

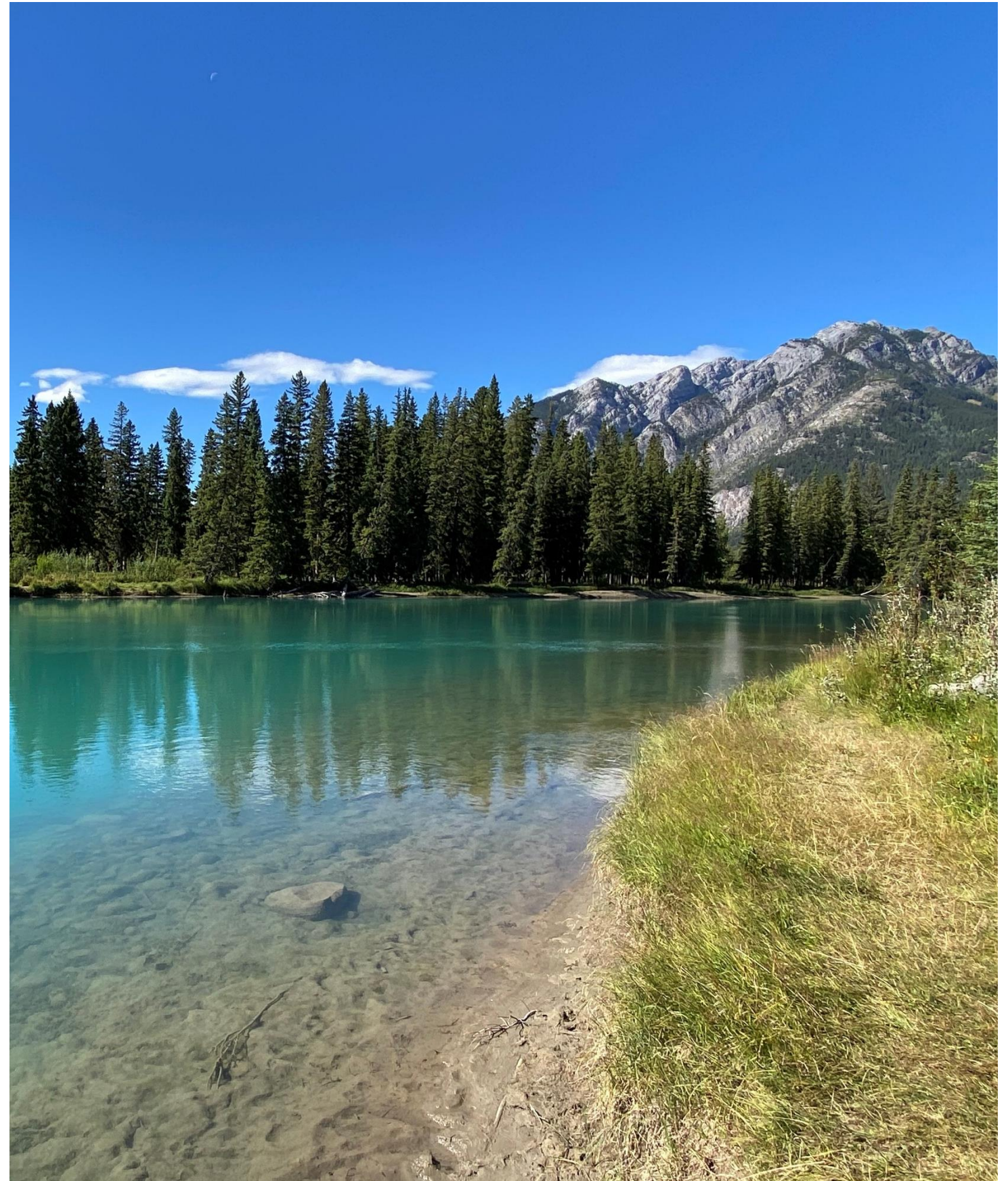


Embodied Carbon Action Plan

2021

Table of Contents

1. Introduction
2. Education
3. Reporting
4. Embodied Carbon Reduction Strategies
5. Advocacy
6. Embodied Carbon Studies

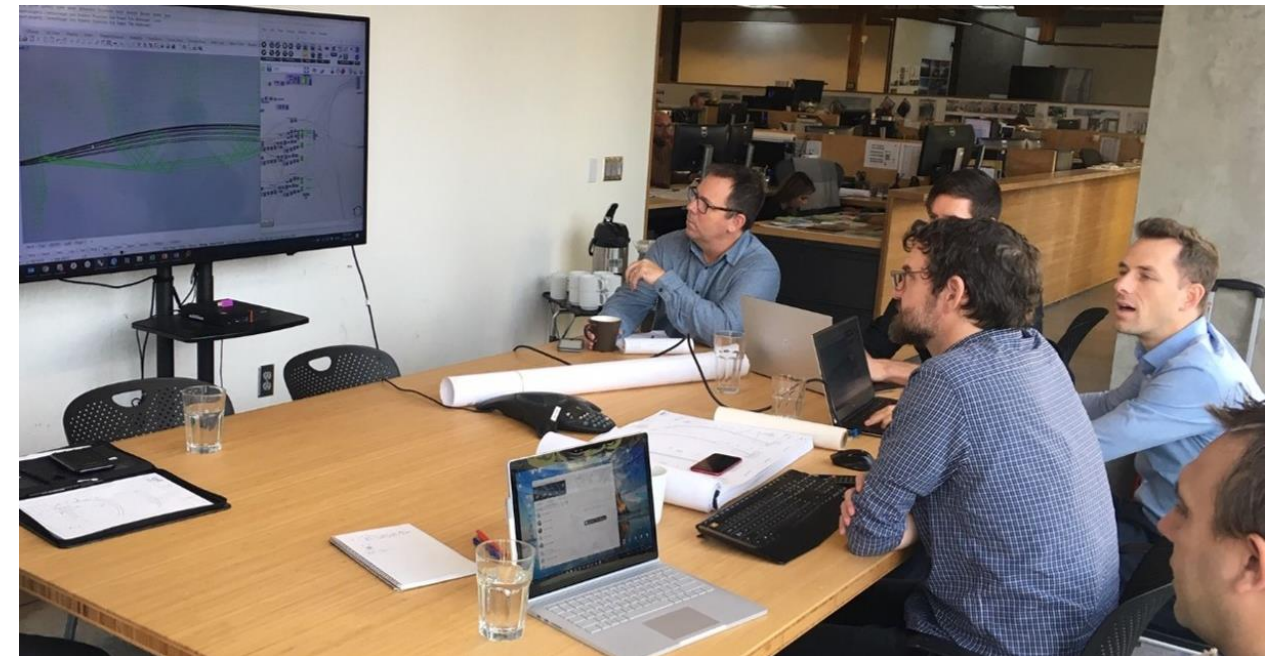


1. Introduction

StructureCraft is an Engineer-Build firm with a portfolio covering efficiently designed and built mass timber and hybrid steel-timber structures across North America and Asia. We understand our roles as stewards and the impact our work has on the environment.

The following Embodied Carbon Action Plan (ECAP) outlines our pledge to provide education and resources on embodied carbon to our internal staff, to track and report the embodied carbon of our current and past projects, to reduce the embodied carbon on future projects through efficient structural design and responsible sourcing and procurement, and to advocate for lower carbon designs amongst clients and industry peers. As our first ECAP, there are initiatives we are pursuing to tackling from the Program Requirements Guidance Document that are complete and other initiatives still in progress. We intend to complete all these initiatives within our first year and will update our ECAP annually to reflect achievements and lessons learned from the previous year.

As a signatory of the SE 2050 Commitment, we look forward to embarking on this endeavour towards net-zero embodied carbon in structural systems by 2050 and to sharing our accomplishments and takeaways from this first year.



2. Education

StructureCraft has created a sustainability group which meets once a month. The primary goal of the group is to ensure the commitment and progress of the company's sustainability goals. Specifically, the group is researching, developing, and implementing sustainability and carbon assessment related topics.

- Researching innovations in timber construction and discussing recent research papers.
- Development of a relevant carbon calculator and considering new improvements in existing carbon estimators for the Canadian and US market.
- Implementing new policies in the company such as new standards on calculation of carbon emissions on projects.

The pledge to join the SE 2050 Commitment will be distributed companywide through email and in an in-depth summary presentation in a weekly engineering meeting.

