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Response to: Federal Buy Clean Request for Information: Construction Materials with Substantially Lower Embodied Carbon
Notice ID: CONSTRLOWCARBON

On behalf of the BlueGreen Alliance (BGA), a coalition representing millions of members and supporters, we thank the president, his administration, and the Buy Clean Task Force for prioritizing the procurement of low-carbon emissions materials in public infrastructure projects. Additionally, we thank the General Services Administration (GSA) for seeking input on construction materials with substantially lower embodied carbon.

The billions of dollars of federal funds spent on public infrastructure each year could hold the keys to reforming the misaligned incentives that have prevented strong action to reduce industrial pollution and to creating markets for firms that innovate to reduce carbon emissions, other air, land, and water pollution and toxics, and create good jobs. A federal Buy Clean policy that prioritizes transparency, invests in innovation, and ties public dollars to low-carbon emissions materials holds the promise of transforming some of the most pollution-intensive and economically vital sectors in our economy—allowing us to confront climate change while rebuilding the middle class and advancing environmental justice.

3. What strategies have you used to lower the embodied carbon of your products or materials? (choosing alternative source materials; buying source materials that have EPDs; improving your plant's energy efficiency; improving transportation energy efficiency; other- please specify)

Tools for Transparency and Disclosure

As a top purchaser of concrete, cement, steel, and other construction materials widely-used in public infrastructure projects, GSA has the power to be a major market mover to the benefit of our climate, environment, public

health, and our domestic manufacturing sectors. The federal Buy Clean initiative established in E.O. 14057, “Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability,” set out the initial stages of a framework (that GSA has since built on) to require and incentivize spending taxpayer dollars on materials that are manufactured in a cleaner, more efficient, environmentally-friendly manner.

As the E.O. suggests, this initiative must be built upon a foundation of data transparency and disclosure of the embodied carbon emissions and other air, water, and land pollutants in the major materials and products purchased by the federal government. An agreed-upon methodology for measuring and calculating the embodied carbon of such materials and products is an environmental product declaration (EPD), as cited in the E.O. as a means for reporting carbon emissions data. EPDs are a commonly-used reporting mechanism in both the U.S. and in Europe.

EPDs, which are typically valid for five years, are often referred to as a “nutrition label” for construction materials. These declarations follow international standards and are third-party verified. Type III EPDs follow standards set by the International Standards Organization (ISO) and can be verified by a range of independent parties instead of relying on self-declarations like other ISO environmental labels.[i] Currently, EPDs are required to include the cradle-to-gate carbon emissions at a minimum, which includes extraction and upstream processing of materials, transportation, and manufacturing. For example, an EPD for a piece of rebar might quantify the impact from the mining of iron ore or the processing of recycled steel, turning that raw material into steel, transport to fabrication shops, and product fabrication.

Cradle-to-gate emissions are well suited for Buy Clean policies because from raw material extraction to when the product leaves the manufacturing facility are typically the largest source of carbon emissions and therefore present the largest opportunity for investment in clean technologies and processes. The goal of any Buy Clean policy is to provide an incentive for manufacturers to invest in cleaner technologies and processes to reduce the carbon emissions and pollution intensity of their operations. As a result, it makes sense to focus on what manufacturers have control over.

For these reasons, BGA has advocated for the use of Type-III product-specific EPDs that report facility-specific and supply chain specific data for production processes that contribute to 80 percent or more of a product’s

cradle-to-gate global warming potential and report the overall percentage of supply-chain specific data. This ensures accurate reporting because end-stage fabricators or manufacturers cannot substitute industry averages for a product's carbon footprint.

Beyond what is currently possible with EPDs, BGA believes that a broader life-cycle assessment will be necessary to meet the full potential of a Buy Clean policy. For example, while cradle-to-gate emissions typically account for the vast majority of a product's carbon footprint, a notable exception would be a material like wood, where transportation emissions from manufacturer to job site could be a significant share. Another example would be in the steel industry where the purchase of off-site renewable energy through Virtual Power Purchase Agreements are not yet captured in EPDs. For this reason, BGA supports efforts to bring experts together to identify gaps in what EPDs can currently capture, and work towards methods that can fill those gaps.

