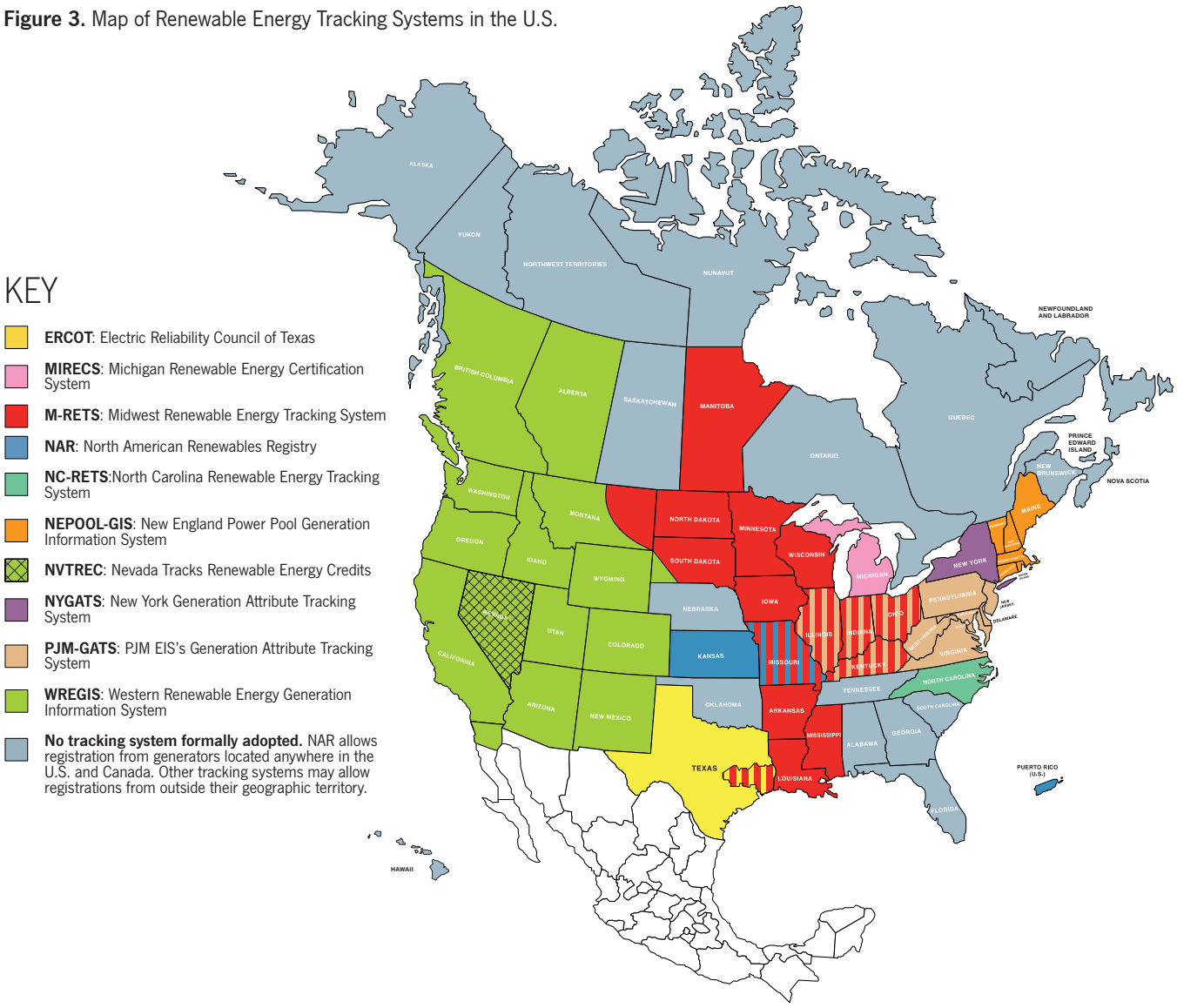
Figure 3 shows the regional REC tracking systems in the U.S. and Canada. All but two are quasi-governmental functional support entities. The Midwest Renewable Energy Tracking System (M-RETs) is an independent non-profit, though it is referenced in state legislation. The North American Renewables Registry (NAR) is a private tracking system run by the private firm APX[23] to cover generation in states and provinces that are not covered by other tracking systems, mainly non-RPS states. It should also be noted that the tracking systems covering the northeast and mid-Atlantic U.S.—including the PJM Generation Attribute Tracking System (PJM-GATS), the New England Power Pool Generation Information System (NEPOOL-GIS), and the New York Generation Attribute Tracking System (NYGATS)—are "all-generation" tracking systems. They track and issue certificates for production from all generation resources and each MWh of generation in the region, not only renewable facilities. All-generation tracking facilitates power source disclosure and residual mix[24] calculations.

