Buy Clean and Buy Fair Washington Project

FINAL REPORT

A professional report commissioned by the State of Washington 67th Legislature through operating and capital budget provisos

November 1, 2022

COLLEGE OF BUILT ENVIRONMENTS
UNIVERSITY of WASHINGTON

CLF Carbon Leadership Forum

Washington State Department of Commerce

About the Carbon Leadership Forum

The Carbon Leadership Forum at the University of Washington. We are architects, engineers, contractors, product suppliers, building owners, and policymakers who work collaboratively, pioneering research, creating resources, and incubating member-led initiatives for the greatest collective impact. Our goal is to accelerate the transformation of the building sector to radically reduce and ultimately eliminate the embodied carbon in building materials and construction.

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Competing interests statement

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Kate Simonen is on the board of directors of Building Transparency, a non-profit organization that supports the Embodied Carbon in Construction Calculator (EC3) tool, which includes a database of environmental product declarations that is referenced in this report.

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Executive summary

The Buy Clean Buy Fair (BCBF) Washington Project is a pilot study commissioned by the Washington State Legislature in 2021. This project requires the University of Washington (UW) College of Built Environments to develop a reporting database to collect environmental and labor information from state construction projects and conduct a case study using pilot projects. This pilot study provided the opportunity to explore the process of setting up and running a potential BCBF reporting program by developing a prototype reporting database and working with pilot project teams to test the implementation of BCBF reporting. This pilot study started in June 2021 and ended in October 2022. This report fulfills the requirements of section 128 (68) of the 2021-23 biennial operating budget (ESSB 5092) and section 1050, Chapter 332, Laws of 2021 (the 2021-23 capital budget).

"Embodied carbon" refers to the greenhouse gas emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials. A product's supply chain generates the majority of its carbon footprint and current climate policy efforts do not address these emissions, creating a 'carbon loophole.' Embodied carbon is a significant percentage of global emissions and requires urgent action to address it. Public agencies were responsible for 32% of the embodied carbon of construction in the U.S. from 2008-2018.[1] Washington state government can lead by example and leverage its purchasing power to reduce embodied carbon in the built environment, which begins with tracking and understanding the full range of embodied carbon in construction materials through environmental product declarations. By coupling Buy Clean requirements with Buy Fair requirements, Washington can also grow its economic competitiveness and support good working conditions at manufacturing facilities. The database supported reporting by providing a platform to consolidate data that can provide insight on state agency procurement of building materials.

"Buy Clean" is a policy approach that incorporates low carbon construction purchasing requirements into government procurement. Procurement policies are becoming more common in the United States as more policies are introduced at the state and federal levels. Buy Clean-type policies, such as the one piloted in this project, have significant potential to reduce embodied carbon in state construction. The "Buy Fair" component of includes additional requirements for reporting on working conditions to promote high labor standards in manufacturing.

The Buy Clean and Buy Fair bill, which will be proposed for consideration during the 2022-23 legislative session, is a first step to address embodied carbon in state building construction projects. Policies like Buy Clean and Buy Fair, which promote procurement of building materials with lower embodied emissions, are a key strategic lever to close the carbon loophole by accounting for a product's emissions throughout its supply chain. With the insight gained during this pilot project, Commerce is positioned well to implement Buy Clean and Buy Fair policy. Should BCBF pass, Commerce will incorporate

[1] U.S. Census Bureau *Annual Value of Construction Spending Put in Place for 2008-2018*; U.S. EPA (USEEIO v1.1)

recommendations from the pilot and develop a BCBF program that encourages broader adoption of EPDs, supports project teams with reporting requirements, tracks procurement data for concrete, wood, and steel used in state building projects, and convenes stakeholders to explore opportunities to strengthen market demand and supply of low carbon building materials.

1.1 Data collection

Data was provided by contractors and product suppliers, which ultimately informed the pilot BCBF database. To develop the reporting database, the research team first proposed a data reporting structure covering all of the reporting requirements and additional useful project information. The research team next presented the data reporting structure to stakeholders and incorporated their feedback to improve the data reporting structure. Then, the research team used UW's public procurement process to hire a database developer, Meserow Design, to create the prototype database. Meserow also connected the BCBF database with the EC3 tool,[2] brainstormed future database needs, and transferred the database and accompanying documentation to the Department of Commerce at the end of the pilot study.

For the pilot project case studies, the research team met with eight potential project teams and ended up with five participating project teams. The research team sent the data reporting templates to the project teams and communicated with them throughout the study. At the end of the study, the research team asked the pilot project teams to submit the data reporting spreadsheets and supply chain-specific environmental product declarations (EPDs) for their project.

EPDs are a commonly used tool in the construction industry to measure the embodied carbon of a building product. EPDs provide environmental data based on a third party-verified life cycle assessment, and report a variety of life cycle impacts including global warming potential. Supply-chain specific EPDs are favored by many Buy Clean policies because they contain primary data from the actual manufacturing facilities and processes used in a specific supply chain, which makes them more representative of the actual product. EPDs can also be industry-wide with product average data, or manufacturer-specific with data from similar products made by the same company.

The submission of the pilot project materials was somewhat incomplete. The submitted EPDs were manufacturer-specific, not supply chain-specific. As a result, they lacked the necessary level of data specificity to be supply chain-specific. Material quantities submissions were not always complete because the project had not completed construction or because the contractor was unresponsive to the data request.

[2] EC3 (Embodied Carbon in Construction Calculator) is a cloud-based database of digitized Environmental Product Declarations (EPDs) maintained by Building Transparency. https://buildingtransparency.org/

1.2 Recommendations

At the end of the pilot study, the research team asked project teams about obstacles or challenges they faced, and what could have helped them successfully submit the data. After debrief interviews with the pilot project teams, the research team condensed the lessons learned into the following recommendations for the state, should the program extend beyond the pilot:

- Provide **model specifications** so owners can use a reliable and consistent set of contract requirements and instructions to set reporting requirements. This will assist contractors in becoming accustomed to these requirements as they become more widespread in the industry. The model specifications should include:
    - A **recommended timeline** for when the contractors should start reaching out to suppliers and initiating the EPD requisition process. For example, project teams should involve/inform suppliers about the reporting requirements as soon as possible, during preconstruction or design development.
- Provide **financial assistance** for EPD creation. There is usually a high upfront cost for a manufacturing plant to produce its first EPD. This can be a significant burden, especially for smaller companies. However, the cost of producing subsequent EPDs are lower, as are the annual fees following the initial registration fee are lower.[3]
- Provide **educational resources** for owners, contractors, and suppliers on how to navigate the BCBF requirements.
- Provide a list of **pre-qualified consultants** who can create EPDs. For example, the Energy Savings Performance Contracting (ESPC) program by the Washington State Department of Enterprise Services (DES) provides pre-qualified consultants who can complete building energy upgrades and retrofit projects for public agencies. Utilizing a similar model would help manufacturers identify qualified consultants to help them create EPDs.
- Have a **dedicated staff person** for the BCBF Program to answer questions and facilitate it.
- Work with industry groups to **conduct outreach** to educate contractors and owners on the reporting program. For example, owners should include the BCBF reporting requirements in the bid documents so contractors can prepare and protect themselves from unexpected costs.

Some of the recommendations mentioned above were incorporated with Buy Clean and Buy Fair policy Commerce plans to introduce as agency request legislation in the 2022-23 legislative session. This will help the state build on these efforts, factor in learnings from other states with Buy Clean and Buy Fair initiatives, and allow state building construction projects to lead by example. These are referenced in Section 5 of this report.

For future BCBF reporting, the prototype database created for this pilot study needs the following additional work to be suitable for long-term use as a production-level database application:

[3] https://www.environdec.com/pricing/pricing2022

- **Improve the administration dashboard** to provide additional metrics on the collection of sustainable construction data and allow administrators to better track submission status and completeness.
- Add more **analytics, reports, charting, and dashboards** as future needs around reporting requirements become clearer.
- Develop a **business continuity plan** and retention policy.
- Create a **public-facing website** displaying global warming potential and other clear metrics, with a feature to allow people to download the database data as a comma-separated values (CSV) file.
- Pursue **deeper integration with the EC3 database** to include bidirectional communication.
- Provide **better support for managing EPD files and EPD data**, including robust document management options and tighter integration with EC3.
- **Expand user management** to include self-service and integration of administration tools.
- Convert the database to a **production environment** with developer and test environments.
- Create **administrator tooling** to allow users to manage questions and answers as information, analytics, and construction practices continue to evolve. Feedback from the prototype will inform the direction of future efforts.

2 Introduction

In January 2021, members of the Washington State House of Representatives passed operating and capital budget provisos that allocated a total of $490,000 of the state budget for the University of Washington (UW) College of Built Environments to develop a database to collect the information required and coordinate with up to 10 pilot projects teams to test the reporting requirements. This project is referred to herein as the "Buy Clean and Buy Fair Washington Project."

2.1 About the pilot study requirements

2.1.1 Legislative mandate

Two budget provisos defined the requirements of this project. Their full text is in Appendix D. The first proviso was from Section 128 (68) of the 2021-23 biennial operating budget (ESSB 5092), which appropriated $340,000 of the general fund for the Washington State Department of Commerce to:

> ...contract with the University of Washington College of Built Environments to create a database and reporting system for promoting transparency on procurement of building materials that make up the primary structure and enclosure used for state-funded construction projects.

The proviso also required a case study analysis:

> In conducting the analysis, the department and the university must identify up to 10 case studies of publicly funded projects and analyze considerations including but not limited to cost impacts, materials procured, embodied carbon contribution to reducing greenhouse gas emissions, and supply chain considerations.

Finally, the operating budget proviso required the submission of two reports to the Legislature:

(1) a progress report by January 1, 2022, and
(2) a final report by November 1, 2022, which should report "findings from the case study analysis and recommendations for the reporting system based on lessons learned."

The second budget proviso was from Section 1050, Chapter 332, Laws of 2021 (the 2021-23 capital budget), which appropriated $150,000 from the State Building Construction account for a case study on two pilot projects:

(a) University of Washington College of Engineering Interdisciplinary Education and Research Center (30000492); and
(b) University of Washington Tacoma Milgard Hall (20102002)

The purpose of the case study was to “test proposed methods and availability of environmental product declarations and working condition information.” The following information had to be collected for at least 90% of the cost of each covered product used in a project:

(a) Product quantity
(b) Current environmental product declaration
(c) Health certifications, if any, completed for the product
(d) Manufacturer name and location, including state or province and country
(e) Measures taken, if any, to promote the international labor organization's four fundamental principles and rights at work within the manufacturer supply chain
(f) Names and locations, including state or province and country, of the actual production facilities
(g) Working condition information for the actual production facilities for all employees

The capital budget proviso also defined the following:

(a) "Actual production facilities" means the final manufacturing facility and the facilities at which production processes occur that contribute to 80% or more of the product's cradle-to-gate global warming potential, as reflected in the environmental product declaration.
(b) "Awarding authority" means the University of Washington capital planning and portfolio management.
(c) "Covered product" means structural concrete products, reinforcing steel products, structural steel products, and engineered wood products.
(d) "Environmental product declaration" means a supply chain-specific type III environmental product declaration as defined by the international organization for standardization standard 14025 or similarly robust life cycle assessment methods with uniform standards in data collection consistent with the international organization for standardization standard 14025, industry acceptance, and integrity.
(e) "Health certification" means a health product declaration, as reported in accordance with the health product declaration open standard, and any product certification that includes health-related criteria.
(f) "International labor organization's four fundamental principles and rights at work" means: Effective abolition of child labor; elimination of discrimination in respect of employment and occupation; elimination of all forms of forced or compulsory labor; and freedom of association and the effective recognition of the right to collective bargaining.
(g) "Working condition information" means the:
    (i) Average number of employees by employment type: Full time, part time, and temporary
    (ii) Average hourly wage, including all nondiscretionary wages and bonuses, by quartiles
    (iii) Hours worked by weekly hour bands: 1-19 hours, 20-29 hours, 30-39 hours, 40-49 hours, 50-59 hours, and 60 or more hours
    (iv) Maximum number of hours that an employee can be required to work per week
    (v) Percent of employees covered by a collective bargaining agreement

Note that environmental product declarations (EPDs) had to be *supply chain-specific*. Supply chain-specific data refers to the use of primary, rather than secondary, data for upstream manufacturing or production processes. In the case of a concrete EPD, for example, supply chain-specific data would entail using a cement EPD from the actual cement plant, instead of using generic data representing industry average cement manufacturing in the United States. Requiring supply chain-specific data for the production states with the largest impact on emissions increases the value of an EPD by making it more representative of the actual product. Buy Clean policies in other states rely on EPDs that are supply-chain specific, product-specific, or facility-specific. Product-specific EPDs represent product from a single manufacturer, and a facility-specific EPD reports impacts calculated from the facilities where the product was manufactured. Industry-wide average EPDs exist but are not typically used for reporting under Buy Clean policies, as they do not have specific enough data to reflect meaningful impacts.

2.2 Project execution

The pilot study was divided into the following five major tasks:

- Task 1: Develop initial data reporting structure
- Task 2: Solicit feedback (on the data reporting structure)
- Task 3: Develop prototype database, and scope long-term database needs and requirements
- Task 4: Coordinate with identified pilots and identify additional case study pilot projects
- Task 5: Collect pilot project data

These tasks are shown in the project timeline diagram in Figure 1.

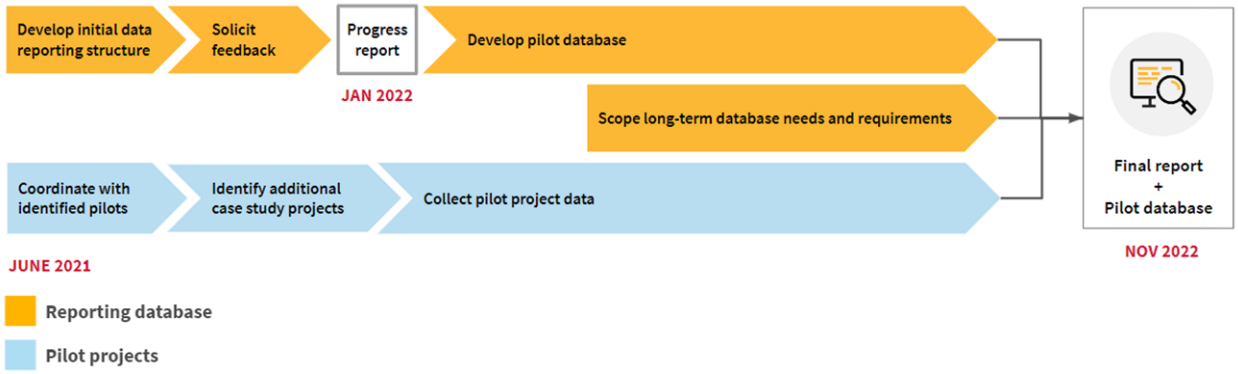


Figure 1. Project timeline diagram.

There were two main streams of work:

1) The database, which is detailed in **Section 3: Prototype database**
2) The pilot projects, which is detailed in **Section 4: Pilot projects**

Section 5: **Recommendations for a future BCBF program** summarizes the recommendations resulting from the database work and pilot project case studies.

2.3 Quarterly stakeholder update meetings

The project team held quarterly update meetings to update general stakeholders about the progress of the BCBF Project. Invitees include Representative Davina Duerr, Representative Sharon Shewmake, Senator Derek Stanford, and representatives from local labor unions and environmental NGOs. The meeting schedule and topic summaries are shown below:

- **September 30, 2021**: General intro to project; data reporting templates; plan for stakeholder engagement with industry
- **January 13, 2022**: Progress report highlights; updated pilot project list; summary of feedback from stakeholder engagement
- **April 14, 2022**: Cancelled due to lack of updates (undergoing the UW procurement process to hire the database developer)
- **June 17, 2022**: Update on database consultant hire; updated project timeline; new deadline and debrief requests with pilot projects
- **September 16, 2022**: Show a preview of the database and summarize the lessons learned from the pilot projects

The presentation slides were sent to the audience after each meeting.

3 Prototype database

This section describes the work of developing the prototype database.

The first step was to develop the data reporting structure; that is, decide on data collection fields and how they should be organized and presented to the user. The second step was to gather stakeholder feedback to improve the initial data reporting structure. The third step was to create the database, which involved hiring a database developer and working with them through the process of designing the database and user interface. The resulting prototype database was still under development at the time of writing this report, but previews of the database are shown in the last subsection.

3.1 Developing the initial data reporting structure

The first step in creating the data reporting structure was to determine which fields needed to be in the database. At a minimum, the database needed to include the information specified by the Operating Budget proviso. The research team also included additional fields to help characterize the building projects. To select these additional fields, the research team analyzed data structures from multiple tools and databases that collected environmental data for buildings, which are listed below:

1. Previous work done by the CLF on whole building life cycle assessment (WBLCA) taxonomy[4]
2. Embodied Carbon in Construction Calculator (EC3)[5]
3. SE2050[6] database
4. deQo[7]
5. AIA DDx[8]
6. LETI[9]

[4] Taxonomy for Whole Building LCA can be accessed at https://carbonleadershipforum.org/lca-practice-guide/
[5] https://buildingtransparency.org/ec3
[6] SE2050 is a commitment program from the Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) that has done work on how to characterize a building in a database.
[7] deQo (database of embodied Quantity outputs) is an interactive online tool provided by the MIT Building Technology Program that contains global warming potential and material quantity data of buildings.
[8] AIA DDx is the American Institute of Architects (AIA) Design Data Exchange (DDx). It is an online database that lets AEC professionals benchmark their projects against industry averages and track performance.
[9] LETI (London Energy Transformation Initiative) is a network of over 1,000 built environment professionals working to put London on the path to a zero carbon future. The voluntary group is made up of developers, engineers, housing associations, architects, planners, contractors, facilities managers and more.

The research team included the following additional fields for characterizing the building projects:

- Project name
- General contractor (name of firm)
- Zip code of project location
- Construction start date (mm/yyyy)
- Construction completion date (mm/yyyy)
- New, existing, or renovation
- Project phase at submittal

- Building use type
- Construction type (per IBC)
- Seismic design category (per IBC/ASCE7)

- Building height above grade
- Number of stories above grade
- Number of stories below grade
- Gross floor area - new construction
- Gross floor area - existing
- Gross floor area - renovation
- Gross floor area - total

- Primary type of lateral force resisting system
- Primary type of foundation system
- Primary horizontal gravity system
- Primary vertical gravity system
- Typical floor live load

3.1.1 The BCBF data collection process

The resulting data fields are divided into two categories: (1) project-related data, to be filled out by the contractor, and (2) product-related data, to be filled out by suppliers/manufacturers. Figure 2 summarizes the expected data collection process from the contractors and the suppliers, identifying who needs to collect which data and where the data need to go.

