STATE OF WASHINGTON

DEPARTMENT OF ENTERPRISE SERVICES

1500 Jefferson Street SE, Olympia, WA 98501

January 9, 2023

The Honorable Mark Mullet
Washington State Senate
PO Box 40405
Olympia, WA 98504

The Honorable Steve Tharinger
House of Representative
PO Box 40600
Olympia, WA 98504

Dear Senator Mullet and Representative Tharinger:

The Department of Enterprise Services (DES) is pleased to forward the DES Carbon Reduction Strategies Workgroup Summary Report in accordance with SHB 1080 Section 7041.

The report discusses current practices in building design and construction within the state's public sector and the University of Washington Buy Clean, Buy Fair pilot projects as ways to develop criteria to reduce the amount of embodied carbon in building construction.

This report is available on the DES publication and reports website, https://des.wa.gov/about/forms-publications/publications-reports.

If there are any questions, concerns, or additional information we can provide, please contact Bill Frare, Assistant Director, Facility Professional Services, at bill.frare@des.wa.gov.

Sincerely,

Tara C. Smith
Director

Enclosure

cc: David Schumacher, Director, Office of Financial Management
Maurice Perigo, Chief Operations Officer, Department of Enterprise Services
Bill Frare, Assistant Director, Facilities Professional Services, Department of Enterprise Services
Ashley Howard, Chief Financial Officer, Department of Enterprise Services
Ann Larson, Assistant Director, Policy & Government Relations, Department of Enterprise Services

DES Workgroup Summary Report:

Carbon Reduction Strategies for Public Works Contracting

Statutory Directive

The 2021-2023 Capital Budget (SHB 1080 Section 7041) directed the Department of Enterprise Services (DES) to convene a construction industry workgroup to recommend applications of successful carbon reduction strategies in state capital projects.

Background

In July 2021, DES invited members of the construction industry to participate in a workgroup to determine strategies to reduce carbon in state construction projects. DES specifically invited representatives from:

- The Washington State Academy of Sciences
- The Associated General Contractors of Washington
- The BlueGreen Alliance
- The University of Washington Carbon Leadership Forum
- The Washington Aggregates and Concrete Association
- The Washington Environmental Council

Additional members were either suggested by the initial invitees and allowed to join or volunteered to join on their own. DES granted all requests for inclusion.

In total, DES sent group meeting invitations to over two dozen individuals, including industry representatives, private architects, designers, engineers, state agency representatives, and legislative staff.

DES held three virtual meetings between August and September 2021. Conversations with stakeholders and information gathering continued through the fall of 2021 and spring of 2022. Several stakeholders requested to submit written materials to be included in the report. DES received these materials late June 2022. Internal review and review by the Department of Commerce and Office of Financial Management resulted in comments that required additional research to address.

DES created this summary to lay out the process followed by DES and the basic information developed by the workgroup. DES is extremely grateful for the time and expertise of the professionals in the workgroup and has made this document available to them upon request.

Methodology

The workgroup addressed the following considerations.

Clarify the definition and proper consideration of Environmental Product Declarations (EPDs)

The basic definition of EPDs is established in current literature. In discussion, workgroup members identified and agreed upon the following concepts.

EPDs allow manufacturers to disclose a product's carbon footprint and other impacts to the environment. Type III EPDs are third party verified, standardized documents that report the results of a life cycle assessment (LCA) for a particular product. EPDs are governed by international standards (ISO 14040 and ISO 14044) and product category rules (PCRs). A PCR is a set of rules and guidelines for a particular product or group of products.

EPDs are based on product LCAs that cover, at minimum, the impacts of product extraction, transportation, and manufacturing. One standard part of EPDs is the global warming potential (GWP) for a product. GWP is expressed in carbon dioxide equivalents (CO_2e) and is an agreed-upon definition for expressing a product's carbon footprint. EPDs may also report a variety of other life cycle impacts to the environment, including acidification, eutrophication, ozone depletion and smog formation. EPDs also typically include additional manufacturer and product data, such as ingredients, manufacturing processes and locations, and resources consumed.

