

# EMBODIED CARBON – POSITION PAPER

## WHAT IS EMBODIED CARBON?

When most people think about a building's carbon footprint, we often think of the greenhouse gases generated to produce the electricity or heat that a building uses. These emissions are known as operational carbon emissions. In the last 16 years, the HERS Industry has done a great job helping to track and reduce those emissions.

But the full emissions story starts with the extraction, processing, and manufacturing of the building materials themselves. These emissions are known as materials embodied carbon emissions, which account for as much as 60-90% of a building's full life cycle total carbon emissions. They exist in the atmosphere before construction begins and operational emissions accrue on top of this baseline.

## WHY NOW?

As of 2017, building operations accounted for 28% of global carbon emissions. An additional 21% came from the production of the building materials themselves. Combined, operational and material emissions account for almost half of global carbon emissions!

Materials with high embodied carbon are often used in order to achieve savings on operational emissions. But by factoring in the embodied carbon of the materials themselves, we have an opportunity to capture the "low hanging fruit" of up-front carbon savings. We don't have to wait decades to realize savings. We can start today. This is a critical step if we want to reach the global carbon targets needed to reverse climate change by 2030.

## WHY RESNET?

RESNET Certified Home Energy Rating System (HERS) Raters are uniquely poised to deliver the data needed to begin materials embodied carbon tracking in the United States. HERS Ratings are third-party verified assessments of a home's energy efficiency and RESNET's rigorous Quality Assurance oversight provides valued consistency across the United States market.

Approaching 4 million homes assessed, the HERS Platform is already acknowledged to be the gold standard for the US residential home energy assessment market. If added to the RESNET Standards, a Materials Embodied Carbon Index would transform the HERS Platform into an even more powerful engine for tackling climate change within the next 10 years, helping to ensure that we have a livable planet for generations to come.

## SIGNIFICANT DATA OVERLAP

HERS raters already collect a lot of data in order to produce detailed reports defining operational emissions for each HERS Rating. About 80% of those data points overlap with the data points needed to calculate material embodied carbon emissions.

## EPDs HELP SET DEFAULTS

Where data is missing, Environmental Product Declarations (EPDs) can help set defaults. EPDs are third-party verified documents based on product-specific Life Cycle Analysis models, written in compliance with rules from the International Standards Organization (ISO). They provide a standard of rigor and consistency needed to trust the declared environmental impact of a product.

## **SOFTWARE INTEGRATION**

The data from any of the three HERS Rating Software Systems can already be imported as XML data into EPD/LCA reporting tools. This allows us to calculate embodied carbon alongside operational carbon with the tools as they exist today. With some software adaptations, we anticipate that embodied carbon calculations can be integrated directly into the tools we currently use to calculate operational emissions, which will make reporting even more straight forward and accessible for any HERS Rater.

## **BASELINE**

NEHERS is preparing a Benchmark Study in Massachusetts. The study is designed to be replicated in other regions of the country. This will provide a snapshot of the current status of embodied carbon in new construction against which future reductions can be compared.

## **REFERENCE HOME**

With a baseline established, it will be possible to determine an Embodied Carbon Reference Home. Just like the HERS Index, an Embodied Carbon Index could result from dividing total embodied carbon values from the Rated Home by the total embodied carbon values from the Reference Home.

## **A NEW STANDARD**

The residential marketplace is not currently served by any comprehensive carbon standard. Creating one would provide a scalable, vetted framework for how to measure Embodied Carbon and allow consistency for training, accreditation of professionals and tools, and quality assurance oversight. We're focused on the first three phases of a material's life cycle (A-1 to A-3), with room to expand.

## **PROGRAM INCENTIVES**

This standard could be used by municipalities, program administrators, and other stakeholders as a platform for program incentives. This would allow us to not only measure energy and carbon efficiency, but to provide verification of both energy and carbon savings, including carbon storage, for programs like energy efficient mortgages, the ENERGY STAR Homes Program, and others.

## **WORKFORCE DEVELOPMENT**

Raters are developing new markets in relation to the new HERS H2O Index and the upcoming CO2 Rating Index for Grid Decarbonization. Adding Embodied Carbon tracking to the RESNET Standards is a natural next step and will encourage workforce evolution and continued relevancy for current HERS Raters, while inspiring the next generation to join us.

## **COLLABORATION OPPORTUNITIES**

We are interested in collaborating with individuals and organizations who can help:

- 1) Fund the adaptation the HERS Rating Software to include embodied carbon calculations.
- 2) Fund a baseline study for the Northeast.
- 3) Draft the Standard itself.

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### **The Northeast HERS Alliance Embodied Carbon Committee: ([info@nehers.org](mailto:info@nehers.org))**

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