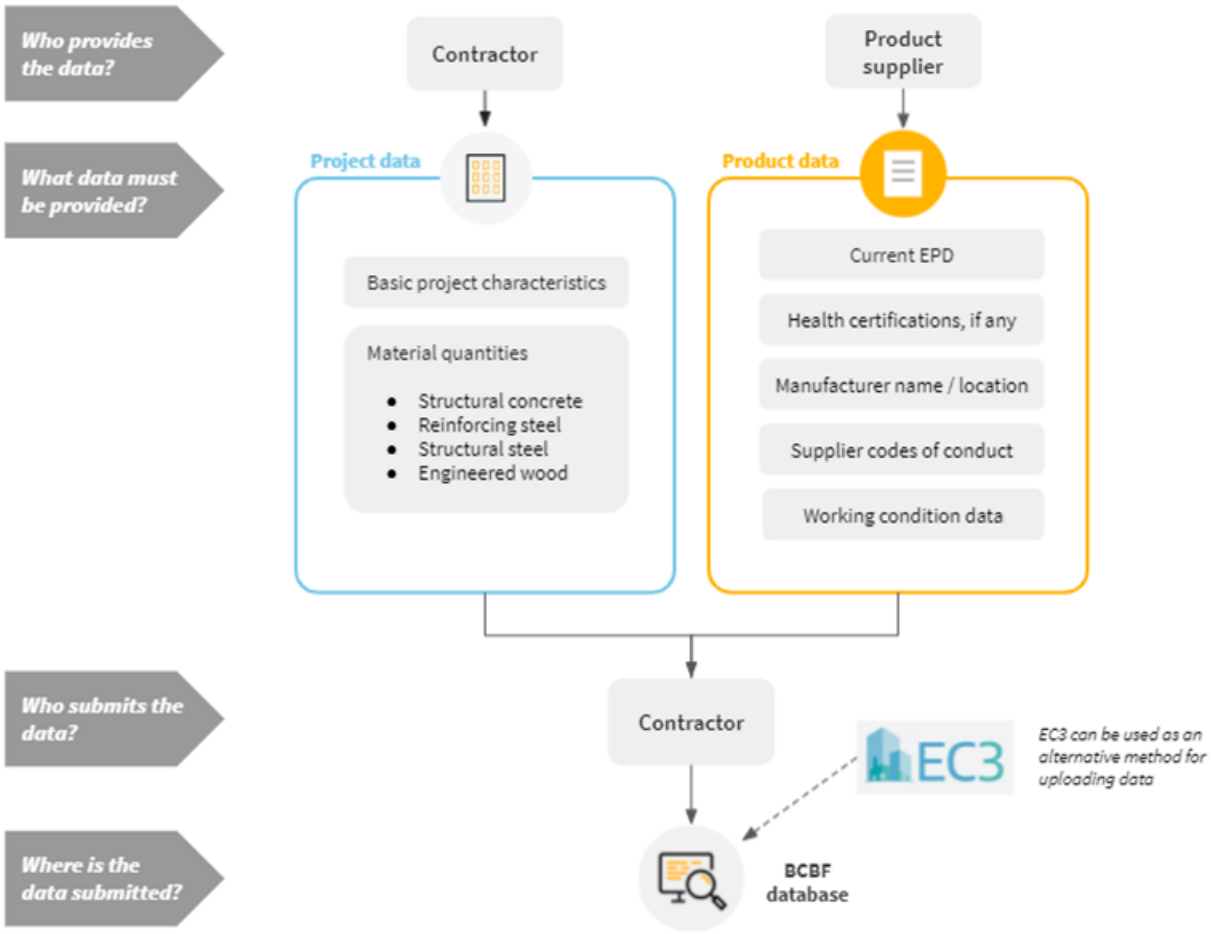


Figure 2. Overview of the data collection process for the Buy Clean and Buy Fair (BCBF) Database.

Under the requirements of this pilot study, the contractor was responsible for providing material quantities of the covered products. Note that this contrasts with most case studies and whole building life cycle assessment (WBLCA) studies evaluating the environmental impacts of buildings, which are performed using material quantity estimates from the designers. Purchased quantities as documented by the contractor will be more accurate. The contractor was also responsible for notifying their relevant suppliers about the data collection requirements of BCBF. The suppliers were expected to provide EPDs, health certifications (if available), manufacturer names and locations, codes of conduct (if available), and

working conditions data. Ultimately, the contractor was responsible for working with suppliers to collect this information and submit it to the database before the substantial completion of the building project. The contractor was not responsible for verifying the data collected from the supplier.

This figure shows that the EC3[10] tool may be used to submit this data to the BCBF Database. EC3 (Embodied Carbon in Construction Calculator) is a cloud-based database of digitized EPDs maintained by Building Transparency. Building Transparency is a non-profit organization established to continue the management and development of the EC3 tool, as well as provide the resources and education necessary to ensure its adoption. EC3 is a comprehensive database for American EPDs, and includes many EPDs from around the world. CLF contracted with Building Transparency to develop this new feature in the EC3 tool.

3.1.2 Initial data reporting templates

A spreadsheet was created for both user types – the contractor and the supplier – so the initial data reporting templates could be shared with pilot projects and stakeholders easily and early. A sample screenshot from each spreadsheet is shown below: Figure 3 shows the material quantity data collection table from the Contractor Reporting Template, and Figure 4 shows the working conditions labor data collection table from the Supplier Reporting Template. More screenshots from these initial reporting templates are shown in **Appendix A: Reporting templates**.

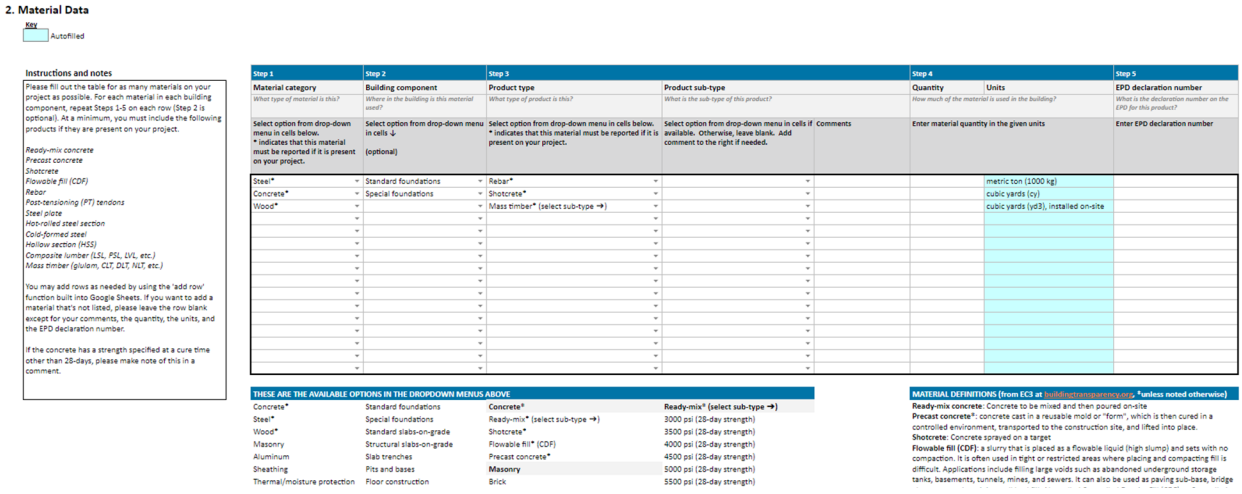
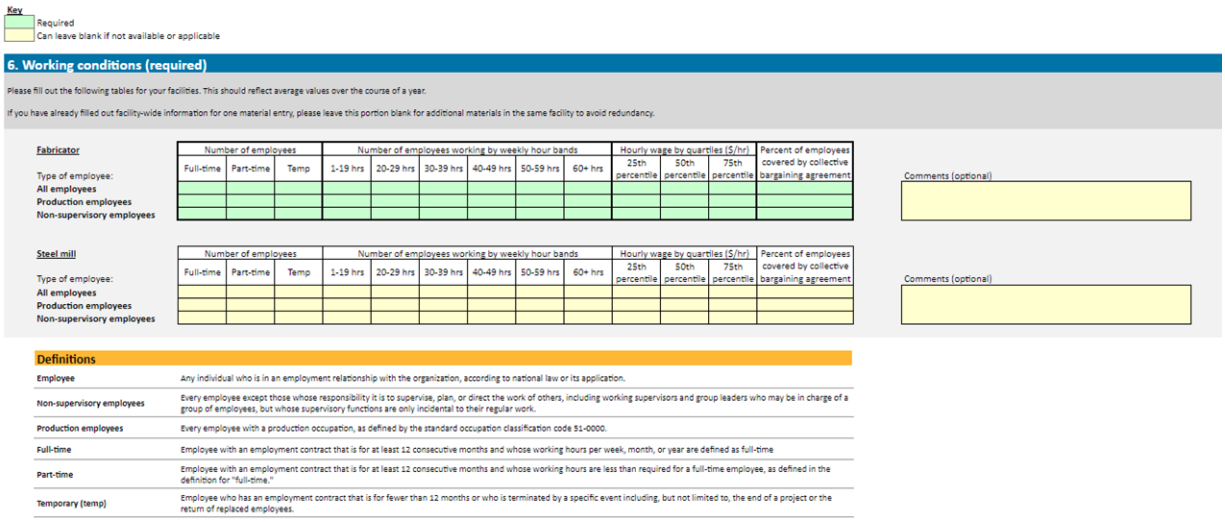


Figure 3. Screenshot of a page from the Contractor Reporting Template (Sheet 2. Material Data).

[10] https://buildingtransparency.org/



Key
Required
Can leave blank if not available or applicable

6. Working conditions (required)

Please fill out the following tables for your facilities. This should reflect average values over the course of a year.

If you have already filled out facility-wide information for one material entry, please leave this portion blank for additional materials in the same facility to avoid redundancy.

Fabricator

Type of employee:	Number of employees			Number of employees working by weekly hour bands						Hourly wage by quartiles ($/hr)			Percent of employees covered by collective bargaining agreement
	Full-time	Part-time	Temp	1-19 hrs	20-29 hrs	30-39 hrs	40-49 hrs	50-59 hrs	60+ hrs	25th percentile	50th percentile	75th percentile	
All employees													
Production employees													
Non-supervisory employees													

Comments (optional)

Steel mill

Type of employee:	Number of employees			Number of employees working by weekly hour bands						Hourly wage by quartiles ($/hr)			Percent of employees covered by collective bargaining agreement
	Full-time	Part-time	Temp	1-19 hrs	20-29 hrs	30-39 hrs	40-49 hrs	50-59 hrs	60+ hrs	25th percentile	50th percentile	75th percentile	
All employees													
Production employees													
Non-supervisory employees													

Comments (optional)

Definitions

Employee	Any individual who is in an employment relationship with the organization, according to national law or its application.
Non-supervisory employees	Every employee except those whose responsibility it is to supervise, plan, or direct the work of others, including working supervisors and group leaders who may be in charge of a group of employees, but whose supervisory functions are only incidental to their regular work.
Production employees	Every employee with a production occupation, as defined by the standard occupation classification code 51-0000.
Full-time	Employee with an employment contract that is for at least 12 consecutive months and whose working hours per week, month, or year are defined as full-time
Part-time	Employee with an employment contract that is for at least 12 consecutive months and whose working hours are less than required for a full-time employee, as defined in the definition for "full-time."
Temporary (temp)	Employee who has an employment contract that is for fewer than 12 months or who is terminated by a specific event including, but not limited to, the end of a project or the return of replaced employees.

Figure 4. Screenshot of a page from the Supplier Reporting Template (Sheet 6. Working Conditions Data).

3.2 Gathering stakeholder feedback

After developing the initial data reporting templates, the research team organized a stakeholder feedback process. The purpose of gathering stakeholder feedback was to improve the data collection templates and further engage people and groups who were interested in the BCBF pilot study. This section describes the feedback process and the feedback results.

3.2.1 Stakeholder feedback process

The target audience (stakeholders) for the feedback process consisted of people from the following groups:

- Contractors
- Manufacturers
- Architects and engineers
- Developers of related databases (AIA DDX, SE2050, EC3)
- Researchers/NGOs interested in outputs and data

The full list of organizations invited to participate in the stakeholder feedback process is in **Appendix B1: Stakeholder feedback process**.

To collect feedback from the stakeholders, the research team performed the following tasks:

1. **Invited stakeholders to provide feedback.** The email sent to the stakeholders (Contractor version) is included in **Appendix B1: Stakeholder feedback process**. The Supplier version is very similar. These emails asked stakeholders to complete a survey and attend an optional meeting (described below). The research team gave the stakeholders one month to review the templates

and complete the survey.

2. **Created two online surveys**, one for each reporting template, with general and targeted questions about the reporting template. The survey asked questions such as "Do you understand what this project is asking from contractors?", "Is any of the basic project information difficult for you to collect?", and "How would you improve this sheet?" The survey assured the responders that the research team would not share their identities, but may attribute feedback to types of organizations (for example, "Feedback from [concrete suppliers, contractors, researchers, etc.] included _____.") Survey results are in **Appendix B2: Stakeholder feedback surveys**.

3. **Held two online presentations to introduce each reporting template and answer any questions.** The research team held one presentation for each reporting template, recorded the presentations, and e-mailed the slides and recording to stakeholders afterward, along with a summary of the Q&A.

4. **Collected feedback through online surveys and revised the data collection templates based on that feedback.** The research team reviewed the feedback from the online surveys and incorporated suggestions that were feasible within the constraints of the provisos, and tabled others that were not feasible within the constraints of the provisos. This stakeholder feedback is summarized in the next subsection.

3.2.2 Stakeholder feedback summary

This section summarizes the stakeholder feedback from both reporting templates. Broadly, the research team received three types of feedback:

1. The first type of feedback provided suggestions about how the templates could more clearly communicate the intent and requirements for reporting and using the BCBF reporting database. This type of feedback was, for the most part, unequivocally adopted into the next iteration of the reporting templates.

2. The second type of feedback was about the data reporting structure. The research team attempted to incorporate this feedback while striking a balance between collecting information that was useful and valuable but would not be overly burdensome or complicated to report.

3. The third type of feedback was regarding the reporting requirements themselves; that is, which data should or should not be reported. For the most part, this feedback conflicted with the directions of the provisos, and therefore could not be incorporated into the pilot database. However, it was important feedback about the pilot program and is presented in **Section 5.3 Feedback on reporting requirements**.

The detailed feedback from the surveys is in **Appendix B3: Stakeholder feedback summary**.

3.3 Creating the prototype database

After reviewing the stakeholder feedback and using it to update the data reporting templates, the research team began creating the actual database.

3.3.1 Consulting database experts

In preparation for the development of the prototype database, the research team consulted with several database experts in the CLF network, showed them the initial data collection templates, and gathered feedback on database best practices. The database experts emphasized the importance of finding someone with expertise in user experience (UX) design to create a user interface that would improve the quality and quantity of submitted data. This advice informed the Request for Proposal (RFP) developed to hire a database consultant.

3.3.2 Hiring a database consultant

The research team carried out UW's RFP process to select a qualified vendor to help create the database. The research team sought a vendor with the following qualifications:

- 5+ years of experience in database development
- Demonstrated success in creating databases that collect data from the public (users who are not subject matter experts)
- Demonstrated success in user experience (UX) design in front-end web applications, including accessible and responsive web design
- Capability to develop a detailed scope of work for a government-run database, including cost estimate
- Ability to meet the project schedule
- 1-3 years of experience in the building or construction field

The research team convened a review committee to select the vendor. The review committee comprised project team members from UW and Commerce, as well as people in IT departments from both organizations. After reviewing and scoring the bid packages and interviewing three finalists, the review committee selected Meserow Design. This RFP-procurement process took five months.

During the RFP process, the research team also coordinated with UW's Office of the Chief Information Security Officer (CISO) and the UW Privacy Office to ensure that the project met security requirements and data privacy requirements.

3.3.3 Creating the database

Given the extensive work done on the spreadsheets for Contractor and Supplier data collection, the BCBF database was partially scoped out by the time the web interface entered the design phase. Meserow Design worked on adding process usability and data validation of submitted answers, in terms of opportunity for help text, error catching, additional groupings, and required information.

The project began in late June 2022 with a design phase, then moved into database development in July 2022. The project schedule for database development is illustrated in Figure 5. Currently, the website application is undergoing active development at https://bcbf.meserow.com. It will move to Washington State Department of Commerce servers at the end of October.

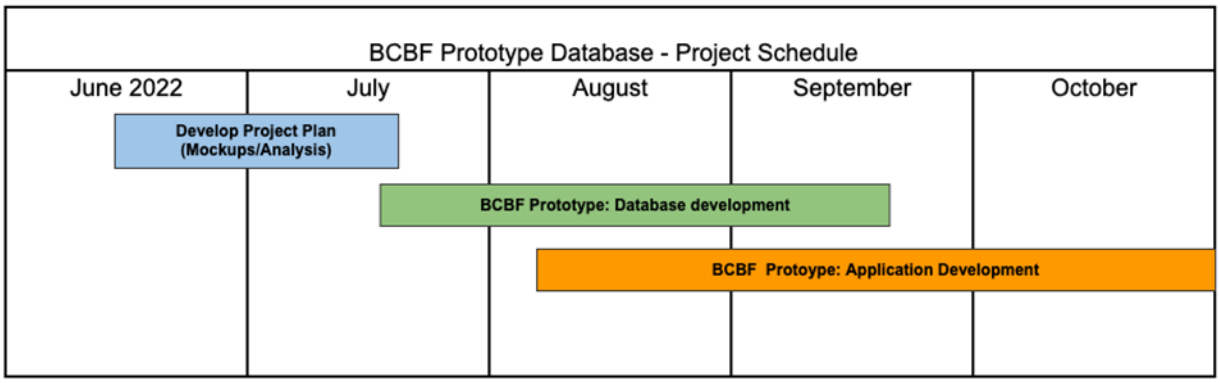


Figure 5. Project schedule for designing and developing the database application.

Screenshots of the user interface in the rest of this section are from the mock-ups of the user interface design, not of the final product. The actual prototype database may differ from this report.

A screenshot of the landing page (still under development) is shown in Figure 6.

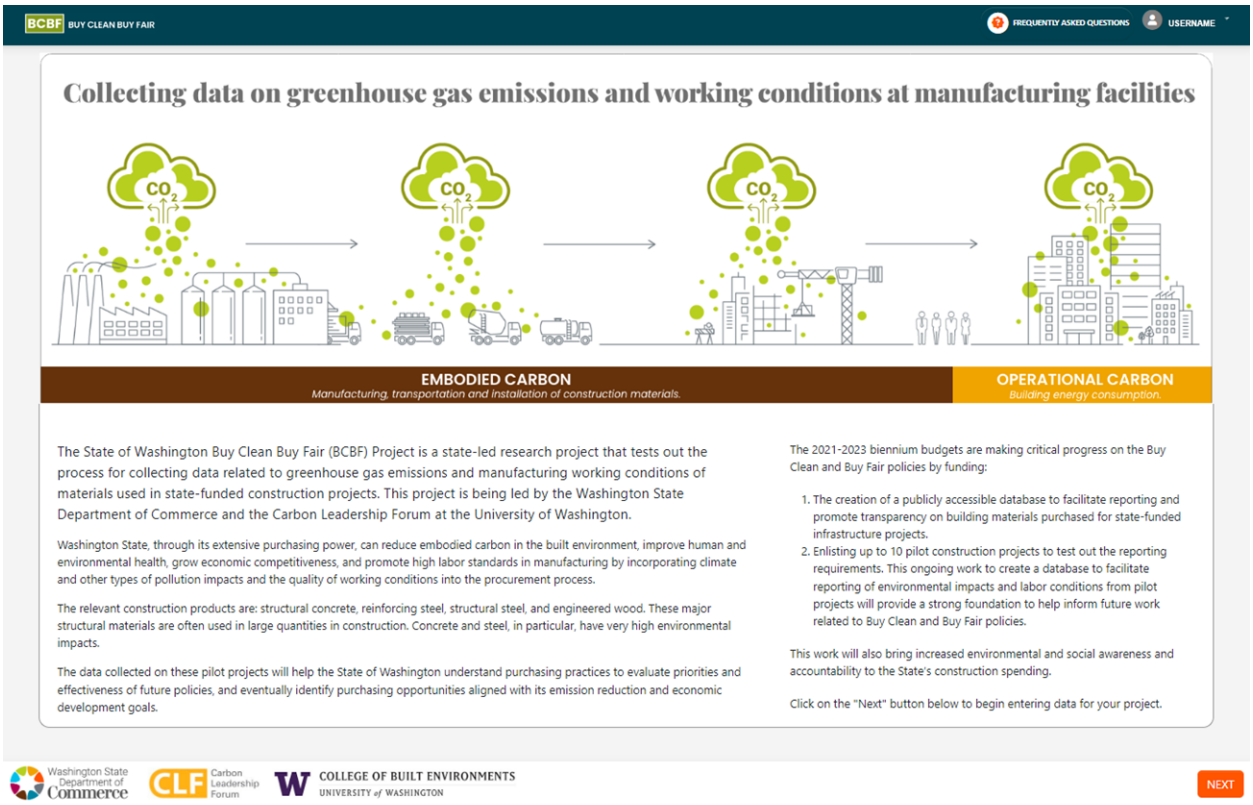


Figure 6. Landing page for the database application (under development). Banner artwork was created by the Washington State Department of Commerce.

