Carbon Leadership Forum

FURTHER FASTER TOGETHER

ANNUAL REPORT

2017-2018

ACKNOWLEDGMENTS

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LETTER FROM THE DIRECTOR

Dear Carbon Leadership Forum Supporters,

To meet global greenhouse gas (GHG) reduction targets by 2050, collaborative problem-solving is needed from leaders across sectors and geographies. The Carbon Leadership Forum is working with you to build the foundation for strong, interdisciplinary partnerships in order to lead the building industry toward a healthy, clean future - **further, faster, together**.

During the past year, as CLF sponsors, collaborators, colleagues and friends across the building industry elevated their commitment to environmental stewardship, we witnessed nearly a decade's worth of CLF-led initiatives intersect to ignite robust collaboration, knowledge exchange and quick action among building sector professionals across the world.

To accelerate progress in the building sector, we spent 2017-2018 working with industry and nonprofit collaborators to develop the **Carbon Smart Building Initiative.** Within a few months, we forged key organizational partnerships with leading sustainability NGOs and formed a committee of over 30 professionals. Together, we defined a vision for the building industry to reach net zero carbon by 2050, underpinned by a 10-15 year roadmap that inspired the upcoming **Carbon Smart Building Day.**

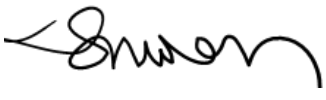
Meanwhile, the new **Embodied Carbon Network (ECN)** continued to rapidly grow, attracting over 300 members from 92 cities worldwide, and evolving to launch an eight-part webinar series led by the subject-specific ECN taskforces. Members are using the platform to share resources, spark discussions and debates, disseminate open letters and calls-to-action, and inform policy.

In 2017-18, we also made significant progress toward CLF's longstanding goal to develop clear industry standards and guidance for quantifying the impact of embodied carbon emissions, through a multi-phase **Low Carbon Construction** project. With funding support from The Charles Pankow Foundation, Skanska USA, and the Oregon Department of Environmental Quality, we conducted an **Embodied Carbon Benchmark Study,** which resulted in the largest known database of embodied carbon from existing buildings. The study also highlighted the need for standardized and accessible guidance for conducting LCAs, which led us to publish a step-by-step **LCA Practice Guide**.

We are excited to share our Annual Report, which highlights recent milestones and current initiatives supported by CLF sponsor firms. We sense a unique current of **optimism and engagement** in the air, and we are committed to harnessing this energy and transforming it into meaningful action across the building sector.

We look forward to working with you in 2018-2019 and beyond to shape a **healthy, clean future** for our planet and people.

Sincerely,



Kate Simonen, Director
Carbon Leadership Forum
Associate Professor
University of Washington

ABOUT THE CARBON LEADERSHIP FORUM

WHO WE ARE

The Carbon Leadership Forum (CLF) is an industry-academic collaboration hosted at the University of Washington's Department of Architecture. We are a professional community of manufacturers, designers, builders and academics focused on reducing the carbon 'embodied' in building materials. Industry sponsorships fund embodied carbon research at the UW, and firm representatives lead initiatives. We work together to understand and reduce embodied carbon: leading by testing methods, sharing results and motivating each other to improve.

WHAT WE DO

The CLF provides building industry professionals with the tools, resources and knowledge needed to account for the carbon impact of manufacturing and construction, and we lead activities to promote low carbon - or 'carbon smart' solutions to foster a thriving clean and healthy built environment. Specifically, we:

Lead initiatives and events to connect and foster collaboration among building industry organizations and individuals

Develop technical and educational resources to accelerate industry adoption of carbon smart building standards and practices

Conduct research projects to build knowledge and understanding of carbon impact of buildings

SPONSORSHIP

CLF supporters collaborate with a unique peer group of building industry professionals. Sponsor firms gain early access to research results, and opportunities to share best practices and lead industry initiatives. Interested in becoming a sponsor? Sign up here.