22. Visit www.epa.gov/greenpower for more information.

23. www.apx.com.

24. See Subsection 4.5.1 for more information on residual mix.

Figure 3. Map of Renewable Energy Tracking Systems in the U.S.



Though both are REC-based and served by the same REC tracking systems, compliance and voluntary renewable energy markets have different geographic scopes and different eligibility requirements. Whereas RPS markets are subnational, so they can produce in-state or regional renewable energy development and benefits, the voluntary renewable energy market is national in scope,[25] so that voluntary purchasers can access renewable energy from across the country at the lowest cost. RECs issued in any state or tracking system can be sold to and claimed by voluntary customers anywhere across the country.

States determine eligibility rules for their RPS programs in terms of eligible fuel types, technologies, locations, and type of procurement (e.g. bundled vs. unbundled), as well as REC vintage and banking rules. Designated state agencies provide oversight and verification for these programs. The voluntary market, on the other hand, is, for the most part, not regulated by governmental agencies. Rather, private, third-party standards and certifications are used to verify delivery and ownership. Green-e® is the leading third-party certification for voluntary renewable energy in the U.S. and Canada. Like state RPS programs, third-party standards for the voluntary market limit eligibility and set rules in terms of technology, date of facility construction/operation, vintage of eligible sales, and other sustainability and consumer protection criteria. The REC Tracking Systems, along with Green-e certification, are used to verify that RECs are used for a state RPS program or a voluntary sales or purchase.

Though there are other important factors influencing renewable energy development—including incentives, tax credits, regulatory programs like The Public Utility Regulatory Policies Act (PURPA) which enable independent renewable power providers to sell their

25. See O'Shaughnessy, E. et al. (2016). Status and Trends in the U.S. Voluntary Green Power Market (2015 Data). National Renewable Energy Laboratory (NREL). Technical Report NREL/TP-6A20-67147. October 2016. Available online: www.nrel.gov/docs/fy17osti/67147.pdf. Also see Center for Resource Solutions (CRS). (October 16, 2016). 2015 Green-e Verification Report. Available at: www.green-e.org/2015.

power, other regulatory programs and policies that lower the cost of development, and carbon prices that support an economic advantage for zero-emitting sources—over the past 20 years, renewable energy markets (the combination of RPS and the voluntary market) have been the primary driver.[26]

Respective market volumes are shown in Figure 4. In 2015, RPS demand was about 214 million MWh. Of that, demand for "new" renewables built since the commencement of each state's RPS (in roughly the last 20 years) was about 126.5 million MWh.[27] In comparison, U.S. electricity customers voluntarily purchased about 78 million MWh of green power in 2015,[28] equivalent to 36% of combined RPS demand. About 56% of that, or 44 million MWh, was certified by Green-e.[29]

4.5 GHG Accounting for Delivered or Purchased U.S. Renewable Energy (Scope 2 Emissions) and Other GHG Claims for REC Suppliers and Owners

The last two columns of Table 2 provide examples of supplier and consumer GHG claims associated with REC purchases and ownership. But in general, REC owners can claim:

1. To be consuming electricity with the direct emissions (or emissions factor or profile) of the renewable generator of the REC (e.g. zero for wind and solar), and
2. That the generation of their electricity avoids emissions on the grid.

These claims are the same regardless of whether the RECs were delivered and consumed through an RPS or the voluntary market.

4.5.1 Scope 2 Accounting and Claims

As introduced in Section 4.1, the first set of claims to be consuming zero-emissions power (related to the direct emissions attribute) are called Scope 2 claims. In January 2015, The GHG Protocol released new Scope 2 Guidance as an amendment to the Corporate Standard.[30] The Guidance is the result of a four-year stakeholder engagement process involving over 200 Technical Working Group members representing 23 countries. The main elements of the Guidance are as follows.