Meserow Design came into this project with experience developing software in green building construction. Its approach to the software significantly informed the database structure and user interface design. Meserow Design has been developing green building scorecards for King County since 2014 and understood the evolving nature of tracking sustainable construction. The database was designed as a configurable survey so questions could be added, deleted, or modified by administrators as the task of encouraging analyzable submissions becomes clearer during the prototype.

The prototype database closely follows the spreadsheets developed for this prototype. However, the survey approach involves storing the question and answer types in a database table once past the user setup and project setup steps. The diagram of the database can be viewed as having two parts:

1. The establishment of projects, users, contractors, suppliers, and their survey responses (and the relationship between these objects), as shown in Figure 7
2. The survey sections, areas, questions, answers, and the answer options involved, as shown in Figure 8

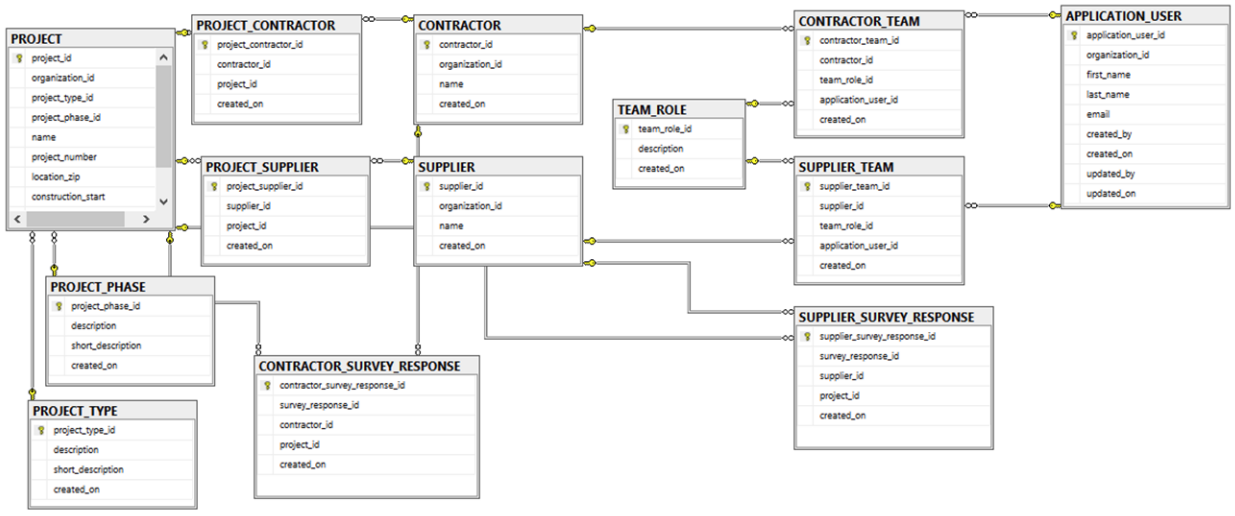


Figure 7. Part 1 of the Database Diagram, showing Projects, Users, Contractors, Suppliers, and Survey Responses.

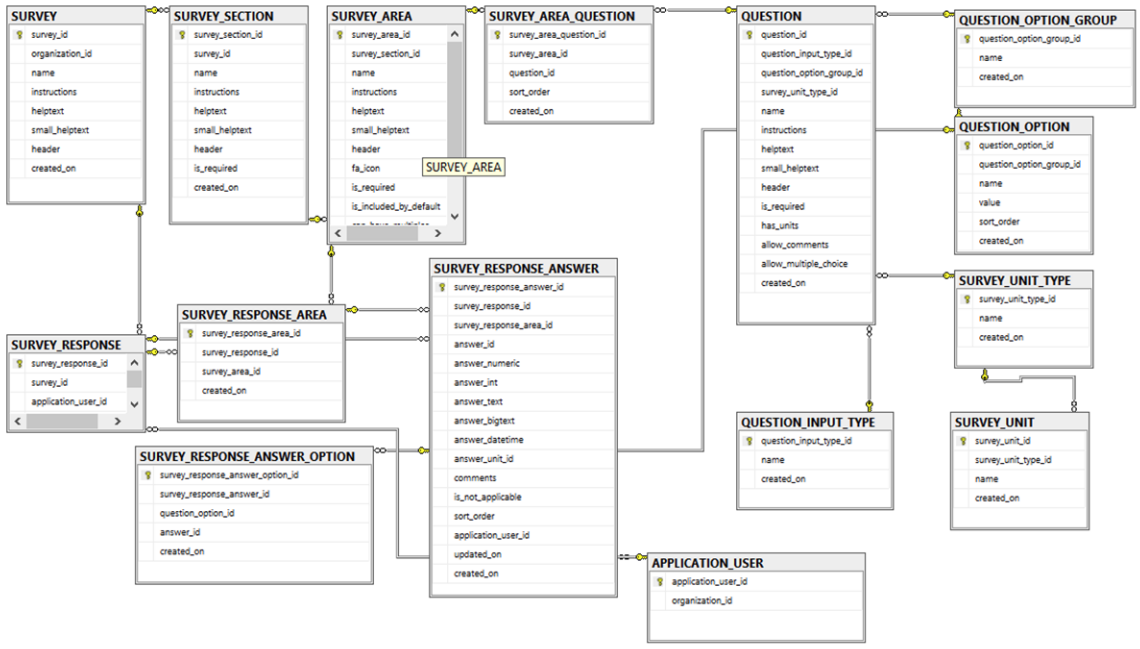


Figure 8. Part 2 of the Database Diagram, showing Surveys, Sections, Areas, Questions, Answers, and Answer Options.

Under this approach, the BCBF database will allow for a variety of answer types (textual, numeric, URLs, dropdowns, multi-select dropdowns), repeated groups of questions, answers with help information, and answers with comment boxes in case the question was not clear.

In terms of workflow, Figure 9 presents a diagram showing the three user types (Administrators, Contractors, and Suppliers) and the pages of the survey they proceed through on their way to submission.

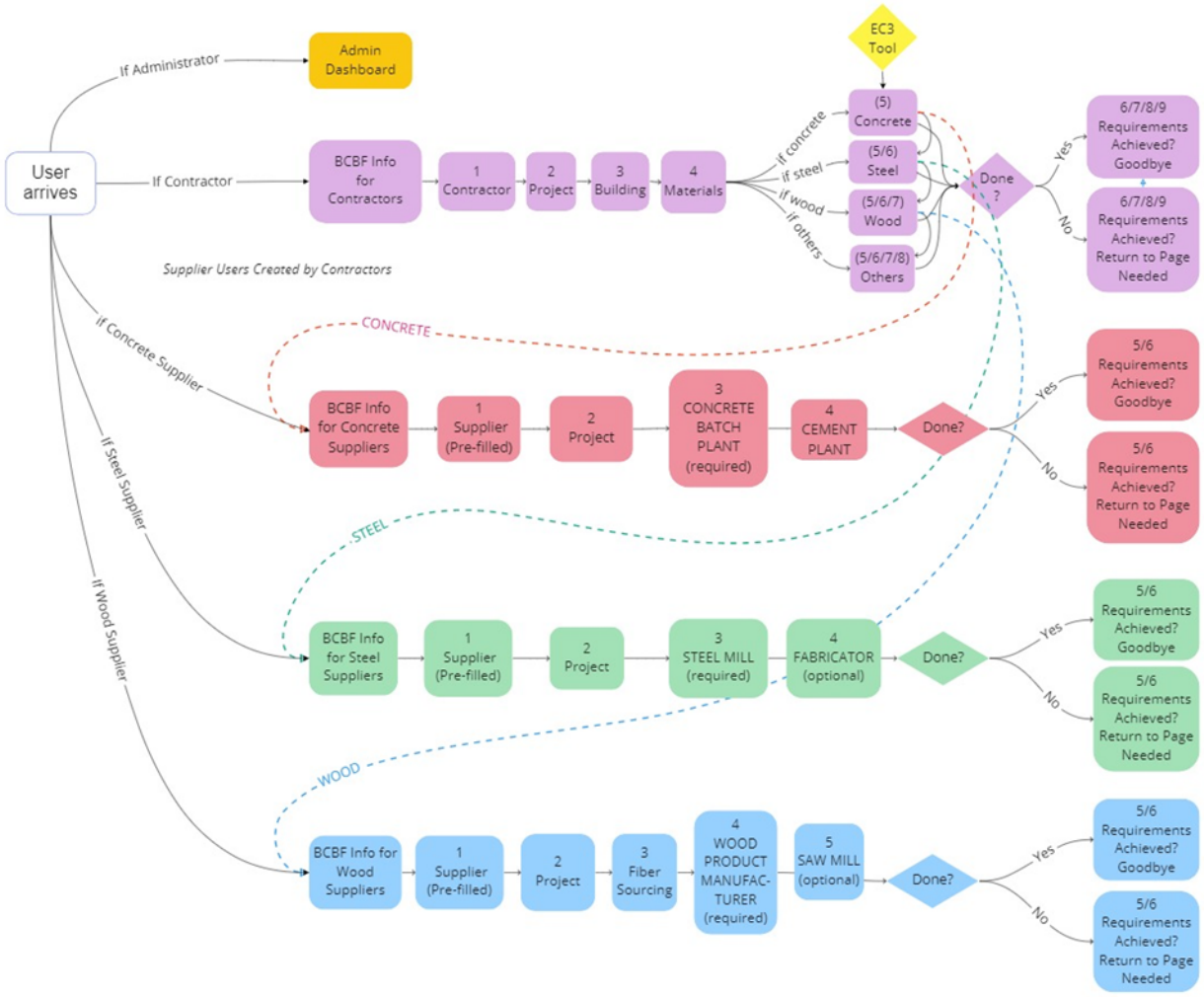


Figure 9. Website workflow for Administrators, Contractors, and Suppliers (wood, steel, and concrete).

Administrators will have a basic dashboard providing reporting tools and a simple overview of what has been submitted. Administrators will be able to export a summary of the data in the submissions and view some charting regarding submissions and global warming potential (GWP) impacts of the projects. The BCBF Database will use EC3's application programming interface (API) to look up the GWP value of the submitted construction products, since EC3 has already done the work of extracting the GWP values from the PDF files. An example of what this Administrator page might look like is shown in Figure 10.

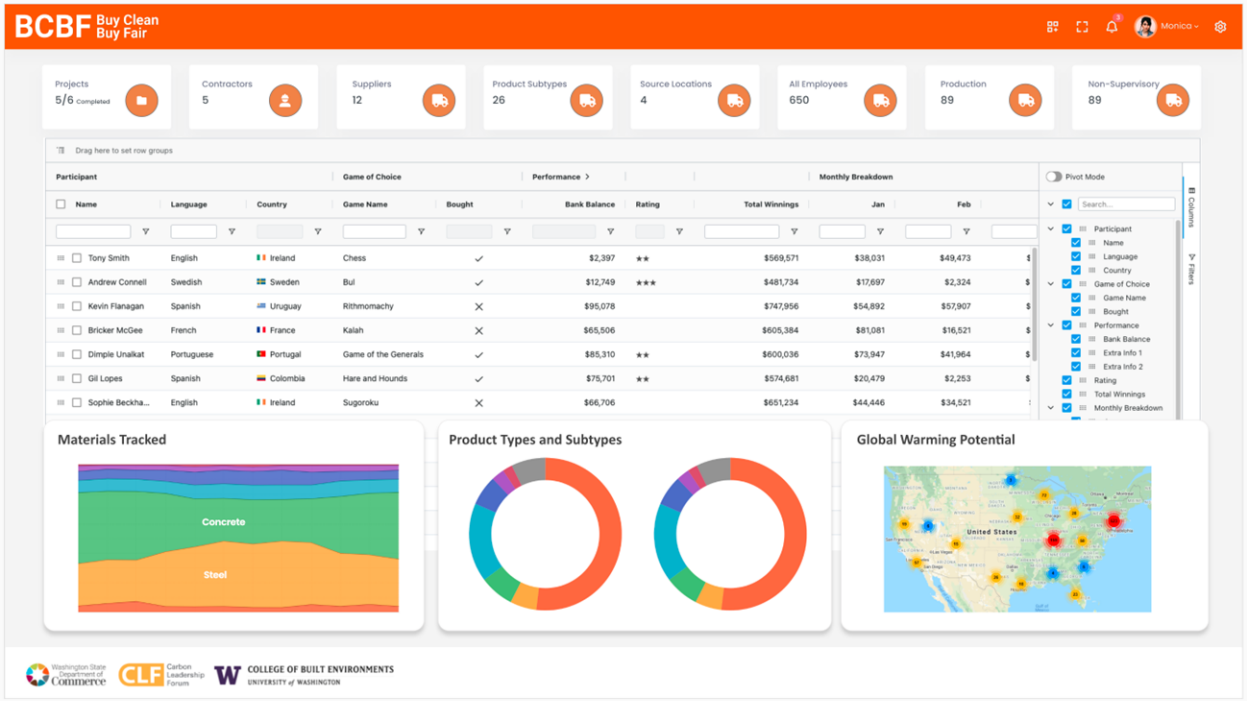


Figure 10. An example of what the BCBF administrator dashboard might look like (in progress).

Contractors will proceed through the process mapped in Figure 9 by providing details about their project and the building itself, and then begin on the fourth page of the interface (the Materials Page), to explain the material types, subtypes, and additional information, as shown in Figure 11.

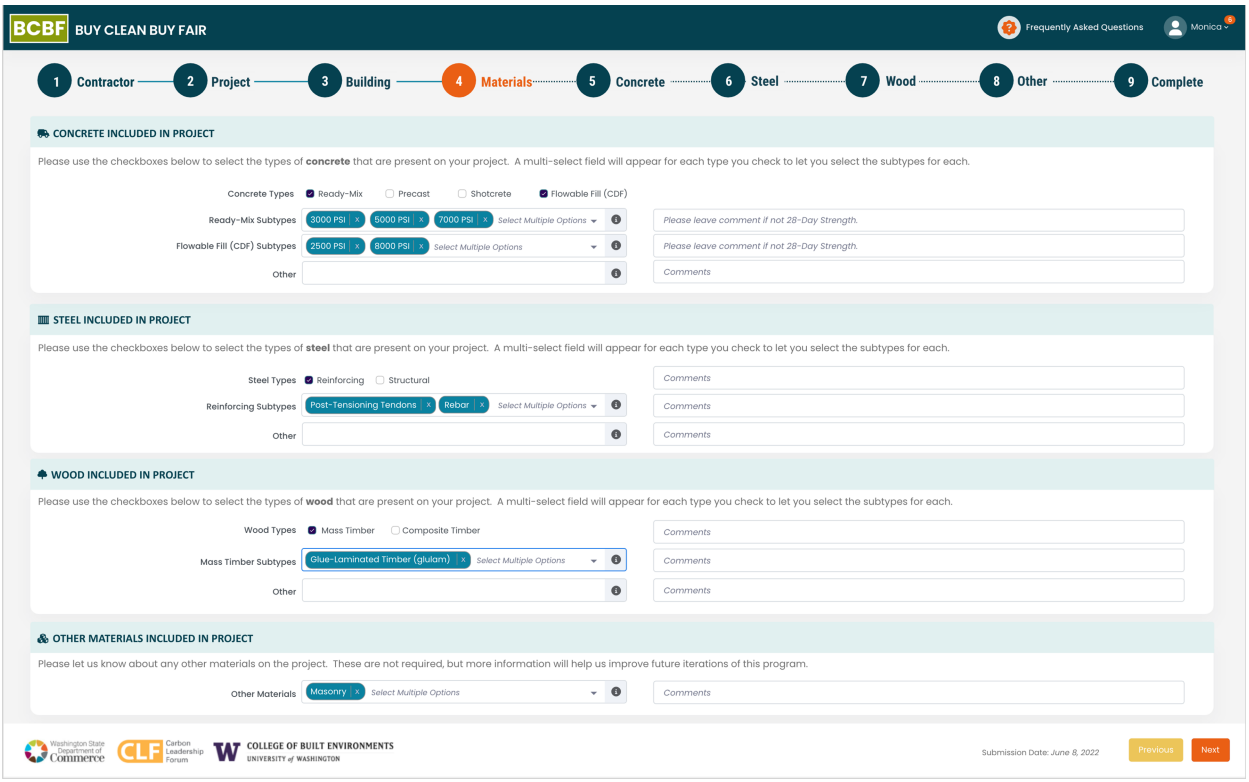


Figure 11. The BCBF user interface (Materials Page), where a Contractor enters types and subtypes of concrete, steel, and wood on the project.

When the Materials page is completed by the general contractor, the remainder of the survey automatically asks specific questions applicable to this project about each combination of material type/subtype/product subtype.

For instance, if the general contractor reports the use of three strength types (in psi) of Ready-Mix Concrete and two strength types of Controlled Density Fill, they will be asked to fill out five areas of information, including supplier details, about those uses. This is illustrated in Figure 12, which demonstrates how Contractors create supplier logins.

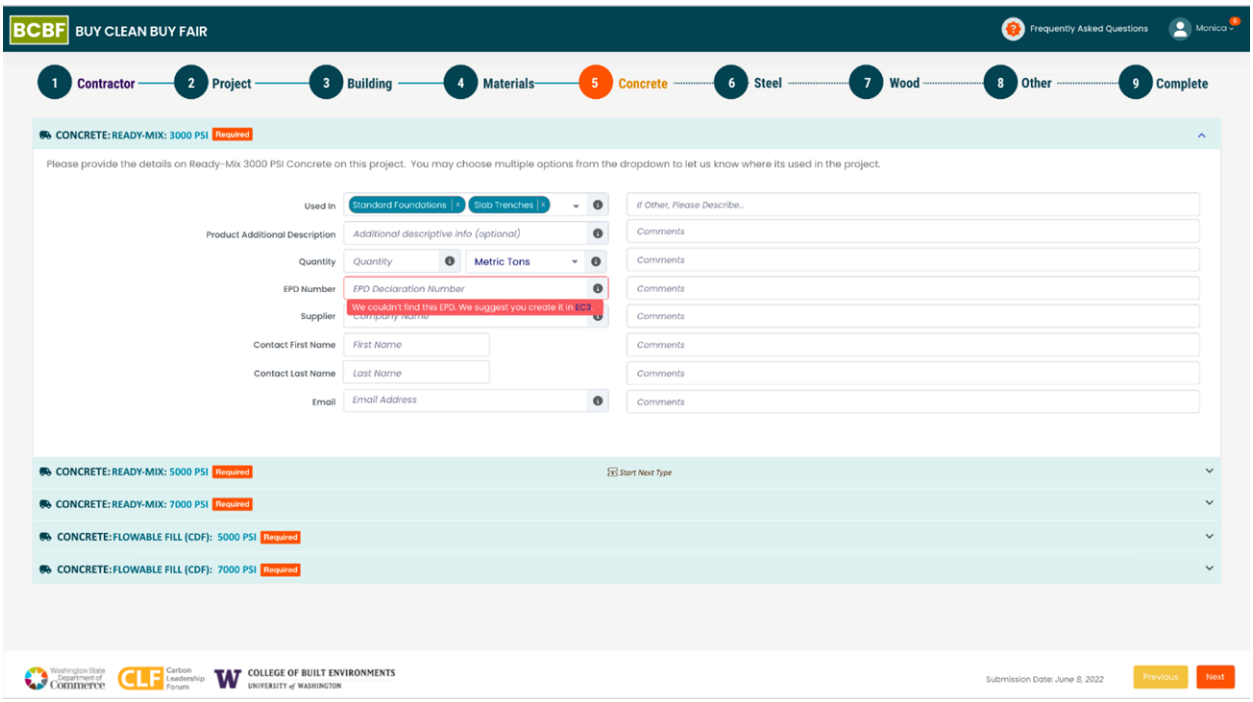


Figure 12. A screenshot of the BCBF user interface where a Contractor enters material details for concrete, including EPD and supplier information.

