THE GREEN-E PROTOCOL FOR GREENHOUSE GAS EMISSION REDUCTIONS FROM RENEWABLE ENERGY

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The Green-e Protocol for Greenhouse Gas Reductions from Renewable Energy

1. Introduction

This Green-e Greenhouse Gas Protocol for Renewable Energy (Protocol) defines the renewable energy facilities that are eligible for selling Green-e certified greenhouse gas (GHG) reductions.[1] This protocol applies to grid-connected renewable energy projects located in the United States. This document details the eligibility requirements for Green-e certification of GHG emission reductions from renewable energy, the methodology used to calculate GHG emission reductions, and other requirements related to tracking, prevention of double counting and double claiming, and verification. *Appendix A: The Green-e Protocol for GHG Emission Reductions from Renewable Energy - Analysis* provides the background and rationale for the approach embodied in this protocol. This Protocol is governed by the Green-e Governance Board (Board) and will be effective immediately upon the approval of the Board after stakeholder consultations. Verification procedures, marketing and disclosure guidelines, and other programmatic documents are developed by the Green-e Program and will be posted on the Green-e website, www.green-e.org.

2. Intent

The intention of this Protocol is to bring additional credibility to the market for GHG reductions or offsets derived from renewable energy project activities. By establishing clear guidelines, informed by stakeholders, on the greenhouse gas claims that can be made from renewable energy projects, the Protocol will help further the development of the voluntary market for renewable energy. The Protocol addresses the issues of tracking, additionality, double counting and double claiming in order to ensure that the greenhouse gas benefits from eligible renewable energy projects are real, surplus, measurable, verifiable and additional. Due to the characteristics and structures of the U.S. electricity sector, including the availability of publicly reported data on the generation and emission characteristics of individual facilities and electricity grid regions, this Protocol outlines an approach which relies on renewable energy tracking systems. This is done to reduce transactions costs and encourage further development of renewable energy projects while ensuring that the benefits of renewable energy generation are not double counted.

[1] In general, direct GHG emission reduction claims require that the emission reduction activities meet additionality criteria that establish that the emission reduction activity is clearly not business as usual. Meeting such criteria enables reductions from such activities to be used to offset direct GHG emissions from any source.

The additionality of the renewable energy projects eligible under this Protocol is ensured through three additionality tests (all required).

1) Performance & Technology Test: Section 3-A details the renewable electricity generation technologies eligible under this certification program. Each of these technologies exceeds performance benchmarks for the electricity sector as documented in Appendix A. The performance test will be updated every five years.
2) Timing Test: Section 3-B describes the timing test requirements of this protocol.
3) Legal & Regulatory Test: Section 3-C describes the Legal and Regulatory test requirements of this protocol.

3. Additionality Tests

3-A Performance and Technology Test

Only renewable energy facilities, as defined below, that are interconnected to an electricity transmission or distribution system and located in the United States that perform in the top bracket of US electric power sector for electricity generation facility GHG emission rates are eligible under this standard. The performance test defines what are "better than business-as-usual" technologies in the US electricity sector based on GHG emission performance. The specific analysis of the US electricity sector is in Appendix A. Eligible technologies include all renewable electricity generation facilities that use one of the following renewable energy resource types:

List of Eligible Renewable Resources

1) Wind

2) Solar Photovoltaics (PV) and Solar Thermal Electric Power.

3) Hydropower from new[2] generation capacity on a non-impoundment or new generation capacity on an existing impoundment that meets one or more of the following conditions:

a) The hydropower facility is certified by the Low Impact Hydropower Institute; or
b) The facility is a run-of-the-river hydropower facility with a total rated nameplate capacity equal to or less than 5 MW. Multiple turbines will not be counted separately and cannot add up to more than a 5 MW nameplate capacity; or
c) The hydropower facility consists of a turbine in a pipeline or a turbine in an irrigation canal.

The Board will consider on a case-by-case basis new incremental capacity on an existing dam, where the "new" output is equal to or less than 5 megawatts.

[2] See section 3-B for the definition of "new".

Pumped storage hydropower installations are not eligible.

Facilities on new impoundments of water are not eligible.

4) Geothermal. Only geothermal electric generation facilities with no direct emissions of GHGs are eligible under this standard. The Green-e program will investigate methodologies to address geothermal facilities that have direct GHG emissions at a later date.

5) Gaseous biomass from landfill gas methane, wastewater methane and digester methane derived from waste biomass fuels used to generate electricity.

Co-firing of landfill gas methane, wastewater methane, and digester methane derived from waste biomass fuels with non-eligible fuels is permitted if at least one of the following conditions is met.

1) The facility is located in an electric system control area that makes use of a generation tracking system that is fully capable of accurately measuring and reporting the differentiated (eligible technology or fuel and non-eligible technology or fuel) electrical output from the facility; or,

2) The biomass is in a gaseous or liquid state and is separately metered, and there are contracts in place to verify that the portion generated from eligible fuels was converted to electricity. Verification of electricity generation from eligible fuels must be submitted by an independent third party (approved by the Green-e Program) to the Green-e Program; or

3) Facilities that do not meet either of the criteria above may be eligible subject to a case-by-case review by the Green-e Governance Board. The methodology presented to Green-e must demonstrate a scientifically valid methodology to measure and calculate the proportion of the electrical output from the facility that is attributed to the eligible technology or fuel. Some of the criteria that the Board will consider in making a decision are:

    a) Whether the facility was modified to accept the eligible technology or fuel;
    b) Whether there is an independent entity or eligible tracking system involved in verifying or determining the appropriate measurement; and
    c) Whether there is a way to determine and ensure the net electricity increment being claimed as "renewable" can be attributed to the eligible technology or fuel. The Board would prefer a verification methodology that is brought forth by the PMAC, UGPAC or GMAC that could be applied universally.

Only the amount of electricity generated from the eligible renewable fuel is eligible for consideration under this protocol.

Additionally, if the generation facility owner or its agent receives any tradable

environmental attributes or other emission offsets based on the GHG reduction benefits attributed to its fuel usage, the generation facility owner or its agent shall provide sufficient evidence demonstrating that the emissions from flaring are accounted for in a manner that supports a claim of zero net GHG emissions from the electrical generation facility.

6) Ocean, Wave and Tidal Power.

New and emerging technologies not included in the above list will be considered on a case-by-case basis, and will be vetted by the Board in accordance with the governance laws of this Protocol.

3- B TIMING TEST

Facilities that meet all of the following criteria are eligible:

CRS seeks additional stakeholder feedback on item 1 of the Timing Test. Please reference discussion of this issue in the accompanying document summarizing the response to stakeholder comments from the first comment period.

1) The facility became operational, or was repowered as defined below, on or later than January 1, 2000, or alternatively, January 1, 2005;[3]

If the January 1, 2000 date is supported by stakeholders, CRS recommends the addition of the following language.

The facility sold Renewable Energy Certificates, GHG Credits, GHG Reductions, or their equivalent, during the first 3 years of the facility's operations.

2) The facility has been operational for less than 15 years since its online date, or since its date of conversion to a clean-fuel facility if applicable.

A facility qualifies as repowered under the following circumstances.

a) If 80% of the fair market value of the project derives from new generation equipment installed as part of the repowering;
b) A separable improvement to or enhancement of an existing operating facility that was first placed in operation prior to January 1, 2005, such that the proposed incremental generation is contractually available for sale and metered separate from the existing generation at the facility;
c) A co-firing facility that meets all requirements for co-firing outlined in Section 3-A above and began co-firing non-eligible fuels with eligible technology or fuel as defined in 3-A above on or after January 1, 2005;

[3] On a case by case basis, projects with operational dates prior to 2005 may meet the timing test if it can be demonstrated with certainty to the satisfaction of the Green-e Governance Board that the projects were induced by the existence of the voluntary carbon market.

d) A 100 percent switch from a non-eligible fuel to an eligible fuel on or after January 1, 2005;
e) A separately metered landfill gas resource that was not being used to generate electricity prior to January 1, 2005; and/or
f) A fuel cell that began generating electricity on or after January 1, 2005. The hydrogen powering the fuel cell must be derived from a facility that meets the resource eligibility requirements described in Section 3-A above. The renewable resource facility does not need to meet the new date criteria.

Conversion to a clean-fuel facility is defined by part (d) of the repowering criteria in this section, 3-B.

3-C LEGAL AND REGULATORY TEST

The Renewable Facility is not eligible if any of the following conditions are true.

1) It was mandated by a local, state, or federal government agency or was required under any legal requirement or settlement.
2) It was built as a least-cost facility under an Integrated Resource Planning process or other regulatory or legal process by which the renewable energy facility was determined to be least-cost when compared with non-renewable energy facilities. If a marketer or generator can demonstrate to the Green-e Governance Board that the revenue from the sale of RECs or GHG credits was a determining factor in the facility being determined the least-cost option the facility is eligible for certified GHG reductions.
3) It is located within a state, region or other legal boundary where a legally binding GHG cap has been set for the electricity sector and no GHG allowances are allocated to the facility or no other mechanism exists to credit greenhouse gas emissions reductions benefits to the facility.[4] If a facility becomes ineligible due to regulatory changes, the Protocol will be updated according to the process described in Section 6, at which time the reductions from the facility will no longer qualify, regardless of the crediting period.
4) If the owner of a renewable generation facility is reporting direct greenhouse gas emissions in a legally binding cap-and-trade program, this constitutes a claim of the GHG emission attributes of the renewable generation. Therefore, renewable energy facilities that are owned by entities participating in a legally binding greenhouse gas cap-and-trade program are ineligible. Green-e may grant exceptions on a case-by-case basis if the cap-and-trade program has an accounting mechanism that assures that the GHG emissions benefits of renewable electricity and/or RECs are not double counted or double claimed.

