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GHG Emission Accounting, Renewable Energy Purchases, and Zero-Carbon Reporting:

Issues and Considerations for the Colocation Data Center Industry



In collaboration with



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Future of
Internet Power 

1. Introduction

A. BACKGROUND AND ISSUE OVERVIEW

In 2016, corporate members of BSR's [Future of Internet Power](#), a collaborative initiative comprised of users of colocation data center services (colos), set out to develop guidelines related to colo procurement of renewable energy that would support zero-carbon claims by clients against their colo data center energy usage. The guidelines were to include documentation requirements that would support zerocarbon claims, that is, claims of an electricity carbon emission factor of 0.0 kg CO₂e/MWH, based on the type of renewable energy procured, such as a utility green power tariff or renewable energy attribute certificates.

As part of this work, BSR consulted at length with World Resources Institute (WRI) to understand how their widely recognized [Greenhouse Gas Protocol](#)¹ (GHGP) and the market-based method outlined in their [Scope 2 Guidance](#)² should be applied to the colo scenario, and the related implications for renewables claims and zero-carbon reporting. Through this consultation, it was determined that renewable energy purchases that meet the GHGP's specified quality criteria can be used to "zero out" greenhouse gas (GHG) emissions associated with data center electricity consumption. However, it was also discovered that double-counting of scope 2 by a colo vendor and client meant that only one party—the "owner of the green energy attributes"—could claim zero-carbon for that scope 2, even though it was the same electricity consumption. This finding led to an investigation into the categorization of GHG emissions associated with colo facility electricity usage by colo vendor and client per the GHGP and Scope 2 Guidelines under the Operational Control consolidation approach.

For the colo data center environment, the GHGP and Scope 2 Guidance are open to differing interpretations about which party (colo vendor or client) has operational control. This ambiguity increases the likelihood of scope 2 double-counting, which, as mentioned, disallows a colo client from making zerocarbon claims for double-counted scope 2 emissions in the case where the colo vendor procures (owns) renewable energy. This scenario reduces the value of colo vendor-procured renewable energy for clients in pursuit of zero carbon for their colo operations, and, in turn, the competitive differentiation that renewable energy procurement might afford colo vendors.

Overall, the motivation behind this working paper reflects the growing environmental sustainability commitments of colo vendors and their clients, as there is increased interest by both parties to power data centers with 100 percent renewable energy. This working paper provides details about GHG scope accounting and reporting, explains the implications of double-counting for zero-carbon reporting, and proposes recommendations for consideration by key stakeholders.

Just as the GHGP is for international use, this working paper is intended for and applicable to global audiences with regard to scope accounting practices; however, regional renewable energy attribute program standards may vary (such as the Center for Resource Solutions (CRS) Green-e program in North America, Guarantees of Origin in Europe, I-RECs, etc.). For non-U.S. regions, where "REC" is mentioned, a recognized renewable energy attribute certificate can be substituted.

¹ WRI's GHG Protocol, <http://www.ghgprotocol.org/>.

² WRI's Scope 2 Guidance, http://www.ghgprotocol.org/scope_2_guidance.

B. COLO USE CASE

This working paper applies only to the colo data center use case, specifically excluding data centers that are wholly owned and operated, fully hosted environments, or cloud services. Key characteristics that apply to this colo use case include the following (see Appendix - Terminology for more definitions):

1. Multi-tenant colo clients have operational control over their information technology equipment;
2. Colo vendor has operational control over the data center infrastructure, such as cooling systems, lighting, backup power, and power conditioning equipment;
3. Colo vendor owns the power utility contract OR colo vendor leases the building/part of the building, whereby the landlord may own the utility contract;
4. Colo client pays colo vendor directly OR indirectly for electricity usage;
5. Colo contracts are generally not capital or equipment leases, but rather service contracts between the colo vendor and client or, in some cases, building leases.

C. GOALS

The goals of this working paper are as follows:

1. Review the GHGP and Scope 2 Guidance as it applies to the colo use case, including differing interpretations of who has operational control in a colo data center environment, which increases the likelihood of scope 2 double-counting;
2. Describe the GHG reporting scenarios for which zero-carbon claims can be made by both colo vendor and client;
3. Describe the double-counting GHG reporting scenario for which zero-carbon claims can only be made by the renewable energy attribute owner;
4. Provide a recommended approach to categorization of GHG emissions and zero-carbon reporting for colo vendors and clients; and
5. Offer preliminary documentation guidelines for colo vendors related to colo procurement of renewable energy that would support zero-carbon claims by clients against their colo data center energy usage.