Once a Contractor has provided Supplier information, which includes creating the Supplier login, the specified Supplier will receive an email asking them to complete information about the process of creating the product (an example for a wood product is shown in Figure 13).

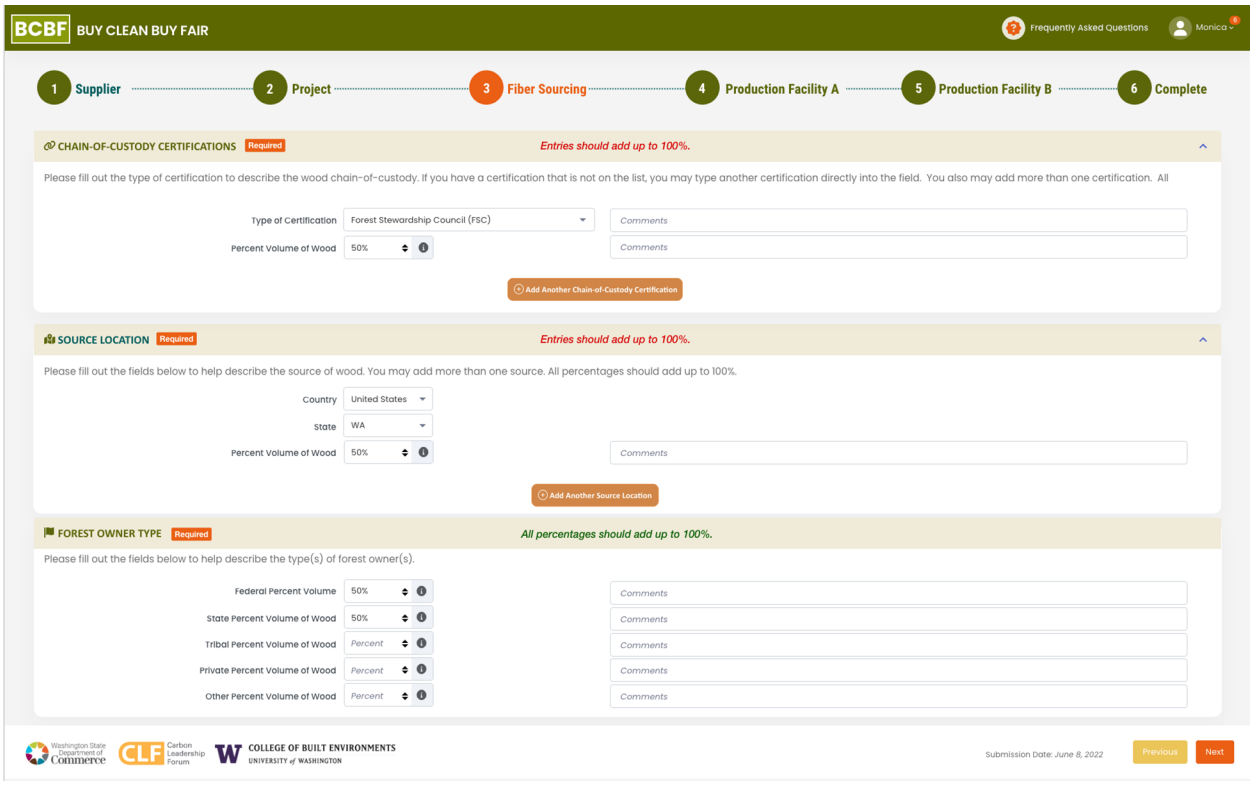


Figure 13. Wood supplier Fiber Sourcing details, including chain-of-custody, location information, and owner.

After providing those details, in the case of wood, the Supplier will enter additional information about the product and the manufacturing facility, including working conditions (a screenshot for a wood product is shown in Figure 14).

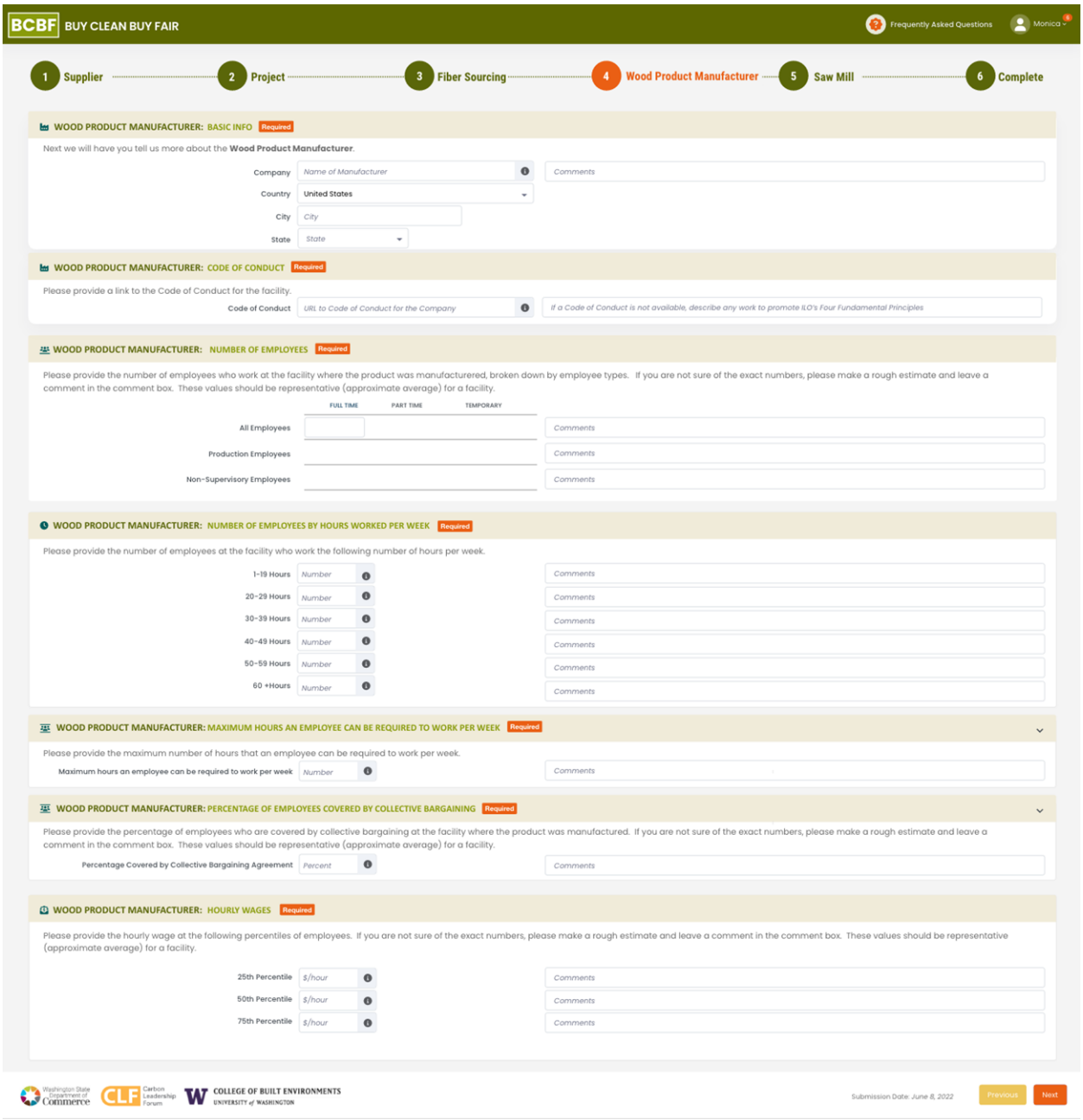


Figure 14. Wood product manufacturing plant details, including code-of-conduct, number of employees and employee types, collective bargaining coverage, and wages.

4 Pilot projects

The purpose of conducting a case study analysis on pilot projects was to test the proposed data collection requirements and gather feedback on how to facilitate reporting in a potential future BCBF program.

The capital budget proviso specified the Interdisciplinary Engineering Building (IEB) at UW Seattle and Milgard Hall at UW Tacoma as two required pilot projects for this study. The research team also added two pilot projects from the Washington State Department of Transportation (WSDOT): a fuel island and a radio tower at their new Olympic Region Maintenance Administration Facility. Both of these projects were scheduled to be complete by fall 2022.

In addition to these projects, the research team reached out to several projects named in the 2018 proviso for the previous Buy Clean pilot study.[11] This proviso, from section 1030 of the 2018 supplemental capital budget (ESSB 6095), required project teams to collaborate with the University of Washington to test the availability of EPDs and report third-party verified EPDs for eligible materials, if available. At the time this proviso was issued, these projects were unable to fulfill the data reporting requirements for the previous pilot study because they had not finished construction (and in some cases had not started construction) when the previous pilot study concluded, but they could be used for this study. These projects were:

- Western Washington University Sciences Building Addition and Renovation
- Shoreline Community College Allied Health, Science, and Manufacturing Replacement
- Secretary of State Library Archive Building

The Secretary of State Library Archive Building was not included in this pilot study because of delays related to the project site.

A summary of the pilot projects is presented in Table 1.

Table 1. Pilot project information

Project short name	Project full name	Proviso status	Construction schedule	Covered products in project
UW IEB	Interdisciplinary Engineering Building (IEB) at UW Seattle	Included in 2021 capital budget proviso	May 2021 - May 2024 (anticipated)	Concrete, rebar, structural steel

[11] https://carbonleadershipforum.org/studying-buy-clean-policy/

Project short name	Project full name	Proviso status	Construction schedule	Covered products in project
UW Milgard Hall	Milgard Hall at UW Tacoma	Included in 2021 capital budget proviso	Summer 2021 - October 2022	Concrete, rebar, structural steel, mass timber
WSDOT	Olympic Region Maintenance Administration Facility (ORMAF) - Fuel Island	Voluntary reporting, not named in proviso	March 2021 - July 2022	Concrete, rebar, structural steel
	Olympic Region Maintenance Administration Facility (ORMAF) - Radio Tower	Voluntary reporting, not named in proviso	December 2021 - January 2022	Concrete, rebar, structural steel
Shoreline	Shoreline Community College - Allied Health, Science, and Manufacturing Replacement	Included in 2018 capital budget proviso	July 2021 – January 2024	Concrete, rebar, structural steel
WWU	Western Washington University - Sciences building addition and renovation	Included in 2018 capital budget proviso	May 2020 - Dec 2021	Concrete, rebar, structural steel

The research team supported all of the included pilot projects by:

- Having an initial **kick-off meeting** with each pilot project team. These meetings usually involved 2-3 people from the construction firm, 1-2 project managers from the owner (if available), and sometimes 2-3 people from the architecture firm.
- Having **quarterly check-in meetings**. However, this was optional depending on the preference of the pilot project teams.
- Sending the contractor a **letter to suppliers** that they could pass on to each of their suppliers. This letter explained the requirements of the BCBF Project.
- Sending the contractors both reporting templates (Excel files) as soon as possible so they knew the expected data submittal requirements.
- Inviting them to **stakeholder meetings**.
- Sending them **e-mail updates** when the project schedule changed.
- Holding **debrief meetings** with the pilot project teams at the end of the pilot study, and collecting feedback through Zoom meetings and a survey.

4.1 Data collection

The research team asked the pilot projects to submit the following information by August 2022:

- Data collection spreadsheets:
  - **Contractor Reporting Spreadsheet**, filled out
  - **Supplier Reporting Spreadsheets**, filled out for each of the following materials used on the project:
    - Concrete
    - Reinforcing steel, or "rebar"
    - Structural steel
    - Engineered wood, or "wood"
- **EPDs** for each of the following materials used on the project:
  - Concrete
  - Reinforcing steel, or "rebar"
  - Structural steel
  - Engineered wood, or "wood"

Items submitted by each pilot project team are summarized in Table 2.

Table 2. Summary of materials received from pilot projects. "✓" = some or all of requested materials were received. "-" = no materials were received. "N/A" = not applicable.

Pilot project	Data collection spreadsheets					EPDs			
	Contractor	Concrete supplier	Rebar supplier	Structural steel supplier	Wood supplier	Concrete	Rebar	Structural steel	Wood
UW IEB	-	-	-	-	N/A	-	✓	*	N/A
UW Milgard Hall	-	-	✓	✓	-	✓	✓	In progress	✓
WSDOT Fuel Island	✓	-	-	-	N/A	✓	✓	✓	N/A
WSDOT Radio Tower	-	-	-	-	N/A	-	-	-	N/A
Shoreline	✓	✓	✓	✓	N/A	✓	✓	✓	N/A
WWU	✓	-	-	-	N/A	-	-	-	N/A

** Supplier not selected yet*

The projects that provided EPDs included the two University of Washington projects required to report by the 2021-23 capital budget proviso, the Shoreline project named in the 2018 proviso, and other projects that were able to insert reporting language in contracts with suppliers and trade partners. Almost none of the submitted EPDs were supply chain-specific. The submitted EPDs were manufacturer-specific, but since they used industry-average data for significant upstream materials, they did not qualify as supply chain-specific.

Only two of the six pilot projects submitted a complete accounting of material quantity data; one pilot project wasn't far enough along to have material quantities, and the others were incomplete or unresponsive. It was also not clear if the pilot projects met the requirements for "90% of the cost of each of the covered products used in the project," since the research team did not ask for cost data and could not verify this.

Only one supplier out of approximately 20 submitted a fully complete accounting of the requested information. Four suppliers partially completed their spreadsheets, while the others were not responsive.

The following subsections describe the data collection experience of each pilot project.

4.1.1 UW IEB

When the pilot study began in late May 2021, the Interdisciplinary Engineering Building (IEB) at UW Seattle was in the very early stages of schematic design. By the end of the pilot study in August 2022, the project was beginning to select trade partners (suppliers). Due to the relatively early phase of this project, the project team was unable to obtain many EPDs nor complete the supplier reporting forms because they were still securing suppliers around the time of the data submittal deadline. However, they were able to include the reporting requirements in the bid documents, which ensured that the data requests would eventually be fulfilled.

At the time of data submittal for the pilot study, the project team had secured a supplier for concrete, but not yet for the other materials of interest. The concrete supplier was able to provide a rebar EPD (pre-existing), and was working on obtaining the concrete EPD from their ready-mix concrete supplier. The concrete supplier was hesitant to provide some of the information requested in the Supplier Reporting Form because of concerns related to privacy.

4.1.2 UW Milgard Hall

The Milgard Hall Project was in late design stages when the pilot study began in late May; they began construction shortly after. This was the only pilot project to include engineered wood.

The project team began contacting suppliers about the pilot study requirements as soon as possible. Their concrete supplier had EPDs available for ready-mix concrete and rebar. The mass timber EPD was created from scratch, which took six months from the point of requesting the EPD to publishing the EPD, three to four months of which were needed to create the actual EPD. The structural steel supplier needed more time to create the EPDs for their products – at least 12 months. The structural steel EPD was not finished at the time of this report writing, but was anticipated to be completed soon. Only one supplier (structural steel) completed the supplier reporting spreadsheet; the other suppliers were unresponsive to requests to complete the reporting spreadsheet.

The project team surmised that the delays in the structural steel EPD were due to external trade partner issues. They also noted that it was difficult to predict how long the EPD creation process was going to take, since it took time to understand cost implications and communicate requirements to suppliers.

4.1.3 WSDOT Fuel Island

The WSDOT Olympic Regional Maintenance Administration Facility (ORMAF) Fuel Island Project was under construction when the research team contacted WSDOT. The WSDOT project managers were able to obtain material quantities and EPDs from the contractor (the EPDs were pre-existing). However, the suppliers were unresponsive to requests to complete the supplier reporting spreadsheets. This was likely because the BCBF data requests came in after the project had started construction, so the contractor and suppliers were not prepared (financially and logistically) to perform this additional task, nor were they legally required. WSDOT project managers said that the BCBF reporting requirements seemed overwhelming at first, especially for small companies. They said that small companies would have a hard time verifying working conditions, especially if their suppliers were global firms.

4.1.4 WSDOT Radio Tower

The WSDOT ORMAF Radio Tower project was already completed when the research team reached out to WSDOT in January 2022. The contractor and suppliers were unresponsive to the data requests. WSDOT asked the contractor how much time/money it would take to complete the data requests, but they did not receive a response. The WSDOT project managers reasoned that the data requests were likely unsuccessful because the project was already done and the company was small, didn't have the capacity to respond, and needed to move on to other work.

4.1.5 Shoreline Community College Allied Health, Science, and Manufacturing

The Shoreline Community College Allied Health, Science, and Manufacturing Replacement Project was one of the pilot projects from the 2018 Buy Clean Pilot Study, so they were already prepared to provide material quantities and EPDs. The project was under construction at the time of the data submittal, so material quantities only reflected what was on site at the time.

This was the only pilot project to submit all of the requested materials – the contractor reporting spreadsheet, multiple EPDs, and supplier reporting spreadsheets representing all of the suppliers

(though the supplier reporting spreadsheets were incomplete). This pilot project was also unique in that the rebar and structural steel suppliers submitted multiple EPDs from multiple manufacturers for their materials. The reinforcing steel supplier provided four EPDs from four different manufacturers, and the structural steel supplier provided three EPDs from three manufacturers. There were additional manufacturers for these products, but they did not have EPDs to submit at this time. This project was already collecting EPDs in pursuit of its LEED Silver Certification. LEED certification does not specifically require EPDs, but projects that disclose material impacts may earn credits that count towards certification.

The project team said it was difficult to obtain all the data because they had to chase down multiple contacts and the supply chains were long, sometimes in countries outside of the U.S. However, they said that since this project was design-build, all of the contractors and subcontractors were on board during preconstruction and were aware of the data reporting requirements from the beginning, which facilitated the reporting process.

4.1.6 WWU Sciences Building Addition

The Western Washington University Sciences Building Addition and Renovation Project was another pilot project from the 2018 Buy Clean Pilot Study. No EPDs were submitted for this project because the project team did not know what an EPD was, and the research team did not realize this until it was too late. The supplier reporting spreadsheets were incomplete, and the contractor reporting spreadsheet was only partially completed. The project manager expressed general concerns about the cost and time burden of this reporting requirement.

4.2 Feedback from contractors

The research team met with each of the pilot project teams at the end of the pilot study to discuss challenges, how these challenges could have been addressed/prevented, and what the state government could do to help contractors adapt to a future BCBF program. The feedback was collected in response to five key questions, presented in Table 3.

Table 3. Feedback collected from contractors of pilot projects.