[4] If allowances are allocated to the facility, the allowances must be retired on behalf of the purchaser in order for the facility to be eligible under this protocol.

A facility that sells a share of its RECs in compliance markets is eligible for offsets from the remaining share of its generation provided that it meets all requirements of this protocol.

4. Additional Requirements

4-A Vintage

Only GHG reductions resulting from generation of renewable energy that occurred on January 1, 2007 or later are eligible. In addition, a Green-e certified product may include only GHG reductions from renewable energy generation that occurred in the calendar year in which the product is sold, the first three months of the following calendar year, or the last six months of the prior calendar year.

4-B Tracking

Ownership of GHG emission reductions will be documented, in part, though the use of electronic tracking systems for Renewable Energy Certificates. Eligible tracking systems are ERCOT, NEGIS, PJM GATS, WREGIS, and MRETS. The Green-e Program will update this list as new tracking systems are developed. Generators wishing to participate in this program must have all generation reported to an eligible tracking system by the following dates:

Immediately upon inclusion of GHG reductions in a product certified under this standard

- PJM GATS
- NEGIS
- ERCOT

By January 1, 2008

- WREGIS
- MRETS

If generators are not eligible to participate in an eligible tracking system, the Green-e Program may consider eligibility on a case-by-case basis.

4-C RECs

Certificates (RECs) issued by eligible electronic tracking systems will be used to track the ownership of GHG emission reductions from eligible renewable energy projects. In order for RECs to be eligible under this program, they must contain all the greenhouse gas emission reduction benefits from the generation of non-emitting grid-connected electricity. When a GHG reduction claim is made on the basis of a REC, the REC must be retired in the tracking system (or reserved in NEGIS or PJM GATS) and cannot be resold or claimed for any other purpose or by any other party. For each generator from which GHG emission reductions are included in a GHG reduction product, the generator owner or its authorized representative must sign a legally binding attestation that they

understand and agree to comply with the above requirements.

Eligible RECs can be used once and only once; making a claim (e.g. "we're buying wind power") is one example of a "use" that results in retirement. GHG reduction claims related to renewable energy or RECs (or the renewable or environmental attributes incorporated in that REC) that can be legitimately claimed by another party are not eligible under this protocol.

Examples of prohibited double uses include, but are not limited to:

1) Where another party has a conflicting contract for the RECs or the renewable electricity;
2) The REC or the electricity from which the RECs are derived is being used simultaneously to meet a local, state, or federal renewable energy mandate or other legal requirement.
3) The renewable electricity or the REC(s) derived from it are being used in calculating another entity's product or portfolio resource mix for the purposes of marketing or regulatory disclosure of GHG emissions. Exceptions to this criterion are allowed if the disclosure is legally required but not associated with GHG claims. Examples of such disclosures include mandatory reporting, including existing generation facility mandatory reporting to FERC, existing required generator emissions reporting to US EPA, and state-level power source disclosure program reporting that reports sources of generation without GHG performance claims.
4) Use or claim of one or more of the GHG attributes of the renewable energy or REC by another party.

When a utility is involved in a REC transaction, either as a generator, a purchaser of RECs, or a purchaser of the commodity electricity from which the RECs have been derived, the local utility commissions in the states where the electricity was generated and where the electricity is sold must be notified of the transactions.

4-D GHG Registries

If the owner of the eligible facility participates in a voluntary or mandatory GHG registry, then the renewable energy facilities can only participate in this program if the generator owner reports the electricity generated at the facility as null power to the registry for each ton of GHG emission reductions attributable to its renewable energy facilities, sold in the voluntary market and certified by the Green-e program. Null power should be assigned system average emission characteristics. If the registry is voluntary and not part of a legally binding voluntary or regulatory cap and trade regime or any other legally binding regime whose primary intent is to require GHG emissions reductions, and if the registry protocol does not allow for this adjustment under its existing protocols, the Green-e Protocol requires that generation owners provide proof of informing the relevant registry(ies) of the adjustments to their renewable energy generation as part of annual verification under the Green-e Program.

5. Calculation of Emission Reductions from Renewable Energy Generation

The emission reductions derived from eligible renewable resources will be calculated using a regional Baseline Emission Rate (BER). For baseload technologies (biomass, geothermal, ocean and hydro), the BER reflects the emission rates of the planned capacity additions in the United States (build margin), and for non-baseload technologies (solar, wind, wave and tidal), the BER is an average of the emissions rates of the build margin and the currently operating grid connected electricity generation facilities (operating margin). Baseload and nonbaseload BERs are developed for each NERC region (see Appendix B).

The operating margin (OM) is the *non-baseload output emission rate* calculated by the US EPA for each of the ten NERC regions.[5] The build margin (BM) is based on information from the U.S. Energy Information Administration which identifies the electric generation facilities added to the US electricity sector between 2000 and 2005 and the electric generation facilities planned for construction between 2006 and 2010.[6] The BER will be updated every three years and posted to the Green-e website or more frequently if the Green-e Governance Board determines that significant changes in the electricity sector warrant a revision.

Biomass, Geothermal, Ocean & Hydro
Baseline emission rate = Build Margin

Solar, Wind, Tidal, and Wave:
Baseline emission rate = Combined Margin

The operating, build and combined margins for the NERC regions are listed below.

Region	Operating margin[7] (lbs/MWh)	Build Margin (lbs/MWh)	Combined Margin (lbs/MWh)
Alaska Systems Coordinating Council (ASCC)	1,437	1,541	1,489
Electric Reliability Council of Texas (ERCOT)	1,335	1,306	1,320
Florida Reliability Coordinating Council (FRCC)	1,475	1,109	1,292
Hawaiian Islands Coordinating Council (HICC)	1,698	1,456	1,577
Midwest Reliability Organization (MRO)	2,192	1,433	1,813
Northeast Power Coordinating Council (NPCC)	1,539	1,142	1,341
ReliabilityFirst Corporation			

[5] US EPA eGRID 2004 update.
[6] The details of this analysis are in *Appendix A: Green-e Protocol for GHG Emission Reductions from Renewable Energy- Analysis*
[7] Non-baseload output emission rate from US EPA eGRID, *op cit*.

(RFC)	1,987	1,083	1,535
SERC Reliability Corporation (SERC)	1,842	1,306	1,574
Southwest Power Pool, Inc. (SPP)	1,659	1,034	1,346
Western Electricity Coordinating Council (WECC)	1,411	1,179	1,295

The GHG Reductions from a renewable energy project are calculated by multiplying the renewable energy generation (MWh) with the relevant BER.

EXAMPLE
For example a Solar facility located in the HICC would use 1577 lbs/MWh as the BER. Generating 5 MWh would result in a reduction of 7885 lbs. (5 MWh * 1577 lbs/MWh).

6. Updates to Standard

If policies enacted on a state, regional or federal level impact the GHG emission benefits from renewable energy, this standard will be updated to reflect such changes. For any substantial changes to this protocol, the Green-e Program commits that:

- Stakeholders will be solicited in advance of Green-e Governance Board meetings for input on substantive changes to the document; and
- At least one year of notice (following the date of announcement of Board approval) will be granted to Green-e Program participants before the substantive changes go into effect, unless a more timely change is necessary to respond to a significant and imminent problem threatening the integrity of this protocol.

7. Program Management

This Protocol defines the renewable energy projects from which GHG reductions may be sourced and included in certified GHG emission reduction products under the Green-e GHG Emission Reduction Certification Program.[8] A GHG emission reduction marketer that wishes to participate in the program is required to sign a contract with the Center for Resource Solutions (CRS). Through the contract, the marketer commits to comply with the Program Standard and to follow the verification procedures and code of conduct as established by CRS.

Current Green-e Certified Renewable Energy products (either renewable energy certificates, renewable energy sold by competitive energy suppliers, or renewable energy sold through Green-e certified utility green pricing programs) are not affected by this protocol. Sellers of such products are prohibited from making direct GHG emission reduction claims for their certified products unless the sources of supply for those products meet the requirements of this protocol and those products become certified under the Green-e GHG Emission Reduction Product Certification Program.

[8] Following stakeholder and Green-e Governance Board approval.

8. Definitions

DEFINITIONS:

Additionality – A criterion applied to GHG projects stipulating that project-based GHG reductions may only be quantified if the project or project activity "would not have happened anyway" – i.e., that the project or project activity (or the same technologies or practices it employs) would not have been implemented in the project baseline scenario and/or that project activity emissions are lower than baseline emissions.

Baseline Emissions – An estimate of GHG emissions, removals, or storage associated with a baseline scenario or derived using a performance standard.

Baseline Scenario – A hypothetical description of what would most likely have occurred in the absence of any considerations about climate change.

Business-as-Usual – A practice typically implemented by a given sector or industry, most frequently because it is the most cost effective option available to produce the service or good or to dispose of related waste products.

Common Practice – The predominant technology(ies) implemented or practice(s) undertaken in a particular region or sector.

Crediting Period – The time period over which baseline emission estimates, derived from a baseline scenario or performance standard, are considered valid for the purpose of quantifying GHG emission reductions. Once the crediting period for the baseline scenario expires, either no further GHG reductions are recognized for the project or project activity, or a new (revised) baseline scenario or performance standard must be identified.

Double Claiming – A situation prohibited under the Green-e Protocol for GHG Emission Reductions from Renewable Energy in which more than one end-user claims the same GHG emission reduction benefits.

Double Sale – A situation prohibited under the Green-e Protocol for GHG Emission Reductions from Renewable Energy in which the same GHG emission reduction is sold to more than one party, resulting in a situation of double claiming or double counting.

Electric Reliability Council of Texas (ERCOT) - REC tracking system that covers most of Texas.

Emission Allowance Program – The provisions of a GHG Cap and Trade Program governing all aspects of the determination of GHG emission limits, distribution of emission allowances, and oversight of the implementation of program requirements.

