

Comments received on Methodology for Time-Shifted Electricity Consumption Targeting Less Carbon-Intensive Generation

This comment was received via email by VCS.

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The U.S. Environmental Protection Agency (EPA) welcomes the opportunity to submit comments on the proposed methodology for the “Time-Shifted Electricity Consumption Targeting Less Carbon-Intensive Generation.” EPA is the U.S. Federal agency charged with protecting human health and the environment and administers both regulatory and voluntary approaches towards this objective. For several decades EPA has been actively involved in working with stakeholders to ensure and establish best practices and transformative market approaches that result in verifiable and credible environmental benefits and air emissions reductions. The following are EPA’s comments on [the proposed standard methodology](#):

The proposed methodology lacks a clear legal or contractual claim to GHG reductions.

The standard methodology is vague in how project activities seeking to convey direct emissions reductions through time-shifted electricity use would legally or contractually substantiate ownership to those emissions reductions and would not otherwise present double claims between parties. Our position, which aligns with the GHG Project Protocol’s “[Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects](#),” is that project activities seeking to turn GHG reductions into a saleable commodity (e.g., project offset) should establish clear legal or contractual claims to the GHG reductions as it pertains to grid-connected electricity projects (Section 1.7, p.9). As proposed, the methodology does not adequately address how electricity usage devices could contractually or legally convey direct GHG emissions reductions resulting from time-shifted consumption patterns to any party when the emissions reductions are legally owned by a third-party generator or consumer. It is our observation that consumers and corporations seeking to use the proposed methodology would not be able to make commercial claims in the U.S. related to the carbon reductions under this methodology. Substantiation of commercial claims would require the legal ownership of or contractual claim to the emissions reductions. We respectfully request that the standard developer detail how such a legal or contractual pathway to ownership of the direct emissions reductions would be achieved through this proposed framework/standard.

The proposed methodology does not account for existing legal regulatory market frameworks that would undermine the calculated emissions reductions.

The proposed methodology does not adequately address how emissions reductions would be handled in regions where emissions from the electricity sector are capped or otherwise regulated (i.e., RGGI). Project activities occurring in regions where electricity sector emissions are capped or regulated would not result in a reduction in emissions stemming from time-shifting consumption. These markets allow regulated sector entities to legally emit up to the cap and utilize a specific market instrument trading approach to allocate emissions (e.g., through allowances) under the cap to regulated entities. While some project activities in the grid region may reduce emissions, the net effect of those emissions reductions are balanced by an increase in emissions through the sale of allowances to other regulated entities. We respectfully request that the standard developer detail how the proposed framework/standard will address existing and potentially future legal regulatory markets which may prevent actual emissions reductions absent additional efforts and cost outside the current scope of the proposed standard.

The proposed methodology should address whether a minimum load is required to affect grid emissions.

Is there a minimum load requirement of an individual project, or aggregation of projects, that would be required such that its effect on the grid would have a material effect on reducing marginal emissions? Is it plausible that shifting a single thermostat from one period of higher emissions would not materially affect the generation of those emissions from that period? If so, can an emissions benefit be created in all circumstances? What analysis or data can the standard developer provide to establish what, if any, load threshold would be required?

The proposed application of this methodology for storage units may double-count emissions in some circumstances.

While the expressed intent of the proposed methodology is to shift consumption from one time-period to another, the storage application appears to be more about storing a source of generation at one time and then dispatching that same source at a different time. This represents a substantive deviation from the original intent of the proposed methodology and has distinct implications. The proposed methodology does not account for how charging storage with specified renewable electricity would avoid double counting emissions under the proposal. Market practice requires that suppliers of generation be required to substantiate or specify the emissions of their electricity using energy attribute instruments. In ignoring the established market practice of recognizing the emissions rate of electricity through energy attribute instruments, the application of this methodology presents a potential for double counting of emissions reductions. This situation is also likely to be problematic for mobile storage applications such as Electric Vehicle (EV) where the EV storage unit charges and discharges to the grid under this standard. Many EV fleet operators (i.e., [Lyft](#), [GM](#)) have made public commitments to not only transform their fleets to EVs, but to power them by renewable energy through specified renewable energy procurements. We recommend that the proponents of this standard consider removing storage as an eligible application for these reasons, or demonstrate how double counting of emissions reductions would be avoided.