Question	Summary of responses
1. If any of your suppliers did not provide EPDs, what do you think was/ were the contributing reason(s)?	• The reporting requirements were **something new and something to figure out**, which must have been overwhelming at first, especially for smaller companies. • Some project teams lacked familiarity with EPDs, which made it more **difficult to communicate requirements** to suppliers. • There is a **lack of market pressure** to produce EPDs. From an individual project level, there is not enough purchasing power to encourage larger

Question	Summary of responses
	suppliers to go through the effort of getting the EPDs if they don't already exist. Market demand would motivate suppliers to produce EPDs. • It **takes time** to **assess finances** and set things in motion. • The **cost is significant**. • EPDs are **not a high priority** for trade partners, and their resources are limited.
2. What could have helped support or motivate your suppliers to provide EPDs?	• **Pay them for it.** The state could have a pool of money, and develop systems and processes that make EPD production more commonplace over time. • The state could **provide resources** (such as guidance) on how to create an EPD. • The state could provide **pre-qualified consultants** to avoid the lengthy RFP process or help manufacturers find trustworthy consultants to hire. The Energy Savings Performance Contracting (ESPC) program managed by the Department of Enterprise Services is an example of a state program that provides pre-qualified consultants. • **Get the suppliers involved as soon as possible**, during preconstruction or design development, before the project is finalized. • Include the reporting requirements as a **contract requirement in the bid process**, because the cost is significant, especially for smaller contracts and contractors initially. If the contractors know about it before/during the bid process, they will be able to plan ahead.
3. At what point in the project planning/ execution process should suppliers be asked to provide EPDs?	• **Before bid**. Since this is a new requirement, the more that project teams can get ahead of it, the better. Knowing about this pre-bid will allow project teams to plan for the time and cost of reporting, and incorporate this in the overall project cost and schedule. One pilot project reported that they used approximately 300 hours of an engineer's time to coordinate EPD and data submittal request over the course of the project. The project specifications should have a recommended timeline. • **During preconstruction or design development**.
4. How difficult was it to collect information for different parts of the Contractor data collection form?	• In some cases, it was impossible to break down the materials by subtype and building component, because the suppliers grouped the material quantities all into one lump sum. This is especially true for steel, for both rebar and structural steel. Steel suppliers also tend to order from multiple manufacturers. If it is necessary to have material quantities be broken down a certain way, contractors would need to include it in the project specifications.

5. What is the best way to engage with contractors in a potential future BCBF Program?	• Provide **model specifications or contract language.**
	• Provide **data reporting forms.**
	• **Communicate with the project manager** of the contractor.
	• Connect with the following bodies to hold **educational sessions**:
	  ○ Associated General Contractors of America (AGC)
	  ○ American Institute of Architects (AIA)

Question	Summary of responses
	○ American Public Works Association (APWA) ○ U.S. Green Building Council, maybe (USGBC) ○ Associated Builders and Contractors (ABC) • Have a **dedicated state employee** whose job it is to answer questions and provide guidance about the BCBF Program. • **Educate owners** and owners' groups on how to administer these requirements.

4.3 Feedback from suppliers

The research team reached out to all of the relevant suppliers toward the end of the pilot study to request feedback on the reporting requirements. Despite multiple email reminders, only two out of 20 suppliers responded to the debrief survey. From the debrief survey (results in **Appendix C: Pilot project debrief surveys**), the key takeaways were:

- Two survey respondents from steel companies said that EPDs can cost as much as $50,000 and can take four to six months to make. However, previous research showed that the costs to create EPDs are often significantly less. An international survey on EPDs found a median cost of $12,826. However, the range of costs vary widely, likely because the survey reflected various types of products and other factors. Additionally, the international survey found that the median time to create an EPD was about 20 business days.[12]
- Names and locations of upstream suppliers are difficult to ascertain. This is especially true if the materials were sourced from overseas, which is common with cement and some steel.

[12] https://www.sciencedirect.com/science/article/pii/S221282711631318X

5 Recommendations for a future BCBF program

Outcomes of the BCBF Pilot Study resulted in the following recommendations for (1) administering a potential future BCBF program, (2) running and maintaining a potential future BCBF database, and (3) changes to the reporting requirements that were in previously proposed (but not ultimately adopted) legislation, described in the subsections below.

5.1 Recommendations for program administration

The following are recommendations to the state government for administering a potential future BCBF program, based on lessons learned from the pilot project. Items marked with a check box in the list below indicate recommendations that have been incorporated with the current version of the BCBF bill.

- ☑ Provide **model specifications** so owners can use a reliable and consistent set of contract requirements and instructions about the reporting requirements. As contractors see these specifications in different projects, they will become familiar with the requirements more quickly. The model specifications should include:
    - A **recommended timeline** for when contractors should start reaching out to suppliers and initiating the EPD requisition process. For example, project teams should involve/inform suppliers as soon as possible about the reporting requirements, during preconstruction or design development.
- ☑ Provide **financial assistance** for EPD creation. This could include complementary funding for LCA consultants to develop streamlined EPD tools and third party verification processes. There can be as much as $50,000 in upfront cost to set up a manufacturing plant to produce its first EPD, and it may take three to 12 months to create. Data from California estimates the cost of developing a facility-specific EPD to be approximately $10,000 per material.[13] An international survey on EPDs found a median cost of $12,826.[14] These costs can be a significant burden, especially for smaller companies. However, the cost of producing subsequent EPDs are lower, and the annual fees following the initial registration fee are also lower.[15] Although EPDs can be costly, they are necessary for enacting effective embodied carbon reduction, and a program like BCBF can help make them more widespread in the industry.
- ☑ Provide **educational resources** for how to navigate the BCBF requirements, including how to use reporting databases, how to understand EPDs, and how to identify the appropriate EPDs within the EC3 tool and/or directly from suppliers.
- Provide **pre-qualified consultants** who can create EPDs. For example, the Energy Savings Performance Contracting (ESPC) program managed by the Washington State Department of

[13] https://dot.ca.gov/-/media/dot-media/programs/engineering/documents/mets/buy-clean-ca-dot-written-justification-a11y.pdf

[14] https://www.sciencedirect.com/science/article/pii/S221282711631318X

[15] https://www.environdec.com/pricing/pricing2022

Enterprise Services provides pre-qualified consultants who can complete building energy upgrades and retrofit projects for public agencies. Utilizing a similar model would help Contractors and Suppliers identify qualified consultants to help them create EPDs.

☑ Have a **dedicated staff person** for the BCBF Program to help answer questions and provide guidance on program requirements.

☑ Work with industry groups to **conduct outreach** to help educate contractors and owners on what they should know about the reporting program. For example, owners should include the BCBF reporting requirements in the bid documents so contractors can prepare and protect themselves from unexpected costs.

5.2 Recommendations for the database

In the development of the prototype database, steps were taken towards developing a long-term application for user-friendly and efficient collection of this data. The following additional items are needed to ensure that the application and database are durable, robust, supportable, and able to scale and evolve with the changing needs of collecting and analyzing sustainable construction and labor data:

- Improved administration dashboard with additional metrics on the collection of sustainable construction data and allowing administrators to better track submission status and completeness.
- Additional analytics, reports, charting, and dashboards, as future needs around reporting requirements become clearer.
- Business continuity plan and retention policy.
- Public-facing website displaying global warming potential savings/reduction and other clear metrics.
- Deeper integration with the EC3 database to include bidirectional communication.
- Increased support for EPDs, including robust document management options and tighter integration with EC3.
- Full implementation of user management to include self-service and integration of administration tools.
- Conversion to a state-managed and maintained production environment with developer and test environments.
- Administrator tooling that will allow users to manage questions and answers as information and analytics and construction practices continue to evolve. Feedback from the prototype will inform the direction of future efforts.
- A method to allow suppliers to more easily provide working conditions data. Instead of requiring them to enter working conditions data by hand, it would be easier if they could select from a dropdown menu of options or a library of up-to-date data.
- A method to verify that the contractor has provided data for 90% of the cost of each of the covered products used in the project, as required by the BCBF bill.

With these upgrades and changes resulting from the prototype database and lessons learned, the BCBF prototype database and website can be a robust application for years to come.

From working with the pilot projects, the research team also learned that a single supplier might source their materials from multiple manufacturers, which complicates the supplier data collection workflow. "Trade partner" was a term that the pilot projects often used to describe the companies that they worked with to procure materials, and a trade partner might acquire the construction materials from multiple manufacturers. Therefore, in a future version of the database, the supplier workflow should be revised include the distinction between "trade partner" and "manufacturer."

The research team would also consider moving the data entry section for reinforcement steel from the Steel section to the Concrete section of the reporting form, since reinforcement steel is usually provided by the concrete supplier.

Commerce will seek to continue the partnership with the Carbon Leadership Forum to support future database development and program implementation efforts in pursuit of future BCBF policy in the 2022-23 legislative session.

5.3 Feedback on reporting requirements

Even though the research team did not specifically request feedback about the reporting requirements, some stakeholders and representatives from pilot projects offered feedback. This feedback is below:

- Update the wood fiber sourcing tab to focus on ASTM D7612: Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources.
- Allow those with supply chains entirely in North America to opt out of the Code of Conduct section due to local and national labor laws.
- Labor data can be difficult to collect, especially if the manufacturing facilities are located outside of the U.S. These requirements should be flexible based on availability.
- It is difficult to separate the material quantities by building components because suppliers normally quantify them as a lump sum. If the breakdown is truly desired, this would have to be outlined in the project specifications.

Given that no pilot projects produced supply chain-specific EPDs for the pilot study, the research team is curious if this requirement would be more feasible if required by state policy. Perhaps during early-stage implementation of a BCBF reporting program, program managers could allow flexibility to use facility or manufacturer-specific EPDs if supply chain-specific data is unavailable. This could give the industry time to develop the data needed for supply chain-specific EPDs, and may bolster confidence and build experience for project teams required to report data under a BCBF program.

The suggestions and recommendations in this report will help inform future policy and program development. If the BCBF policy currently up for consideration passes the Legislature, additional data could be available from a variety of state projects. Commerce will continue to seek feedback from project teams on reporting requirements, and will leverage the stakeholder working group established by the bill to provide additional input.

6 Conclusion

Addressing the impacts of climate change requires a comprehensive and ongoing commitment to decreasing greenhouse gas emissions. Buy Clean and Buy Fair is an important step to establish Washington's commitment to mitigating the effects of embodied carbon. The 2021 State Energy Strategy identifies key actions that need to be taken to achieve the state's statutory greenhouse gas limits and recommends adopting Buy Clean and Buy Fair requirements for public projects, recognizing that this policy is essential priority in the transition to 100% clean energy.
This BCBF Pilot Study provided the opportunity to explore the process of setting up and running a BCBF reporting program.

In developing the prototype database, the research team underwent the process of creating the first Washington database to collect user-supplied data for a Buy Clean and Buy Fair program. This database tracks data on state procurement of building materials and provides interoperability with the EC3 tool and EPD data used in private-sector projects. The research team proposed a data reporting structure, collected industry feedback to improve it, and worked with a database development team to troubleshoot various user workflows and possible scenarios. The next step recommended by the research team is testing the database with the pilot project teams and then implementing additional features listed in **Section 5.2 Recommendations for the database**.

The pilot project case studies reinforced the importance of including the reporting requirements in the bid documents. Project teams said that if the reporting requirements weren't in the bid documents, the contractors couldn't contractually require their suppliers to provide the requested data. They also couldn't anticipate the cost of coordinating the EPD and data submittal requests from their suppliers, which, according to one pilot project, used approximately 300 hours of an engineer's time over the course of the project. Those pilot projects that did secure EPDs were the ones legally required to do so, either through the provisos or because they were able to insert reporting language in their contracts with their trade partners. Even though this pilot study didn't gather as much data from the pilot projects as hoped, there were many lessons learned about how to support contractors and facilitate the reporting process to maximize the chances of successful reporting.

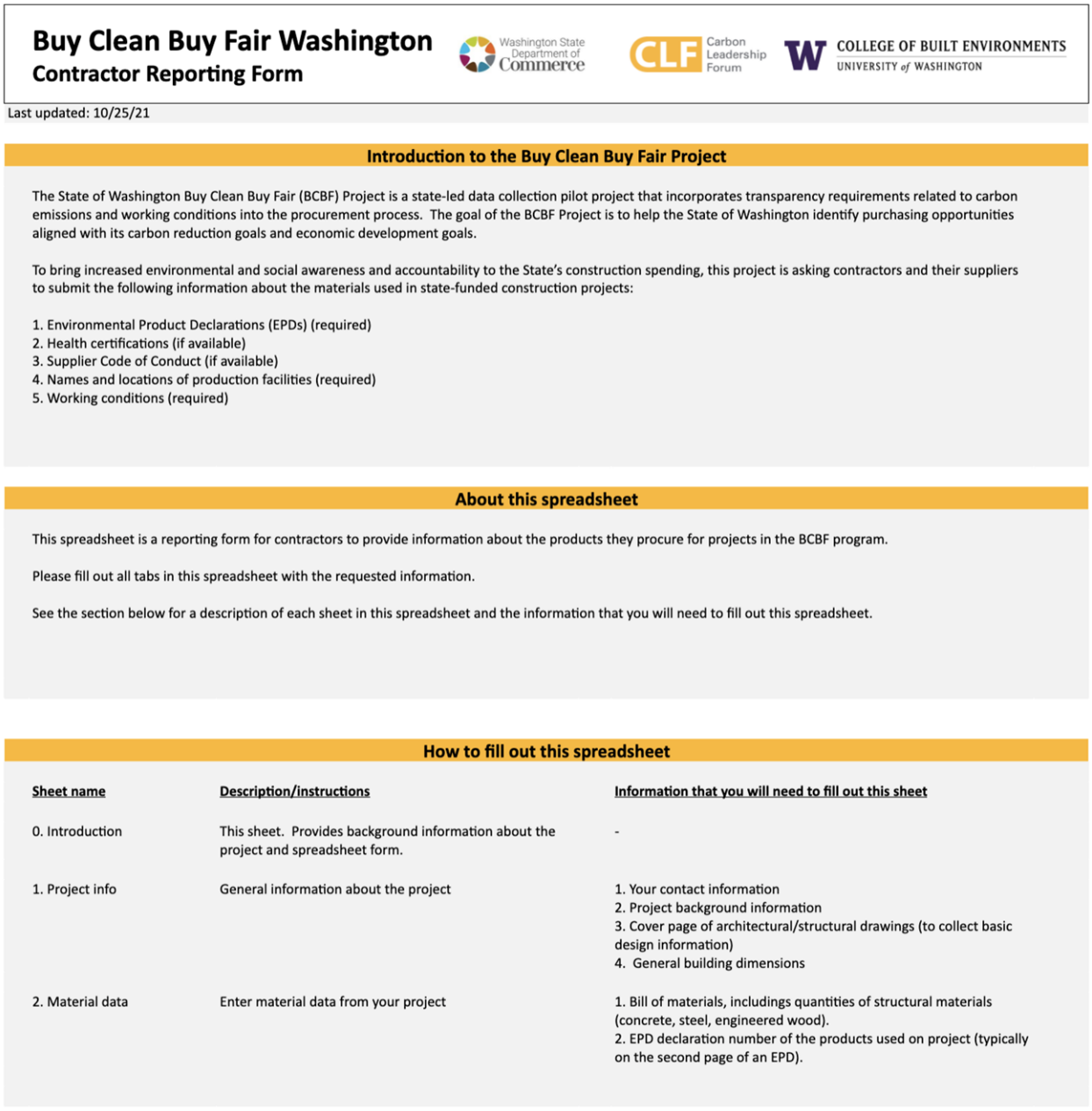
The Buy Clean and Buy Fair bill for consideration during the 2022-23 legislative session is designed as a first step to address embodied carbon in state building construction projects. The majority of a product's carbon footprint is generated across its supply chain, and current climate policy efforts do not address these GHG emissions, creating a 'carbon loophole.' Policies like Buy Clean and Buy Fair that promote public procurement of building materials with lower embodied emissions are widely recognized as a key strategic lever for closing this loophole by accounting for a product's emissions throughout its supply chain.

With the insight gained during this pilot project, Commerce is well positioned to implement Buy Clean and Buy Fair policy. Should the BCBF bill pass, Commerce will incorporate recommendations from the

pilot and develop a BCBF program that encourages broader adoption of EPDs, supports project teams with reporting requirements, tracks procurement data for concrete, wood, and steel used in state building projects, and convenes stakeholders to explore opportunities to strengthen market demand and supply of low-carbon building materials.

Appendix A: Reporting templates

Figure 15 through Figure 17 capture the three sheets of the Contractor Reporting Template, and Figure 18 through Figure 24 capture the six sheets of the Supplier Reporting Template. These images reflect updates made to the templates based on survey feedback.



Buy Clean Buy Fair Washington
Contractor Reporting Form

Washington State Department of Commerce | CLF Carbon Leadership Forum | COLLEGE OF BUILT ENVIRONMENTS, UNIVERSITY of WASHINGTON

Last updated: 10/25/21

Introduction to the Buy Clean Buy Fair Project

The State of Washington Buy Clean Buy Fair (BCBF) Project is a state-led data collection pilot project that incorporates transparency requirements related to carbon emissions and working conditions into the procurement process. The goal of the BCBF Project is to help the State of Washington identify purchasing opportunities aligned with its carbon reduction goals and economic development goals.

To bring increased environmental and social awareness and accountability to the State's construction spending, this project is asking contractors and their suppliers to submit the following information about the materials used in state-funded construction projects:

1. Environmental Product Declarations (EPDs) (required)
2. Health certifications (if available)
3. Supplier Code of Conduct (if available)
4. Names and locations of production facilities (required)
5. Working conditions (required)

About this spreadsheet

This spreadsheet is a reporting form for contractors to provide information about the products they procure for projects in the BCBF program.

Please fill out all tabs in this spreadsheet with the requested information.

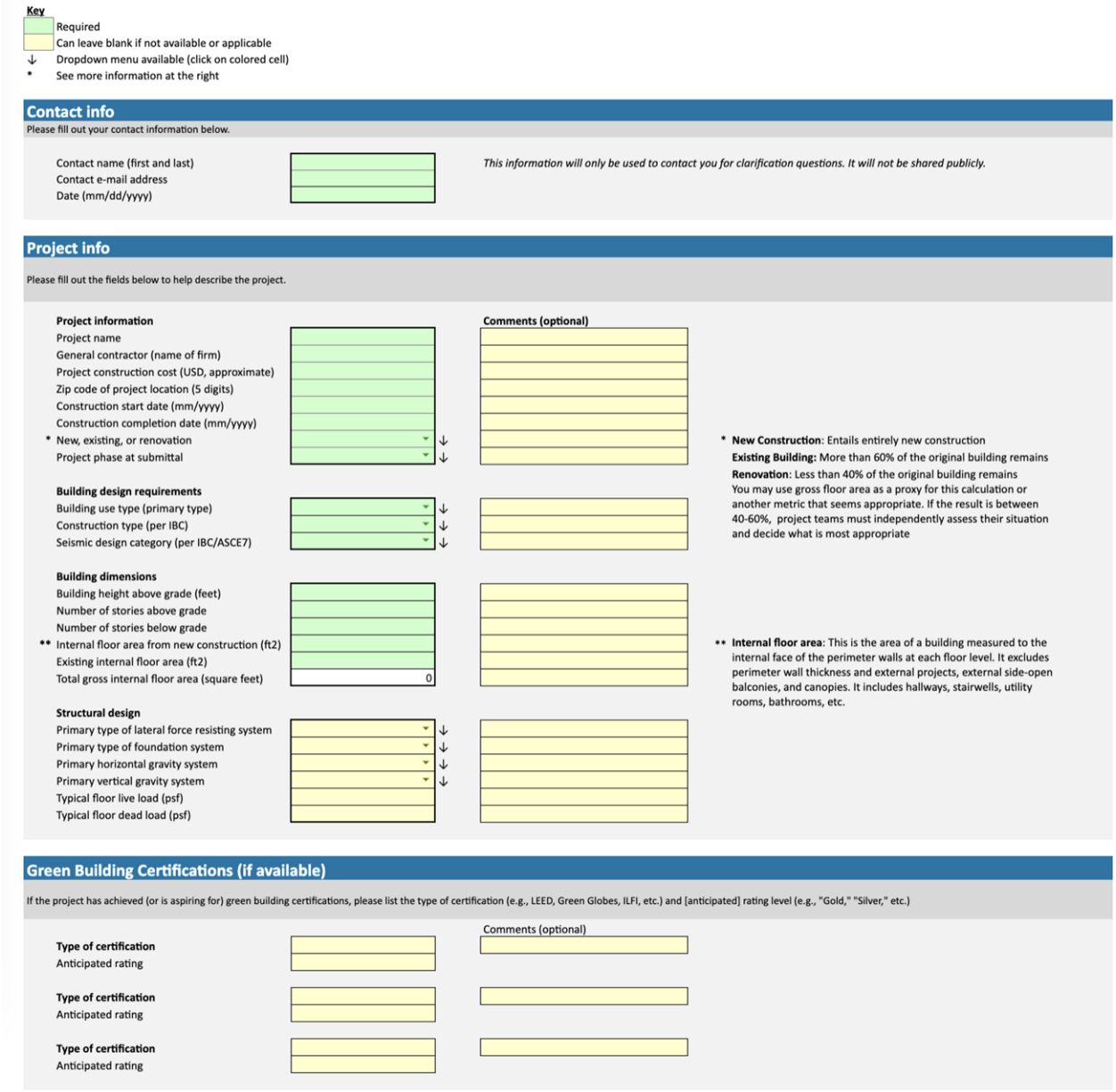
See the section below for a description of each sheet in this spreadsheet and the information that you will need to fill out this spreadsheet.