Green-e Power Marketers Advisory Committee (PMAC) - The Power Marketers Advisory Committee is composed of representatives of the Green-e Renewable Energy Certification Program's participating REC and competitive electricity marketers. The Chair of the PMAC is elected by a simple majority vote by the members of the PMAC. The Chair will sit on the Green-e Governance Board as a non-voting member, and has the responsibility of representing all marketers participating in the PMAC.

Green-e Utility Green Pricing Advisory Committee (UGPAC) - The Utility Green Pricing Advisory Committee is composed of representatives of the Green-e Renewable Energy Certification Program's participating utilities. The Chair of the UGPAC is elected by a simple majority vote by the members of the UGPAC. The Chair sits on the Green-e Governance Board as a non-voting member, and has the responsibility of representing all UGPAC members.

Green-e GHG Marketers Committee (GMAC) - The Greenhouse Gas Reduction Marketers Advisory Group will be formed after the Green-e GHG Certification Program begins product certifications. The GMAC will be composed of representatives of the program's participant marketers. The Chair of the GMAC is elected by a simple majority vote by the members of the GMAC. The Chair will sit on the Green-e Governance Board as a non-voting member, and has the responsibility of representing all marketers participating in the GMAC.

Green-e GHG Certification Program – The Green-e GHG Certification Program will certify GHG Reduction products sold by GHG Marketers on the retail market.

Green-e Renewable Energy Certification Program – The existing Green-e Renewable Energy Certification program certifies renewable energy products sold to customers on the wholesale and retail markets.

Green-e Greenhouse Gas Protocol for Renewable Energy (Green-e Protocol) - The Green-e Protocol determines the eligibility of renewable facilities in the United States to sell GHG reductions through the Green-e GHG Certification Program.

Green-e GHG Subcommittee – A subcommittee of the Green-e Governance Board with primary responsibility for the independent oversight of the Green-e GHG Emission Certification Program. Reviews stakeholder comments on proposed revisions to the Green-e Program and provides input on such revisions to the Green-e Governance Board.

Green-e Governance Board – An independent body with primary responsibility for the oversight of all Green-e Programs.

Greenhouse Gas (GHG) – Gases that trap heat in the atmosphere and are emitted through natural processes and human activities. These are defined as the six gases included in the Kyoto Protocol: CO_2, CH_4, N_2O, SF_6, CFCs and HFCs.

GHG Emission Reduction – Reductions, removals or the permanent storage of greenhouse gases produced by projects or project activities that meet the requirement of real, verifiable, permanent and additional. They may not be claimed or registered by more than one end-user. Measured in metric tons of carbon dioxide equivalent.

GHG Registry – An organization that develops and manages a common greenhouse gas emissions reporting system for its members. Members report their GHG emissions by following accounting protocols and verification procedures developed by the GHG registry. Participation in a GHG Registry is voluntary. Examples include: The California Climate Action Registry (CCAR), The Climate Registry (national) and the Environmental Protection Agency Climate Leaders Program.

Leakage – An indirect and/or unanticipated decrease or increase in GHG emission reductions from a project outside of the project's accounting boundary as a result of the project.

Midwest Renewable Energy Tracking System (M-RETS) - REC tracking system that covers all or most of Iowa, Manitoba, Minnesota, Montana, North Dakota, South Dakota, and Wisconsin.

New England Generation Information System (NEGIS) - REC tracking system that covers Connecticut, Maine, Massachusetts, New Hampshire, Vermont, Rhode Island.

Null Power – Null power is the power generated by a renewable energy facility but for which the renewable and environmental benefits have been sold off. As such null power is functionally identical to system average power in the region in which it is generated.

Participating GHG Marketers – GHG Marketers that seek and earn certification under the Green-e GHG Certification Program of GHG emission reduction products that they transfer or retire through sales to customers. Participating GHG Marketers must adhere to disclosure, contractual and marketing requirements contained in the Green-e GHG Emission Reduction Product Program documents.

PJM-Generation Attribute Tracking System (PJM-GATS) - REC tracking system that covers all or most of Delaware, Indiana, Illinois, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

Real – A requirement for GHG emission reductions under this program. Entails that quantified GHG emission reductions represent actual emission reductions and are not artifacts of incomplete or technically flawed accounting. In the case of project- based GHG emission reductions, "real" emission reductions must meet the additionality criteria contained in this document.

Regulatory GHG Cap and Trade Emission Allowance Program – An administrative approach used to control GHG emissions whereby a central authority – either a

government agency or group of government agencies -- sets a limit or cap on the amount of GHGs that can be emitted within a defined geographic boundary. Such programs include the allocation to entities of emission allowances that represent the right to emit a specific quantity of GHGs. Entities may trade emission allowances.

Renewable Energy Certificate (REC) – The property rights to the environmental attributes from generating electricity from renewable energy sources. These certificates may be sold and traded and the owner of the REC can legally claim to have purchased renewable energy. RECs incentivize carbon-neutral renewable energy by providing a source of revenue to electricity generated from renewable sources. A renewable energy provider is credited with one REC for every 1,000 kWh of electricity it produces.

Tracking System - A REC Tracking System refers to a system that issues certificates of generation, and tracks such certificates until their ultimate retirement. One certificate is issued for every MWh of generation in the regional domain of the certificate tracking system. Generation data used is generally based on financial settlements data from regional system operators or balancing authorities. Certificates are then deposited into the certificate owner's "account;" the first point of deposit is the generator. The certificates carry information about the environmental and other attributes of the generation. Once issued, certificates can be traded and transferred easily regardless of the actual energy flow. Both the buyer and seller must confirm the transaction (e.g. quantity and whether bundled or unbundled with energy) before it is officially entered into the system. Certificate-based systems typically retire certificates when they are sold to retail marketers or customers (depending upon the system), used to meet a regulatory requirement such as an RPS, or are exported out of the system. In this way, certificate systems are able to track all certificates generated and "used" to ensure that no one certificate is "used" more than once (double-counting). Typically, a certificate is "used" when it is noted on a disclosure label or used to meet retail load, used for a regulatory purpose (such as an RPS), exported out of the system, or otherwise retired (e.g. if it expires per PUC/ISO rules). Examples of tracking systems in the US include: ERCOT, M-RETS, NEGIS, PJM-GATS & WREGIS.

Voluntary GHG Cap and Trade Emission Allowance Program - A GHG reporting and trading system within which entities make a legally binding commitment to meet certain GHG emission reduction targets. Such a system may include the allocation to entities of emission allowances that represent the right to emit a specific quantity of GHGs. Entities may trade emission allowances.

Western Renewable Energy Generation Information System (WREGIS) – REC tracking system that covers Arizona, California, Colorado, Idaho, Nevada, Oregon, Utah, Washington, Wyoming, some of New Mexico and Montana and parts of Texas and South Dakota as well Baja California (Mexico) and British Columbia and Alberta.

Appendix A: Green-e Protocol for GHG Emission Reductions from Renewable Energy - Analysis

This appendix provides justification for the methodologies for assessing additionality and for quantifying and verifying GHG emission reductions from renewable energy contained in the *Green-e Greenhouse Gas Protocol for Emission Reductions from Renewable Energy* (Green-e RE Protocol).

This justification uses as its foundation the accounting guidelines developed by the World Resources Institute in the following documents: *The GHG Protocol for Project Accounting* (WRI Project Protocol) and *The GHG Protocol: Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects* (WRI RE Protocol).[9]

The WRI Project Protocol is the most internationally recognized reference for guidance on establishing credible accounting practices around GHG emission reductions. The WRI Project Protocol outlines six steps in project accounting.

1. Defining the GHG assessment boundary - determining what sources will be considered in the accounting of GHG emissions.
2. Selecting a baseline procedure - choosing whether to use a project-specific standard or a performance standard when estimating baseline emissions.
3. Identifying baseline candidates - selecting technologies or practices against which to compare the project activity under consideration.
4. Estimating baseline emissions – using baseline candidates to estimate a baseline emissions scenario against which to compare the emissions rated from the project activity.
5. Monitoring and quantifying GHG reductions.
6. Reporting GHG reductions.

These steps are followed in the Green-e RE Protocol, and more fully elaborated in this analysis document. In addition to these steps, this analysis also contains a step for establishing the additionality of a project activity—that is, for establishing that the project activity and associated emission reductions are in practice beyond the business as usual scenario.

1. Approach

WRI Project Protocol Guidance: There are two credible options when establishing a baseline scenario against which to compare project-activity-related GHG emissions: a project-specific procedure where a project-specific baseline is set through an analysis of the project activity and its alternatives, or a performance standard, where baseline emissions are set by conducting an analysis of all baseline candidates, and constructing a

[9] Both of these documents can be found at ww.ghgprotocol.org. The WRI recommendations referenced in this Appendix represent the interpretation of CRS staff.

baseline rate out of that analysis. The baseline emission rates determined through this second method require periodic updating, but can be used in evaluating any number of similar project activities. The WRI Project Protocol acknowledges both of these procedures, makes no recommendation on which to use, and recognizes that the decision to use one or the other may be made on administrative grounds.[10]

Green-e Protocol for Greenhouse Gas Emission Reductions from Renewable Energy (Green-e RE Protocol): Due to the characteristics and structures of the U.S. electricity sector, including existing data collection and verification databases and tracking systems, the Green-e RE Protocol outlines an approach primarily relying on renewable energy tracking systems and publicly reported information instead of project-specific verification procedures. The Protocol requires the performance standard method to ensure an accurate and credible baseline determination, and to ease the long-term administrative burden on project developers. This approach reduces transactions costs and encourages further development of renewable energy projects while still ensuring that the benefits of renewable energy generation are additional and are not double counted.