D. METHODOLOGY

This was commissioned by BSR's [Future of Internet Power](#) collaborative initiative, a consortium of colo clients working to address challenges and collaborate on solutions that will enhance the ability to procure renewable energy to power data centers. This working paper was drafted in support of the initiative's larger mission to power the internet with 100 percent renewable energy, and it is based on over 12 months of consultation with WRI and discussions with key colo industry stakeholders. The paper has been reviewed and addresses feedback provided by WRI, CRS, Future of Internet Power members, and key industry stakeholders (see complete list of key contributors and peer reviewers in the Appendix - Acknowledgements).

2. GHG Protocol Reporting Standards

A. CORPORATE ACCOUNTING AND SCOPE 2 GUIDANCE

WRI's internationally recognized [GHGP Corporate Accounting and Reporting Standard](#) is intended to help companies "prepare a GHG inventory that represents a true and fair account of their emissions,"³ which in turn provides information that can be used to build an effective strategy to manage and reduce GHG emissions. The GHGP's Corporate Standard requires organizations to quantify emissions from the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as "electricity"). These emissions are termed "scope 2" and are considered an indirect emissions source because the emissions are a consequence of activities of the reporting organization but actually occur at sources owned or controlled by another organization.⁴ The GHGP Corporate Standard also serves the purpose of defining scope 1 and 2 (and now scope 3) "to ensure that two or more companies will not account for emissions in the same scope."⁴

In 2015, WRI released an amendment to the GHGP, the GHG Scope 2 Guidance, to provide guidance specifically on the accounting and reporting of scope 2 emissions. This working paper references that guidance and takes into consideration three renewable energy procurement options that have a carbon emission rate of zero and are eligible to be counted as such toward a company's scope 2 or scope 3 emissions profile. These are 1) registered energy attribute certificates, e.g. a Renewable Energy Certificate (REC) derived from unbundled, traditional, or virtual Power Purchase Agreements (PPA); 2) a utility's green tariff or green pricing program backed by energy attribute certificates; or 3) renewable energy generated on-site (behind the meter), where energy attribute certificates are retained (see Appendix-Terminology for a list on the types of renewable energy sources that are recognized in the GHGP). These three renewable energy procurement options are currently the most typical; however, other potential options (such as community renewables) require additional guidance from regional energy attribute certificate issuing and standard setting bodies.

Note: It was determined that the GHGP Appendix F does not apply to the colo use case. Appendix F provides guidance on how to assign emissions for capital or operating leases. The guidance presumes that the lessee, rather than the lessor, has operational control of the leased asset (although a lessee may be able to argue that it does not have operating control under the terms of its specific lease). The contractual relationship between colo vendors and their clients generally takes the form of a master service agreement or, in some cases, a building lease, rather than a capital or operating lease.

³ GHG Protocol Corporate Accounting and Reporting Standard, <http://www.ghgprotocol.org/corporate-standard>, p3.

⁴ Scope 2 Guidance, p5.

⁴ GHGP Corporate Standard Accounting, p25.

3. Applying the GHGP to the Colo Use Case

A. SCOPE ACCOUNTING SCENARIOS FOR COLO VENDORS AND CLIENTS

The GHGP and Scope 2 Guidance note that companies using the same consolidation approach “should avoid double-counting the same emissions ... within the same scope by multiple companies.”⁵

Doublecounting of scope 2 is only acceptable under the GHGP if one party is using the operational control approach and the other using financial control. As noted above, this working paper addresses the colo use case under the most common approach taken in the industry: operational control.

For the operational control approach, there are six potential scope 2 accounting scenarios that can be applied to the colo use case, depending on how each entity interprets the Scope 2 Guidance.

Figure A illustrates three of these scenarios that avoid double-counting of emissions.