An EPD reports the results of an LCA that tells how a product is made and explains each environmental impact and how it was measured. Although they are complex and can be challenging to interpret, EPDs are the best available tools for embodied carbon disclosure and transparency.

Not all EPDs are the same. EPDs can be supply chain specific, industry wide, generic, or manufacturing plant specific, and the LCAs and PCRs that inform these EPDs can vary. Each capital project may use various EPDs to evaluate environmental impacts during the conceptual design stage or following completion of construction.

Comparisons between EPDs should only be made when the impacts are calculated using the same methodologies, and the products being compared are functionally equivalent. EPDs should not be used as a comparison tool between disparate products — such as wood and steel, or different types of concrete — because the LCA information on which they are based is quite different. EPDs are valuable for comparison of variations between suppliers of like materials. Different product EPDs are based on different characteristics associated with those products. When looking across products, there may need to be different goals and evaluation methods required to identify the lowest carbon products within a given category to assist with materials selection for building projects.

EPDs can be product specific or industry wide, and some EPDs can be product specific but use industry average data. Before knowing the supplier of materials for a specific project, an industry average EPD may provide information to project designers about the magnitude of the project's upfront embodied carbon associated with the structure itself.

Identify how EPDs can be used to:

- **Provide baseline understanding of embodied carbon intensities in state construction projects.**
- **Lead to measurable carbon reduction results.**

Before knowing the supplier of materials for a specific project, an industry average EPD may provide information to project designers about the magnitude of the project's overall GWP associated with the structure itself.

At design, with material quantities identified, applying industry average EPDs can provide a benchmark level for the building's embodied carbon footprint. Embodied carbon optimization is determined by design decisions. Once those decisions are made, the process of optimization can begin. Optimization takes collaboration between the building owner, the design team, and the general contractor to achieve success.

Comprehensive optimization of a building's greenhouse gas (GHG) footprint includes incorporation of both the structure's GHG impacts as noted above and emissions impacts associated with the facility's operations. RCW 39.35, Energy conservation in design of public facilities, uses LCA to inform design teams and facility owners about the energy impacts (and thus the GHG related emissions) of design choices associated with new construction and significant remodel of public facilities. Combining both construction and operation impacts associated with facility design decisions provides a more complete picture of a facility's GHG footprint.

After a California bill passed in 2017, policy approaches to embodied carbon reduction optimization have been referred to as "buy clean" policies. The Carbon Leadership Forum has developed a policy primer series addressing embodied carbon and the steps to developing a buy clean policy.

The information provided in this primer series explains how EPDs provide information to understand embodied carbon intensities in major construction and how use of buy clean policies can lead to measurable carbon reduction results.

Carbon reduction strategies can also include facility design features, materials selection, product sourcing, overall building efficiency improvements and contract incentives for surpassing building performance targets.

Suggest a project review methodology or pilot project for application of the industry recommendations.

Public facilities construction projects have a timeline that can be measured in biennia. Project proposals:

- Are reviewed by the Office of Financial Management for approval and potential funding.
- Are required to complete project pre-design reports and to seek funding for design.
- Receive a capital budget appropriation for construction.

Construction of capital projects can take multiple years, depending upon the scope. Several pilot projects are currently underway that are intended to gather input on ways the state can pursue low-carbon construction.

For example, in 2021 the Department of Commerce was provided direction and funding to engage with the University of Washington (UW) to gather information as part of the UW's Buy Clean, Buy Fair Washington pilot at two UW educational properties. The pilot is intended to produce specific information on material quantities, current environmental product declarations and other information.

HB 6095 Buy Clean Washington Pilot (91000447) was started in 2018 to follow five projects. As of January 2022, two of these projects have not yet started construction. These pilot projects were the first attempt to collect EPD data by state agencies, and the University of Washington keeps the data.

There is insufficient data and specialized expertise across the construction and manufacturing industry to make an informed recommendation for a standardized project review methodology. DES recommends a forensic study of the pre-designs and designs of three recently completed projects. This study could perform a cradle-to-cradle lifecycle analysis of the alternatives examined in these projects, explore the availability of industry wide EPDs for key products, and make detailed recommendations for a standardized review methodology. The study should also perform a cost analysis and make recommendations on how to estimate the cost of performing a standard review.