2. Defining Boundary

WRI Project Protocol Guidance: Defining the boundary includes identifying the *project activity* and its *primary* and *secondary effects* as well as evaluating the significance of any secondary effects. Primary effects are the intended results of the project activity. Secondary effects are unintended changes in GHG emissions resulting from the project activity either as one-time phenomenon or upstream and downstream from the project.

Green-e RE Protocol: The project activity for a renewable energy project is the generation of grid-connected renewable electricity. The primary effect is a reduction in combustion emissions from grid-connected electricity generation.[11] Secondary effects

[10]WRI. *The GHG Protocol for Project Accounting*. November 2005. p. 19

[11] This reduction is a result of two principal effects: 1) a reduction because the renewable facility capacity is built instead of an emitting facility (estimated with the Build Margin) and 2) a reduction of emissions from power plants currently operating on the grid (estimated with the Operating Margin). These two effects occur in the electricity sector in the absence of a cap on GHG emissions or any other policy that distributes allowances or allocates emissions credits to power generation facilities. It has been argued that in a system where electricity demand is declining the #2 effect (see above) is exclusively a result of one or more fossil fuel facilities on the grid reducing their output (MWh) and GHG emissions, and the emission reductions therefore 'belong' with the fossil fuel facility. This argument assumes that fossil fuel emitters will be retroactively allocated credits for reducing emissions even if the reduction is not a result of increased efficiency but due to its generation being replaced by other generation. Since electricity demand has been increasing steadily in the United States and there is no cap-and-trade or similar policy currently in place, it is reasonable to state that emission reductions occurring from renewable energy facility generation are not being double counted by other facilities that have done nothing to cause the reductions (Section 3.C, 4.C and 4.D of the Protocol detail the eligibility claims of emission reductions from facilities that overlap with voluntary cap-and-trade regimes, GHG registries, and other institutions that have the potential for causing double claims to the emission reductions). It should also be noted that existing protocols for GHG reductions from renewable energy generation such as the Kyoto Protocol's Clean Development

include upstream GHG emissions associated with the manufacturing, construction and installation of the renewable energy facility.

No fuels are used to directly generate electricity from wind, solar photovoltaics (PV), concentrated solar power[12], LIHI hydro, ocean, wave and tidal energy. Therefore, only secondary emissions are associated with these technologies, and those emissions result from the manufacturing, construction, and deconstruction of the power generation facilities. Since the emissions associated with manufacturing, construction and deconstruction of these facilities are minute in comparison to the life-cycle emissions of fossil fuel plants[13], they are not included in this analysis. Any effects on methane emission from the filling of reservoirs for hydro installations are not relevant because electricity generation from new impoundments of water is not eligible under this protocol. Only electricity generated from new turbines on existing impoundments is eligible.

These zero-emission assumptions do not apply to electricity generated from biomass, with a few exceptions. In general, the production of biomass for use as a fuel has substantial associated secondary effects, including the emissions generated from the growing, harvesting, and processing of the fuel.

The exception to this is gaseous biomass fuel generated from waste, such as wastewater digester gas and captured landfill gas. These are considered as having negligible secondary effects, since the fuel is a byproduct of the waste and those emissions generated in the creation of the fuel would have happened anyway.

3. Selecting Baseline Procedure

WRI RE Protocol Guidance: The WRI RE Protocol has guidance on whether to choose a performance standard or a project specific procedure for estimating baseline emission rates. If several projects similar in nature are undertaken, and confidentiality concerns make it difficult to obtain economic and financial data for each project, a performance standard procedure may be preferred. If there is only limited information on the emission rates of baseline technologies a project standard procedure may be preferred.

Mechanism, the CDM Gold Standard as well as renewable electricity projects initiated by the Climate Trust in the U.S. define the boundary of renewable energy projects and their effects in a manner similar to this Protocol.

[12] There are some concentrating solar power installations that cofire with fossil fuels. Only the solar portion of the electricity produced by these systems would be considered within the project boundary. WREGIS, which covers all or portions of the 14 Western US states, is the renewable energy tracking system in place where these facilities exist or are likely to exist. WREGIS requires separate reporting of solar and non-solar generation for such facilities, and WREGIS separately issues certificates for the solar portion. See WREGIS operating rules at: http://www.wregis.org/content/blogcategory/26/47/.

[13] Paul J. Meier, "Life-Cycle Assessment of Electricity Generation Systems and Applications for Climate Change Policy Analysis", Fusion Technology Institute, University of Wisconsin, August 2002. UWFDM-1181.

Green-e RE Protocol: The electricity sector in the United States is characterized by a limited number of technologies with known GHG emission rates. The United States Environmental Protection Agency publishes emission rates for most power plants in the United States and compiles regional emissions averages. In general, the financing structure of electricity projects in the United States is not transparent due to confidentiality concerns. As such, the performance standard procedure for estimating baseline emissions is appropriate for this Protocol.

4. Identifying Baseline Candidates

WRI RE Protocol Guidance: In order to determine the baseline candidates, the following procedures are required:[14]

- Define product or service provided by project activity;
- Identify types of baseline candidates; and
- Define and justify geographic and temporal range.

Product or service refers to whether the renewable energy facilities are baseload or load-following electric generation plants. Baseload plants serve load at all or nearly all times and operate at a high capacity factor, while load-following plants only serve load when demand for electricity is at its highest (on a daily or seasonal basis). Accordingly, new baseload plants replace generation from other baseload plants as well as load-following plants while load-following plants only replace generation from other load-following plants.[15] Non-firm intermittent sources are classified as baseload for purposes of defining the baseline candidates because they are not dispatchable and generally do not follow load.[16]

The geographic and temporal boundaries should be set in a manner that allows for a "sufficient number and diversity of baseline candidates to allow a credible analysis and estimate of baseline emissions."[17] Guidance on the temporal boundary includes an analysis of plants being built within the previous 5-7 years, and there is a preference for knowable facts, such as what has been built instead of what might be built in the future. If future construction is included the estimation should be based upon "published government or company plans."[18] Similarly, the geographic area could be "expanded to include other areas that exhibit circumstances similar to those surrounding the project activity."[19]

Green-e RE Protocol:
Define product: Load-following or baseload?

[14] A couple of additional requirements are listed but these are either overlapping with the listed criteria or not relevant for the performance standard procedure (p. 39).
[15] *WRI RE Protocol*: 37
[16] *WRI RE Protocol*: 38
[17] *WRI RE Protocol*: 41
[18] *WRI RE Protocol*: 43
[19] *WRI RE Protocol*: 41

The general resource types that are eligible under the Green-e RE Protocol are: wind, solar, hydro, geothermal, ocean, wave, tidal and gaseous biomass derived from waste fuels. Since wind, tidal, wave and solar technologies generate electricity on an intermittent basis (i.e. when the sun shines or the wind blows), they are categorized as non-firm intermittent resources and can therefore not be categorized as load-following per the WRI guidance. Hydro, geothermal, ocean and biomass resources eligible under the Protocol all operate at high capacity factors and are baseload plants. Accordingly, the baseline candidates used for this protocol are all electric generating plants, including both baseload and load-following plants.

Geographic area:
Since there are regional differences in generation and construction patterns in the US electricity sector, regional boundaries provide a more accurate representation of the effects of generating renewable energy. While NERC regions do not necessarily represent the exact boundaries of power flows and vary dramatically in size, they are preferable to any smaller regions (such as sub-NERC regions or state lines) since the publicly available data generally does not account for the substantial impact of power imports/exports.

Temporal range:
The analysis will focus on the last 6 years of available data (2000-2005) for electricity generation plants built in the US electricity sector. The six year period follows the recommendation from the WRI RE Protocol. The sample represents more than 20% of the total generating capacity in the US sector.[20] The WRI RE Protocol recommends that future planned construction should be included in the analysis if there is a significant shift in what is being built versus what has been built in the preceding period. Table 1, below, compares the plants built between 2000 and 2005 with the planned plants in 2006-2010 for the US as a whole.

Table 1. New (2000-2005) and Planned U.S. Generation Capacity (2006-2010) by Resource Type.[21]

Resource Type	2000-2005[22]	2006-2010[23]
Coal	1%	30%
Oil	2%	2%
Gas	95%	62%
Other Fossil	<1%	<1%
Nuclear	0%	0%
Hydro	<1%	<1%
Renewables	3%	7%

[20] The *WRI Protocol* recommends that the sample represents at least 20% of existing capacity.
[21] Energy Information Administration: *Planned Capacity Additions,* http://www.eia.doe.gov/cneaf/electricity/epa/epat2p4.html. This is the most recent data available. Updated information will be published in October 2007. It is important to note that this table is based on nameplate capacity, not energy. Technologies with lower capacity factors (such as wind and some solar technologies) would contribute relatively less on an energy basis. Also, the category "renewables" includes many technologies and fuels not eligible under the Green-e RE protocol, such as wood, black liquor, other wood waste, municipal solid waste, sludge waste, tires, agriculture byproducts, other biomass.
[22] Totals approximate due to rounding.
[23] Totals approximate due to rounding.

Total Capacity (MW)	248,230 MW	94,429 MW
Average Emission Factor (lbs. CO_2/MWh)[24]	1175	1383

The table shows that a significant shift is occurring from natural gas generation to more coal generation. This is reflected in the national weighted average emission factor, which is significantly higher for the planned construction than for the recently built plants, even though there is a higher proportion of non-emitting resources in the planned construction mix. It is therefore reasonable to include the next five years of planned construction in our temporal range to better approximate the emissions from the baseline candidates.

5. Estimating the Build Margin Emission Factor

WRI RE Protocol Guidance: The build margin (BM) represents the emission reduction that occurred because the renewable generation was built instead of the business-as-usual plant. The requirements for calculating the baseline are to use already known and publicly available data on GHG emission rates and then calculate the emission rate for each baseline candidate. Finally, a weighted average of the different emission rates is calculated and this represents the build margin.