Within the first year of the pledge, the group is planning at least two internal presentations: 1) a presentation focusing on the ECAP and the SE 2050 commitment and 2) a presentation on internal Carbon assessment tools and sustainable forestry. The two presentations will be recorded and provided as onboarding material for new employees. On the company internal intranet page for sustainability a list of videos on the topics of LCA assessments, sustainable forestry and carbon neutral construction will be available. On the same page, the SE 2050 library of resources will be linked and explained in more detail.

Members of our sustainability team will attend the quarterly external education programs provided by SE 2050, Carbon Leadership Forum (CLF), or other embodied carbon resources. They will also participate in webinars on LCA tools such as One Click LCA and Tally.

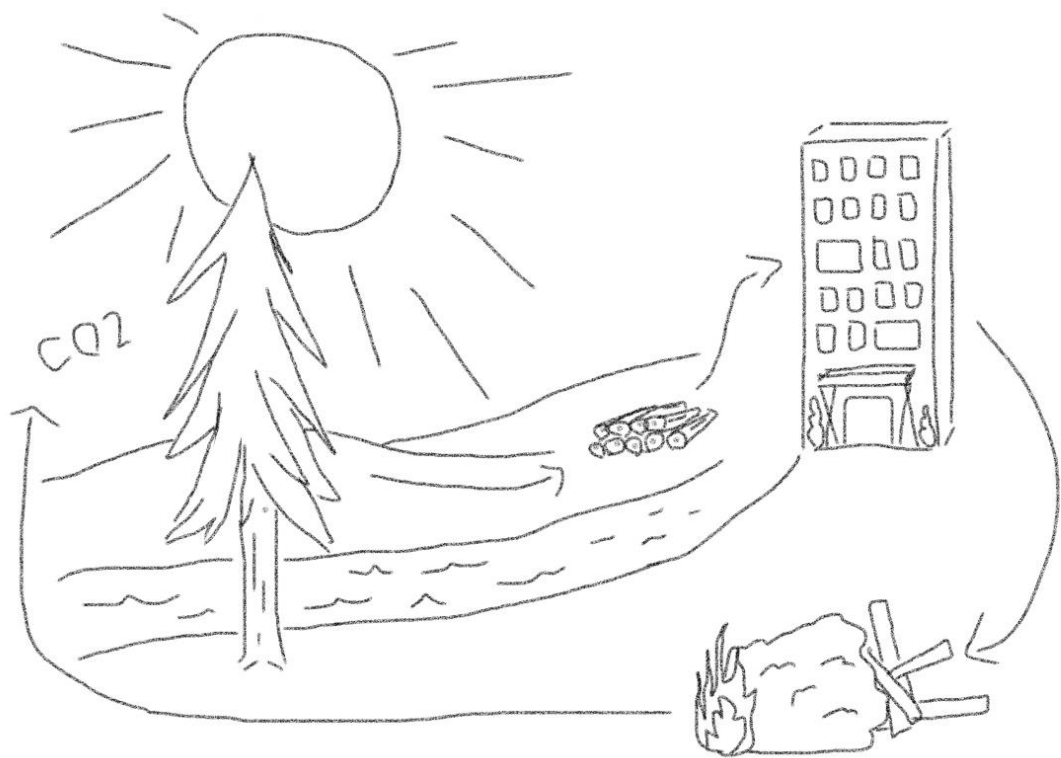
3. Reporting

Working closely together with Architects & Owners, the sourcing of wood is a common topic and often given as a project requirement. As a design-build company, StructureCraft assists both the Architect and Owner in determining sustainable pathways. Education internally is an integral part in providing this service for our clients. Therefore, our tools are accessible to all employees on our server along with guidance manuals and reference projects.

We track embodied carbon on our projects through use of our BIM and computational design tools which we link to an internal calculation tool for embodied carbon estimation, providing us feedback throughout the design process.

Out LCAs typically focus on stages A1-A5 as these emissions are accurately quantifiable and easy to track as an engineering firm. For specific projects, cradle-to-gate (stages A-D) analyses are made by StructureCraft in order to take informed design decisions. Our in-house tool together with principles in the IStructE guidance document and further tools such as the Athena Impact Estimator are used to model the A-D stages. The sequestering potential of wood is declared separately together with the main modules, either with stages A1-A5 or stages A-D.