How to fill out this spreadsheet

Sheet name	Description/instructions	Information that you will need to fill out this sheet
0. Introduction	This sheet. Provides background information about the project and spreadsheet form.	-
1. Project info	General information about the project	1. Your contact information 2. Project background information 3. Cover page of architectural/structural drawings (to collect basic design information) 4. General building dimensions
2. Material data	Enter material data from your project	1. Bill of materials, includings quantities of structural materials (concrete, steel, engineered wood). 2. EPD declaration number of the products used on project (typically on the second page of an EPD).

Figure 15. Sheet 0: Introduction from the Contractor Reporting Template

1. Project Info



Key
Required
Can leave blank if not available or applicable
↓ Dropdown menu available (click on colored cell)
* See more information at the right

Contact info

Please fill out your contact information below.

Contact name (first and last)
Contact e-mail address
Date (mm/dd/yyyy)

This information will only be used to contact you for clarification questions. It will not be shared publicly.

Project info

Please fill out the fields below to help describe the project.

Project information — Comments (optional)
Project name
General contractor (name of firm)
Project construction cost (USD, approximate)
Zip code of project location (5 digits)
Construction start date (mm/yyyy)
Construction completion date (mm/yyyy)
* New, existing, or renovation ↓
Project phase at submittal ↓

* **New Construction**: Entails entirely new construction
Existing Building: More than 60% of the original building remains
Renovation: Less than 40% of the original building remains
You may use gross floor area as a proxy for this calculation or another metric that seems appropriate. If the result is between 40-60%, project teams must independently assess their situation and decide what is most appropriate

Building design requirements
Building use type (primary type) ↓
Construction type (per IBC) ↓
Seismic design category (per IBC/ASCE7) ↓

Building dimensions
Building height above grade (feet)
Number of stories above grade
Number of stories below grade
** Internal floor area from new construction (ft2)
Existing internal floor area (ft2)
Total gross internal floor area (square feet) 0

** **Internal floor area**: This is the area of a building measured to the internal face of the perimeter walls at each floor level. It excludes perimeter wall thickness and external projects, external side-open balconies, and canopies. It includes hallways, stairwells, utility rooms, bathrooms, etc.

Structural design
Primary type of lateral force resisting system ↓
Primary type of foundation system ↓
Primary horizontal gravity system ↓
Primary vertical gravity system ↓
Typical floor live load (psf)
Typical floor dead load (psf)

Green Building Certifications (if available)

If the project has achieved (or is aspiring for) green building certifications, please list the type of certification (e.g., LEED, Green Globes, ILFI, etc.) and [anticipated] rating level (e.g., "Gold," "Silver," etc.)

Comments (optional)

Type of certification
Anticipated rating

Type of certification
Anticipated rating

Type of certification
Anticipated rating

Figure 16. Sheet 1: Project Info from the Contractor Reporting Template

2. Material Data

Key
Autofilled

For each material in each building component, repeat Steps 1-5 on each row:

Instructions/notes

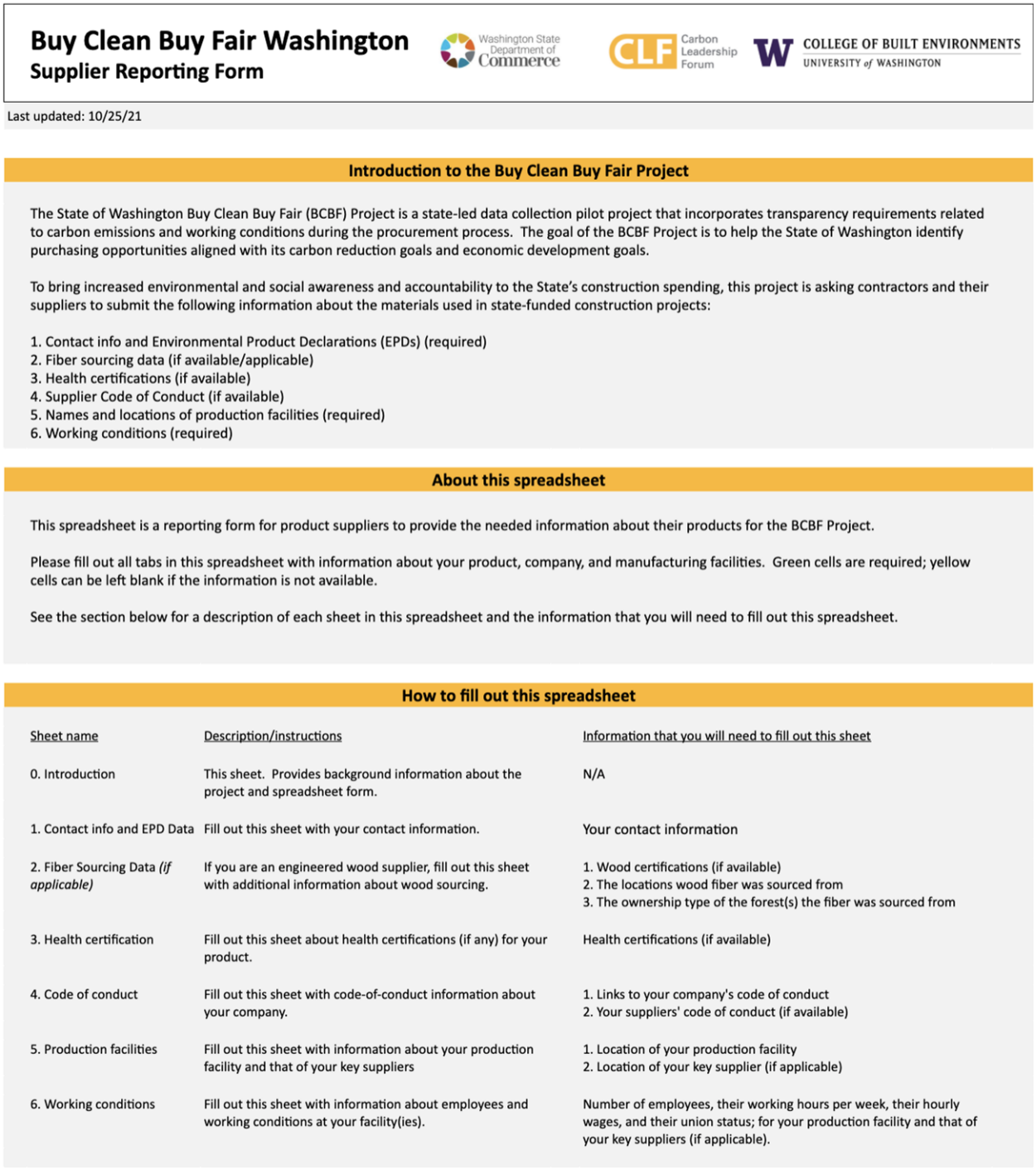
Please fill out the table for as many materials on your project as possible. At a minimum, you must include the following products if they are present on your project:

1. Ready-mix concrete
2. Precast concrete
3. Shotcrete
4. Rebar
5. Post-tensioning (PT) tendons
6. Hot-rolled steel sections
7. Hollow structural steel sections
8. Steel plate
9. Cold-formed steel
10. Composite lumber (LSL, PSL, LVL, etc.)
11. Mass timber (glulam, CLT, NLT, DLT, etc.)

You may add rows as needed

Step 1	Step 2	Step 3			Step 4		Step 5
Material category	**Building component**	**Product type**	**Product sub-type**		**Quantity**	**Units**	**EPD declaration number**
What type of material is this?	*Where in the building is this material used?*	*What type of product is this?*	*What is the sub-type of this product?*		*How much of the material is used in the building?*		*What is the declaration number on the EPD for this product?*
Select option from drop-down menu in cells below. * indicates that this material must be reported if it is present on your project.	**Select option from drop-down menu in cells ↓**	**Select option from drop-down menu in cells below. * indicates that this material must be reported if it is present on your project.**	**Select option from drop-down menu in cells if available. Otherwise, leave blank. Add comment to the right if needed.**	**Comments**	**Enter material quantity in the given units**		**Enter EPD declaration number**
Concrete*	Standard foundations	Ready-mix* (select sub-type →)	3000 psi (28-day strength)			cubic yards (cy)	
Steel*	Special foundations	Rebar*				metric tonnes	
Wood*	Standard slabs-on-grade	Mass timber* (select sub-type →)	Cross-laminated timber (CLT)			cubic meters (m3)	
Masonry	Structural slabs-on-grade	Brick				metric tonnes	
Aluminum	Slab trenches	Billets				metric tonnes	
Sheathing	Pits and bases	Gypsum sheathing				square meters (m2)	
Thermal/moisture	Floor construction	Dampproofing and waterproofing					
Cladding	Roof construction	Stone cladding					
Openings	Stairs	Storefront					
	Columns						
	Structural walls						
	Exterior windows						
	Exterior doors and grills						
	Exterior louvers and vents						
	Exterior wall appurtenances						
	Roofing						

Figure 17. Sheet 2: Material quantity data from the Contractor Reporting Template



Buy Clean Buy Fair Washington
Supplier Reporting Form

Washington State Department of Commerce | CLF Carbon Leadership Forum | COLLEGE OF BUILT ENVIRONMENTS UNIVERSITY of WASHINGTON

Last updated: 10/25/21

Introduction to the Buy Clean Buy Fair Project

The State of Washington Buy Clean Buy Fair (BCBF) Project is a state-led data collection pilot project that incorporates transparency requirements related to carbon emissions and working conditions during the procurement process. The goal of the BCBF Project is to help the State of Washington identify purchasing opportunities aligned with its carbon reduction goals and economic development goals.

To bring increased environmental and social awareness and accountability to the State's construction spending, this project is asking contractors and their suppliers to submit the following information about the materials used in state-funded construction projects:

1. Contact info and Environmental Product Declarations (EPDs) (required)
2. Fiber sourcing data (if available/applicable)
3. Health certifications (if available)
4. Supplier Code of Conduct (if available)
5. Names and locations of production facilities (required)
6. Working conditions (required)

About this spreadsheet

This spreadsheet is a reporting form for product suppliers to provide the needed information about their products for the BCBF Project.

Please fill out all tabs in this spreadsheet with information about your product, company, and manufacturing facilities. Green cells are required; yellow cells can be left blank if the information is not available.

See the section below for a description of each sheet in this spreadsheet and the information that you will need to fill out this spreadsheet.

How to fill out this spreadsheet

Sheet name	Description/instructions	Information that you will need to fill out this sheet
0. Introduction	This sheet. Provides background information about the project and spreadsheet form.	N/A
1. Contact info and EPD Data	Fill out this sheet with your contact information.	Your contact information
2. Fiber Sourcing Data *(if applicable)*	If you are an engineered wood supplier, fill out this sheet with additional information about wood sourcing.	1. Wood certifications (if available) 2. The locations wood fiber was sourced from 3. The ownership type of the forest(s) the fiber was sourced from
3. Health certification	Fill out this sheet about health certifications (if any) for your product.	Health certifications (if available)
4. Code of conduct	Fill out this sheet with code-of-conduct information about your company.	1. Links to your company's code of conduct 2. Your suppliers' code of conduct (if available)
5. Production facilities	Fill out this sheet with information about your production facility and that of your key suppliers	1. Location of your production facility 2. Location of your key supplier (if applicable)
6. Working conditions	Fill out this sheet with information about employees and working conditions at your facility(ies).	Number of employees, their working hours per week, their hourly wages, and their union status; for your production facility and that of your key suppliers (if applicable).

Figure 18. Sheet 0: Introduction from the Supplier Reporting Template

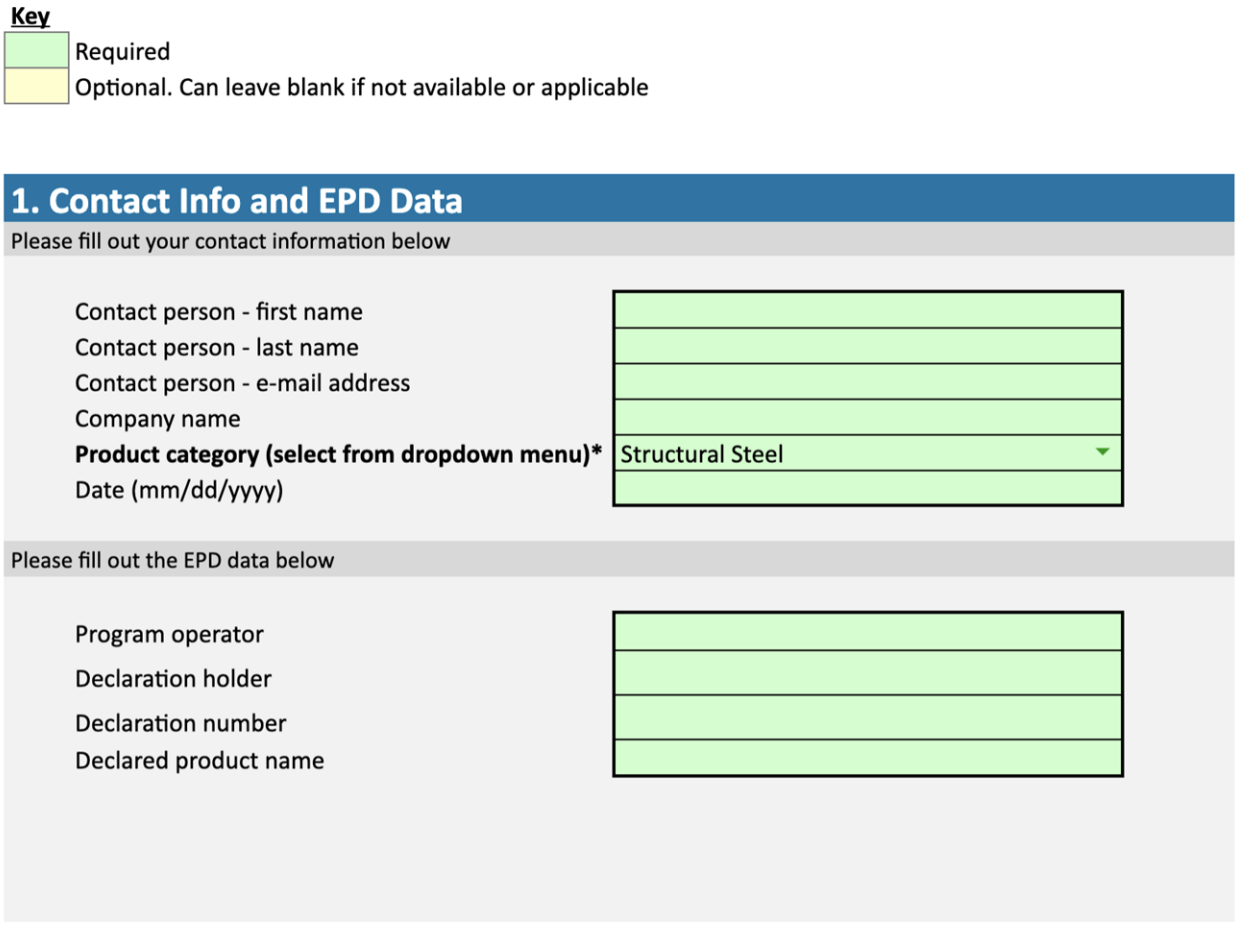
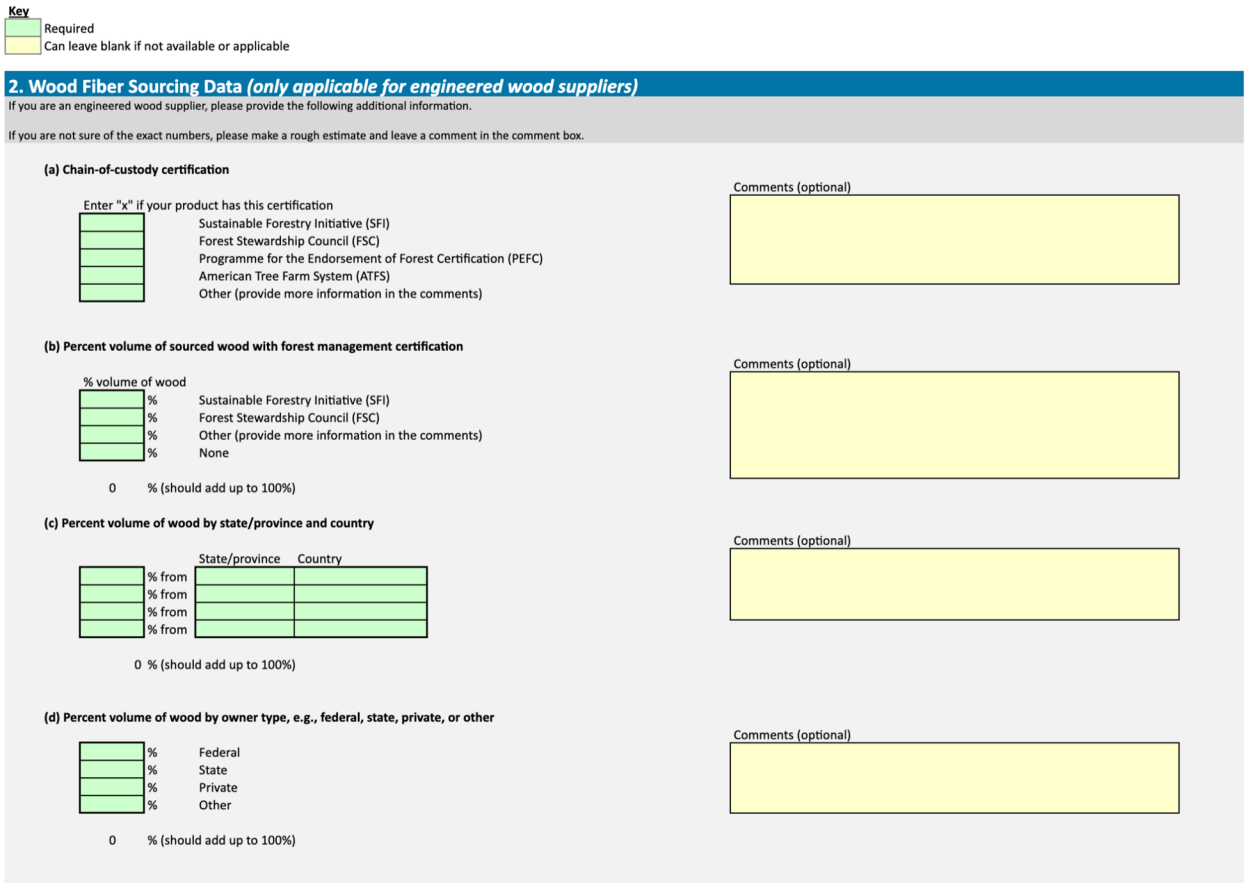


Figure 19. Sheet 1: Contact Info and EPD Data from the Supplier Reporting Template



Key
Required
Can leave blank if not available or applicable

2. Wood Fiber Sourcing Data *(only applicable for engineered wood suppliers)*

If you are an engineered wood supplier, please provide the following additional information.

If you are not sure of the exact numbers, please make a rough estimate and leave a comment in the comment box.

