
SENATE BILL 5391

State of Washington

68th Legislature

2023 Regular Session

By Senators Van De Wege, Schoesler, and Mullet

1 AN ACT Relating to the modeling, measurement, and reporting of
2 embodied carbon emission reductions from structural building products
3 in state-funded projects; and adding a new chapter to Title 19 RCW.

4 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF WASHINGTON:

5 NEW SECTION. **Sec. 1.** (1) To preserve quality of life and well-
6 being for Washingtonians and increase the carbon competitiveness of
7 Washington businesses, documented greenhouse gas reductions are
8 required, including embodied carbon reductions in structural
9 products.

10 (2) Reducing embodied carbon necessitates a focus beyond just
11 procurement. Building clean in the built environment requires the
12 implementation of multiple strategies including: Modeling the
13 lifetime carbon emissions of the structure, programming and budgeting
14 for a long service life, increasing the number of available product-
15 specific environmental product declarations to facilitate embodied
16 carbon measurement, and reporting the embodied carbon intensities and
17 the product quantities of completed projects to inform meaningful
18 reduction targets.

19 (3) The legislature recognizes the significant accomplishments of
20 Washington state project teams including designers, engineers,
21 construction contractors, and product manufacturers to build award

1 winning sustainable projects regionally and nationally. The
2 legislature also recognizes the importance of incorporating
3 professional industry insights and input to inform the building
4 material selection process, resolve constructability issues, and
5 realize significant and measurable embodied carbon emission
6 reductions.

7 (4) Through collaboration with all project team members early in
8 the design process and considering all phases of the project's
9 service life, key decisions can be made regarding design,
10 constructability, product innovation, and optimization to identify
11 innovative and synergistic strategies that reduce both energy use and
12 overall carbon emissions over the service life of the project.

13 (5) To provide design and construction teams the ability to
14 select the product, or combination of products, which satisfies
15 program, cost, schedule, product availability, as well as carbon
16 reduction targets, the project's embodied carbon baseline and
17 reduction targets should measure and compare the impact of all
18 eligible products in aggregate, and not in isolation. Measuring
19 impacts in aggregate enables the contractor to offset the higher
20 impact of an unavoidable eligible product by strategically selecting
21 specific eligible products with a lower impact and provides needed
22 flexibility in procurement and construction decisions.

23 (6) The legislature recognizes the need to maintain an adequate
24 quantity and resilient supply chain for lower carbon building
25 products to support a robust economy balanced with environmental
26 stewardship.

27 (7) Furthermore, Washington has a unique combination of natural,
28 clean energy, manufacturing, and knowledge assets that have realized
29 significant embodied carbon reductions in completed public sector
30 projects.

31 NEW SECTION. **Sec. 2.** The definitions in this section apply
32 throughout this chapter unless the context clearly requires
33 otherwise.

34 (1) "As-built" means the condition at substantial completion of
35 the eligible project.

36 (2) "Awarding authority" means:

37 (a) A state agency for a contract for a public works project that
38 is subject to chapter 39.04 or 39.10 RCW;

1 (b) Institutions of higher education as defined in RCW
2 28B.92.030;

3 (c) Natural resource agencies, including the department of
4 natural resources, the state parks and recreation commission, and the
5 department of fish and wildlife;

6 (d) Any other state governmental entity that receives funding
7 from the omnibus capital appropriations act for a public works
8 project contracted directly by the state agency; and

9 (e) The department of transportation.

10 (3) "Construction contractor" means the business entity,
11 typically a general contractor or joint venture contractor, holding
12 the prime contract with the governmental entity to construct the
13 eligible project.

14 (4) "Department" means the department of commerce.

15 (5) "Designer of record" means the licensed design professional,
16 who is responsible for leading the design team. The designer of
17 record shall oversee and manage the design, specification, or both of
18 the eligible products.

19 (6) "Eligible product" means:

20 (a) Structural concrete products, specifically ready mix,
21 shotcrete, precast, and concrete masonry units;

22 (b) Reinforcing steel products, specifically rebar and post
23 tensioning tendons;

24 (c) Structural steel products, specifically hot rolled sections,
25 hollow sections, plate, and metal deck; and

26 (d) Engineered wood products including mass timber products such
27 as laminated veneer lumber, parallel strand lumber, cross-laminated
28 timber, dowel laminated timber, nail laminated timber, glulam
29 laminated timber, glulam beams and columns, and structural sawn
30 lumber.