Figure A: Scope 2 Accounting Scenarios that Avoid Double-Counting Emissions



Scenario 1:

- Vendor accounts all emissions related to the Data Center Equipment as scope 2 (Client accounts same emissions as scope 3)
- Client accounts all emission related to their IT Equipment as scope 2 (Vendor accounts same emissions as scope 3)



Scenario 2:

- Vendor accounts all emissions related to both the Data Center Equipment and their multiple client's IT Equipment as scope 2 (Client accounts same emissions as scope 3)



Scenario 3:

- Client accounts all emissions related to both the Data Center Equipment and their own IT Equipment as scope 2 (Vendor accounts same emissions as scope 3)

Figure B illustrates three scenarios in which ... scope 2 double-counting can occur.

Figure B: Scope 2 Accounting Scenarios that Double-Count Emissions

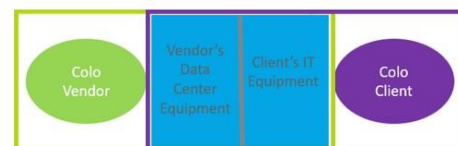
⁵ Scope 2 Guidance, p34, full quote: “However, as stated in the Corporate Standard, companies should avoid double counting the same emissions in multiple scopes in the same inventory. In addition, double counting the same emissions within the same scope by multiple companies should also be avoided (see Section 5.5).”

**Scenario 4:**

- Vendor accounts all emissions related to both the Data Center Equipment and the client's IT Equipment as scope 2
- Client also accounts all emissions related to their IT Equipment as scope 2

**Scenario 5:**

- Client accounts all emissions related to both their IT Equipment and the Data Center Equipment as scope 2
- Vendor also accounts all emissions related to the Data Center Equipment as scope 2

**Scenario 6:**

- Vendor accounts all emissions related to both the Data Center Equipment and the client's IT Equipment as scope 2
- Client also accounts all emissions related to both their IT Equipment and the Data Center Equipment as scope 2

Aside from these six accounting scenarios, there is also the possibility of under-counting scope 2 or double-counting of scope 3. This would occur if neither party counts the emissions as its scope 2, and/or both count the emissions as their scope 3. Under GHGP, either of these scenarios should be also avoided.

Current scope accounting practices among colo vendors and clients vary based on differing interpretations of the GHGP. This could result in inconsistent scope accounting by vendors and clients throughout the colo industry. Based on consultations with WRI, the most appropriate interpretation of the current GHGP, under the operational control consolidation approach, is Scenario 1, a split of scope 2 and 3 emissions.

B. THE IMPLICATIONS OF DOUBLE-COUNTING

Not only is double-counting discouraged by WRI and the GHGP,⁶ but it becomes problematic in practical terms when a renewable energy purchase is made, and both the vendor and client want to report the zero-carbon attribute of the purchase toward their scope 2 emissions profile for that energy use. The current protocol does not provide for more than one party to report zero carbon if they are both accounting for the same emissions as scope 2.⁸ Rather, the GHGP indicates that for scope 2 emissions, only the party in “possession” of the renewable energy/renewable energy attribute can make a zerocarbon claim. Other parties in the value chain may only make a zero-carbon claim against the renewable energy purchase for emissions categorized as scope 3 with the appropriate documentation and attestations.

Additionally, double-counting of renewable energy purchases by multiple companies accounting for the same emissions as scope 2 is addressed by the North America [CRS Green-e Program](#).⁷ CRS states in its [Summary of WRI Scope 2 Guidance](#) that “Green-e Energy specifically restricts double claims on

⁶ GHGP Corporate Standard Accounting, p33.

⁸ Scope 2 Guidance, p40.

⁷ CRS Green-E Program, <https://resource-solutions.org/programs/green-e/>.

renewable energy certificates (RECs).”⁸ Consultations with CRS have reinforced that they would require documentation by the parties involved to confirm no double-counting of scope 2 has occurred under the same operational control consolidation approach related to a particular REC purchase.

In sum, this issue of scope 2 double-counting, and subsequent limitation on non-renewable energy owner parties to report zero carbon in conformance with prevailing accounting and renewable energy claims standards, may serve as a barrier for clients seeking to fulfill their renewable energy and GHG emission reduction commitments. Furthermore, double-counting of scope 2 will lessen the value of colo renewable energy procurement for clients in pursuit of zero carbon for their colo operations, and, in turn, the competitive differentiation that renewable energy procurement might afford colo vendors.