(a) Chain-of-custody certification

Enter "x" if your product has this certification

- Sustainable Forestry Initiative (SFI)
- Forest Stewardship Council (FSC)
- Programme for the Endorsement of Forest Certification (PEFC)
- American Tree Farm System (ATFS)
- Other (provide more information in the comments)

Comments (optional)

(b) Percent volume of sourced wood with forest management certification

% volume of wood

- % Sustainable Forestry Initiative (SFI)
- % Forest Stewardship Council (FSC)
- % Other (provide more information in the comments)
- % None

0 % (should add up to 100%)

Comments (optional)

(c) Percent volume of wood by state/province and country

	State/province	Country
% from		
% from		
% from		
% from		

0 % (should add up to 100%)

Comments (optional)

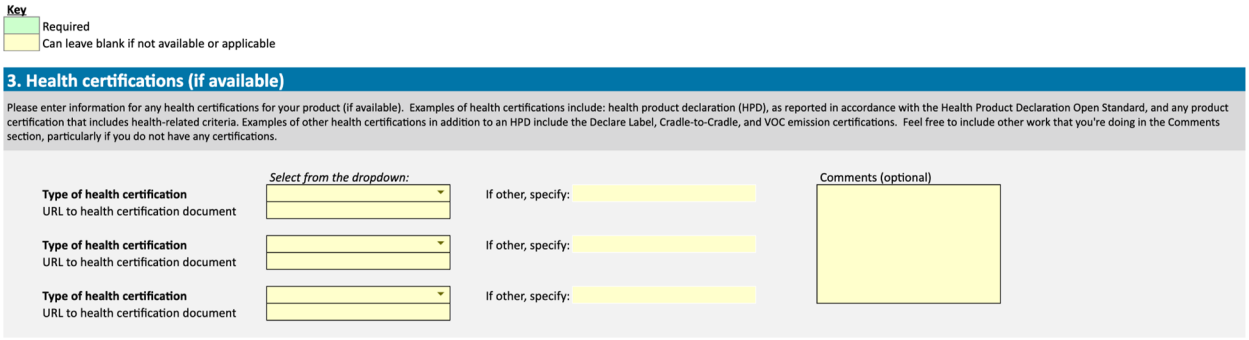
(d) Percent volume of wood by owner type, e.g., federal, state, private, or other

- % Federal
- % State
- % Private
- % Other

0 % (should add up to 100%)

Comments (optional)

Figure 20. Sheet 2: Fiber Sourcing Data from the Supplier Reporting Template



Key
Required
Can leave blank if not available or applicable

3. Health certifications (if available)

Please enter information for any health certifications for your product (if available). Examples of health certifications include: health product declaration (HPD), as reported in accordance with the Health Product Declaration Open Standard, and any product certification that includes health-related criteria. Examples of other health certifications in addition to an HPD include the Declare Label, Cradle-to-Cradle, and VOC emission certifications. Feel free to include other work that you're doing in the Comments section, particularly if you do not have any certifications.

Select from the dropdown:

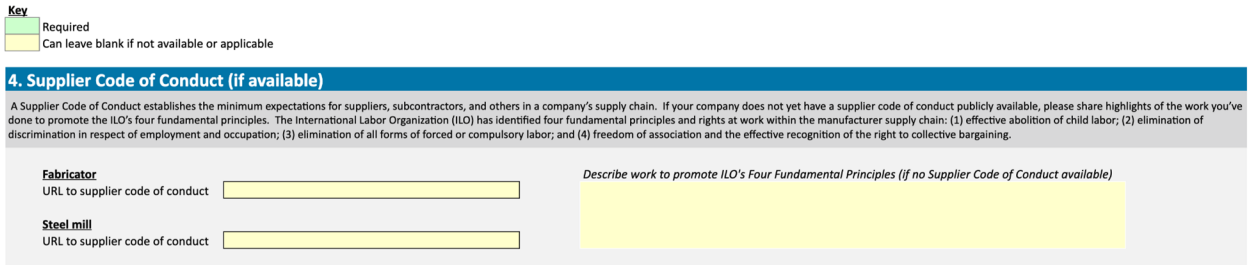
Type of health certification — If other, specify:
URL to health certification document

Type of health certification — If other, specify:
URL to health certification document

Type of health certification — If other, specify:
URL to health certification document

Comments (optional)

Figure 21. Sheet 3: Health Certification from the Supplier Reporting Template



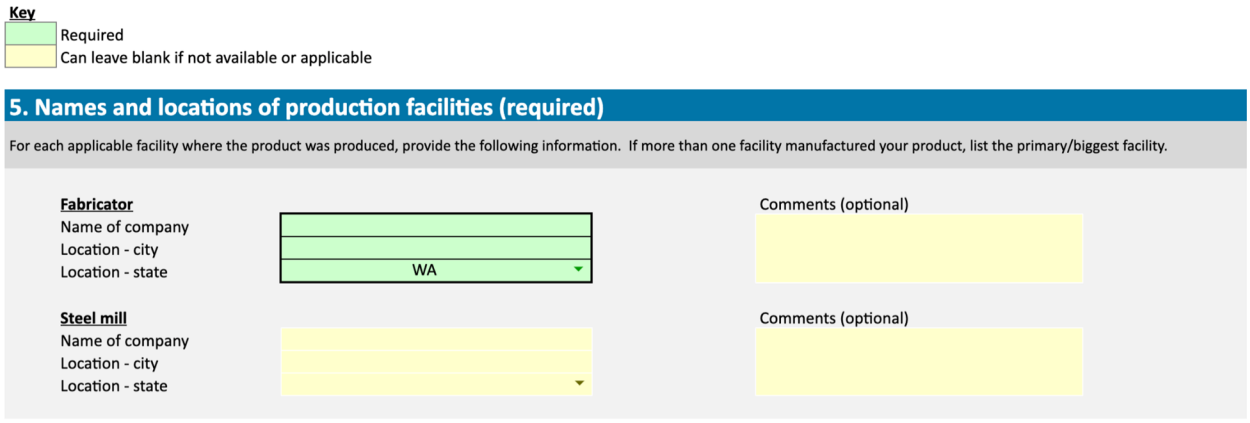
Key
Required
Can leave blank if not available or applicable

4. Supplier Code of Conduct (if available)

A Supplier Code of Conduct establishes the minimum expectations for suppliers, subcontractors, and others in a company's supply chain. If your company does not yet have a supplier code of conduct publicly available, please share highlights of the work you've done to promote the ILO's four fundamental principles. The International Labor Organization (ILO) has identified four fundamental principles and rights at work within the manufacturer supply chain: (1) effective abolition of child labor; (2) elimination of discrimination in respect of employment and occupation; (3) elimination of all forms of forced or compulsory labor; and (4) freedom of association and the effective recognition of the right to collective bargaining.

Fabricator		*Describe work to promote ILO's Four Fundamental Principles (if no Supplier Code of Conduct available)*
URL to supplier code of conduct		
Steel mill		
URL to supplier code of conduct		

Figure 22. Sheet 4: Code of Conduct from the Supplier Reporting Template



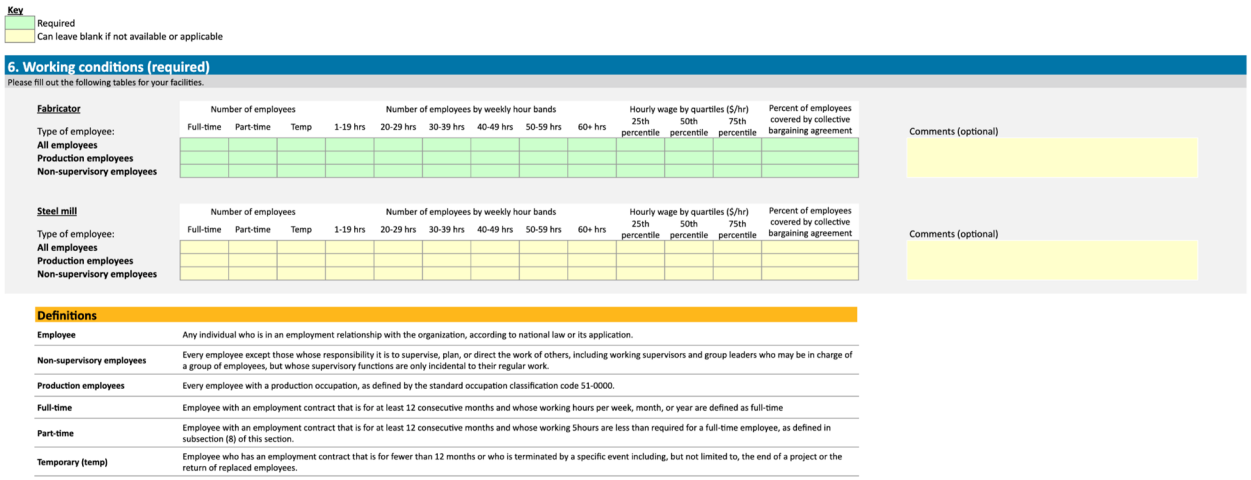
Key
Required
Can leave blank if not available or applicable

5. Names and locations of production facilities (required)

For each applicable facility where the product was produced, provide the following information. If more than one facility manufactured your product, list the primary/biggest facility.

Fabricator		Comments (optional)
Name of company		
Location - city		
Location - state	WA	
Steel mill		Comments (optional)
Name of company		
Location - city		
Location - state		

Figure 23. Sheet 5: Production Facilities from the Supplier Reporting Template



Key
Required
Can leave blank if not available or applicable

6. Working conditions (required)

Please fill out the following tables for your facilities.

Fabricator

Type of employee:	Number of employees			Number of employees by weekly hour bands						Hourly wage by quartiles ($/hr)			Percent of employees covered by collective bargaining agreement
	Full-time	Part-time	Temp	1-19 hrs	20-29 hrs	30-39 hrs	40-49 hrs	50-59 hrs	60+ hrs	25th percentile	50th percentile	75th percentile	
All employees													
Production employees													
Non-supervisory employees													

Comments (optional)

Steel mill

Type of employee:	Number of employees			Number of employees by weekly hour bands						Hourly wage by quartiles ($/hr)			Percent of employees covered by collective bargaining agreement
	Full-time	Part-time	Temp	1-19 hrs	20-29 hrs	30-39 hrs	40-49 hrs	50-59 hrs	60+ hrs	25th percentile	50th percentile	75th percentile	
All employees													
Production employees													
Non-supervisory employees													

Comments (optional)

Definitions

Employee	Any individual who is in an employment relationship with the organization, according to national law or its application.
Non-supervisory employees	Every employee except those whose responsibility it is to supervise, plan, or direct the work of others, including working supervisors and group leaders who may be in charge of a group of employees, but whose supervisory functions are only incidental to their regular work.
Production employees	Every employee with a production occupation, as defined by the standard occupation classification code 51-0000.
Full-time	Employee with an employment contract that is for at least 12 consecutive months and whose working hours per week, month, or year are defined as full-time
Part-time	Employee with an employment contract that is for at least 12 consecutive months and whose working Shours are less than required for a full-time employee, as defined in subsection (8) of this section.
Temporary (temp)	Employee who has an employment contract that is for fewer than 12 months or who is terminated by a specific event including, but not limited to, the end of a project or the return of replaced employees.

Figure 24. Sheet 6: Working Conditions from the Supplier Reporting Template

Appendix B: Stakeholder feedback

Appendix B1: Stakeholder feedback process

List of stakeholders invited to complete feedback survey and attend feedback sessions

Type of organization	Organization	Number of invitees to each meeting		
		Meeting 1 - Contractor Template	Meeting 2 - Supplier Template	Both
Architect	EHDD	1		
	KieranTimberlake	2		
	LMN	1		
	Miller Hull	1		
	Perkins + Will	2		
	ZGF	1		
Contractor	Absherco	1		
	AGC of Washington	1		
	Andersen Construction	2		
	BNBuilders	2		
	Hensel Phelps (design builder)	2		
	Hoffman	1		
	Lewis Builds	1		
	McKinstry	1		
	Mortenson	1		
	Sellen	1		
	Skanska	2		
	Tiger Construction	1		
	Turner Construction	1		
	Webcor	1		
Engineer	MKA	1		

Type of organization	Organization	Number of invitees to each meeting		
		Meeting 1 - Contractor Template	Meeting 2 - Supplier Template	Both
Independent consultant	Independent consultant with relevant experience	1	3	1
NGO - building industry	AIA	1		
	SE2050 / LeMessurier	1		
	SE2050 / Meyer Borgman Johnson	1		
NGO - environmental	Blue Green Alliance			1
	National Indian Carbon Coalition		1	
	Washington Environmental Council		1	
	Washington Forest Protection Association		1	
Labor	United Steelworkers District 12		1	
	USW District 338		1	
	Washington Fair Trade		1	
State	University of Washington Project Managers			3
	Washington State Department of Enterprise Services			3
Supplier - concrete	Cadman (a Lehigh Hanson company)		1	
	Cal Portland		2	
	Lehigh Hanson		1	
	Stoneway Concrete		1	
Supplier - glass	Saint-Gobain		2	
Supplier - insulation	BASF Corporation (polystyrene)		1	
	Hunter Panels (polyiso)		1	
Supplier - precast concrete	Clark Pacific		1	
Supplier - steel	Nucor Steel		1	
	Tri States Rebar (Spokane)		1	
Supplier - wood	Weyerhaeuser		2	

Type of organization	Organization	Number of invitees to each meeting		
		Meeting 1 - Contractor Template	Meeting 2 - Supplier Template	Both
Supplier - wood (mass timber)	Structurlam		1	
	Vaagen Timbers		1	
Trade association	American Institute of Steel Construction (AISC)	2		
	American Iron and Steel Institute (AISI)	1		
	American Wood Council (AWC)	1		
	Fenestration and Glazing Industry Alliance	1		
	North American Insulation Manufacturers Association (NAIMA)	1		
	National Glass Association (NGA)	1		
	National Insulation Association (NIA)	1		
	National Ready Mixed Concrete Association (NRMCA)		2	
Grand Total		31	37	8

Invitation email to stakeholders to participate in feedback process (Supplier version)

Hello,
I am reaching out to invite you to participate in the stakeholder feedback process for the Buy Clean and Buy Fair (BCBF) Washington Project being led by the Washington State Department of Commerce and University of Washington College of Built Environment. A brief description of the project is attached for your reference.

We are asking you to provide feedback on the Supplier Reporting Template (a separate form collects Contractor reporting information). This reporting template will be used to collect environmental and social impact data for a select list of materials used in state-funded construction projects.

How to submit feedback:

- To provide feedback, please complete the following survey: Survey on Supplier Reporting Template. A link to the template is in this survey. If any of the questions in this form aren't relevant to you, please feel free to skip as you see fit. Emails are only collected for clarification.
- The goal of this survey is to collect user feedback that will help U.S. 1) create a data collection form that is clear, straight-forward, and user-friendly, and 2) create a database of material data that will contain

useful environmental information about construction projects. Therefore, please **share this email with the appropriate team member who can provide feedback on the required data collection**.

- We are only accepting written feedback at this time to ensure that we accurately capture feedback from all stakeholders.

Deadline:
The deadline to submit feedback via the survey form above is **November 23, 2021**.

What will we do with this feedback?

- We will include a summary of feedback in our progress report to the Washington Legislature in January 2021, as well as a list of which organizations were invited to participate.
- We will use this feedback to improve the format, user experience, and structure of the reporting templates and database.
- We will not attribute feedback to specific individuals. However, we may attribute feedback anonymously by organization, such as *"Feedback from [concrete suppliers, contractors, researchers, etc.] included _____."*

Questions?
We are happy to answer questions via email: please reach out to Monica Huang and Meghan Lewis.

There is an optional meeting **Thursday, October 28 at 11am PST** that will be recorded and shared with invited participants following the meeting. This will only provide an overview and an opportunity to answer questions.

Meeting Information: Oct 28, 2021 11:00 AM PST
Join meeting: https://washington.zoom.us/j/91775941953
Meeting ID: 917 7594 1953
Find your local number: https://washington.zoom.us/u/aelxjAc1ig

Thank you in advance for your participation in this feedback process, and please reach out with any questions!

Sincerely,
Meghan Lewis, Senior Researcher, UW College of the Built Environment
Monica Huang, Researcher, UW College of the Built Environment

Follow-up email to stakeholders to following (Supplier version)

Hello all,
I am writing to follow-up on our invitation to provide feedback on the BCBF WA Reporting Database and to provide a link to the overview meeting last Thursday.

Slides of the meeting are attached, and here is a recording of the call: https://washington.zoom.us/rec/share/E2CoEZ78rECAmmD75HS7DpNDLRKyKTwlAHLKdCTdiGM4QdsFhBN_lKbgVg_8vQNP.8LmntPhDspTOhPAs

A few questions that came up during the call:

- **When are EPDs collected?** The BCBF pilot project and database is testing the requirements of HB 1103. Per that bill, EPDs are not required until project completion and (eventually) at time of install. Neither the legislation nor pilot program require EPDs at time of bid.
- **Which materials are included in the pilot?** Structural and reinforcing steel products, concrete products, and engineered wood products are included in the pilot. However, envelope materials such as glass and insulation are included in the material quantities list and database per the scope of the database set by legislature.
- **What do contractors fill out?** Contractors will be responsible for providing project information and material quantities. Material quantities are linked to a specific product via EPD number (if an EPD is required). See the contractor reporting form here, for reference.
- **Why don't the dropdowns work?** If you would like edit access to the form to be able to use the dropdown functionality shown in the recording, please reach out. We are happy to change it from view access.

As a reminder, here is the survey for providing feedback. We ask that you complete this survey by November 23 at the latest, to ensure we can incorporate feedback in the progress report to WA legislature that is due January 1. Please reach out with any questions, and thank you again for your participation.

Best,
Meghan

Appendix B2: Stakeholder feedback surveys

Feedback Survey for Contractor Reporting Form

Page	Content and questions
1. Introduction	The purpose of this survey is to collect feedback on the draft Contractor Reporting Form for the Buy Clean and Buy Fair (BCBF) Washington Project. The goal of the BCBF Project is to help the State of Washington identify purchasing opportunities aligned with its carbon reduction goals and economic development goals. This form will be used to collect basic project information and material quantity data for materials used in state-funded construction projects. The collected data will be stored in an online database as a part of the BCBF Project. This feedback will help U.S. 1) create a data collection form that is clear, straight-forward, and user-friendly, and 2) create a database of material data that will contain useful environmental information about construction projects. This survey will take approximately 10 minutes to complete. If any of the questions in this form aren't relevant to you, please feel free to skip as you see fit. You can view the Contractor Reporting Template here: https://docs.google.com/spreadsheets/d/1robhuQ5Ari7IOpCwst8Ouk7sVYoks_NlyjydxaGkyKc/edit?usp=sharing. What will we do with this feedback? - We will include a summary of feedback in our progress report to the Washington Legislature in January 2021, as well as a list of which organizations participated. - We will use this feedback to improve the format, user experience, and structure of the reporting templates and database. - Emails will only be used for clarifying questions on the feedback. - We will not attribute information to individuals. However, we may attribute feedback to groups of organizations (e.g. “Feedback from [concrete suppliers, contractors, researchers, etc.] included _____.”)

2. Contact information	• Email:
	
	• First name:
	
	• Last name:
	
	• What best represents your organization’s role?
	  ○ Industry Trade Organization
	  ○ Architecture
	  ○ Engineering
	  ○ Contractor
	  ○ Government
	  ○ Research
	  ○ Other

Page	Content and questions
3. Feedback for the "0. Introduction" sheet	• Is the background information on BCBF clear? Too much information? Too little information? Elaborate. • Do you understand what this project is asking from contractors? • Are the instructions unclear? How so? • How would you improve this sheet?
4. Feedback for the "1. Project Info" sheet	• Is any of the basic project information difficult for you to collect? ☐ Project information ☐ Building design requirements ☐ Building dimensions ☐ Structural design • If you checked a box in the previous questions, why is that information difficult to collect? • What documents would you need to reference to fill this section out? (e.g. would the information typically found on a cover sheet for architectural or structural drawings be enough, or would you need additional documents?) • Does the distinction between new construction, existing building, and renovation make sense? How might you define these differently? The information currently shown is consistent with LEED. • Would you need additional definitions to fill out this section? • Are the instructions unclear? How so? • How would you improve this sheet?
5. Feedback for the "2. Material Data" sheet	• Are there any material categories, building components, product types, or product sub-types that you would add? Any that you would take away? • Is your bill of materials adequate to fill this section out? If not, what other resources would you need to collect before filling out this form? • Are the units consistent with how you collect and report these data? • Are the instructions unclear? How so? • How would you improve this sheet?