31 (7) "Eligible project" means a construction project larger than
32 50,000 gross square feet of space as defined in the Washington state
33 building code adopted under chapter 19.27 RCW.

34 (8) "Embodied carbon" means greenhouse gas emissions from the
35 harvesting, extracting, manufacturing, transportation, installation,
36 maintenance, replacement, and disposal of eligible products.

37 (9) "Environmental product declaration" means a type III
38 environmental product declaration, as defined by the ISO 14025. Other
39 equally robust life-cycle assessment methods and metrics that have
40 uniform standards in data collection consistent with the ISO 14025,

1 industry acceptance, and integrity may also be used. For consistency
2 in the required calculations, only the impacts from life-cycle stages
3 A1 through A3, also referred to as "cradle to gate," may be included.

4 (10) "Greenhouse gas" has the same meaning as in RCW 70A.45.010.

5 (11) "Life-cycle assessment" of eligible products means
6 calculation of the projected greenhouse gas emissions using
7 international organization for standardization compliant standards
8 and the United States life cycle inventory database information.

9 (12) "Successful bidder" means the eligible product supplier, the
10 subcontractor that manufactures or provides for installation, or
11 both, of the eligible product.

12 NEW SECTION. **Sec. 3.** (1) During the schematic design phase and
13 when considering structural products that will satisfy the
14 anticipated project applications and the project requirements
15 including, but not limited to, project program, financial budget,
16 construction schedule, product availability, and overall
17 constructability, the designer of record or their designated
18 consultant must conduct a life-cycle assessment of the eligible
19 structural products in the project.

20 (2) The life-cycle assessment modeled components must consist of
21 the primary and secondary structural members pursuant to the
22 Washington state building code adopted under chapter 19.27 RCW.

23 (3) The assessment of the eligible products selected by the
24 design team must be reported in accordance with ISO 14044, excluding
25 operating energy, and disclose the modeled global warming potential.

26 (4) Software used to conduct the whole building life-cycle
27 assessment must have a data set compliant with ISO 14044, and ISO
28 21930 or EN 15804, and the software must conform to ISO 21931-2017,
29 EN 15978:2011, or both.

30 (5) This assessment per ISO 14044 may use a local, regional, or
31 national industry average dataset that considers the potential range
32 of possible outcomes associated with the uncertainties and
33 variability at this point in the project. The range of potential
34 outcomes must be reported in the assessment.

35 (6) For purposes of the life-cycle assessment, the assessment
36 must measure impacts at the 60-year point of the building project's
37 modeled service life. The designed service life of the project may
38 differ from the modeled service life assumption used in the life-
39 cycle assessment model.

1 (7) Modeling assumptions for life-cycle stage A4 (transportation
2 from manufacturing location to jobsite) must be based on the usual
3 method of transportation and average distance from an eligible
4 product's typical manufacturing locations to the jobsite that would
5 be reasonably anticipated in the project's current market.

6 (8) For projects with a designed service life of less than 100
7 years, the modeling assumptions for the extent of reuse and recycling
8 in life-cycle stage D must be similar to the economically feasible
9 practices commonly found in the project's current market.

10 (9) The designer of record must upload a summary of the life-
11 cycle assessment of the structural systems to the online database, as
12 described in section 7 of this act. The uncertainty and variability
13 factors creating a range of possible outcomes must be disclosed.

14 NEW SECTION. **Sec. 4.** To support informed product selection and
15 to document the availability of lower embodied carbon Washington
16 products, the department must partially reimburse manufacturers for
17 the costs of producing product-specific environmental product
18 declarations of eligible products as follows:

19 (1) Reimbursements are available only to manufacturers that
20 currently harvest, extract, recycle, produce, or assemble an eligible
21 product within the state of Washington.

22 (2) Reimbursement must be for one-half of the substantiated
23 direct financial costs for producing product-specific environmental
24 product declarations, not covered by other grants, up to an amount of
25 \$15,000 per manufacturing location or batch plant, with a maximum of
26 \$45,000 for manufacturer, associated companies, or both.

27 (3) Eligible products with a previously published environmental
28 product declaration or that are produced by a previously purchased
29 on-demand environmental declaration software license are not eligible
30 for reimbursement.

31 (4) Reimbursement requires that all environmental product
32 declarations comply with ISO 14025, are product-specific, third-party
33 reviewed, and published by or before December 31, 2025.