Green-e RE Protocol: The product being produced in the electricity sector is watt hours and it follows that the appropriate metric is emissions (lbs CO_2) per MWh.

The eGRID database provides output emission rates for four different kinds of generation: Gas, Fossil, Coal and Oil. These emission rates are shown in Table 2.

Table 2: Annual CO_2 Emission Rates (lb/MWh)[25]

	ASCC	ERCOT	FRCC	HICC	MRO	NPCC	RFC	SERC	SPP	WECC	**National**
Coal	1703	2289	1874	1876	2358	2075	2080	2074	2296	2249	2087
Oil	1681	2052	1327	1709	2325	1730	91	1404	538	2442	1530
Gas	1329	1156	1096	N/A	1348	1180	1078	1225	1168	1212	1199
Other Fossil Fuels	1431	1673	1447	1737	2335	1573	1914	1961	2008	1804	1788

Based on these emission rates and the capacity and construction patterns shown in Table 1, the national Build Margin is calculated as 1232 lbs. CO_2/MWh. This represents the average emission rate for all the generation capacity added between 2000 and 2005 and planned for construction between 2006 and 2010.

6. Estimating the Operating Margin Emission Factor

WRI RE Protocol Guidance: The operating margin (OM) estimates the effect of backing down other generating facilities when the renewable energy facility is operating

[24] Average national emission factors are weighted by fuel type.
[25] US EPA: eGRID2006 Version 2.1, April 2007 (http://www.epa.gov/cleanenergy/egrid/index.htm)

and generating power. WRI RE Protocol lists four approaches to estimate the operating margin: average load-following, average marginal, marginal historic and marginal modeled. The complexity of the different methods and their applicability varies.

Green-e RE Protocol: In the most recent release of data from the US EPA's eGRID database, a *non-baseload output emission rate* was calculated. The emission rates produced are:

> *"… derived from plant level data and supplement, rather than replace, the fossil fuel output emissions rates, which are sometimes used as a rough estimate to determine how much emissions could be avoided if energy efficiency and/or renewable energy displaces fossil fuel generation. These non-baseload output emission rates would somewhat improve this rough estimate by factoring out baseload generation, which is generally unaffected by measures that affect marginal generation. The plant level capacity factor is used a* [sic] *surrogate for determining how much non-baseload generation and emissions occur at each facility."*[26]

The NERC region non-baseload output emission rate will be used as the operating margin for the calculation of emission reductions from the generation of renewable energy. The national non-baseload output emission rate for 2004, the most recent year for which such data is available, was 1,714 lbs/MWh.

7. Estimating Baseline Emissions

WRI RE Protocol Guidance: In order to calculate the emission reductions associated with a specific project activity, a baseline emission rate is calculated. The baseline emission rate is a combination of the build margin and operating margin. Depending on the characteristics of the project activity, different weights are assigned to the margins. The WRI RE Protocol divided projects into four categories and has specific recommendations for each type.

Green-e RE Protocol: Table 3 illustrates the different types of projects covered by the Green-e RE Protocol and their categorization according to the WRI RE Protocol.

Table 3 [27]

PROJECT ACTIVITY PROVIDES	FIRM POWER	NON-FIRM POWER
On-peak, baseload, or intermittent generation	Biomass, Geothermal, Hydro, Ocean	Solar, Wind, Wave and Tidal
Exclusively off-peak generation	n/a	n/a

To calculate emission reductions from firm power activities such as biomass, geothermal and hydro facilities, the WRI RE Protocol recommends using the Build Margin exclusively. For non-firm power activities, such as solar and wind, one of the

[26] US EPA 2007: The Emission and Generation Resource Integrated Database for 2006 (eGRID2006) Technical Support Document: 13

[27] Adapted from Table 5.1 on page 33 of the WRI RE Protocol.

recommendations is to weight the build margin and operating margin equally. The resulting baseline emission rates are:

Biomass, Geothermal, Hydro, Ocean:

Baseline emission rate = NERC Region Build Margin

Solar, Wind, Wave and Tidal:

Baseline emission rate = NERC Region Build Margin * 0.5 +
NERC Region Operating Margin * 0.5

8. Assessing Additionality

The purpose of these additionality tests is to prove that emissions reductions credited to a project activity are, in practice, reductions beyond business as usual, and that GHG emissions reductions are a primary driver behind the implementation of the project activity.

WRI Project Protocol Guidance: The WRI Protocol lists five additionality tests that can be applied to projects in order to ascertain whether the project is truly additional. No judgment is made as to how many of the tests have to be met in order to qualify as additional. This is seen as a policy decision to be made by GHG programs so "the Project Protocol does not require any of these tests."[28] Other literature lists several other tests not mentioned in the WRI Protocol, including barriers test, performance benchmark test, and project in, project out.[29] The Green-e GHG Standard combines these into a list of seven additionality tests. These are listed in Tables 1 and 2 of the Green-e GHG Emission Reduction Product Standard.[30]

Green-e RE Protocol: This Green-e RE Protocol seeks to ensure that the GHG emission reductions certified from renewable energy projects are additional to a business as usual scenario. This is determined through the application of three additionality tests:

The Legal, Regulatory or Institutional Test
The Timing Test
The Performance & Technology Test

Legal, Regulatory or Institutional Test
WRI Project Protocol Guidance: The WRI Project Protocol makes no determination of how this test should be formulated. However, the protocol states that the purpose of this

[28] *WRI Protocol*, p. 20
[29] See Trexler, M.C., Broekhoff, D.J., and Kosloff, L.H. "A Statistically Driven Approach to Offset-Based GHG Additionality Determinations: What Can We Learn," *Sustainable Development Law and Policy*, Winter 2006, vol. VI, issue 2, 30-40. Al.
[30] This standard can be found at http://www.green-e.org/getcert_ghg_standard.shtml

test is to ensure that a project activity reduces GHG emissions below "the level required (or effectively required) by any official policies, regulations, guidance, or industry standard."[31]

Definition from the Green-e GHG Product Standard: The GHG project must reduce GHG emissions below the level required by official policy, regulations, guidance or industry standards. This requirement also applies in the case where official policy, regulations, guidance or industry standards do not specifically address GHG emissions.[32] *If the project does not reduce emissions beyond these levels, the assumption is that the only real reason for pursuing the project is compliance; the project or project activities, therefore, are not additional.* GHG emission reductions (from projects or parts of projects) that are not credited towards or used for regulatory or legal requirements are eligible under this standard as long as they meet all other requirements of the standard. Projects initiated to meet a regulatory target must demonstrate an emission reduction capacity added beyond that required by law in order to qualify.

Green-e RE Protocol: This test is required to ensure that the project activity is not built in response to legal requirements. The underlying concept is that if the GHG emission reductions were achieved in response to another requirement, then the reductions are being credited towards that requirement, and any other crediting would be considered double counting. The legal requirements that apply in this test include, but are not limited to, using the generation for renewable portfolio standards, as a result of legal settlements or other mandates imposed upon the facility owner or the power purchaser.

Timing Test

WRI Project Protocol Guidance: This test should be designed such that only projects initiated after a fixed, pre-established date can be considered additional. However, the WRI Project Protocol indicates that projects that meet this test usually are required to meet other tests as well, i.e., that this test cannot stand alone.

Definition from the Green-e GHG Product Standard: GHG reductions will only be eligible for this program if they are from projects that became operational on or after January 1, 2000.[33] *The assumption is that any project that became operational before this date was not induced by the existence of the GHG reduction market.* Projects that have been operational for five years without selling emission reductions or becoming validated and producing verified and certified emission reductions according to a Partner Program's requirements do not pass the timing test.[34]

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[31] *WRI Protocol* p. 20

[32] Any GHG emission reductions derived from renewable energy, renewable energy certificates or energy efficiency that occur due to a local, state, provincial or national law, regulation or other mandate are not eligible even if the local, state, provincial or national law, regulation or other mandate does not require the retirement of GHG emission reductions.

[33] On a case by case basis, projects with operational dates prior to 2005 may meet the timing test if it can be demonstrated with certainty to the Green-e Governance Board that such projects were induced by the existence or anticipation of the voluntary carbon market.

[34] Emissions reductions may include renewable energy, renewable energy certificates, or energy efficiency certificates that incorporate GHG reduction benefits.

Green-e Protocol for GHG Emission Reductions from Renewable Energy: The purpose of this test is to ensure that the project activity under consideration was selected and implemented, in part, for the purpose of limiting GHG emissions. The assumption made is that projects implemented prior to 2000 were not necessarily induced by the carbon offset market. The Timing Test functions, in essence, as a coarse additionality filter. It is designed to make ineligible renewable electricity facilities that were built before the existence of a robust market for offsets, and facilities that obviously did not demonstrate awareness of the additional revenue stream from offsets, RECs, or other environmental services by utilizing these potential revenue streams within the first five years of operation. Since the late 1990s, there has been a significant green power market in the US, which has produced an income stream for renewable projects for their GHG emission benefits. The existence of a robust green power market and the establishment of international markets for carbon offsets in 2000 establishes the validity of using a 2000 date for section 3-B(1) of the Timing Test. A cutoff date of 2000 is also general practice in market, being used by CDM, Gold Standard, the Voluntary Carbon Standard and others.

From the perspective of customers, there may be a strong desire to know that their offsets are being generated from newer facilities. Advancing the online date to 2005 could potentially improve consumer acceptance of the protocol, but will result in a number of 'false negatives', where a facility is determined to be ineligible when is was actually additional. If stakeholders provide support for the 2005 date, CRS thinks it is necessary to attempt to limit the false negatives inherent in moving this date up by adding a provision whereby facilities with an online date prior to 2005 can be considered by the Green-e Board GHG subcommittee on a case-by-case basis. Although this does increase the administrative burden on a subset of applying facilities as well as on CRS and the Board sub-committee, CRS feels it is an approach that may address customers' expectations while also not unnecessarily excluding additional facilities

CRS would like to solicit feedback from the Board and Stakeholders specifically regarding the following suggested changes to the timing test.