OUTCOME I: BUILDING A GROWING MOVEMENT TO COOL THE CLIMATE

2017-2018 INITIATIVES

CARBON SMART BUILDING INITIATIVE[1]

This collective impact movement aspires to create a thriving built environment that safely stores carbon, while minimizing GHG emissions over the life cycles of buildings and materials. To realize this vision, CLF is leading a growing community of architects, engineers, contractors, building material suppliers, academics, and NGO and government professionals to define and implement a 10-15 year carbon smart building roadmap to help the building sector meet zero-net carbon targets by 2050.

EMBODIED CARBON NETWORK (ECN)[2]

The CLF launched ECN to connect and provide a communication platform for individuals focused on tracking and reducing carbon emissions caused by building materials. ECN now comprises over 300 members located throughout the world, connecting professionals and students from across the building industry, nonprofits, government agencies, academic institutions, and business and IT firms. ECN chairs and members are working together to shape, grow and leverage the new network, using it as a forum to share event announcements, research, news, op-eds and calls-to-action, and to park discussions and debate.

SE 2050 COMMITMENT[3]

This effort aims to inspire structural engineers to support and measure progress made toward a zero carbon building sector vision for 2050. The SE 2050 commitment will challenge structural engineers to meet embodied carbon benchmarks and ambitious reduction targets. Specifically, the commitment will challenge structural engineers to collect quantifiable structural material data from building projects in order to determine an embodied carbon baseline. Leaders of this commitment are developing a streamlined but robust process for data collection of structural material quantities, which will provide structural engineers rewarding information on material efficiency.

LEED V4 COMMENTARY[4]

The CLF is supporting an effort to encourage USGBC to accelerate stronger integration of carbon reduction into LEED. The CLF has helped bring awareness to an open letter by industry representatives providing specific recommendations to USGBC, signed and submitted by 13 organizations and over 150 professionals.

BAY AREA EMBODIED CARBON PROPOSAL

The CLF supported a collaborative proposal by Marin County, StopWaste, Alameda County, and the Ecological Building Network to establish best practices, specifications, and model policies that address the embodied emissions in building materials, starting with concrete. The CLF helped the proposal team collect 45 signatures for a letter of support, which helped lead to the successful funding of the grant.

QUICK CLICKS

[1]Carbon Smart Building vision

[2]Embodied Carbon Network

[3]SE Commitment 2050

[4]LEED V4 Letter

OUTCOME II: BRINGING PEOPLE TOGETHER TO MAKE A COLLECTIVE IMPACT

2017-2018 EVENTS

CARBON SMART BUILDING DAY[1]

Part of the 2018 Global Climate Action Summit in San Francisco, this conference will bring together architects, structural engineers, contractors, real estate developers, materials manufacturers and policy makers who aspire to reduce the carbon footprint of their projects and make the building industry a big part of the solution to climate change.

The conference will share tools, resources, programs and concrete steps that governments, corporations, organizations and individuals can take to lead the industry transformation necessary to realize a Zero Net Carbon (ZNC) built environment.

BUILD POSITIVE SUMMIT (NYC 2018)[2]

In June, the CLF brought together over 70 professionals from across the building industry, sustainability-focused nonprofits, and government agencies for a three-hour session that presented a roadmap to transform buildings from climate problems to climate solutions. CLF Director Kate Simonen was joined by a panel of speakers, who shared research and strategies for designing and constructing carbon sequestration design and construction, followed by a keynote presentation from Chad Frischmann of Project Drawdown.

CLF ANNUAL FORUM (NYC 2018 & BOSTON 2017)

Each forum brought together over 50 CLF sponsors, project collaborators and NGO partners. Meeting participants in Boston participated in interactive workshops to help define the Carbon Smart Building Initiative and to inform development of the LCA Practice Guide. Workshops in NYC focused on two new initiatives: helping Architecture 2030 build a new Carbon Smart Materials Palette, and working with NGO leaders to build Carbon Smart Resource Library.

CONFERENCE PRESENTATIONS AND TRAINING

The CLF staff and students travel across the US to present research updates and provide training at conferences and educational events, including Greenbuild, Living Futures, AIA Conference on Architecture, AIA Seattle's Materials Matter, the Mass Timber Conference, Residential Building Design & Construction Conference and the Structures Congress, among many others.