4. Recommendations and Considerations

Given the strong trend in the adoption of ambitious climate goals among colo vendors and clients and the desire for colo vendors to provide differentiated services to their clients, it is in the interest of the industry and its stakeholders to find a solution that allows both parties to claim the zero-carbon emission rate related to colo renewable energy procurement. In light of the prevailing standards that discourage scope 2 double-counting and preclude two parties from making a zero-carbon claim where emissions are double-counted within the same scope, a consistent approach to scope 2 accounting is required.

The following are recommendations for stakeholders based on the findings of this work:

A. AVOIDANCE OF DOUBLE-COUNTING AND UNDER-COUNTING

Double-counting of scope 2 emissions should be avoided. For colo clients, double-counting negates the zero-carbon claim value of renewable energy procurement by colo vendors and lessens the competitive differentiation value for colo vendors. Based on an assessment of the GHGP Scope 2 Guidance for operational control consolidation approach reporting, a split-scope approach is recommended where the colo vendor accounts for electricity consumption of its data center infrastructure as its scope 2, and the colo client accounts for electricity consumption of its IT equipment as its scope 2 (as illustrated in Figure A, Scenario 1). This would provide a uniform approach across the industry, rather than a per-facility, or per-contract approach, which would increase the likelihood of scope 2 double-counting.

B. COLO RENEWABLE ENERGY ATTESTATION DOCUMENTATION

Certain documentation is required for colo clients to leverage renewable energy procured by vendors for a facility to make accurate zero-carbon claims. The development of a standard attestation documentation form that the colo vendor makes available per facility would support clients' zero-carbon claims. Below is an illustrative list of information per facility that is recommended to be considered for inclusion in such a form:

1. The type of renewable energy procured, such as registered energy attribute certificates, a utility green power tariff, or onsite or offsite generation through traditional or virtual PPA and related power generated (such as wind or solar).
2. The emissions factor of the energy source (e.g. “0” for renewables) and emissions factor of nonrenewable grid electricity if renewable procurement does not cover 100 percent of the facility's electricity usage.
- 3.

⁸ CRS Green-e Energy Summary of WRI Scope 2 Guidance, <https://www.green-e.org/docs/energy/Scope2Summary.pdf>, p2.

4. Renewable energy documentation, such as energy attribute certificate serial numbers, vintage, ownership, and retirement status; attestation from utility regarding source and percentage of energy attribute certificate backed renewable power; proof for on-site generation that no energy attributes were generated or that generated attributes were retained.
5. Quantity of energy generation.
6. Percent of data center electricity usage that is covered by the renewable energy procurement. If percentage is less than 100, and if client is claiming renewables for a percentage that is higher than the percent procured for the facility, documentation allocating a specific percentage or number of energy attribute certificates to client.
7. Facility Power Usage Effectiveness (PUE). A client can use the PUE to estimate the electricity usage of the data center infrastructure as follows: Data Center infrastructure electricity consumption = Client IT electricity consumption x (PUE - 1). This would enable a client to account for scope 3 emissions associated with data center infrastructure.

The client is responsible for monitoring and estimating their IT equipment energy usage (e.g. using an inventory of equipment used within the facility or using data from a more sophisticated energy management system if provided by the colo vendor). Limitations to measurement and estimation methods could be explained further in public communications (i.e. sustainability reports), in addition to elaborating how the scope assignments are done.

C. CONSIDERATIONS FOR STANDARD-SETTING BODIES

There are two opportunities for the standard-setting bodies to clarify zero-carbon reporting and GHG accounting practices for the colo industry:

1. GHGP Scope 2 Guidance for colocated data centers: In an effort to minimize scope 2 doublecounting among industry stakeholders, WRI, Green-e, and other relevant standard setting bodies should provide clear guidance, similar to Appendix F on leased assets, explaining the proper scope accounting approach when equipment assets under operational control of multiple entities reside in a facility operated by another entity that provides support services under a services contract. A published statement from WRI on how operational control applies to this colo use would be a useful first step to provide short-term clarity for industry stakeholders.
2. Zero-carbon claims and scope categorization: WRI, Green-e, and other relevant standard-setting bodies should consider separating the issues of scope assignment and zero-carbon claims to allow for zero-carbon claims to be made against any MWh that has been greened through renewable energy procurement, regardless of how users of that electricity categorize it within their scope emissions profiles. This would also avoid “double-purchasing,” where more than one energy attribute certificate may be tied to an individual MWh of energy consumption, which is also undesirable per prevailing accounting standards.