The proposed methodology misrepresents the accuracy of “Real-Time” emissions.

The proposed methodology states that the carbon advisory service can calculate “the grid’s real-time carbon intensity.” We feel that the description of “real-time carbon intensity” exaggerates the ability of publicly available data to substantiate such a claim for many grids. Since changes in consumption are assumed to affect generators on the operating margin we respectfully request that the developer better detail how a carbon advisory service would have access to “real-time” generator data, what types of data are available and identify available sources of such data. We believe that the standard might be better served to describe the grid’s carbon intensity as a “calculated estimate”, while recognizing that the operational consumption of electricity by a project would be monitored in real-time under the proposed standard.

Leakage may need to be addressed in the proposed standard

The Developer of the standard should articulate the basis for why leakage is not covered by the standard. Absent new information regarding the definition of a grid or regional grid under this standard, it appears leakage would be a potential concern given the natural interconnectedness of sub or regional grids relative to the U.S. electricity market.

The proposed methodology lacks both transparency and rigor in several key areas.

The core of the proposed methodology is a calculation of “real-time” marginal emission rates. The methodology identifies two options for calculating these rates.

Under the preferred option, real-time emissions data is provided directly by grid operators. Under this option, the carbon advisory service isn’t performing any calculation of marginal emissions rates at all but is merely pulling in existing data from other sources.

Under the second option, emissions rates are “determined using a regression model based on, and validated against, historical data.” Unfortunately, little information is provided regarding the structure and application of this regression model or how validation would be performed in different grid regions with varying data availability or transparency. We respectfully request, as we further detailed below, that the developer of this standard better detail the regression model, how validation would be performed and provide details on the requirements of data availability and transparency that informs the model.

According to the proposed methodology, any regression model for determining marginal emission rates “must be fit using sound and well-documented statistical methods” and be based in “direct measures of power plant response to changes in demand to identify marginal generation unit(s).” Beyond that, the methodology is vague, indicating that “various types of models may be appropriate depending on the observed relationship between covariates and response variables.” The only requirements are that:

1. The data set used to validate the model consist of at least one year of historical data on all relevant covariates and outputs;
2. Marginal fuel data may be used as output validation data, in which case it must be transformed into marginal emissions data using an emissions factor for each fuel type;
3. The regression model must take as inputs real-time data of the same form as the covariates from the validation data set; and
4. The regression model must produce marginal emissions estimates with a root mean squared error of less than one percent of average marginal emissions value over the entire validation data set.

The regression-based methodology could be improved as follows:

- **Vagueness:** It would be useful to have some examples of the input variables that the proposed methodology would require using to predict real-time marginal emissions rates. It would also be useful to know the expected sources for the input and output data. It would also be useful to understand the requirements placed on data availability (e.g., publicly verifiable) and transparency.
- **Use of historical data:** The methodology specifies that at least one year of historical data should be used, but does not specify the period from which that historical data should be taken. Given the evolving nature of the electric grid, one year’s worth of data from ten years ago may not have sufficient predictive power now, as last year’s data would not be predictive of the grid in future years. If the methodology is intended to require that the validation data come from the most recent complete year, it should specify that. However, note that as the grid continues to evolve, a yearly dataset may only have relevant application for a handful of future years.
- **Use of fuel-specific emissions factors:** The methodology includes an option for users to predict marginal fuel rather than marginal emissions, and subsequently apply a fuel-specific emissions rate assumption to forecast marginal emissions. This assumes that emission rates are reasonably similar across plants with a similar fuel type. However, different power plants that use the exact same fuel can have substantially different emission rates if they use different generation technologies. For example, NGCCs are much more fuel-efficient than NGCTs, and as a result can have emission rates that are more than 35 percent lower. Any methodology meant to determine emission rates should at least attempt to account for the generator type (e.g. steam, combined cycle, combustion turbine) of the marginal unit. We respectfully request that the developer address how generator type will be accounted for under the methodology approach which allows for marginal fuel to be used in forecasting marginal emissions. In addition, please describe the types of data that will be required and examples of sources of data that would be required by the proposed standard.