EMBODIED CARBON NETWORK WEB FORUMS[3]

The CLF hosts four all-member ECN calls a year, bringing together professionals across the world to share network and taskforce announcements, and alert people to broader initiatives, events and projects related to embodied carbon reduction. CLF also hosts quarterly introduction calls for new members to highlight ECN's mission, goals, structure and activities. ECN's web forums - including its communication platform Basecamp - help increase awareness and understanding of work happening to transform the built environment's role in climate change.

QUICK CLICKS

[1] Carbon Smart Building Day

[2] Build Positive Summit press coverage

[3] Embodied Carbon Network

OUTCOME III: TRANSLATING KNOWLEDGE AND EXPERIENCE INTO APPLICABLE RESOURCES FOR INDUSTRY

2017-2018 TECHNICAL & EDUCATIONAL RESOURCES

2018 WEBINAR SERIES[1]

Through the Embodied Carbon Network taskforces, the CLF is delivering "Embodied Carbon Reduction in the Building Sector", an eight-part series offering free, one-hour educational sessions eligible for AIA education credits. Sessions provide case studies, knowledge, and strategies to help building professionals reduce the carbon impact of materials. The webinars are reaching broad audiences, demonstrated by 194 live views and 495 downloads of the web recording.

LCA PRACTICE GUIDE[2]

The CLF recently published *Life Cycle Assessment of Buildings: A Practice Guide,* a step-by-step LCA primer and technical guidance document. The Practice Guide introduces the use of LCA to analyze the environmental impacts of buildings in order to help building professionals apply LCA in practice. It addresses how buildings impact the environment, the basic components of LCA and how its used to evaluate building data. It uses a case study to walk beginners through the steps of conducting an LCA.

MODEL LCA SPECIFICATIONS[3]

The CLF supported development of model LCA specifications, which design and construction professionals can use to request embodied carbon data for structural materials. Purpose of the LCA specifications are to establish recommended product specific LCA reporting data requirements, including the reporting of material quantities, with a goal of being able to measure embodied carbon footprints of new construction projects and to help secure LEED v4 credits for those projects.

CONCRETE PCR TECHNICAL EDITS[4]

The CLF and the National Ready Mixed Concrete Association (NRMCA) collaborated with a group of experts to revise the existing Concrete Product Category Rule (PCR). The NSF International National Center for Sustainability Standards (NSF-NCSS) - in collaboration with CLF and NRMCA - launched a public comment period to collect feedback on the revised document.

AIA MATERIALS MATTER[5]

The CLF worked with AIA Seattle and AIA National to develop and deliver Materials Matter, a professional education series on sustainable building materials selection. Materials Matter comprises online and in-person courses focused on the environmental and health impacts of materials, and implementing materials transparency and optimization in practice.

COMING SOON: CARBON SMART RESOURCE DATABASE

As part of the Carbon Smart Building Initiative, CLF is working with NGO partners to develop an accessible tool to provide educational, technical and other resources for building professionals, policy makers, sustainability advocates and general audiences to access the information they need to learn about and communicate the carbon impact of buildings. The tool will incorporate information on embodied and operational carbon.