> ***CRS suggests moving up the threshold date to January 1, 2005, and adding provisional language which offers case-by-case exemptions to the timing test. In addition, CRS would then recommend removing the 5-year requirement stipulated in section 3-B(2).***

If it can be demonstrated that a project initiated prior to 2000 (or alternatively 2005) was undertaken with the explicit goal of reducing greenhouse gas emissions, the Green-e Governance Board can determine such a project eligible on a case-by-case basis.

The 2000 (or alternatively 2005) date also applies to repowered facilities, with the restriction that 80% of the fair market value of the project derives from new generation

equipment installed as part of the repowering. This requirement is designed to necessitate that facilities that have been repowered are, in essence, new facilities.

Performance & Technology Test
The performance test is used with increasing frequency by organizations developing GHG protocols. The test assesses the types of projects that qualify as additional on a sector-wide basis instead of project-by-project. This upfront determination enhances the transparency of the marketplace for project developers, marketers and consumers. The performance test is used by the US EPA Climate Leaders program as well as by the California Climate Action Registry in its Forestry Protocol and Manure Management Protocols.

Green-e GHG Definition: The technology used in the project has been adopted by the GHG Program onto a list of technologies that fall within the top percentile(s) of net GHG emission rates for similar technologies and practices producing the same or similar goods or services, as defined by the GHG Program.

Green-e RE Protocol: "The purpose of a performance standard is to establish a threshold that is significantly better than average greenhouse gas (GHG) production for a specified service, which, if met or exceeded by a project developer, satisfies the criterion of "additionality."[35]

In the case of the Green-e RE Protocol, it must be established that a project activity has lower GHG intensity than the common practice electricity generation activities in the US commercial electricity sector. The burden of establishing which technologies meet this criterion falls to CRS and the Green-e Governance Board, which has established, and will periodically update, a list of acceptable technologies. The initial list was established through a thorough evaluation of the composition of the US electricity sector (see Performance Analysis below).

9. Performance Analysis

National Overview
The performance analysis presented below assesses whether building zero-emitting generation to serve load in the US electricity sector is a business-as-usual practice or a relatively rare practice. The analysis focuses on what is being built in the electricity sector to serve load in the absence of legal mandates such as Renewable Portfolio Standards or their equivalent. The rationale for excluding mandated facilities is that they are not a true reflection of what is being built in response to the market conditions (price of electricity, transmission options, demand for renewable energy/RECs, etc.). Mandated renewable facilities will be built regardless of market conditions because their construction and operation is a legal requirement. Accordingly, each table presented

[35] California Climate Action Registry (2007): A Performance Standard for Livestock Manure Management Project Protocol: 1 (http://climateregistry.org/docs/PROTOCOLS/Project/CCAR_LMM_Protocol_Performance_Standard.pdf)

below shows the percentage of new electrical generation construction by resource type on a national and regional (NERC regions) basis, with and without mandated (RPS) facilities.[36]

Some stakeholders have suggested using a project-by-project financial additionality test as a replacement for or to supplement the performance standard. CRS has analyzed this issue and feels that a financial additionality test would be less rigorous and transparent than the current performance standard, while also being of greater administrative burden. The financial additionality test rests on the idea of conducting a financial investigation for each project under consideration to determine whether or not the project had planned on the revenue stream from offsets, RECs, or other such instruments, and whether that revenue stream was a determining factor in the financial viability of the project.

This test has several major drawbacks in the renewable energy sector:

- It is not a robust test within the electricity sector. Assessing project financial additionality is technically difficult, and any assessment made of a project would rely on subjective interpretation of financial data. The test leaves the protocol open to gaming.

- Given the difficulty in determining a project's financial additionality, the administrative costs associated with the burden of proof would be quite high.

- The financial additionality test makes eligible only those projects on the margin financially and therefore promotes the construction of marginal projects. This can have the perverse effect of pushing a project developer to build a smaller facility (in order to 'qualify' as financially additional) instead of a larger facility that would take advantage of economies-of-scale. The test would also exclude from eligibility demonstration projects, or any other project which was not directly financially viable even with the sale of offsets (as an example most solar PV installations). This artifact of the test removes the ability for the offset market to foster new and innovative low-carbon energy technologies.

CRS has opted, in this protocol, to assess additionality primarily using the performance standard approach. Conceptually, the performance standard functions differently from project-by-project additionality tests. The concept is to step back from the individual project and a few select financial indicators, and instead to examine the sector as a whole and the full set of market forces that influence project development, including technical, resource, and institutional barriers in addition to financial ones. The question asked during a performance test is this: Is building renewable energy facilities to serve electricity demand a business-as-usual activity, or is it additional? In this way, the performance standard determines if, given today's market conditions and all direct and indirect drivers, companies are choosing to build renewable energy.

[36] The data used to separate mandated facilities is adapted from data generated by a Union of Concerned Scientist study which can be found here: http://www.ucsusa.org/clean_energy/clean_energy_policies/state-clean-energy-maps-and-graphs.html.

The data presented below describe the US grid-connected energy generation facilities, segmented by resource, or fuel type, placed in operation between 2000 and 2005. A total of 248,230 MW of capacity was added in the U.S. in the form of grid-connected electricity generation facilities between 2000 and 2005, 3,654 MW of which was added to meet various state renewable portfolio standards. The data from the EIA represented in Table 4 lists several categories of resources. We have divided these categories into *zero-emitting resources* and *emitting resources*. In doing so we have taken a conservative approach and included all resource types that are zero-emitting or potentially-zero-emitting in the zero-emitting category. Some resource/technology types included in this category may not be zero emitting if a broader, fuel-cycle approach to evaluating emissions is employed. Examples of such emitting resource types that are included in the zero-emitting category are *energy crops* and *pumped storage*. Thus, the total of zero-emitting resources listed in the table overestimates the amount of zero-GHG- emitting facilities built.

Nationally, three percent of the generation capacity added between 2000 and 2005 was attributable to zero-emitting resources. However, when resources allocated to RPS requirements are removed, zero-emitting resources constitute only 1.6% of new generation capacity.

Table 4

Resource Type	**Percentage of New Capacity 2000-2005**[37]	**Percentage of New Capacity excluding RPS 2000-2005**[38]
Agriculture Crop Byproducts/Straw/Energy Crops	0.01%	
Black Liquor	0.06%	
Geothermal	0.04%	
Landfill Gas	0.08%	
Other Biomass Gases (Digester Gas, Methane, and other biomass gases)	0.03%	
Solar (Photovoltaic, Thermal)	0.00%	
Water (Conventional, Pumped Storage)	0.28%	
Wood/Wood Waste Solids (Paper Pellets, Railroad Ties, Utility Poles, Wood Chips, and other wood solids)	0.02%	
Wind	2.54%	
Total: Zero-emitting resources	**3.07%**	**1.63%**
Blast Furnace Gas	0.02%	
Anthracite Coal, Bituminous Coal	0.21%	
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	1.72%	
Jet Fuel	0.02%	
Kerosene	0.05%	

[37] New capacity data was collected from EIA form 860 generator data. Percentages represent a portion of the total national capacity.

[38] To calculate these, the total renewable capacity used to fulfill RPS standards was subtracted from both the numerator and the denominator, so that RPS-related capacity was excluded from the calculation entirely. Data regarding what portion of capacity was applied to RPS standards nationwide and by NERC region was sourced from the Union of Concerned Scientists (see footnote 33).

Lignite Coal	0.21%	
Municipal Solid Waste	0.01%	
Natural Gas	94.15%	
Other Biomass Liquid (Ethanol, Fish Oil, Liquid Acetonitrile Waste, Medical Waste, Tall Oil, Waste Alcohol, and other Biomass not specified)	0.00%	
Other Gas (Butane, Coal Processes, Coke-Oven, Refinery, and other processes)	0.15%	
Other (Batteries, Chemicals, Coke Breeze, Hydrogen, Pitch, Sulfur, Tar Coal, and miscellaneous technologies)	0.00%	
Purchased Steam	0.00%	
Residual Fuel Oil (includes No. 5 and No. 6 Fuel Oils and Bunker C Fuel Oil)	0.01%	
Subbituminous Coal	0.08%	
Tires	0.01%	
Waste/Other Coal (Anthracite Culm, Bituminous Gob, Fine Coal, Lignite Waste, Waste Coal)	0.24%	
Wood Waste Liquids (Red Liquor, Sludge Wood, Spent Sulfite Liquor, and other wood related liquids not	0.03%	
Oil-Other and Waste Oil (Butane (Liquid), Crude Oil, Liquid Byproducts, Oil Waste, Propane (Liquid), Re-refined	0.03%	
Total: Emitting Sources	**96.93%**	**98.37%**
Total	**100%**	**100%**

The conclusion that can be drawn from this table is that building non-emitting technologies to serve load in the US sector is rare since it represents only 1.6% of the non-RPS capacity that has been added over the last six years. Furthermore, the majority of the renewable capacity that has been added is wind (83%). Since wind generally has a low capacity factor (20-35%), due to its intermittent nature, a focus on nameplate capacity exclusively will overestimate its impact on the electricity sector. Accordingly generating electricity from new renewable energy projects on a voluntary basis is rare (likely less than 1% of electricity generation from capacity added between 2000 and 2005). In the context of the performance standard, this shows that even with federal incentives and functioning green power and offset markets in place, there are substantial barriers that retard or prohibit the development of renewable energy projects. If this were not the case, then the percent of new build plants that use renewable resources would be much higher. This national analysis does not capture potential regional differences that may make some resources business-as-usual in some region but not others. The tables below show the regional analysis.