1. The Guidance adopted an "attributional" accounting approach (called an "emission rate approach" in the Guidance) based on the direct emissions factor of the generation, rather than a "consequential" approach (called an "avoided emissions approach" in the Guidance) based on the avoided emissions associated with the generation (see Table 1 in Section 2). In other words, the emissions associated with purchased electricity are the gross emissions that can be attributed to the production of that electricity and are not adjusted based on the net change in emissions on the grid as a result of the production.

2. The Guidance requires reporting of two Scope 2 figures (or "dual reporting"): a market-based figure and a location-based figure. Each is explained below. The guidance provides a hierarchy of emissions factor data sources for each method.

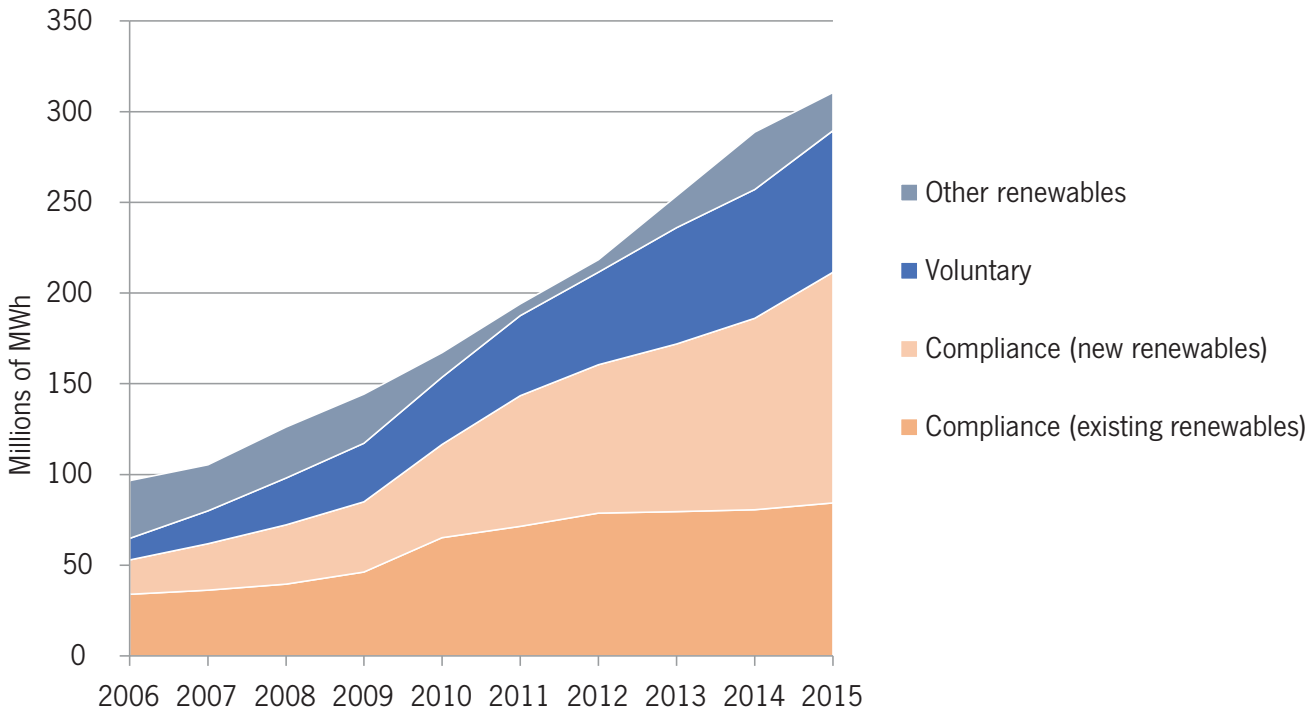
3. The Guidance provides "quality criteria" for contractual instruments (e.g. certificates) that are used to demonstrate specified source consumption and use of a specified source emissions factor to calculate the market-based Scope 2 figure. These criteria include that the contractual instrument exclusively convey the direct GHG emission rate attribute; that it be tracked and retired on behalf of the reporting entity; that it be issued and retired as close as possible to the period of energy consumption to which the instrument is applied; and that it be sourced from generators located within the same market or electricity sector as the reporting entity's electricity-consuming operations.