Using the reporting Structure described in this section, StructureCraft will provide up to 5 project reports in the last quarter of 2022 per U.S. office with structural engineering services to the SE 2050 Database.



4. Embodied Carbon Reduction Strategies

As engineer of record on structures which often already contain significant timber elements as well as concrete/steel, StructureCraft's focus in pushing forward sustainable construction techniques must go beyond simply recommending mass timber as a lower carbon construction material. Our focus is thus two-fold: reducing total material consumption by designing the entire structure efficiently, regardless of material choice; and lowering the carbon content of the materials we do specify via regional sourcing, and specification of low-carbon materials where possible. Initially, we will compute the embodied carbon of our most recently constructed projects. Using the average values for each sector/structure type, we will track the design of future projects to reduce the embodied carbon by a minimum of 10% on the average based on Life Cycle Stages A1 through A5. We will revisit our goal each year to see if we can reduce beyond 10% in coming years.

Overall embodied carbon reduction strategies:

1. Improved efficiency in the structural design, including incorporating composite timber-steel and timber-concrete systems where possible to minimize the amount of timber, steel and concrete.
2. Sourcing timber from regional and sustainably managed forests and/or certified timber where possible (e.g. FSC, PEFC, SFI, etc..).
3. For all materials, procuring materials where supplier-specific EPDs are possible
4. Add language to our General Notes and Specifications to request supplier-specific EPDs and contractor's bill of materials for more accurate material quantities and the associated embodied carbon of those materials.

5. Advocacy

StructureCraft will immediately declare that the firm is a member of the SE 2050 Commitment and will reinforce our commitment for lower carbon designs by participating in and leading industry professional committees, conferences, and code development. We plan to present each year at a minimum of one sustainability-focused conference such as Greenbuild International Conference and regularly discuss sustainability in our presentations.

Code Development: CSA O86, Mass Timber Floor Vibration Guide, NLT Design Guide, FPI Mass Timber Modelling Guide

Committees: Seattle AIA Mass Timber Working Group, ASCE, Carbon Leadership Forum, SEI, SEAW, CTBUH Timber Steel Hybrid

Events: International Mass Timber Conference, CTBUH Mass Timber Conference, and Advancing Mass Timber Conference, Fabricate Conference, Greenbuild Conference

Media & Publications: Structure Magazine, ENR Magazine, ArchDaily, Wood Design & Building, Canadian Consulting Engineering, ThinkWood, WoodWorks

Our marketing department plans to regularly promote the sustainable aspects of our projects on our company’s webpage and on social media such as LinkedIn and Instagram. We will also share on our website and social media our commitment to the SE 2050 Challenge.

With the above efforts, we hope that we will show our clients the value the SE2050 Challenge brings to the overall building industry.