Regional Analysis

The regional analysis is somewhat limited by data availability. NERC regions do not follow state lines and some data from the Energy Information Administration is only provided with state location and not NERC region. The analysis is further complicated by the facts that several NERC regions were merged midway through the 2000-2005 period, and NERC regions do not follow state boundaries while RPS policies are generally state-based, therefore a single state RPS policy may impact generators that lie in more than one NERC region. For simplification, states that are bisected by NERC regional boundaries were assigned to the NERC region that covered the largest portion of

the state territory.[39] In the cases where this assumption resulted in substantive changes to the results of the analysis, the impacts are noted in the text.

ASCC[40]
The total capacity added in the ASCC between 2000 and 2005 was 91 MW - equivalent to less than 0.01% of the total capacity added in the US in the same period. Ten MW of capacity was built of facilities that can generally be categorized as zero or net-zero-emitting resources, which translates to roughly 11% of the total new capacity. This percentage includes pumped storage hydro which is not a zero-emitting generation source.

Table 5

Resource	Percentage of new capacity 2000-2005[41]	Percentage of New Capacity 2000-2005 (excluding RPS)[42]
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	77.34%	
Jet Fuel	5.83%	
Natural Gas	5.50%	
Total: Emitting Sources	**88.67%**	**88.67%**
Water (Conventional, Pumped Storage)	8.80%	
Wind	2.53%	
Total: Zero-emitting resources	**11.33%**	**11.33%**

ERCOT[43]
The total non-RPS capacity added in ERCOT between 2000 and 2005 was 31,313 MW, equivalent to 13% of the total non-RPS capacity added in the US in the same period. 848 MW of non-RPS capacity consisted of facilities that can generally be categorized as zero-emitting resources, which translates to roughly 2.7% of the total non-RPS new capacity. A significant amount of the renewables used to meet the Texas RPS are located in the SPP. The approximate capacity of these resources is 283 MW.[44] Including these in the Texas analysis shows that approximately 6% of the resources built in Texas (including the SPP portion) were zero-emitting. The proportion of non-RPS added capacity is 3%.

Table 6

Resource Type	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS)
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	0.05%	

[39] See Appendix B: NERC Region Map
[40] Alaska is the only state in the ASCC
[41] For all regional analysis tables: New capacity data was collected from EIA form 860 generator data. Percentages represent a portion of the total NERC regional capacity.
[42] For all regional analysis tables: To calculate these, the new the total renewable capacity used to fulfill RPS standards was subtracted from both the numerator and the denominator, so that RPS-related capacity was excluded from the calculation entirely. Data regarding what portion of capacity was applied to RPS standards nationwide and by NERC region was sourced from the Union of Concerned Scientists (see footnote 33).
[43] Defined as: TX
[44] Data from the Texas Public Utilities Commission.

Natural Gas	94.63%	
Other Gas (Butane, Coal Processes, Coke-Oven, Refinery, and other processes)	0.03%	
Total: Emitting Sources	**94.71%**	**97.29%**
Landfill Gas	0.09%	
Other Biomass Gases (Digester Gas, Methane, and other biomass gases)	0.01%	
Wind	5.18%	
Total: Zero-emitting resources	**5.28%**	**2.71%**

FRCC[45]

The total non-RPS capacity added in FRCC between 2000 and 2005 was 17,286 MW equivalent to 7% of the total non-RPS capacity added in the US in the same period. 64 MW of non-RPS capacity was built of facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 0.37% of the total non-RPS new capacity in the FRCC.

Table 7

Resource Type	**Percentage of New Capacity 2000-2005**	**Percentage of New Capacity 2000-2005 (excluding RPS)**
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	4.04%	
Natural Gas	95.60%	
Other (Batteries, Chemicals, Coke Breeze, Hydrogen, Pitch, Sulfur, Tar Coal, and miscellaneous technologies)	0.00%	
Total: Emitting Sources	**99.64%**	**99.64%**
Agriculture Crop Byproducts/Straw/Energy Crops	0.09%	
Landfill Gas	0.03%	
Water (Conventional, Pumped Storage)	0.25%	
Total: Zero-emitting resources	**0.37%**	**0.37%**

HICC[46]

The total non-RPS capacity added in HICC between 2000 and 2005 was 211 MW, equivalent to 0.09% of the total non-RPS capacity added in the US in the same period. 19 MW of non-RPS capacity was built of facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 9% of the total non-RPS new capacity. The majority of that 19 MW is generated from biomass, and would not be eligible under this Protocol.

Table 8

Resource Type	**Percentage of New Capacity 2000-2005**	**Percentage of New Capacity 2000-2005 (excluding RPS)**

[45] Defined as: FL

[46] Hawaii is the only state in the HICC

Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	41.42%	
Jet Fuel	18.53%	
Oil-Other and Waste Oil (Butane (Liquid), Crude Oil, Liquid Byproducts, Oil Waste, Propane (Liquid),Re-refined	31.28%	
Total: Emitting Sources	**91.23%**	**91.23%**
Agriculture Crop Byproducts/Straw/Energy Crops	7.63%	
Water (Conventional, Pumped Storage)	1.14%	
Total: Zero-emitting resources	**8.77%**	**8.77%**

MRO[47]

The total non-RPS capacity added in MRO between 2000 and 2005 was 9,876 MW, equivalent to 4% of the total non-RPS capacity added in the US in the same period. 567 MW of non-RPS capacity was built of facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 5.7% of the total non-RPS new capacity.

Table 9

Resource Type	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS resources)
Anthracite Coal, Bituminous Coal	0.41%	
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	6.82%	
Municipal Solid Waste	0.04%	
Natural Gas	79.27%	
Subbituminous Coal	1.14%	
Total: Emitting Sources	**87.68%**	**94.26%**
Black Liquor	0.26%	
Landfill Gas	0.33%	
Other Biomass Gases (Digester Gas, Methane, and other biomass gases)	0.02%	
Wind	11.70%	
Total: Zero-emitting resources	**12.31%**	**5.74%**

NPCC[48]

The total non-RPS capacity added in NPCC between 2000 and 2005 was 15,256 MW equivalent to 6% of the total non-RPS capacity added in the US in the same period. 7 MW of non-RPS capacity was built of facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 0.05% of the total non-RPS new capacity**.**

[47] Defined as: ND, SD, NE, MN, IA, WI

[48] Defined as NY, MA, CT, RI, NH, ME, VT

Table 10

Resource Type	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS)
Anthracite Coal, Bituminous Coal	0.07%	
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	1.64%	
Kerosene	0.74%	
Natural Gas	95.91%	
Residual Fuel Oil (includes No. 5 and No. 6 Fuel Oils and Bunker C Fuel Oil)	0.16%	
Total: Emitting Sources	**98.52%**	**99.95%**
Landfill Gas	0.23%	
Water (Conventional, Pumped Storage)	0.06%	
Wood/Wood Waste Solids (Paper Pellets, Railroad Ties, Utility Poles, Wood Chips, and other wood solids)	0.00%	
Wind	1.20%	
Total: Zero-emitting resources	**1.49%**	**0.05%**

RFC[49]

The total non-RPS capacity added in RFC between 2000 and 2005 was 35,569 MW equivalent to 14% of the total non-RPS capacity added in the US in the same period. 129 MW of non-RPS capacity was built of facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 0.36% of the total non-RPS new capacity in RFC.

Table 11

	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS)
Blast Furnace Gas	0.16%	
Anthracite Coal, Bituminous Coal	0.03%	
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	0.66%	
Municipal Solid Waste	0.01%	
Natural Gas	96.05%	
Other Biomass Gases (Digester Gas, Methane, and other biomass gases)	0.03%	
Other Gas (Butane, Coal Processes, Coke-Oven, Refinery, and other processes)	0.53%	
Waste/Other Coal (Anthracite Culm, Bituminous Gob, Fine Coal, Lignite Waste, Waste Coal)	1.64%	
Total: Emitting Sources	**99.11%**	**99.64%**
Landfill Gas	0.08%	
Water (Conventional, Pumped Storage)	0.23%	
Wind	0.58%	
Total: Zero-emitting resources	**0.89%**	**0.36%**

[49] Defined as: MI, IN, PA, WV, MD, DC, DE, NJ, OH

SERC[50]
The total non-RPS capacity added in SERC between 2000 and 2005 was 86,107 MW equivalent to 35% of the total non-RPS capacity added in the US in the same period. 818 MW of capacity was built of non-RPS facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 0.95% of the total non-RPS new capacity.

Table 12

Resource Type	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS)
Anthracite Coal, Bituminous Coal	0.54%	
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	2.33%	
Lignite Coal	0.60%	
Municipal Solid Waste	0.00%	
Natural Gas	95.53%	
Other Biomass Liquid (Ethanol, Fish Oil, Liquid Acetonitrile Waste, Medical Waste, Tall Oil, Waste Alcohol, and other Biomass not specified)	0.00%	
Purchased Steam	0.01%	
Tires	0.03%	
Total: Emitting Sources	**99.04%**	**99.04%**
Black Liquor	0.15%	
Landfill Gas	0.05%	
Other Biomass Gases (Digester Gas, Methane, and other biomass gases)	0.02%	
Water (Conventional, Pumped Storage)	0.56%	
Wood/Wood Waste Solids (Paper Pellets, Railroad Ties, Utility Poles, Wood Chips, and other wood solids)	0.01%	
Wind	0.16%	
Total: Zero-emitting resources	**0.95%**	**0.95%**

SPP[51]
The total non-RPS capacity added in SPP between 2000 and 2005 was 8,224 MW equivalent to 3% of the total non-RPS capacity added in the US in the same period. 736 MW of non-RPS capacity was built of facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 8.95% of the total non-RPS new capacity. It is worth noting, however, that 283 MW of wind capacity is located in the Texas Panhandle, which is considered part of the SPP. That 283 MW is included in the 736 MW figure quoted above. Deducting the capacity from the legally required facility as well as the Texas Panhandle facilities shows that 5.7% of the capacity built in the SPP was zero-emitting and not required by law.