34 NEW SECTION. **Sec. 5.** To enable accurate bid pricing and to
35 inform the construction contractor of the embodied carbon
36 implications of a specific product procurement, the designer of
37 record must include in the contract documents or project
38 specifications for eligible projects the following requirements:

1 (1) For projects with product or subcontractor bidding commencing
2 on or after January 1, 2025:

3 (a) The successful bidder must submit one month prior to the
4 project's substantial completion to the construction contractor,
5 product-specific environmental product declarations for at least 90
6 percent by weight or volume of all eligible products and their
7 installed product quantities. The unit of measurement for the
8 installed eligible products must match the units used in that
9 eligible product's product-specific environmental product
10 declarations.

11 (b) The construction contractor must transmit the product-
12 specific environmental product declarations and associated eligible
13 product quantities to the awarding authority and to the department at
14 substantial completion of the construction contract.

15 (2) For projects with eligible product bidding or subcontractor
16 bidding commencing on or after January 1, 2027:

17 (a) The successful bidder must submit to the construction
18 contractor at the time of bid submission and one month prior to the
19 project's substantial completion, product-specific environmental
20 product declarations for at least 90 percent by weight or volume of
21 all eligible products and their estimated product quantities. The
22 unit of measurement for the installed quantities must match the units
23 used in that eligible product's product-specific environmental
24 product declarations. The successful bidder must update the eligible
25 product quantities, environmental product declarations, or both at
26 substantial completion to reflect as-built conditions.

27 (b) The construction contractor must transmit the product-
28 specific environmental product declarations and associated eligible
29 product quantities to the awarding authority and to the department at
30 the time of the successful bidder award and update the information at
31 the time of substantial completion of the construction contract.

32 (3) This section does not apply to an eligible product for a
33 specific project if:

34 (a) The awarding authority determines, based on its examination
35 of written justification, that it is not technically feasible to
36 provide a product-specific environmental product declaration; or

37 (b) The awarding authority determines that a state of emergency
38 exists and submitting documentation would pose a clear and imminent
39 danger, requiring immediate action to prevent or mitigate the loss or
40 impairment of life, health, property, or essential public services.

1 NEW SECTION. **Sec. 6.** (1) To provide consistency in targeting
2 and measuring embodied carbon reductions and in reporting data, the
3 project-specific baseline, the project-specific reduction percentage,
4 and the embodied carbon intensity must be calculated and reported
5 pursuant to this section.

6 (2) Prior to bidding of eligible products, the designer of record
7 or the project's life-cycle assessment consultant under the designer
8 of record's direction must:

9 (a) Calculate an estimated embodied carbon emissions for the
10 project's eligible products and include this calculation in the
11 construction specifications used for bidding of the eligible
12 products.

13 (i) The project's estimated embodied carbon emissions must be
14 expressed in kilograms of carbon dioxide equivalence and is equal to
15 the sum of: Each eligible product quantity multiplied by the
16 corresponding embodied emissions intensity factor found in the most
17 recently published industry-average environmental product
18 declaration, if available, as published by the following
19 organizations:

20 (A) Wood products: American wood council (AWC);

21 (B) Steel sections, and steel tendons: American institute of
22 steel construction (AISC);

23 (C) Steel reinforcing: Concrete reinforcing steel institute
24 (CRSI);

25 (D) Ready-mixed concrete: National ready-mixed concrete
26 association (NRMCA, Pacific Northwest regional baseline data);

27 (ii) For concrete, quantities must be grouped by the mixes'
28 individual strength class and type of weight, such as lightweight
29 concrete or conventional concrete. The applicable strength class
30 baseline must be determined as the minimum specified design strength
31 as documented by cylinder testing, maturity testing, or both. The
32 embodied greenhouse gases of mixes may be reduced through the use of
33 material and mix design innovations.

34 (iii) Eligible products without published regional or national
35 industry-average environmental product declarations, such as ready-
36 mixed concrete mixes exceeding 8,000 pounds per square inch, must use
37 available data from a mix-specific benchmark calculated from
38 verifiable data from a life-cycle analysis practitioner.

39 (iv) The designer of record's estimated embodied carbon emissions
40 calculation must be based on the estimated quantity of eligible

1 products in the bid documents. For building projects, eligible
2 products used on site must be excluded from the quantity estimate.

