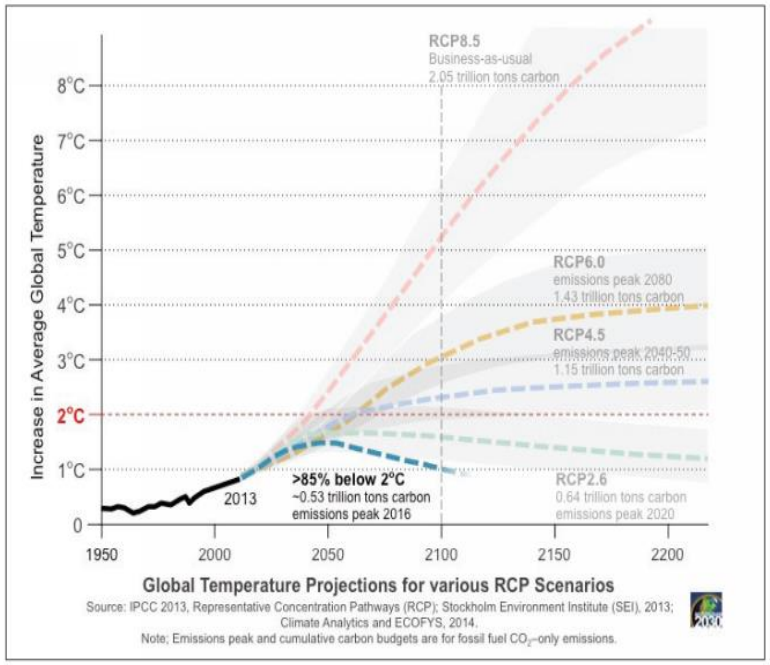
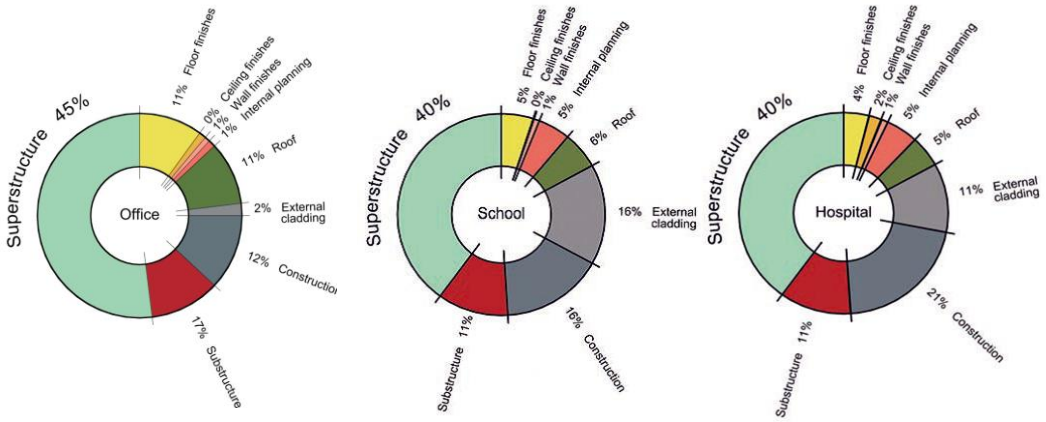
University of Washington
College of Built Environments
Department of Architecture

Structural Engineers 2050 Commitment Initiative*

Structural engineers have an important role to play in reducing greenhouse gas (GHG) emissions from the building sector, yet sustainable design has traditionally been the realm of the architect and other design team members. However, structural materials contribute to at least 40% of the carbon embodied in a building[i], and the new call to move towards **a zero carbon built environment includes embodied carbon** as a significant contributor to the building sector's impact on global climate change.





~ The Paris Climate Agreement[ii] set a new target: to keep global temperatures from rising above 2°C and avoid catastrophic, irreversible climate change. To meet this goal, the building sector must be carbon free by 2050[iii]. ~

The goal of the *Structural Engineers 2050 (SE 2050) Commitment Initiative* is to **inspire structural engineers** to contribute towards the global vision of Zero Carbon buildings by 2050, and to **provide measurement of progress** towards that vision.

Much like the **AIA 2030 Commitment** does for operational energy in buildings, this SE 2050 initiative will challenge structural engineers to meet embodied carbon benchmarks and increasingly higher reduction targets in a "race towards the most efficient building" as we approach the year 2050.