[50] Defined as: MO, IL, LA, AR, AL, MS , GA, SC, NC, TN, VA, KY

[51] Defined as: KS & OK

Table 13

Resource Type	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS)
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	1.00%	
Natural Gas	90.05%	
Total: Emitting Sources	**91.05%**	**8.95%**
Wind	8.95%	
Total: Zero-emitting resources	**8.95%**	**8.95%**

WECC[52]

The total non-RPS capacity added in WECC between 2000 and 2005 was 40,644 MW, equivalent to 17% of the total non-RPS capacity added in the US in the same period. 794 MW of non-RPS capacity was attributable to facilities that can generally be categorized as zero- or net-zero-emitting resources, which translates to roughly 1.95% of the total non-RPS new capacity.

Table 14

Resource Type	Percentage of New Capacity 2000-2005	Percentage of New Capacity 2000-2005 (excluding RPS)
(Anthracite Coal, Bituminous Coal)	0.00%	
Distillate Fuel Oil (includes all Diesel and No. 1, No. 2, and No. 4 Fuel Oils)	0.24%	
Natural Gas	93.39%	
Other Gas (Butane, Coal Processes, Coke-Oven, Refinery, and other processes)	0.39%	
Subbituminous Coal	0.21%	
Total: Emitting Sources	**94.23%**	**98.05%**
Geothermal	0.25%	
Landfill Gas	0.06%	
Other Biomass Gases (Digester Gas, Methane, and other biomass gases)	0.08%	
Solar (Photovoltaic, Thermal)	0.02%	
Water (Conventional, Pumped Storage)	0.12%	
Wood/Wood Waste Solids (Paper Pellets, Railroad Ties, Utility Poles, Wood Chips, and other wood solids)	0.18%	
Wind	5.07%	
Total: Zero-emitting resources	**5.78%**	**1.95%**

[52] Defined as the following states: CA, WA, OR, NV, AZ, NM, UT, CO, MT, WY, ID

CONCLUSION OF PERFORMANCE ANALYSIS

The results of the regional analysis show that regions without RPS policies have very small amounts of zero-emitting resources while renewable capacity additions are concentrated in regions with RPS policies.

Table 15. Non-emitting resources as percentage of total resources added to the US electricity sector between 2000 and 2005.

REGION	NON-EMITTING PERCENTAGE W/ RPS RESOURCES	NON-EMITTING PERCENTAGE WITHOUT RPS RESOURCES
National	3.1%	1.6%
ASCC	11.3%	No RPS
ERCOT	5.3%	3%[53]
FRCC	0.4%	No RPS
HICC	8.8%	No RPS
MRO	12.3%	5.7%
NPCC	1.5%	0.1%
RFC	0.9%	0.4%
SERC	1.0%	No RPS
SPP	9.0%	5.7%[54]
WECC	5.8%	2.0%

The data suggests at least half of the new zero-emitting resources added nationally have been built for RPS purposes.

As demonstrated by the data present above, the zero-emitting technologies that were not required by state-level RPS policies contribute less than 2% nationally to new capacity additions. For all regions, with the exception of ASCC, new capacity additions of non-mandated zero-emitting resources were under 10% of new capacity for the period 2000-2005. The analysis' focus on capacity overestimates the impact of the zero-emitting resources (primarily wind) because the capacity factors of wind generation are generally lower than the capacity factors of the emitting sources that have been added to the grid.

The Green Power Market

The analysis detailed above showes that approximately 4,000 MW of renewable energy capacity was added in 2000-2005 that was not directly in response to renewable portfolio standards or other legal mandates. It is important to note that this capacity was not built in absence of any incentives. Instead the vast majority of this capacity was built to serve load in the growing green power markets. This includes the market for renewable electricity provided through utility green pricing programs or by competitive electricity providers as well as the sale of Renewable Energy Certificates on the retail market.

[53] This has been revised upward because of the inclusion of facilities built in the SPP for Texas demand (see ERCOT section).
[54] This has been revised downward because of the exclusion of facilities built in the SPP for Texas demand (see SPP section).

Estimates from the National Renewable Energy Laboratory show that approximately 2,600 MW of the renewable energy capacity constructed in 2000-2005 is used to serve green power markets.[55] The green power market has been expanding rapidly over the 2000-2005 period including increases in overall sales volume of 62% and 37% in 2004 and 2005 respectively.[56]

In addition to the capacity that is being used to serve green power markets, several utilities have built renewable energy to serve all of their customers with some portion of renewable energy in response to local directives from municipal boards or utility commissions separate from Renewable Portfolio Standards. These facilities are captured in the 4,000 MW figure but RECs or GHG reductions from these facilities would not be eligible for voluntary markets since they are being claimed for the utility customers.

While there is no REC exchange with fully transparent prices, indications are that the price of RECs sold in the voluntary market (especially for wind) have been increasingly steadily over the last three years to approximately $5-8 per REC today.[57] This is evidence of an increasingly tight market for renewable generation even with the new capacity being added every year,

The fact that a significant majority of the 4,000 MW are serving green power markets is further proof that building renewable energy in the US today is not a business-as-usual activity.[58] Without a specific customer demand for green power, or the available revenue streams from RECs or offsets, and the support of subsidies, very little--if any--of the proposed eligible technologies stipulated in this protocol would be under development anywhere in the US. CRS therefore feels confident that the proposed Protocol will ensure that the eligible projects deliver real, verifiable and additional greenhouse gas reductions.

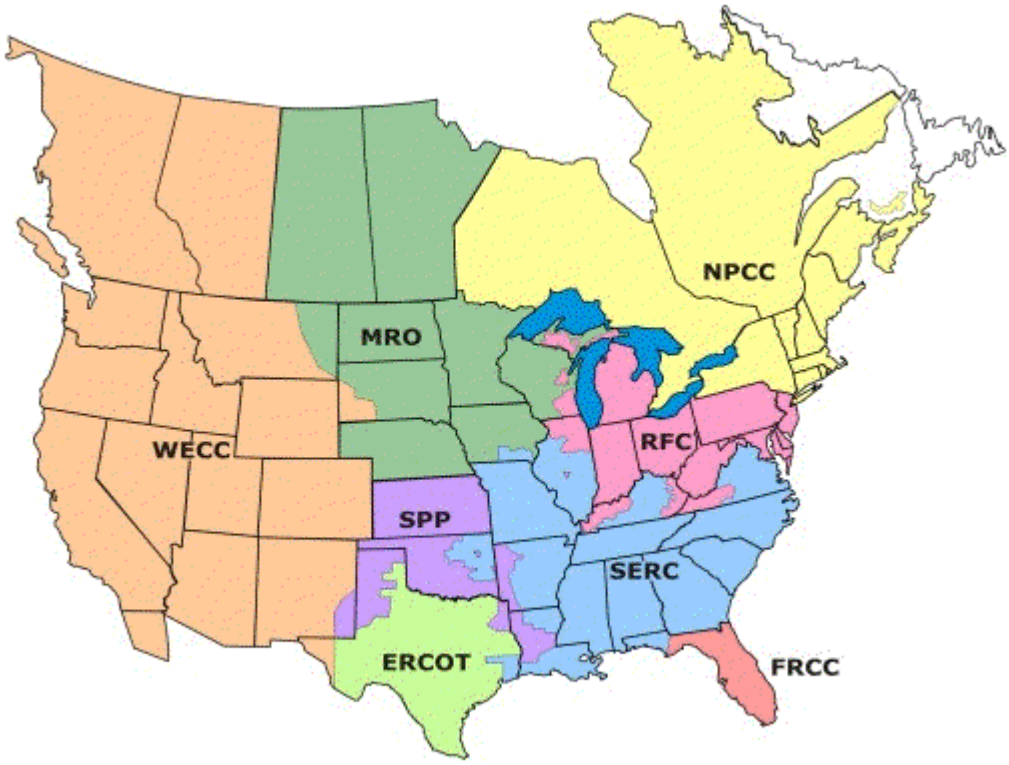
Conclusion

The conclusion that can be drawn from the analysis of renewable energy capacity additions and the size of the U.S. voluntary market for renewable energy products is that adding new non-emitting resources to the US electricity grid is not a business-as-usual practice, and adding new non-emitting technologies that are not required by law is extremely unusual. Based on this analysis, we conclude that the resources eligible under

[55] Since the data in the NREL report was published in 2005 it included only some of the facilities constructed in late 2004 and 2005. The numbers in the NREL report included 107 MW of capacity installed in 1997-99. We have excluded the 107 MW from the analysis above since 1997-1999 construction was not included in the performance analysis sample.
[56] http://www.nrel.gov/docs/fy07osti/40904.pdf: 5
[57] The most consistent REC pricing data comes form Evolution Markets' Monthly REC Market Updates (see www.evomarkets.com). This is not a perfect data set but it is often used as an indication of the market trends in REC pricing.
[58] Also, the 4000 MW is known to overestimate the amount of capacity added for voluntary purposes. There has been renewable energy capacity added to the U.S. electric grid in response to other mandates and directives, apart from state-level RPSs, that has not been subtracted from the 4000 MW number but that would be excluded by the Legal and Regulatory Test under this protocol.

the Green-e Protocol for GHG Emission Reductions from Renewable Energy are activities that are clearly beyond business-as-usual in the US electricity sector.

Appendix B: NERC Regions



Map Source: Energy Information Administration, http://www.eia.doe.gov/cneaf/electricity/chg_str_fuel/html/fig02.html