5. Next Steps

We encourage colo vendors and clients to discuss this issue with each other and with their GHG verifiers, particularly in terms of the proposed renewable energy attestation documentation and other concepts noted in “Recommendations and Considerations” Section 4.

BSR welcomes feedback on this working paper, as additional inputs from stakeholders (colo vendors, colo clients, verifiers of GHG accounting and zero-carbon reporting, WRI, CRS, etc.) will help inform next steps, which may include clarification from WRI on the correct interpretation of operational control in the colo use case and developing resources such as documentation requirements and template forms. For

example, to ensure consistency and transparency across the industry, the recommended documentation on renewable energy procurement could be captured in a standardized “Colorado Renewable Energy Attestation Form” and be submitted to verifiers who complete audits of corporate GHG emission profiles.

BSR will be developing a formal feedback gathering process and various distribution channels to share this working paper; in the meantime, please direct comments to author Kelly Gallo (kgallo@bsr.org), Michael Rohwer (mrohwer@bsr.org), and Berkley Rothmeier (brothmeier@bsr.org).

Appendix

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 - » IBM
 - » Infomart Data Centers
 - » Iron Mountain
 - » Switch »
- WRI

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2. WRI Greenhouse Gas Protocol, <http://www.ghgprotocol.org/>.
3. WRI GHG Protocol Corporate Accounting and Reporting Standard, <http://www.ghgprotocol.org/corporate-standard>.
4. WRI Scope 2 Guidance, http://www.ghgprotocol.org/scope_2_guidance.

TERMINOLOGY

Colocation data center terms (sourced by authors for the purpose of this paper)

1. Attestation Documentation: The supporting documentation required for colo clients to leverage renewable energy procured by vendors to make legitimate zero-carbon claims (as explained further in section 4.B).
2. Colocation Data Center (“colo”): A facility managed by the “colo vendor,” which hosts the IT equipment, such as servers, switches, and appliances, of multiple companies (“colo clients”).

3. Colo Client: A company that enters into a contractual service agreement with the colo vendor to host the client's IT equipment within the colo facility.
4. Colo Vendor: The colo data center service operator that provides space and support services, such as cooling, power conditioning and supply, and security, for client IT equipment.

WRI GHG Protocol and Renewable Energy Terms (sourced from GHGP)

5. Energy Attribute Certificates: A category of contractual instruments used in the energy sector to convey information about energy generation to other entities involved in the sale, distribution, consumption, or regulation of electricity. This category includes instruments that may go by several different names, including certificates such as Renewable Energy Certificates (RECs, used in U.S. and Australia) or Guarantees of Origin (GOs, used in Europe), tags, credits, etc.
6. Green Tariff: A consumer option offered by an energy supplier distinct from the "standard" offering. These are often renewables or other low-carbon energy sources, supported by energy attribute certificates or other contracts.
7. Operational Control: A consolidation approach whereby a company accounts for 100 percent of the GHG emissions over which it has operational control. It does not account for GHG emissions from operations in which it owns an interest but does not have operational control.
8. Renewable Energy Sources: Includes "energy taken from sources that are inexhaustible, e.g. wind, water, solar, geothermal energy, and biofuels." Note that hydro power may be considered renewable in some markets but may not have a zero-carbon profile. Purchasers of hydro power must perform due diligence on the regional market standards when reporting on the use of hydro as renewable and having a zero-carbon emissions profile or not.
9. Scope 2 Quality Criteria: A set of requirements that contractual instruments shall meet in order to be used in the market-based method for scope 2 accounting. Scope 2 Quality Criteria require consumers to ensure that only one instrument conveys a GHG emission rate claim to consumers, and that that claim be clearly conveyed with the instrument, or if multiple instruments convey the GHG emission rate claim, that all such instruments be owned and retired to substantiate a usage and scope 2 claim.
10. Zero-Carbon Claim: WRI-approved reporting practices that allow each MWh of renewable energy purchased to be reported as having a CO₂ emissions rate of zero (0.0 kg CO₂e/MWh), which can be applied accordingly towards an organization's scope 2 or 3 electricity consumption.

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