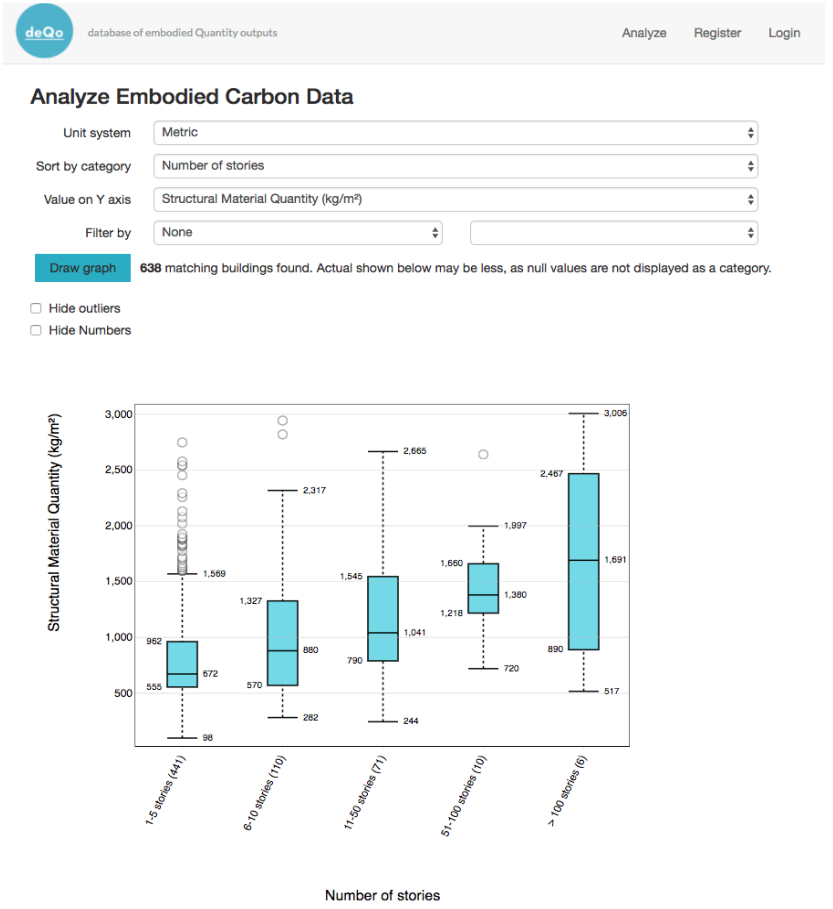
*The proposal for a **SE 2050 Commitment Initiative** was drafted by a committee of the Carbon Leadership Forum including:Amy Hattan, Thornton Tomasetti; Catherine De Wolf, MIT, EPFL; Duncan Cox, Thornton Tomasetti; Frances Yang, Arup; and Kate Simonen, UW. (Last modified 04/16/18)*

Towards this goal, the initiative aims to **enlarge the collection of structural material quantities** on buildings projects to **enable the determination of an embodied carbon baseline**. Therefore, the initiators will develop a process that enables simple and straightforward, yet robust, collection of structural material quantity data. Through collection of material quantities, the structural engineering profession will also **gain insight on material efficiency**.

The SE 2050 Commitment asks that **structural engineers commit to providing structural material quantities and key project information to a database** such as the *database of embodied Quantity outputs (deQo)*[iv]. The database is a centralized repository that will anonymize and aggregate the information, managed by a third party. The project information will be kept confidential unless the provider of the project data wishes to make it public.

The intention is that firms who commit to the initiative will contribute a minimum of **20 projects or 20% of their projects** (for small firms) in the first year with an increasing percentage of their projects contributed each year to eventually include all projects in design or completed each year.

As Architecture 2030 used operational energy benchmarks to rally and enable architectures to meet the 2030 Challenge, SE 2050 uses these structural materials benchmarks to set targets for embodied carbon and **challenge structural engineers to lead in the race to improve material efficiency and design lower carbon buildings**.



[i] Kaethner, S. and Burridge, J. (2012) "Embodied CO2 of structural frames." The Structural Engineer, May, 33-40.
[ii] UNFCCC (2015) "Adoption of the Paris agreement. Proposal by the President/CP.21" *2015-12-12.* Available at https://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf
[iii] IPCC (2014) "Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change." Synthesis Report, Geneva, Switzerland: IPCC.
[iv] De Wolf, C., Ochsendorf, J., Cox, D., Hattan, A., Yang, F., Charlson, A. (2016) "Material quantities and embodied carbon dioxide in structures," ICE Journal of Engineering Sustainability, Vol. 169, Issue ES4, 2016, 150-161, DOI: 10.1680/ensu.15.00033. Available at http://www.icevirtuallibrary.com/doi/abs/10.1680/jensu.15.00033

*The proposal for a **SE 2050 Commitment Initiative** was drafted by a committee of the Carbon Leadership Forum including:Amy Hattan, Thornton Tomasetti; Catherine De Wolf, MIT, EPFL; Duncan Cox, Thornton Tomasetti; Frances Yang, Arup; and Kate Simonen, UW. (Last modified 04/16/18)*