4. The Guidance requires calculation and use of "residual mix" for unspecified purchases and null power under the market-based method (or disclosure of its absence). Residual mix characterizes the GHG intensity of unclaimed or publicly shared electricity (the mix of resources generating electricity in a region that are not being specifically purchased by a particular electricity user or group of users).

The market-based method allows a consumer to claim the benefits of its specified purchases and specified deliveries, including renewable energy purchased voluntarily or delivered through the RPS, and accurately calculate resulting Scope 2 emissions. It is based on supplier- and product-specific emissions rates, which for renewable energy are conveyed using RECs, whether they are bought separately from electricity, delivered through an electricity supplier's green power program or renewable electricity product, or consumed from on-site generation. The location-based method

26. See Mai et al. (2016) A Prospective Analysis of the Costs, Benefits, and Impacts of U.S. Renewable Portfolio Standards. Lawrence Berkeley National Laboratory. Also see Barbose, Galen (2017). U.S. Renewables Portfolio Standards: 2017 Annual Status Report. Lawrence Berkeley National Laboratory. Both available at: emp.lbl.gov/projects/renewables-portfolio/.
27. Barbose, G. (2016). U.S. Renewables Portfolio Standards: 2016 Annual Status Report. Presentation April 2016. Lawrence Berkeley National Laboratory. Available at: emp.lbl.gov/sites/all/files/lbnl-1005057.pdf
28. O'Shaughnessy, E. et al. (2016). Status and Trends in the U.S. Voluntary Green Power Market (2015 Data). National Renewable Energy Laboratory (NREL). Technical Report NREL/TP-6A20-67147. October 2016. Pg. 3. Available at: www.nrel.gov/docs/fy17osti/67147.pdf.
29. Center for Resource Solutions (CRS). (October 16, 2016). 2015 Green-e Verification Report. Available at: www.green-e.org/2015.
30. Sotos, M. (2015). GHG Protocol Scope 2 Guidance: An Amendment to the GHG Protocol Corporate Standard. World Resources Institute. Pg. 56, 60. Available online: www.wri.org/sites/default/files/Scope_2_Guidance_Final.pdf.

Figure 4. Comparison of Voluntary and Compliance Markets, 2006–2015 [31]



assigns the average emissions rate of electricity generated in the consumer's region (eGRID subregion) to every MWh used. It does not reflect any purchasing choice or action taken by the consumer or any RPS compliance activity undertaken by their supplier.

The market-based figure is required for electricity consumption in markets where differentiated energy products in the form of contractual instruments (including direct contracts, certificates, or supplier-specific information) are available. This explicitly includes the U.S.[32] This is the Scope 2 figure and allocation of emissions that is based on legal contractual instruments for delivering and consuming specified power—in the case of renewable energy, the REC—and it lines up with RPS program rules and the existing voluntary market. RECs (either bundled or unbundled) are at the top of the market-based emissions factor data hierarchy since they represent the most precise emissions factor information for Scope 2 accounting, and they represent the only means of reporting Scope 2 emissions using a specified renewable emissions factor in the U.S. and Canada. In the U.S., the location-based figure amounts to extra information, since it does not represent a legally enforceable allocation of attributes (i.e. emissions) (and again, it does not represent a physical distribution of emissions). It allows reporting entities to effectively see the average of what is produced in the region in which they consume, which is good for transparency and can affect other decision making. An example of Scope 2 calculations is provided in Table 3.

