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Hydrogen Program
U.S. Department of Energy
1000 Independence Ave. SW
Washington, DC 20585

RE: U.S. Department of Energy Clean Hydrogen Production Standard (CHPS) Draft Guidance

Submitted on behalf of Covanta, York County Solid Waste Authority, and Kent County Department of Public Works via email to Cleanh2standard@ee.doe.gov

Thank you for the opportunity to provide comments to the U.S. Department of Energy (DOE) Hydrogen Program in response to its request for stakeholder feedback on the DOE proposed guidance on clean hydrogen production. Covanta is a U.S.-based company focused on providing more sustainable waste management services to our customers and clients.

As part of our portfolio, Covanta currently owns and/or operates 37 waste-to-energy ("WTE") facilities in the United States, most in public-private partnerships with local government. These facilities generate baseload, resilient renewable energy from post-recycled municipal solid waste, while mitigating greenhouse gas ("GHG") emissions relative to the business-as-usual practice of landfilling. We believe these facilities, as well as other technologies, including anaerobic digestion, can be an important source of low-carbon hydrogen derived from biogenic components of waste.

We are pleased to see DOE's recognition of the potential for waste products that would otherwise have been disposed of (e.g., municipal solid waste), as having net zero or negative CO2 emissions. Today, the overwhelming fate of these waste materials is landfilling, a leading source of the potent greenhouse gas methane, even after factoring in existing landfill gas collection and capture systems. As a result, the use of biogenic waste stream-derived materials and/or energy would have likely resulted in large GHG emissions if not used for hydrogen production. In addition, the use of waste sources of biomass, including that contained in municipal solid waste, has been consistently found to have no land-use change impacts.

To best ensure that use of biogenic waste stream-derived materials and/or energy is properly accounted, we provide our specific comments below.

The DOE should incorporate the latest science in assessing the climate impacts of methane.

According to the United Nations Environmental Programme (UNEP), "cutting methane is the strongest lever we have to slow climate change over the next 25 years."[1] In the near-term, reducing emissions of SLCPs like methane is more effective than reducing CO_2.[2]

The choice of the 100-yr timeframe commonly used for GWPs in GHG reporting, inventories, and even scientific studies is somewhat arbitrary and doesn't have a basis in science. According to the IPCC's 5th Assessment Report:

> "There is no scientific argument for selecting 100 years compared with other choices. The choice of time horizon is a value judgment because it depends on the relative weight assigned to effects at different times."[3]

To bring the consideration of methane emissions in the CHPS with the latest science, the DOE should adopt the 20-year GWP. Methane is 84-86 times more potent than CO_2 over a 20-year period, a time frame now used by CA, NY, and NJ to assess policies aimed at reducing methane.[4,5,6] This approach follows years of calls from the scientific community for a greater focus on climate pollutants like methane owing to their potency and other differences relative to CO_2.[7,8,9]

Existing lifecycle models and frameworks that specifically address waste management practices should be incorporated into the final guidance.

The GREET model is an excellent choice for a life cycle model to evaluate hydrogen fuel pathways under these programs because GREET is peer-reviewed, updated annually and configured with the latest U.S. average data. Furthermore, the GREET model already models the avoided emission benefits associated with diverting wastes from their baseline management practices to hydrogen production and including these emission credits will incentivize low-CI hydrogen pathways and recognize the real-world emission benefits of converting waste to fuel. Taking into account the emissions tied to the alternate fate of the fuel used to produce hydrogen, such as open-burning or contributing to wildfire, will encourage responsible use of these materials.

In addition, we recommend that the DOE consider the use of lifecycle tools specifically designed for waste management, including North Carolina State's SWOLF tool and the U.S. EPA Office of Research and Development's MSW Decision Support Tool (MSW-DST). The EPA's Waste Reduction Model (WARM) is often used, but only provides greenhouse gas and energy outcomes and lacks the flexibility of other tools in evaluating different process and materials. Furthermore, many defaults are unchangeable, making it difficult to tailor the analysis to new technologies or development.

Lifecycle models, tools, and defaults need to be carefully validated against the new data emerging on landfill methane emissions to ensure proper accounting of emissions savings by using waste feedstocks.

Until recently, there have been few actual measurements of landfill emissions. Instead, lifecycle models have historically relied on defaults informed by a very small dataset. Even within the modeling approaches currently accepted by the U.S. EPA for GHG reporting, significant differences can exist,[10] and current defaults used in many models have been found to underestimate emissions.[11] Direct measurement of landfill methane plumes has corroborated this conclusion. UNEP summarized some of the recent data as follows:

> "[R]emote sensing from aircraft has been used to quantify emissions from specific sources with relatively high accuracy, based on flights of independent instruments on different aircraft … These data have shown that many bottom-up estimates are incorrect."[12]

Across a series of recent studies employing direct measurement of methane plumes via aircraft downwind of landfills, actual measured emissions from landfills have averaged ***twice*** the amount reported in GHG inventories.[13-19] Actual emissions from specific landfills have been measured over 14X greater than reported. This recent data must be reflected in models used to calculate carbon intensity of hydrogen production to ensure proper quantification.

The DOE should allow for separate carbon intensity (CI) calculations for hydrogen produced or derived from comingled feedstocks containing biogenic and fossil fuel waste streams.

We recommend allowing producers to calculate the CI and claim credit for low-CI hydrogen from biogenic waste sources co-processed with fossil sources either through energy allocation of the production process(es) or by demonstrating the biogenic portion using radiocarbon testing. This flexibility will allow for large quantities of comingled waste resources to be responsibly converted to hydrogen rather than landfilled.

The co-product methodology should depend on the product mix.

The energy allocation method should be used for all hydrogen pathways that produce only energy products. Pathways that produce non-energy co-products (e.g., elemental carbon) should use economic (price-based) allocation based on a 3-year average of price data. This hierarchical approach is designed to allocate emissions based on what society values most. The primary interest is to produce energy and pathways that produce only energy should allocate emissions based on the relative share of energy flows in the products. For processes producing non-energy products, emissions should be allocated based on economic value because this reflects the relative value of each product in the global marketplace.

The DOE should allow indirect accounting for low-CI process inputs used to produce hydrogen.

Many hydrogen producers do not have direct access to renewable electricity or RNG and the economics of developing their own renewable electricity or RNG sources are prohibitive. Use of renewable electricity and RNG via "book and claim" accounting can be readily verified by third parties based on contracts, attestation letters and data management systems. "Book and claim" accounting has been successfully used to promote low-CI hydrogen production under many fuel programs, including the California Low Carbon Fuel Standard (LCFS) and other state LCFS programs, the International Sustainability and Carbon (ISCC) certification scheme and many others

We look forward to working with the U.S. Department of Energy to best use waste resources remaining after recycling to help generate clean hydrogen. Please do not hesitate to reach out to me with any questions by email (MVanBrunt@covanta.com) or 862 345 5279.

Sincerely,

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