Create an education and standards brief on the subject.

As mentioned above, educational materials about EPDs are readily available. Several examples were provided by the workgroup participants.

- CalPortland provided two documents with educational information:
    - EPD FAQs includes definitions of Environmental Product Declarations, Life Cycle Assessments, types of environmental labels, and other information.
    - A white paper Buy Clean Regulations: Providing a Real Solution vs. an Expedient Answer discusses the role the construction industry plays in moving towards a low-carbon economy. A PDF is attached.
- David Walsh, AIA, provided Carbon Reduction Strategies Supplemental Information that discusses the following:
    - The current state of material disclosure
    - Issues related to EPDs and disclosure
    - Future opportunities for embodied carbon reduction in building materials
    - Current sourcing limitations
- The Carbon Leadership Forum provided links to several documents about education and policy guidance.
    - EPD requirements in procurement policies includes explanations of how EPDs are appropriate for use in procurement policies.
    - The above cited CLF Embodied Carbon Policy Toolkit - Carbon Leadership Forum is a guidance series for policy makers on the topic.

Identify measurable criteria for use in establishing a project baseline summary during facility design using existing data gathering resources.

Identifying measurable environmental criterial is a complex topic. Policy level decisions about environmental goals and objectives must be evaluated and balanced with the project scope, schedule,

and budget. The primary policy level decision is to determine what life cycle phases of a material is going to be assessed: Cradle-to-Gate, Cradle-to-Grave, or Cradle-to-Cradle.

> **Cradle-to Gate** is an assessment that includes the extraction of raw materials, manufacturing, and production to a finished product ready for market. It sometimes includes distribution and construction but does not include use or end of life stages.
>
> **Cradle-to-Grave** is an assessment that includes Cradle-to-Gate and use operation and maintenance. It may include end of life stages such as demolition, and disposal.
>
> **Cradle-to-Cradle** is an assessment that includes all stages from extraction, manufacturing, distribution, construction, use, end of life and reuse, recycling, and recovery.

Once this determination is made, life cycle analyses can be performed, and environmental product declarations developed. As stated above, LCAs and EPDs vary by product and location. Evaluations between products are not necessarily comparable. Baseline summaries will vary across projects based on project location, and the standards used in an assessment.

In terms of carbon reduction two criteria stand out: **Primary Energy utilization** and **Global Warming potential**.

Again, there are many variables in how these criteria are measured and the extent of the measurement. Primary Energy can be measured in megajoules (MJ) and varies widely by energy source. Global Warming Potential is measured in CO_2 equivalents and is dependent on the energy source. Both are dependent on the life cycle stages considered in the assessment.

Identify sustainable and low-carbon emitting building materials.

As stated in the proviso, many construction materials can be recycled and reused for future projects. These materials have well established markets and result from the necessary processes of construction. The construction industry itself is ever evolving in response to market forces and opportunities. Future markets will drive which materials are reused and recycled, thus lowering GHG content of future construction. Some typical construction materials that can be recycled include:

- Wood may be reused in new floors, paneling, doors, window frames, fencing materials, and shipping pallets. Damage wood may be ground to become particle board.
- Metals, such as steel, copper, aluminum are often reused or recycled through scrap metal facilities. Glass can be reformed into new windows or recycled into other products such as fiberglass insulation, decorations, consumer products and aggregate gravel.
- Plastic salvaged from construction site has the potential to be recycled into roofing, pipes, window frames, playground equipment and many other consumer products
- Drywall is composed primarily of gypsum. Uncontaminated drywall can be recycled into new drywall. Other drywall can be recycled into agricultural products.
- Masonry can be cleaned and possible reforming for other construction projects. It can also be crushed for use in producing new masonry or for road construction base materials.
- Concrete can be crushed and used to produce new concrete or as aggregate base material.
- Asphalt pavement can be recycled and used for paving road and parking lots.