Lastly with respect to the direct emissions attribute, in order to avoid double counting in the case of unbundling (where RECs and the underlying electricity are delivered to different consumers), null power (electricity minus the REC) must be assigned the emissions of the residual mix. As a result, when either a supplier or end-use consumer purchases unbundled RECs, the RECs (re-)define the attributes (e.g. emissions) of the delivered or consumed electricity with which it is matched, and the attributes of the electricity otherwise delivered or consumed get (re-)distributed to the rest of the supplier's customers, such that their power gets incrementally dirtier. The regional mix and delivered emissions factor in the area where the unbundled RECs were generated will be automatically affected (i.e. get dirtier), provided there is no double counting (i.e. there is no one claiming delivery or consumption of renewable energy without the RECs). For example, if a consumer is located in Pacific Gas & Electric (PG&E) territory in Northern California and buys an unbundled REC from a wind facility in Texas, her electricity becomes renewable and gets cleaner and the utility emissions factor and regional grid emissions factor in Texas gets dirtier (by one less MWh of zero-emitting power). In this case, nothing might happen to PG&E's emissions factor. PG&E's mix has not changed, but the allocation has, from the unbundled REC consumer to the null power purchaser in Texas. The California consumer gets the REC and whoever gets the null power gets what she had. If, however, the California consumer is buying voluntary renewable energy from a facility in PG&E's territory, then that would be automatically reflected in PG&E's default mix (i.e. it would get dirtier) since PG&E would not have those RECs.

31. Based on data received via email from Jenny Heeter, National Renewable Energy Laboratory (NREL), May 12, 2017.

32. Ibid. p.43.

Regions will all-generation tracking systems (like the northeast and mid-Atlantic U.S.) calculate and disclose this exact transaction of attributes. For the rest of the country with renewable-only tracking systems, Green-e provides regional residual mix emissions factors, which have all Green-e certified renewable energy purchases factored out, for all non-purchasers of renewable energy in those regions to use.[33]

Depending on supply and demand, and the particular RECs purchased, unbundled REC purchases may allocate and redistribute existing renewable generation to different consumers on the grid without changing the composition of the grid. This is not unique to RECs, or, in fact, unbundled RECs, since contracts for existing physical electricity can also be reallocated to different consumers without affecting generation or grid composition. Purchasing any clean product, even ones that (unlike electricity) can be differentiated at the point of consumption based on their clean production, may not change overall production of that product, which may be a mixture of dirty and clean. That does not mean that all purchasers are equally responsible for the overall mixture. Different consumers are buying clean and dirty. Those that buy clean are changing their own usage (and the emissions associated with their usage), if not the overall production. That is what Scope 2 emissions accounting and accounting for RECs are intended to reflect—an accounting of responsibility for emissions on the grid (or purchased emissions). There is, however, also a demand-side effect of the choice to pay for the clean energy on the grid.

4.5.2 Avoided Emissions Accounting and Claims

In addition to and separate from Scope 2 GHG claims related to the direct emissions attribute, REC owners and RPS ratepayers can also make claims based on the avoided emissions associated with the renewable energy generation they consume. REC purchasers can claim that emitting generation was displaced or avoided on the grid as a result of the renewable generation they are using. These avoided emissions are typically calculated as described in Section 2, again, typically approximated using the non-baseload or marginal emission rate in the area of the REC generator. An example is provided in Table 4.

Avoided emissions claims made by REC owners are not equivalent to carbon offset claims. First, avoided grid emissions are not equivalent to absolute reductions on the grid or global reductions. They are only a calculation of the emissions displaced by the renewable generation. Avoided grid GHG emissions cannot be used to adjust a consumer's carbon footprint or for Scope 2 emissions calculations. Second, avoided grid emissions associated with the renewable generation are not necessarily caused by the renewable energy/REC purchase or purchaser. Rather, the generation used by the purchaser results in avoided emissions. In public statements, avoided grid emissions should always be associated with the renewable energy generation itself or the supply for the renewable energy product, rather than the purchaser's action.

In general, RECs should not be confused with carbon offsets. They are different instruments that convey different claims, and they are accounted for differently in a consumer's GHG emissions inventory or footprint. Whereas RECs represent a MWh of renewable energy

Table 3. Example Scope 2 Calculations by Renewable Energy Consumers

Activity Information	
Location of electricity consumption: Dayton, OH eGRID subregion: RFC West A. Total Electricity Consumption = 100 MWh B. Nebraska Wind RECs Purchased = 95 MWh	
Market-based Scope 2 Emissions	**Location-based Scope 2 Emissions**
C. Adjusted Consumption = 5 MWh (A - B) D. Residual Mix Greenhouse Gas Emission Rate for RFC = 1,248.99 lbs/MWh*	F. Regional grid average emissions factor for RFC West: 1,386.55 lbs/MWh**
Market-based Scope 2 Emissions = **2.8 tCO2e** (C * D / 2204.62)	Location-based Scope 2 Emissions = **62.9 tCO2e** (A * F / 2204.62)