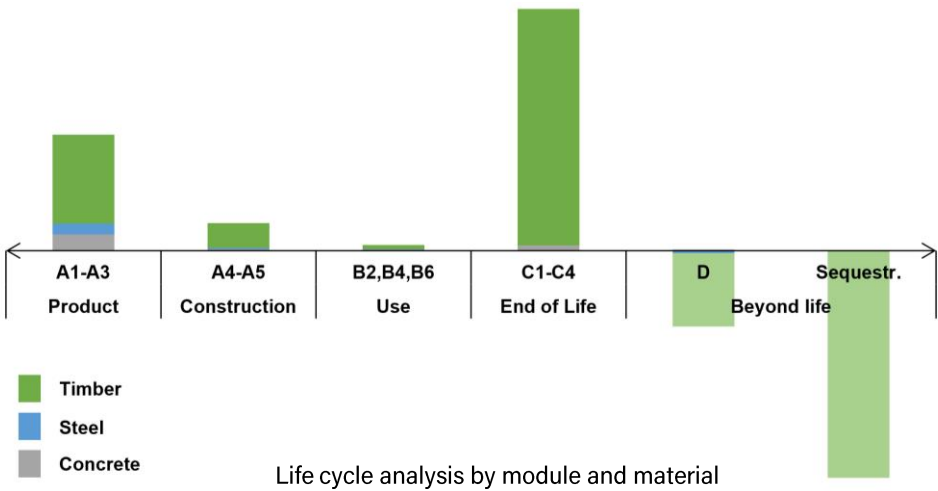
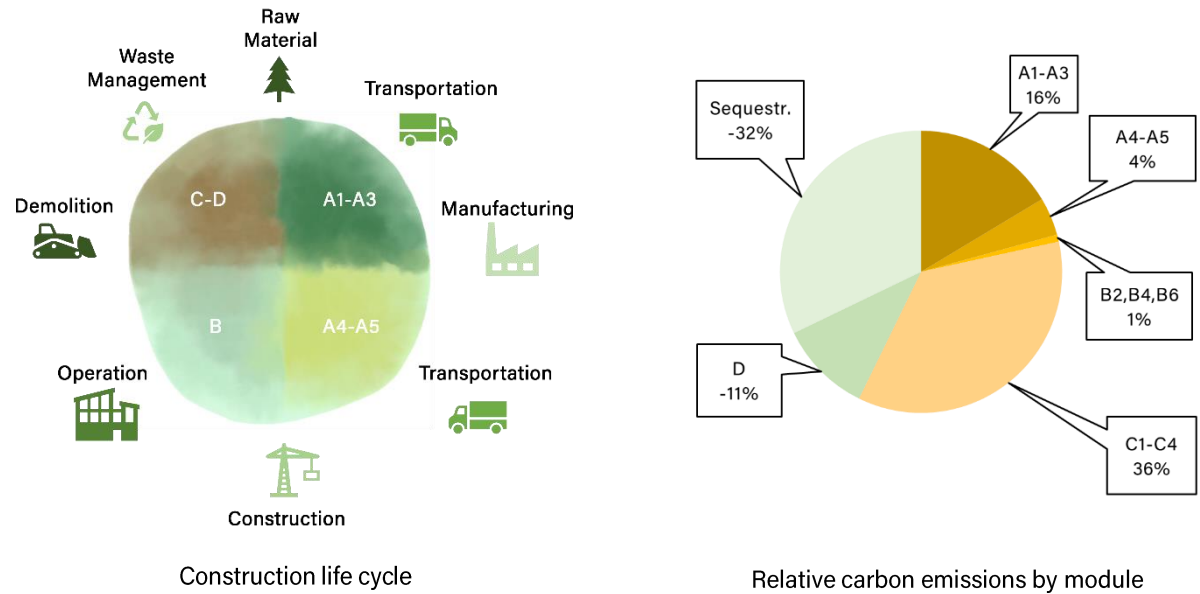
6. Embodied Carbon Studies

This section provides an example study of an LCA (stages A-D) considering the sub and superstructure of the building. The calculation covers the structural elements of the building and includes the ones provided in the list below.

- Substructure: Foundations, Slabs on Grade, Basement Walls, Pile Caps
- Superstructure: Columns, Beams, Floor Plates, Stairs, Walls, Bracing Elements

The assessment has been modelled without considering the full recycling potential of the timber or the potential re-use of the steel and concrete elements.

Sample assessment of a multistory mass timber building





June 10, 2021

To: Laura Champion, Structural Engineering Institute

Subject: SE 2050 Commitment

Re: StructureCraft's Commitment to the 2050 SE Challenge

Dear Laura:

StructureCraft, an engineer-build firm with offices in Abbotsford, BC and Seattle, WA, is hereby signing on to the SE 2050 Commitment Program. We support the vision that all structural engineering shall understand, reduce, and ultimately eliminate embodied carbon in their projects by 2050.

One of StructureCraft's core values is to always maximize structural efficiency to minimize structural materials. This goal helps us reduce the embodied carbon of our designs, so it is our honor to join the growing list of firms committed to eliminating embodied carbon in their projects by 2050.

We understand that his commitment will involve taking the following steps:

- Within six months and annually henceforth, we commit to reporting an Embodied Carbon Action Plan (ECAP) and permit the ECAP document or form be made public on the SE 2050 website.
- Within one year and annually henceforth, we commit to submit data to the SE 2050 project database in a collaborative effort to understand embodied carbon in structural engineering projects and to set attainable targets for future projects.

We look forward to joining this coalition and industry effort to achieve the goals of the SE 2050 Program.

Sincerely,

StructureCraft, Inc.



Leif Johnson, PE, SE, LEED AP
Structural Engineering Director
Seattle