QUICK CLICKS

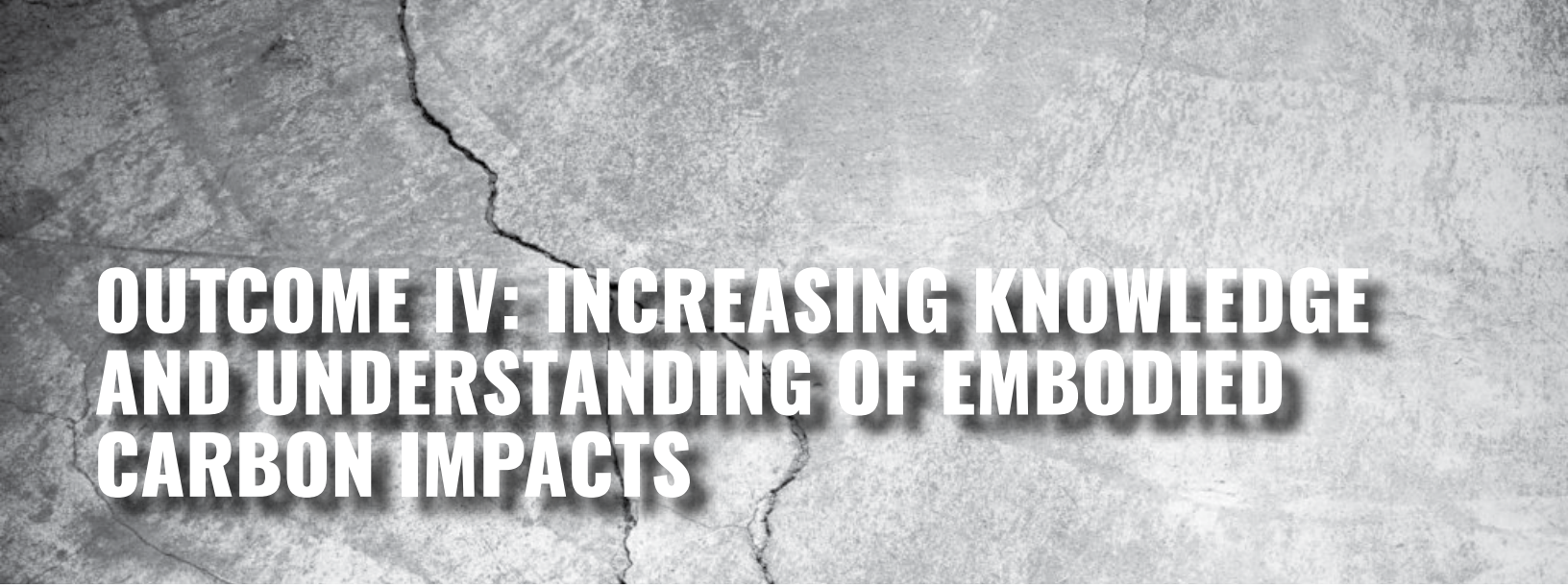
[1]Webinar recordings

[2]LCA Practice Guide

[3]Model LCA Specs

[4]Concrete PCR details

[5]AIA Seattle Materials Matter



OUTCOME IV: INCREASING KNOWLEDGE AND UNDERSTANDING OF EMBODIED CARBON IMPACTS

2017-2019 RESEARCH PROJECTS

BUY CLEAN WASHINGTON EVALUATION[1]

To help WA State inform policy, the CLF is working with the Washington Department of Enterprise Services (DES) to evaluate proposed bill methods and availability of EPDs for each eligible material. In January 2019, the CLF will report to the WA State Legislature proposed policy options, including methods for categorizing and reporting structural materials quantities origins, and proposed methods to establish maximum global warming potential limit for each eligible material.

EMBODIED CARBON BENCHMARK STUDY[2]

Though there is growing recognition of the need to track and reduce embodied carbon emissions, building industry professionals need better data and guidance on how to implement low carbon methods in practice. This project compiled the largest known database of building embodied carbon and created an interactive database. The CLF established consensus on the order of magnitude of typical building embodied carbon, identified sources of uncertainty and outlined strategies to overcome this uncertainty.

LCA OF OFFICE BUILDING MECHANICAL ELECTRICAL PLUMBING SYSTEMS AND INTERIOR TENANT IMPROVEMENTS.

Through these two studies, CLF is providing estimates of the range of material quantities consumed and LCA impacts due to mechanical, electrical and plumbing systems and interior tenant improvement fit out (walls, ceilings, lights, finishes and furnishings) for typical commercial office buildings in the Pacific Northwest.

APPLIED TECHNOLOGY COUNCIL (ATC): SEISMIC DAMAGE AND LCA[3]

This project developed and analyzed the largest known environmental impact database of building component seismic damage. To calculate the environmental impacts, data from Carnegie Mellon University's Green Design Institute's Economic Input-Output LCA database were connected to previously established repair cost estimate data. Environmental impacts, including embodied carbon, embodied energy, and other metrics, were calculated for the repair of nearly 800 building components under three or more different seismic damage levels.

NSF RESILIENT AND SUSTAINABLE COMMUNITIES

Part of a multi-institution research team, the CLF is responsible for integrating architectural considerations in the development of building and community archetype models as well as developing life cycle cost and environmental impact assessment models for residential construction taking into account the impacts of tornadoes and expansive soils.