In addition to these potential gaps in EPDs, more work needs to be done to ensure health and environmental impacts beyond carbon emissions, such as a full spectrum of priority air and water pollutants and toxic chemicals, can be incorporated into a Buy Clean policy. Tools such as the Health Product Declaration or the Declare Label could be paired with EPDs to provide a more robust understanding of the impacts industrial processes have on the health of workers, fenceline communities and consumers.[ii],[iii] This can provide the information necessary for Buy Clean to not only help in driving industry towards net-zero, but also to protect the health of manufacturing workers and the communities where industrial facilities are located, which are disproportionately low-income and communities of color.

Technological Innovations in Emissions Reductions

New technological innovations are always under development and require significant support on research, development, and deployment (RDD) as well as direct investment from the federal government to meet the reductions necessary to achieve the goal of net-zero carbon emissions economy-wide by 2050. Many pathways currently exist to deeply reduce emissions in the industrial sector including those cited in the recent release of the DOE's Industrial Decarbonization Roadmap for the relevant materials such as energy efficiency, material efficiency and reuse, fuel and feedstock switching, other process changes, and carbon capture, utilization, and sequestration (CCUS) to name a few.[iv]

Industrial Energy Efficiency and Material Efficiency and Reuse

A key way to improve the energy efficiency of manufacturing is through the use of cogeneration systems, often referred to as combined heat and power (CHP), or waste heat to power (WHP).[v] In addition to CHP and WHP, a range of commercially available efficiency technologies and measures exist that could reduce carbon emissions from manufacturing. For instance, studies have shown that efficiency improvements could result in a 15 to 20% reduction in energy consumption for steel.[vi]

Associated deployment challenges for these technologies can hamper their application, however. For instance, internal capital investment competition can mean smaller investments that yield payback more quickly than CHP and end-use efficiency are often prioritized, especially as such technology is not viewed as a revenue generator. Additionally, there is often poor awareness or knowledge about the technical and economic potential of these technologies.[vii]

We also need more innovation of technologies and business models to scale up the reuse of materials and support circular economies within manufacturing. Recycling is already an integral part of steel production, although we need to do more to reduce contaminants in steel products to further increase the recyclability of scrap steel. However, it is important to note that even in a more circular economy primary steel production will remain a major part of meeting the global demand for steel.[viii]

Fuel and Feedstock Switching

Fuel switching to clean sources can also help reduce carbon emissions from the industrial sector, particularly with respect to process heat, which is the biggest source of energy use and related emissions in the sector. This could include switching to dispatchable clean energy sources, such as clean hydrogen along with the electrification of certain processes.

Solar thermal could play a role in addressing industrial energy demand as Concentrating Solar Power (CSP) plants are capable of producing heat at temperatures as high as ~1000°C, which make them applicable to certain manufacturing subsectors. Disadvantages around geographical mismatch between their optimal location and existing manufacturers, and a current lack of commercial scaling hamper these efforts.

New technological innovations are under development to address the

emissions associated with high-temperature heat generation. One cutting-edge innovation for steel is “electrolysis,” which could replace high-temperature chemical processes. In this method, electricity, rather than heat, would drive reduction and oxidation reactions.[ix]

Another innovative approach under development entails reducing emissions from the consumption of fossil fuel for heat and emissions from certain feedstocks by switching them with clean hydrogen or some forms of ecologically responsible biomass.[x,xi] For example, primary steel can be produced through direct reduction of iron ore with clean hydrogen as a fuel and feedstock instead of coal.[xii,xiii]

Carbon Capture, Utilization, and Sequestration (CCUS)

The Intergovernmental Panel on Climate Change (IPCC) Special Report found that CCUS will need to play a major role in decarbonizing the industrial sector in pathways limiting warming to both 1.5°C and 2°C, particularly in the key manufacturing industries with higher process emissions that result from the conversion of feedstocks into commodities, for example, iron ore into iron and steel, limestone into cement, and bauxite into aluminum.[xiv] It needs to be emphasized that these emissions are associated with chemical conversions rather than energy use and we do not currently have near-term options other than CCUS to manage them.

Adoption of CCUS also means finding more effective ways to safely utilize carbon dioxide (CO2) emissions in ways that do not damage the environment or exacerbate impacts on environmental justice communities. For instance, captured CO2 may be sequestered through permanent geological storage under ironclad protections for clean water. Additionally, industrial facilities that capture and sell CO2 for non-polluting purposes such as mineral carbonation can reduce their emissions while also gaining an extra revenue stream, creating jobs in their company as well as downstream industries and suppliers. The economic benefit of this would encourage more carbon producers to capture their emissions, and could result in reduction of stationary source CO2 emissions from current levels.