3 (b) Calculate an estimated embodied carbon intensity, which is
4 the ratio of the total carbon dioxide equivalents in kilograms for
5 the quantities of all eligible products divided by the square meters
6 of project area.

7 (3) At the project's substantial completion, the project's
8 construction contractor must:

9 (a) Calculate an updated estimate of embodied carbon emissions
10 for eligible products as defined by this section using the procured
11 as-built product quantities and transmit this calculation to the
12 awarding authority and the department.

13 (b) Calculate an as-built embodied carbon reduction percentage of
14 the sum of all eligible products and transmit this calculation to the
15 awarding authority and the department.

16 (i) The as-built embodied carbon reduction percentage is the
17 percentage reduction between: The embodied carbon emissions from the
18 as-built quantities of all eligible products using industry average
19 data and the as-built embodied carbon from as-built quantities of all
20 eligible product quantities using product-specific environmental
21 product declarations data for the installed eligible products.

22 (ii) Eligible products having a specific strength class pursuant
23 to subsection (2)(a)(iii) of this section, or a specific product
24 subcategory lacking a corresponding published industry average
25 baseline relevant for that specific strength class or product
26 subcategory, must use available verifiable data from a life-cycle
27 practitioner to develop a mix-specific benchmark. If a mix-specific
28 benchmark is not available for a specific product, an explanation
29 must be submitted.

30 (iii) In the case of building projects, eligible products used on
31 site outside the building's footprint must be excluded from the
32 calculation under this subsection (3)(b).

33 (c) Calculate the as-built embodied carbon intensity which is the
34 ratio of the total carbon dioxide equivalence in kilograms for all
35 eligible products divided by the gross square meters of project area
36 and transmit this calculation to the awarding authority and the
37 department.

38 (i) All as-built eligible products must be included, including
39 ones that do not have corresponding industry-average environmental
40 product declarations.

1 (ii) In the case of building projects, eligible products used on
2 site must be excluded from the calculation under this subsection
3 (3)(c).

4 NEW SECTION. **Sec. 7.** (1) To inform project stakeholders of the
5 achievable reductions specific to a given market, products and
6 structural systems, and to inform future reduction targets and
7 stretch goals, the department must select a public or nonprofit
8 entity to collect data for the following information. Information in
9 this online database must remain in the public domain, be accessible
10 without cost or limitation, and include the following data for all
11 eligible projects bidding on eligible products on or after January 1,
12 2025:

- 13 (a) Name of project;
- 14 (b) Type of project;
- 15 (c) The awarding authority;
- 16 (d) Primary use types of project;
- 17 (e) Date of bidding;
- 18 (f) Date of substantial completion;
- 19 (g) Zip code of project location;
- 20 (h) The type of eligible products included in the project;
- 21 (i) The primary eligible products and primary types of structural
22 systems used in the superstructure and lateral system;
- 23 (j) The primary products and primary types of structural systems;
- 24 (k) Summary of the life-cycle assessment of the structural
25 systems with the range of possible outcomes disclosed;
- 26 (l) The gross project area. In the case of a building project,
27 site area outside the building footprint when calculating the gross
28 project area must be excluded;
- 29 (m) The project's estimated embodied carbon emissions as
30 calculated with estimated quantities prior to bidding;
- 31 (n) The project's updated estimated embodied carbon emissions as
32 calculated with actual quantities at substantial completion;
- 33 (o) The project's estimated embodied carbon intensity as
34 calculated prior to bidding;
- 35 (p) The project's as-built embodied carbon emissions;
- 36 (q) The project's as-built embodied carbon reduction percentage;
- 37 and
- 38 (r) The project's as-built embodied carbon intensity.

1 (2) The department may, at a future date, require reporting of
2 additional project information to align this database with the
3 structural engineering institute of the American society of civil
4 engineers SE2050 commitment program database.

5 (3) Awarding authorities may review the database annually to
6 inform embodied carbon targets for future projects constructed of
7 like products for a like purpose in a similar location.

8 (4) Awarding authorities must require the designer of record to
9 review applicable projects in this database prior to completion of
10 schematic design.

11 NEW SECTION. **Sec. 8.** This act may be known and cited as the
12 embodied carbon measurement and disclosure build clean act.

13 NEW SECTION. **Sec. 9.** Sections 1 through 8 of this act
14 constitute a new chapter in Title 19 RCW.

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