USDA CLT OPTIMIZATION

The CLF engaged in a Market and Environmental Assessment of cross laminated timber (CLT) production in the Olympic Peninsula. The CLF team defined a reference commercial office building using heavy timber/CLT. The UW School of Forest Resources Team is developing regionally specific life cycle assessment models to evaluate the environmental impact of potential CLT production in the Olympic Peninsula. A report was published for building optimization.

QUICK CLICKS

[1] Original WA bill

[2] Embodied carbon data visualization tool

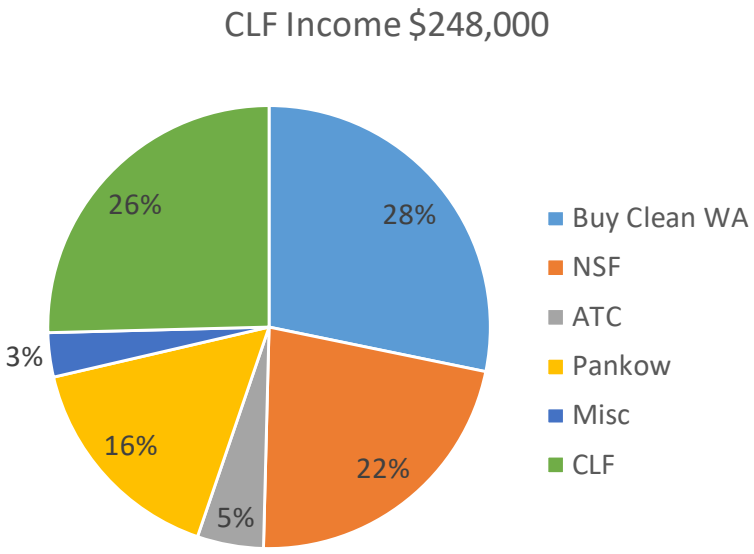
[3] ATC report & project documents

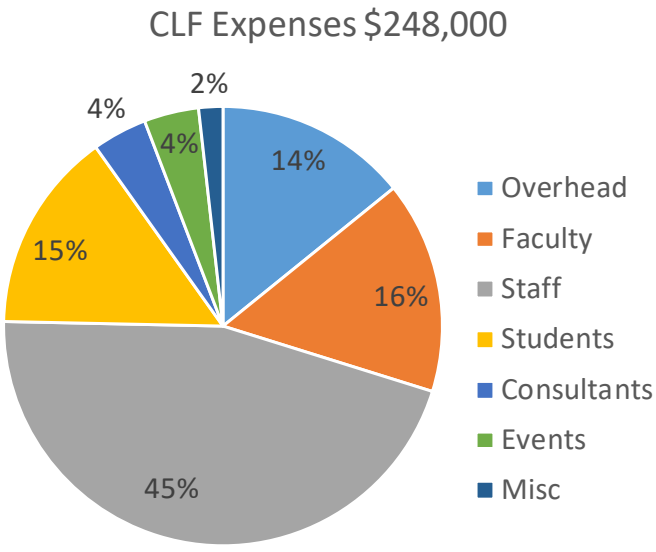
ORGANIZATIONAL & FINANCIAL INFORMATION

CLF FAST FACTS

- **Launched in 2010** by construction industry firms including founding CLF sponsors Climate Earth, Magnusson Klemencic Associates, Central Concrete, and the Ecological Building Network.
- **Three core staff** at 50-80% FTE and undergraduate, graduate, PhD student assistants/interns.
- **Advisory board** comprising eight leading sustainable building and materials experts knowledgeable in LCA, whole building performance, building technology, structural engineering, environmental science & urban planning.
- **Ongoing events** include annual CLF in-person forums and monthly advisory board meetings
- **Recent fiscal status:** revenue $248,000; expenditures $248,000
- **Nonprofit** 501(c)(3) organization

INCOME/EXPENSE BREAKDOWN





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MITHŪN

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at home • at work • at school

THE RUSSELL FAMILY FOUNDATION

Carbon Innovations

PLATINUM

ARUP

CENTRAL
Stronger, Cleaner, Greener Concrete.

Interface

Orca
Distributed by Eagle Rock

SKANSKA

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