*Available from Green-e
**Available from EPA's eGRID database

33. See "Residual Mix Emission Rates" on the Green-e website: www.green-e.org/programs/energy/documents.

generation, carbon offsets represent an amount of GHG emissions reduction in tons of CO_2e. REC purchasers effectively contractually fuel switch from a certain mix of electricity generation to renewable generation, and can therefore both reduce the portion of their carbon footprint associated with purchased electricity (Scope 2) and claim that their generation has some emissions effect on the grid. A carbon offset is a standalone, global emissions reduction beyond a baseline level of emissions from a project activity that would not have occurred but for the carbon offset market. Carbon offsets can be used to address any scope of emissions as a net adjustment to the gross consumer GHG inventory. Likewise, purchasing carbon offsets, which do not include non-GHG generation attributes, is not equivalent to purchasing renewable energy instruments or certificates, and carbon offsets cannot be used to make renewable energy consumption or zero-emissions electricity usage claims.

Though they are different instruments and projects must meet different criteria to generate each of them, a REC and a carbon offset cannot both be generated or issued for the same MWh of renewable energy generation since the avoided emissions attribute of renewable energy is included in both of them. An individual MWh can either be used and claimed as a REC or used to generate a carbon offset. Where carbon offsets are issued to renewable energy generators that meet carbon offset criteria, the RECs associated with those MWh must be retired to substantiate the creation of offsets in order to avoid disaggregation of the attributes included in a REC. Though RECs do not deliver offset claims, avoided emissions are included in a REC so that voluntary renewable energy sales and RPS programs can deliver these benefits and so that they are not sold off separately, for example in a carbon offset.

To avoid double counting, RECs should not be used as carbon offsets or emissions reductions in production-based GHG Regulations. If RECs are used as emissions reductions in GHG emissions markets, either representing a quantity of emissions reductions or avoided emissions, or representing a quantity of renewable energy generation to reduce a GHG compliance obligation, there is double counting since the same reduction due to renewables will be automatically counted under the regulation (or cap) and then counted and used for compliance again as an emission reduction. This is effectively the same double counting as would occur if carbon offsets were permitted for use in a cap-and-trade program from projects within a capped sector.

4.6 The Effect of GHG Regulation on RECs

In the previous sections, we have explained how GHG Regulation affects renewable generation attributes (Section 3) and how those attributes are accounted for in existing markets using RECs (Subsections 4.2–4.5). In this subsection, we explain how GHG Regulation therefore affects the accounting instruments and claims of renewable energy market participants. It affects claims made by REC owners and suppliers related to delivery and consumption of renewable energy in two primary ways.

4.6.1 Direct Emissions Associated with Imported Power

Broadly speaking, production-based GHG Regulation does not affect the direct emissions of renewable energy generation, as noted in Section 3. It will not affect the claims of REC owners to the direct emissions attribute or Scope 2 GHG accounting by REC purchasers due to the distinction between production and consumption claims (explained in Subsection 4.1). However, where emissions associated with imported power are included in and accounted for under the GHG Regulation, this affects RECs. This is the first primary effect of GHG Regulation on RECs.

State-level GHG Regulation or caps (or regional caps within a larger self-contained grid) may cover both emissions from in-state resources as well as emissions associated with imported power.

Table 4. Example Avoided Emissions Calculations by Renewable Energy Consumers

Activity Information
Location of electricity consumption: Dayton, OH eGRID subregion: RFC West A. Total Electricity Consumption = 100 MWh B. Nebraska Wind RECs Purchased = 95 MWh
Supplemental Report of Avoided Grid Emissions
E. Non-baseload Greenhouse Gas Emission Rate for Nebraska (MRO West) = 1965.21 lbs/MWh**
Avoided Grid Emissions = **84.7 tCO2e** (B * E / 2204.62)

**Available from EPA's eGRID database

As discussed previously, emissions from in-state resources can be directly regulated and measured. In other words, it is the generation or the source that is regulated. In-state zero-emitting renewable energy would not have a compliance obligation but would be recorded as zero-emitting. Again, consumption claims on this in-state generation would not be affected by the regulation. RECs associated with renewable energy located in the state can be consumed inside the state or they can leave the state, in which case that renewable energy is effectively being consumed by customers outside the state.