- **Applicability across time periods and regions:** The proposed methodology indicates that, once validated, a regression model “may be applied to new monitoring periods in the same grid,” and also “may be applied to different grids, as long as the same covariates are available.” The unlimited application of a validated model across different time periods seems dubious. There should likely be some expiration date beyond which a model must be re-validated using more recent data that reflects changes in such important factors as resource mix and fuel prices. The allowance for universal applicability across geographic regions is even less supportable. It is not hard to imagine a model built for the Midwestern grid accurately predicting that coal will be on the margin during certain over-night hours when load is at a certain level.

There are certain areas of the proposed methodology that would benefit from additional clarification. These include:

- **Baseline consumption calculation:** The methodology identifies three alternative ways of defining a baseline electricity consumption scenario. However, it does not provide sufficient descriptions of how baseline consumption would be calculated under any of these alternatives. We respectfully request additional detail in these areas.
- **Timescale of consumption switching:** It would be useful if the main methodology document specified the timescale across which the proposed methodology would lead to load shifting. Appendix B of the document implies that WattTime is designed to enable electric devices to switch on and off at five-minute intervals. This is a surprisingly short time interval across which to predict marginal emission rates.
- **Error related to the Carbon Advisory Service computations:** The standard is vague on the computational performance requirements that a carbon advisory service must demonstrate and whether there are any inherent errors in the computations that must be defined and considered as it pertains to quantifying the avoided emissions from a project. For example, does the carbon advisory service involve any input error, round-off errors or floating point operations that should be defined and controlled for as it pertains to quantifying emissions reductions? We request that the developer or VCS better explain what and how the Carbon Advisory Service works.
- **Evidence of Review and Testing of the Regression Model as Required.** Section 4 specifies requirements for the carbon advisory service and cites Section 4.1.6 of the VCS Standard, v3.7, for the regression model requirements, of which we request clarity around whether the proposed methodology and undergone an appropriate review and testing and whether the results and process of that review are publicly available.
- **Targeted customer class.** In reading the methodology, it was not clear to us whether this tool is designed for a specific class of electricity customers, or for all customers. The list of electric devices included in Appendix A indicates that residential customers are the primary target. If this is the case, it should be clarified somewhere in the document.
- **Data and Regression Analysis Validation for Different Grids.** With respect to determining the operating margin under Option 2, we request that the standard developer, or qualified peer group, undertake and make available transparent analysis for more than one RTO/ISO using publicly verifiable data sets that “produce marginal emissions estimates with a root mean squared error of less than 1 percent of the average marginal emissions value of the entire validation set” under the regression model.

The standard would be improved with additional terminology definitions.

Section 3. Definitions should include definitions for:

- **Grid or Regional Grid:** Because the standard's approach for determining the grid's operating margin relies on the definition of a "grid" or "regional grid" and the need for alignment of the covariates between grids, the definition of a grid should be made clear.
- **Grid Operator:** In the U.S., a grid operator is often defined as an RTO/ISO, however, not all the country is covered by RTO/ISO operators. The standard would benefit from a clearer definition of what constitutes a grid operator and whether the proposed standard can be used in regions absent an operator that meets this definition, if applicable.
- **EV Charger:** What type of EV Charger does this standard apply to? Is it possible that an EV charger unit could be portable? If so, how would the methodology account for potential temporal charge and discharge of a mobile EV with a portable charger that could charge and discharge with electricity from different grids? Does this standard only apply to stationary EV charging or fast charging units?
- **Thermostats:** What constitutes a thermostat under this standard? Is it simply the thermostat or does it extend to what the thermostat controls (e.g, HVAC unit)? Does the controlled technology have to be electric-based?
- **Heating and Cooling Equipment:** What constitutes eligible heating and cooling equipment? Are there types of equipment that wouldn't qualify?