

September 30, 2026

Abbey Brown
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Lauren Sanner
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Department of Ecology
State of Washington
P.O. Box 47600
Olympia, WA 98504-7600

Re: Feedback on the Clean Fuel Standard (Chapter 173-424 WAC)

Dear Lauren Sanner and Abbey Brown,

Antora Energy (Antora) appreciates the opportunity to provide informal comments regarding updates to Chapter 173-424 WAC, the Clean Fuel Standard (CFS). Specifically, this comment provides our input on how deploying thermal energy storage (TES) technology at low carbon fuel production facilities can help deliver more immediate, direct, rapid, and affordable achievement of CI reduction targets within the CFS.

About Antora: Antora delivers affordable, industrial heat that deploys rapidly and is available around the clock. Antora's TES systems draw power when local renewable electricity is cheapest and most abundant, delivering low-cost process heat. Antora's TES system delivers multi-day storage including always-available heat and power. Factory-built modules deploy rapidly, without supply-constrained critical minerals or multi-year construction timelines.

TES is a pathway for low carbon fuel producers to reduce their CI. TES systems consume electricity selectively, charging at times when the local grid is unconstrained and renewable generation is the marginal or predominant source of electricity, storing it as heat for later use to produce industrial process steam.

Antora recently commissioned a 5 gigawatt-hour, multi-day TES system at POET's ethanol bioprocessing facility in Big Stone City, South Dakota. To supply low-emission steam to the facility, Antora is sourcing renewable energy that provides low value to the grid due to congestion, much of which would otherwise be curtailed. Antora's system replaces on-site fossil fuel combustion for steam at the facility and, as such, delivers direct scope 1 emissions reductions. The deployment ranks among the world's largest energy storage projects, delivered at the speed required to meet surging domestic energy demand. Antora has another project with a clean fuel producer currently under construction.

Integrating TES into the CFS Will Help Washington Achieve CI Reduction Targets and Fulfill Clean Energy Goals

Deployment of TES technology at scale is relatively novel world-wide but is rapidly increasing due to the advancement of TES technology. The commercialization and deployment of TES technology at low carbon fuel production facilities is a recent development that has not previously been considered in a Washington CFS rulemaking (or any other state-level clean fuel program rulemaking). As a result, the CFS framework does not account for the CI reductions that the deployment of TES technology provides to low carbon fuel production.

Where the conditions are right for TES, the technology enables charging with low-cost, local renewable surplus, when the grid is congested and clean energy would otherwise be curtailed, rather than adding demand when fossil generation is on the margin. In doing so, the adoption of TES technology provides an opportunity to dramatically and affordably decarbonize transportation fuels. Deployment of TES under these conditions also enables greater utilization of existing renewable power generation capacity and reduced fossil fuel use.

Antora's recently commissioned multi-day thermal energy storage system at POET's bioprocessing facility in Big Stone City, South Dakota illustrates these dynamics. Known as Project Big Stone, the scale of this facility at approximately 5,000 MWh (5 GWh) establishes it as one of the world's largest energy storage installations. The project consists of over 200 of Antora's solid carbon block thermal batteries.

The TES system leverages a novel tariff developed in partnership with Ottertail Power (OTP). The tariff is designed to convert surplus local renewable energy into industrial heat with electricity priced at wholesale market rates plus a margin that ensures net system benefits for other OTP customers. Under the renewable charging requirement set by the tariff, demand for TES must be renewable- coincident. OTP and Antora identify specific renewable facilities with transmission availability to the site and the TES system draws power only when such identified nearby wind and solar farms are generating electricity. Further, the charging flexibility provided by long-duration storage in combination with exposure to wholesale pricing structurally incents TES projects to charge exclusively at times of lowest-price when the grid is least constrained, rather than adding demand when fossil generation is on the margin. The TES system then delivers around-the-clock, low-cost industrial steam to the low carbon fuel production facility.¹

Tariff language specifically states that the thermal storage must “take service coincident with and not to exceed the hourly generating output of a nearby specifically identified wind and/or solar generation resource.”

However, CI reductions from such TES systems are not yet recognized by Washington's CFS or any of the other clean fuel programs in the United States. The current CFS framework assumes annual grid average electricity emissions over a wide area. As such, the CI of TES-derived steam used by a clean fuel production facility would be analyzed not on the basis of the electricity

¹ Antora Energy, Antora and POET Commission 5 Gigawatt-Hour Thermal Battery Project to Power South Dakota Industry with Affordable Energy <https://www.antora.com/insights/big-stone-release>

specifically procured for the TES system but rather on the basis of the emissions associated with the regional grid mix.² Such an assumption would inaccurately show an increase in emissions from TES and perversely *penalize* low carbon fuel producers that adopt TES at their facilities. Examining TES electricity emissions with greater temporal and spatial fidelity increases accuracy and shows the emissions intensity of electricity at the times of TES consumption is near zero.

Updating CFS rules accordingly would support Washington's goals of rapidly decarbonizing the transportation sector and drive greater utilization of renewable electricity generation by leveraging the capabilities of TES technology. Doing so would also help fulfill the goals of the Clean Energy Transformation Act (CETA) and the state legislature's recognition of the value of innovative technologies to decarbonize the grid and the energy sector.

Further, the early commercial deployment of TES systems at low carbon fuel production facilities like POET Big Stone will help accelerate uptake of this emissions reducing technology for a much broader set of industrial sector applications of critical importance to Washington: aviation fuel, chemicals, refining, iron and steel, food and beverage, pulp and paper, cement and lime, and mining and minerals processing.

We very much appreciate the opportunity to provide these comments and are available for discussion on these issues.

Sincerely,

Sasha Stashwick
Director, Federal Affairs
Antora Energy

² See WAC 173-424-610(4)(a) of the CFS regulations which is entitled "Obtaining a carbon intensity score" and states in applicable part, "All applicants using grid electricity must choose electrical generation mixes from among the subregions specified in the Simplified Tier 1 CI calculators, if applicable; (...)"