In contrast, emissions associated with imported power from generation outside the state or regulated region often cannot be directly regulated. The regulator often cannot assign compliance obligations to those sources based on their direct emissions (or assign no compliance obligations to zero-emitting sources). Instead, the state can regulate the delivery or import of power, the power delivered into the state to meet load, at the point of the importer. In this case, the state assigns emissions to imported power, establishing the source of the power that is delivered. The state is reporting to be importing or consuming zero-emissions power, not just generating zero-emissions power. Since the REC instrument delivers the direct emissions of renewable energy and the REC owner has the right to claim consumption of electricity with those direct emissions (e.g. zero), the REC must be imported with the power and used inside the state to avoid double counting. If the power from a renewable energy source located outside the state is delivered to the state and counted as zero-emissions power (or assigned the emissions factor of renewable energy) and the RECs associated with renewable energy located outside the state are not also consumed in the importing state, there could be consumption claims being made on the same renewable energy in different states. The state with GHG Regulations will be importing zero-emissions power, and the REC owner or RPS in a different state will also be claiming consumption of that same MWh of zero-emissions power.

GHG Regulation can therefore result in double counting of renewable energy if RECs are not required to report a zero-emissions renewable energy import. The imports portion of the GHG Regulation is therefore effectively consumption-based. In other words, regulation of emissions associated with imported power is effectively a Scope 2 "claim" being made by the state, rather than a Scope 1 claim, and so it would double count a delivery or Scope 2 claim made through another state's RPS or voluntary program based on the REC. This is similar to but not in conflict with the RPS since the RPS of the importing state can still deliver imported renewable energy to specific customers of regulated suppliers in that state (meaning RECs associated with renewable imports can still be used for the RPS in the importing state).

As an example of this, California, Oregon, the Western Renewable Energy Generation Information System (WREGIS) (the REC Tracking System for the western U.S.), and the western Energy Imbalance Market (EIM), are all, as of publication, evaluating questions around RECs associated with imports into California. Specified renewable imports into California are assigned a specified source emissions factor by the California Air Resources Board (CARB) regardless of whether the RECs associated with that power are also imported with that power.[34] Those RECs can therefore be used in other states. Oregon is considering whether to allow those RECs for compliance in its RPS, and WREGIS has been asked to clarify its certificate definition and whether or not California's policy represents a claim on WREGIS certificates.

RECs are similarly affected anywhere else that GHG Regulation or its emissions accounting protocol assigns emissions to power on the grid rather than measuring emissions at the point of generation.

4.6.2 Avoided Emissions Claims and Demand-side Impact for REC Owners

The second primary effect of GHG Regulations on RECs, and most importantly for the purposes of this guide, is that production-based GHG Regulation automatically counts GHG reductions at regulated units due to renewable energy generation toward compliance and removes the avoided grid emissions (prevents a net change in emissions) associated with renewable energy generation (see Section 3). Avoided grid emissions are an attribute that is conveyed to consumers using RECs in both RPS and voluntary renewable energy markets, so that these markets can have some impact on grid emissions (see Subsection 4.3). Once GHG Regulations for the power sector are put in place, RECs from renewable energy in the regulated sector carry an avoided emissions attribute of zero.

It is important to clarify that the avoided emissions attribute in the REC is not being double counted, removed or disaggregated by production-based GHG Regulations, since there is no separate consumption claim being made and no separate instrument being issued for a delivery or consumption claim. Again, the difference between production and consumption permits both the renewable energy generator and the REC consumer to claim production and use, respectively, of generation that avoids emissions. Rather, the emissions effect of renewable energy is simply counted toward compliance and the value of the attribute (which nevertheless remains exclusive in the REC for consumption) is reduced to zero. This change to the regulatory status of the renewable energy generation and the value of its attributes has important implications for demand in different renewable energy markets.

34. Sec. 95111(a)(4) and 95111(g)(1)(M)(3) of California's Mandatory Reporting Regulation (MRR).