CO2 is already used in some industrial processes, such as waste gas recycling used in steelmaking, and has the potential to shift from a burden to a valuable commodity in the future as research into safe and non-polluting carbon utilization advances.

4. Do you currently offer construction materials or products in the

following product categories that are substantially—and demonstrably—lower in embodied carbon, compared to industry averages for similar materials or products?

The Federal Government and GSA should build on and align with the federal Buy Clean Initiative and use its vast purchasing power to create a multi-billion dollar market for the domestic companies making investments to reduce emissions in the manufacture of low-carbon construction materials. Those materials listed in Tier 1 of this RFI, including steel, cement, asphalt, and flat glass and Tier 2—especially aluminum—are among the biggest sources of industrial climate pollution and therefore the identification and procurement of such materials with lower embodied carbon, pollutants, and toxics should be prioritized.

Addressing industrial emissions, which account for nearly a third of U.S. emissions, is a critical piece in meeting the scope and urgency of the climate crisis. A series of misaligned incentives that include unfair trade policies and a lack of investment in domestic manufacturers have created barriers to achieving the deep reductions in climate pollution that are needed.

Despite these barriers, many materials produced in the United States are among the cleanest in the world when it comes to carbon emissions, most specifically steel. BGA commissioned a study by Global Efficiency Intelligence that found the U.S., which is the 4th largest steel producing country—making over 85 million metric tons of steel in 2021—produces the second lowest-carbon steel in the world.[xv] Among the six largest steel producing nations — China, India, Japan, the U.S., Russia and South Korea — which account for 75% of global steel production, the U.S. has the lowest CO2 intensity, according to the analysis.

While Buy Clean is novel in its approach to reducing industrial sector carbon emissions, using public procurement to support domestic industry is not new. Federal Buy America laws exist, which incentivize investments in local manufacturing by giving preferences to domestically made materials and products in some federal aid infrastructure programs.[xvi] Similar to that of Buy Clean, Buy America effectively states that taxpayer dollars should be used to support domestic industry. Domestic manufacturers abide by U.S. environmental, labor, and health and safety laws. It makes little sense to signal the importance of these protections only to send taxpayer dollars overseas, where producers often operate in environments with low, or nonexistent, labor, safety and environmental standards. Steering public infrastructure investments to U.S. manufacturers is an important part of

creating a strong industrial base that can compete against heavily subsidized foreign manufacturing firms.

The Build America, Buy America Act provision included in the Bipartisan Infrastructure Law (BIL) expands and strengthens Buy America provisions. The law expands Buy America to all federal programs that provide grants for the construction of infrastructure and closes loopholes that had undermined the effectiveness of the law.[xvii] Enhancing Buy America can help ensure taxpayer dollars are invested at less carbon intensive domestic facilities, showcasing how Buy America and Buy Clean can work in concert to reduce industrial emissions and support good jobs.

9. What, if any, are the technical, economic, or regulatory obstacles to reducing the embodied carbon of more of your materials or products?

Technical

Cutting edge projects have not been widely adopted in the United States because – until the BIL, Inflation Reduction Act, and the CHIPS and Science Act (CHIPS) are fully implemented – the policies and programs have not been put in place to incentivize and support the kind of investments needed to make them a reality.

A major barrier to deep decarbonization is the nascent development stage and/or the capital cost of necessary technologies combined with an inability to spread cost across the supply chain. As such, the federal government must play a critical role in helping deploy and commercialize transformative technologies as decarbonization will not happen incrementally and requires high-risk near-term investments. If the United States does not start playing catch up with the countries making these investments, low- and zero-emission manufacturing will be commercialized in countries that are our global competitors. This will require an aggressive agenda to regain American leadership in clean technology innovation and deployment.

Despite the urgency of the climate crisis and the need to invest in industrial competitiveness, total federal support for research and development has been declining for decades from over 2% percent of GDP in the early 1960s to about 0.5% in 2019.[xviii] Restoring R&D spending to the 2% peak in 1964 would increase public funding for innovation by over $300 billion. Spending on energy-related R&D has declined even further from 3.6% of total R&D spending in 1964 to 2.8% of spending in 2019.[xix] Pulling back on our investments in innovation makes it harder to solve the climate crisis and risks

leaving American companies and workers at a disadvantage in a globally competitive economy.