Feedback Survey for Supplier Reporting Form

Page	Content and questions
1. Introduction	The purpose of this survey is to collect feedback on the draft Supplier Reporting Form for the Buy Clean and Buy Fair (BCBF) Washington Project. The goal of the BCBF Project is to help the State of Washington identify purchasing opportunities aligned with its carbon reduction goals and economic development goals. This form will be used to collect environmental and social impact information for materials used in state-funded construction projects. The collected data will be stored in an online database as a part of the BCBF Project. This feedback will help U.S. 1) create a data collection form that is clear, straight-forward, and user-friendly, and 2) create a database of material data that will contain useful environmental information about construction projects. This survey will take approximately 10 minutes to complete. If any of the questions in this form aren't relevant to you, please feel free to skip as you see fit. You can view the Supplier Reporting Template here: https://docs.google.com/spreadsheets/d/1oOXGOJYuSV6QUutvTqJGzo79O2K3Vo2xNZl7LaBFqmM/edit?usp=sharing What will we do with this feedback? - We will include a summary of feedback in our progress report to the Washington Legislature in January 2021, as well as a list of which organizations participated. - We will use this feedback to improve the format, user experience, and structure of the reporting templates and database. - Emails will only be used for clarifying questions on the feedback. - We will not attribute information to individuals. However, we may attribute feedback to groups of organizations (e.g. “Feedback from [concrete suppliers, contractors, researchers, etc.] included _____.”)

2. Contact information	• Email:
	
	• First name:
	
	• Last name:
	
	• What best represents your organization’s role?
	  ○ Industry Trade Organization
	  ○ Architecture
	  ○ Engineering
	  ○ Contractor
	  ○ Government
	  ○ Research
	  ○ Other

Page	Content and questions
3. Feedback for the "0. Introduction" sheet	• Is the background information on BCBF clear? Too much information? Too little information? Elaborate. • Do you understand what this project is asking from suppliers? • Are the instructions unclear or confusing? How so? • How would you improve this sheet?
4. Feedback for the "1. Contact Info and EPD Data" sheet	• Should we be asking for more information? Less information? • Are the instructions unclear? How so? • How would you improve this sheet?
5. Feedback for the "2. Fiber Sourcing Data" sheet	• For wood suppliers: Which of these (if any) is particularly difficult to answer or quantify? ☐ Chain-of-custody certification ☐ Percent volume of sourced wood with forest management certification ☐ Percent volume of wood by state/province and country ☐ Percent volume of wood by owner type, e.g. federal, state, private, or other • If you checked a box in the previous questions, why is that information difficult to collect? • Are the instructions unclear? How so? • How would you improve this sheet?
6. Feedback for the "3. Health Certification" sheet	• Is the background information on health certifications clear? If not, what is unclear about it? • Are the instructions unclear? How so? • How would you improve this sheet?
7. Feedback for the "4. Code of Conduct" sheet	• How familiar are you with your company's Supplier Code of Conduct and the ILO's four fundamental principles and rights at work within the manufacturer supply chain? 1 2 3 4 5 My company does not have a Supplier Code, and I have not heard of ILO's 4 fundamental principles. ○ ○ ○ ○ ○ I am very familiar with my company's Supplier Code of Conduct. • Is there other information we should ask about the Supplier Code of Conduct? • Are the instructions unclear? How so? • How would you improve this sheet?

Page	Content and questions
8. Feedback for the "5. Production Facilities" sheet	• Is there other information we should ask about the production facilities? • Are the instructions unclear? How so? • How would you improve this sheet?
9. Feedback for the "6. Working Conditions" sheet	• Is the background information provided sufficient? What other information do you need to fill out this sheet? • For suppliers: Is any of this information difficult for you to collect? ☐ Number of employees ☐ Number of employees by weekly hour bands ☐ Hourly wage by quartiles ☐ Percent of employees covered by collective bargaining agreement • If you checked a box in the previous questions, why is that information difficult to collect? • Is there other information we should be asking about to help WA understand working conditions in facilities where it purchases products? • Are the instructions unclear? How so? • How would you improve this sheet?

Appendix B3: Stakeholder feedback summary

The following is a summary of feedback about how templates could more **clearly communicate** the intent and requirements of BCBF:

- Expand the introduction tabs on both templates to cover definitions and background information, FAQs, motivation for BCBF, its history, and intent for how the data collected will be used.
- Better distinguish the introduction of each spreadsheet to more directly address the supplier and contractor, respectively.
- Reorganize and reformat sections to consolidate instructions.
- Clarify which data is anonymous.
- Update instructions to better address “edge-cases” (i.e., unusual or ambiguous scenarios) and clearly outline our intention.
- Make slight wording changes to align more closely with industry-standard terminology.
- Distinguish between industry-average and product-specific EPDs and clarify the type of EPD being asked for in the Supplier Reporting Template.

- Use a different classification system for building type in the Contractor Reporting Template Project Information sheet to allow for more options for 'building use type'.
- Update the format of the product data collection sheet in the Contractor Reporting Template to more clearly emphasize that structural products are required, and other products are encouraged but optional.

The following is a summary of feedback about the **data reporting structure**:

- Reformat the entire spreadsheet to allow for multiple product inputs on the same spreadsheet rather than requiring different submissions for each entry.
- Include the option for a secondary building use type as applicable on the Project Information sheet of the Contractor Reporting Template.
- Remove the requirement to include the building component (e.g. stair, column, structural wall)
- Include MasterSpec sections for all products identified.

The following is a summary of feedback about the **reporting requirements**:

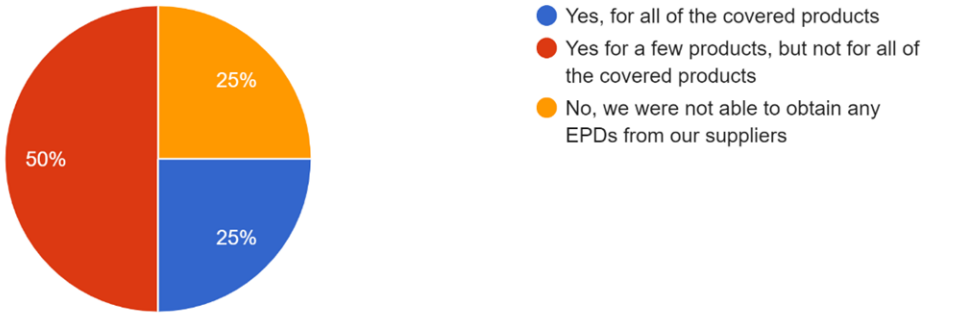
- Update the wood-fiber sourcing tab to focus on ASTM D7612: Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources.
- Allow those with supply chains entirely in North America to opt out of the Code of Conduct section due to local and national labor laws.

Appendix C: Pilot project debrief surveys
The results of the Contractor Debrief Survey and the Supplier Debrief Survey are shown here.

Contractor Debrief Survey Results

The screenshots below show the results from the Contractor Debrief Survey (collected using Google Forms), excluding survey questions that identified the respondent.

Were you able to obtain EPDs from your suppliers for all of the covered products in your project? (note that "covered products" refers to concrete, reinforcing steel, structural steel, and mass timber)
4 responses



If any of your suppliers did not provide EPDs, what do you think was/were the contributing reason(s)?
4 responses

If any of your suppliers did not provide EPDs, what do you think could've helped support or motivate them to provide EPDs?

3 responses

Not sure. We made them aware that cost could be covered and have them examples. I think they are just such a small company that they don't have the band-width to do the task and simply needed to move on to the next job.

Paid them additional, but work was already complete so little incentive for the amount of work involved after the fact.

I think market demand would motivate the the suppliers to provide the EPDs, because from an individual project level there is not the purchasing power to encourage the larger suppliers to go through the effort of getting the EPDs if they don't already exist.

At what point in the project planning / execution process would it be ideal to ask suppliers to provide EPDs? (to give them enough lead time)

4 responses

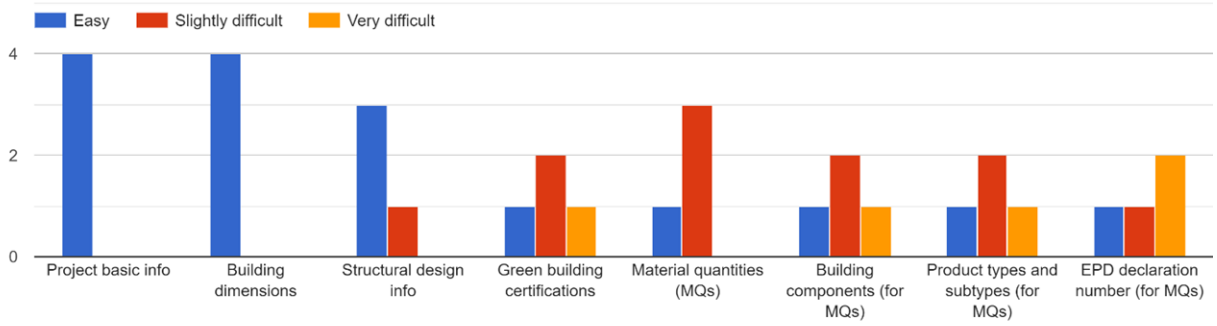
In the technical specs so they have the opportunity to bid the effort and plan for its completion

During the bid or agreement process.

The best time would be in design, and to have the design team specify products/suppliers that have the necessary information. All of the EPDS we were provided had already been produced so not sure about how long the process takes or what could be done to get one. Essentially when we requested EPDS they either already had them or they did not exist and there was no effort made to create one.

At bid time

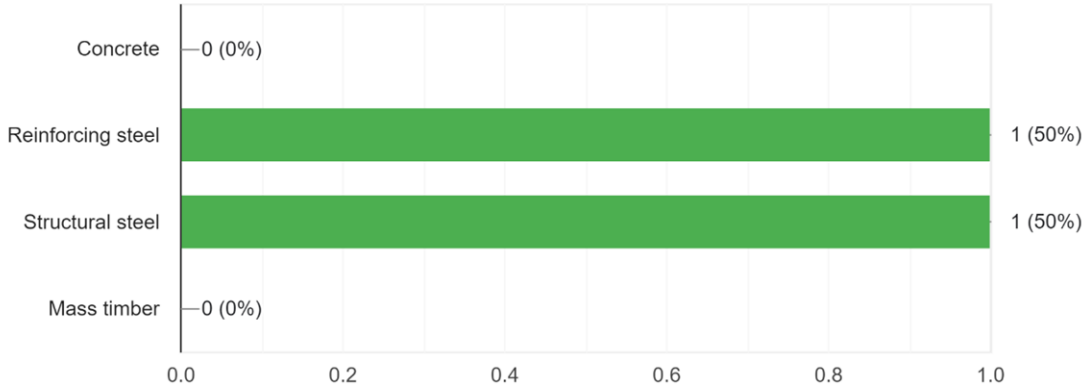
How difficult was it to collect information for different parts of the Contractor data collection form? If there were specific pieces that were particularly difficult, please note them i...T7bc9k0cw1ysWAMXP8Cu52Zf0no87NoJCSAVorel/edit?usp=sharing)



Supplier Debrief Survey Results

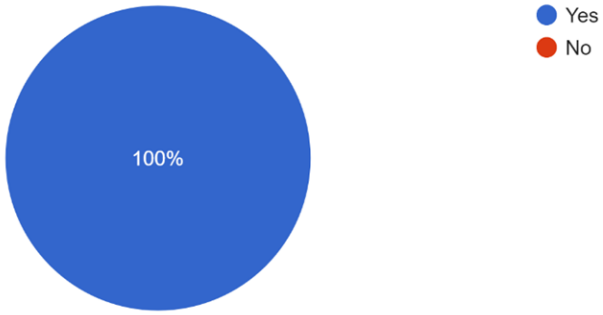
The screenshots below show the results from the Supplier Debrief Survey (collected using Google Forms), excluding survey questions that identified the respondent.

Which type(s) of product(s) does your company produce?
2 responses



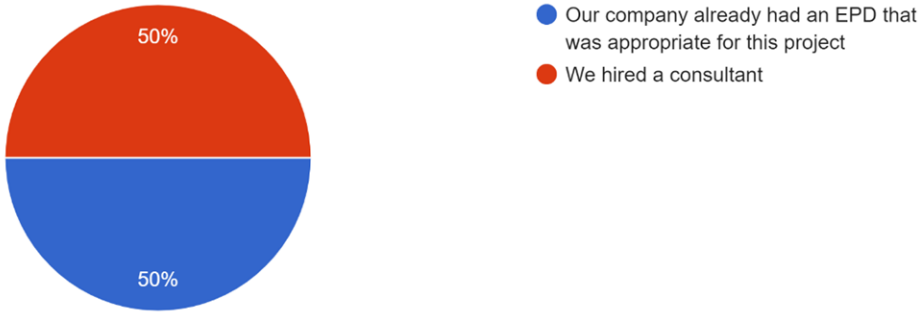
Did you provide an EPD for this pilot study?

2 responses



How did you go about producing an EPD?

2 responses



How much did it cost to produce the EPD?

2 responses

$50K

$50k

How long did it take to produce the EPD? i.e., how much lead time did you need?

2 responses

6 months

4-6 Months

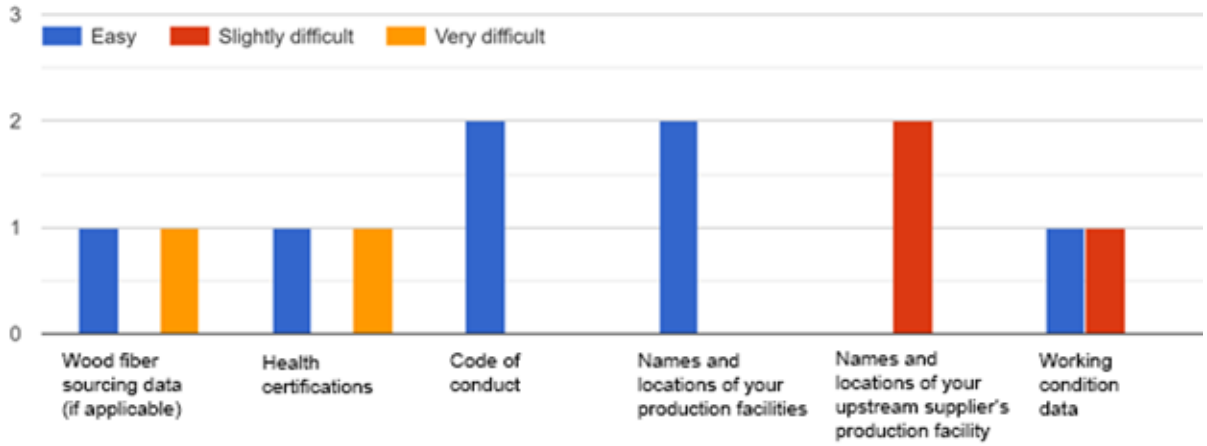
What challenges did you run into in producing your EPD, if any?

2 responses

Difficulty with representative data for suppliers

Long Lead Time

How difficult was it (or would it be) for you to provide the following information? The specific data requests are shown in this Supplier spreadsheet...



Appendix D: Legislative mandates

Section 128 (68) of the 2021-23 biennial operating budget (ESSB 5092)

(68)(a) $340,000 of the general fund—state appropriation for fiscal year 2022 and $85,000 of the general fund—state appropriation for fiscal year 2023 are provided solely for the department to contract with the University of Washington college of built environments to create a database and reporting system for promoting transparency on procurement of building materials that make up the primary structure and enclosure used for state-funded construction projects. The department and university may use publicly available information and data sources as well as consult with outside experts to create the database. The database may include fields for environmental product declarations, product quantity, manufacturer location, global warming potential, health certifications, supplier codes of conduct, and working conditions.

(b) When developing the reporting system required under (a) of this subsection, the department and the University of Washington must conduct a case study analysis. In conducting the analysis, the department and the university must identify up to 10 case studies of publicly funded projects and analyze considerations including but not limited to cost impacts, materials procured, embodied carbon contribution to reducing greenhouse gas emissions, and supply chain considerations. By January 1, 2022, the department and the university shall submit a progress report on the case study analysis to the legislature. By November 1, 2022, the department and the university shall submit a final report to the legislature with findings from the case study analysis and recommendations for the reporting system based on lessons learned.

Section 1050, Chapter 332, Laws of 2021 (the 2021-23 capital budget)

NEW SECTION. **Sec. 1050. FOR THE DEPARTMENT OF COMMERCE**
Buy Clean, Buy Fair Washington Pilot (91001679)

The appropriation in this section is subject to the following conditions and limitations:

(1) By June 15, 2021, the department must coordinate with the following projects: (a) University of Washington College of Engineering Interdisciplinary Education and Research Center (30000492); and (b) University of Washington UW Tacoma (20102002). The awarding authorities for these projects must collaborate with the University of Washington college of built environments to test proposed methods and availability of environmental product declarations and working condition information, as defined in subsection (3) of this section.

(2) The awarding authority shall require the successful bidder for a contract to submit the following information for at least 90 percent of the cost of each covered product used in the project:

(a) Product quantity;

(b) A current environmental product declaration;

(c) Health certifications, if any, completed for the product;

(d) Manufacturer name and location, including state or province and country;

(e) Measures taken, if any, to promote the international labor organization's four fundamental principles and rights at work within the manufacturer supply chain;

(f) Names and locations, including state or province and country, of the actual production facilities; and

(g) Working condition information for the actual production facilities for all employees.

(3) For the purposes of this section:

(a) "Actual production facilities" means the final manufacturing facility and the facilities at which production processes occur that contribute to 80 percent or more of the product's cradle-to-gate

global warming potential, as reflected in the environmental product declaration.

(b) "Awarding authority" means the University of Washington capital planning and portfolio management.

(c) "Covered product" means structural concrete products, reinforcing steel products, structural steel products, and engineered wood products.

(d) "Environmental product declaration" means a supply chain specific type III environmental product declaration as defined by the international organization for standardization standard 14025 or similarly robust life-cycle assessment methods that have uniform standards in data collection consistent with the international organization for standardization standard 14025, industry acceptance, and integrity.

(e) "Health certification" means a health product declaration, as reported in accordance with the health product declaration open standard, and any product certification that includes health-related criteria.

(f) "International labor organization's four fundamental principles and rights at work" means: Effective abolition of child labor; elimination of discrimination in respect of employment and occupation; elimination of all forms of forced or compulsory labor; and freedom of association and the effective recognition of the right to collective bargaining.

(g) "Working condition information" means the:

(i) Average number of employees by employment type: Full time, part time, and temporary;

(ii) Average hourly wage, including all nondiscretionary wages and bonuses, by quartiles;

(iii) Hours worked by weekly hour bands: One-19 hours, 20-29 hours, 30-39 hours, 40-49 hours, 50-59 hours, and 60 or more hours;

(iv) Maximum number of hours that an employee can be required to work per week; and

(v) Percent of employees covered by a collective bargaining agreement.

(4) The department shall include the information collected in this section in their report to the legislature, the case study analysis of environmental and labor reporting requirements for state funded construction projects required in section 129, chapter . . ., Laws of 2021 (House Bill No. 1094).

Appropriation:

State Building Construction Account—State	$150,000
Prior Biennia (Expenditures)	$0
Future Biennia (Projected Costs)	$0
TOTAL	$150,000