There is no reason the United States cannot be home to the cutting-edge industrial operations of the future, but we must make the necessary investments now. BGA and its partners have been at the forefront of that effort, releasing a bold Manufacturing Agenda in 2020 that lays out a roadmap for how the U.S. can once again lead the world in manufacturing the technologies and products of the future.[xx] BGA is now working to maximize existing federal dollars, take advantage of recently enacted funding streams, and continue advocating for the new investments necessary to transform the industrial sector.[xxi]

Economic

Environmental Product Declarations

While expanding EPD usage is doable, companies, particularly smaller and mid-sized manufacturers, will need technical assistance and funding to help them obtain EPDs. The costs to obtain an EPD for a product can vary greatly, between $5,000 to $50,000 according to a study in Washington State, and an international study found the cost to be around $18,700.[xxii,xxiii] In addition to these costs, the number of EPDs a company will need can vary greatly by industry. A steel producer might only need one EPD for the rebar it produces, but a concrete manufacturer might have dozens of different product specifications. The Inflation Reduction Act provides a critical first step in expanding EPD adoption by providing $250 million over 10 years to provide businesses with grants and technical assistance for obtaining an EPD for the construction materials it produces.

Spurring greater adoption of EPDs can also help drive down costs by spurring competition among Life Cycle Assessment providers and EPD program operators. Ready-mix concrete is one industry that has already seen this happen as private sector demand for EPDs, along with state and local-level policies, are increasing EPD adoption. In just the past year, according to Building Transparency, there has been an increase in product specific EPD disclosures in multiple building material categories including cement, concrete, steel and mass timber.

RD&D and Direct Investment

In addition to providing funding for EPD costs, significant investments in

industrial innovation are a necessary component of a successful Buy Clean policy as achieving the deep carbon emissions and other pollution reductions we need in the industrial sector will require major investments in new and emerging technologies.

Several pathways exist to deeply reduce climate and toxic air pollutant emissions in the industrial sector, but innovation, smart policies and investments, and *deployment* will be needed to achieve reductions in line with climate and environmental justice goals. For instance, most steel and cement plants will begin their next investment cycle in the coming two decades, which further emphasizes the need for near-term investment in order to meet these goals otherwise companies will need to commit to another cycle of investment in emissions-intensive assets.[xxiv]

One of the Inflation Reduction Act's key investments in industrial transformation is the creation of a new Advanced Industrial Facilities Deployment Program to support emissions-reducing projects at steel, aluminum, cement, and other energy-intensive, heavily polluting manufacturing facilities. The law offers $5.8 billion in funding for the new program, which represents an increase from earlier proposals due to the advocacy of BGA and its partners. The law also expands the 48C tax credit, making the credit available—for the first time—for manufacturers to install equipment that achieves an at least 20% reduction in climate pollution.

The BIL and Inflation Reduction Act provide historic investments in expanding clean technology manufacturing and industrial facility retooling, but more will need to be done to meet the scale of industrial transformation that is required.

Regulatory

Robust investments in RD&D will help ensure that domestic manufacturers have the resources necessary to upgrade facilities and adopt the latest technologies available to reduce emissions and other pollution. Once these programs are funded and widely available to manufacturers, and a strong foundation of embodied carbon emissions data is in place, the work of creating more competitive Buy Clean standards can move forward. Contractors will have to meet these standards in order to be eligible for federally funded construction projects and are meant to serve as a vehicle for reducing emissions in U.S. industry while boosting its global competitiveness.

BGA recommends that the Federal Buy Clean Task Force coordinate with

agencies to use data from EPDs to establish emissions thresholds for bidding companies, and also recommends development of a robust process for determining product category eligibility, which must include significant stakeholder input. The stakeholders should include representatives from covered industries, representatives of associated workforce including organized labor, representatives from fenceline communities, and environmental organizations. This process must also consider separate standards that account for differences in production processes and technologies, as they can create significant competitive and economic disadvantages for domestic facilities. The clearest example of this is structural steel, where steel from Electric Arc Furnace facilities and integrated steelmaking facilities must be treated separately. The same may also be said for certain domestic cement and concrete technologies.

Standards should strengthen over time and be directly correlated with investments and other forms of direct financial support (as described above) to allow domestic industry to innovate, reduce emissions, and improve sustainability as standards become more stringent.

Establishing standards for construction materials should be considered a floor for the more transformational changes that a Buy Clean initiative can incentivize. BGA also recommends establishing a high-achievers' market, through which the government would procure a certain percentage from the highest performing bidders. While standards coupled with investment would help raise the floor of domestic performers, a high-achievers' market would help raise the ceiling on performance, further pushing for innovation and improved technologies and processes.

End Notes:

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