Turner

Opportunities in the Post Carbon Economy
Achieving a Net Zero Energy / Zero Carbon Emissions Jobsite by 2030

presented to the

CCInnovations Conference 2017:
Construction on the Precipice of Massive Change
November 3, 2017

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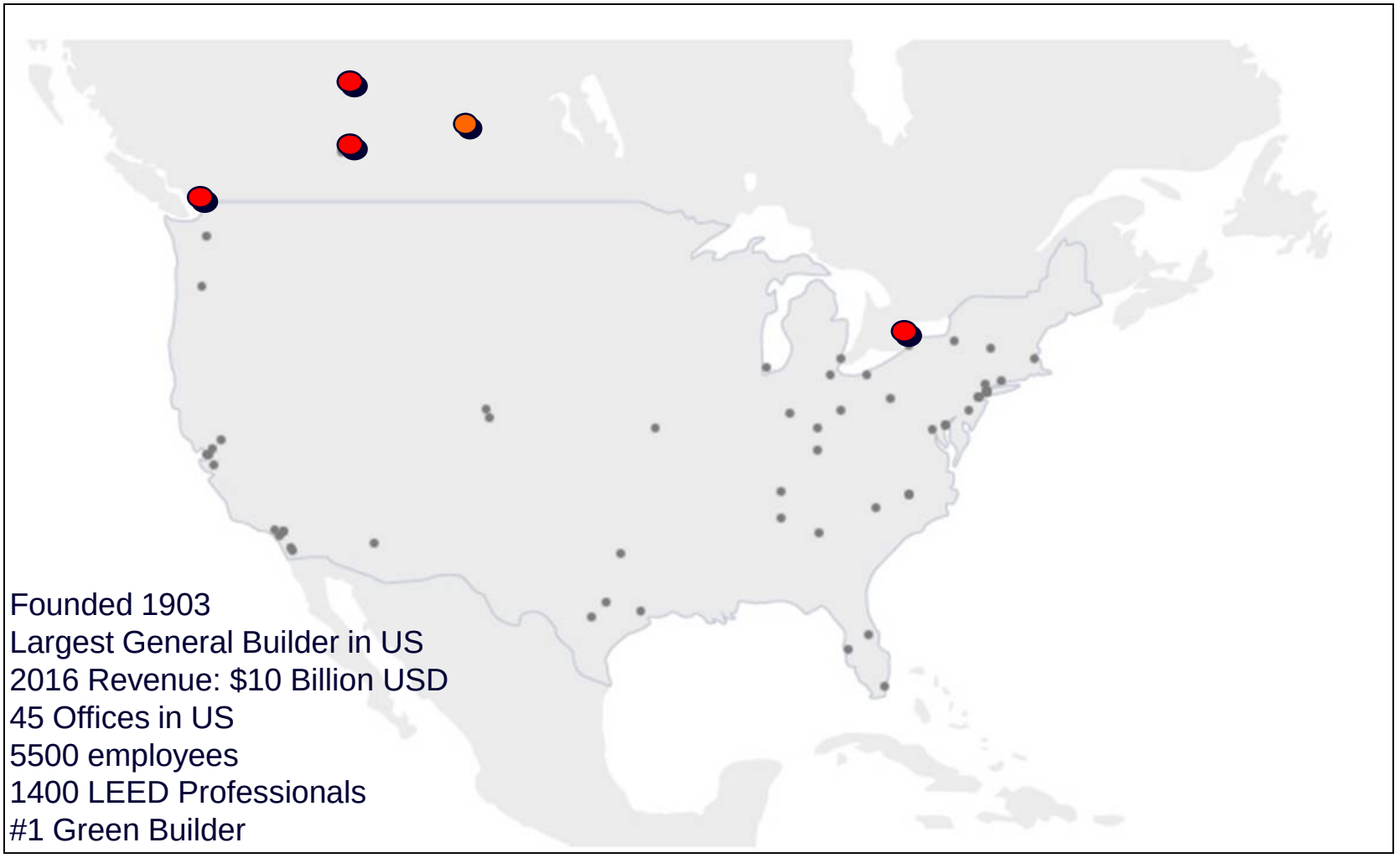
A Bit About - Turner Construction Company

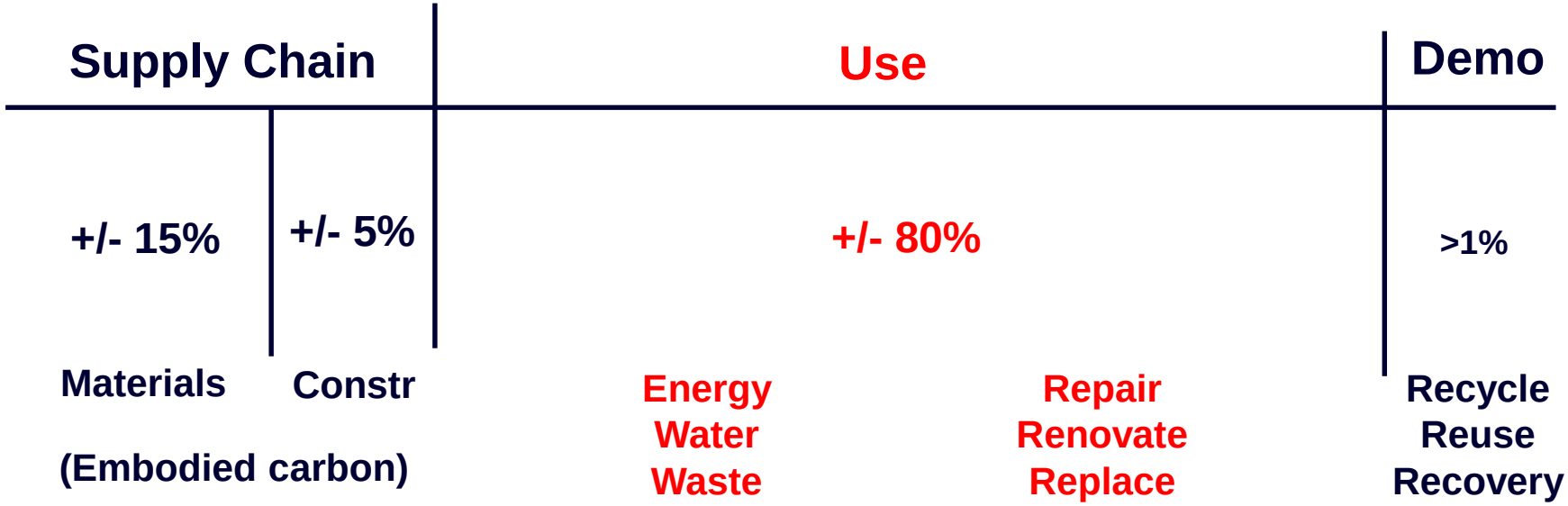


- Founded 1903
- Largest General Builder in US
- 2016 Revenue: $10 Billion USD
- 45 Offices in US
- 5500 employees
- 1400 LEED Professionals
- #1 Green Builder

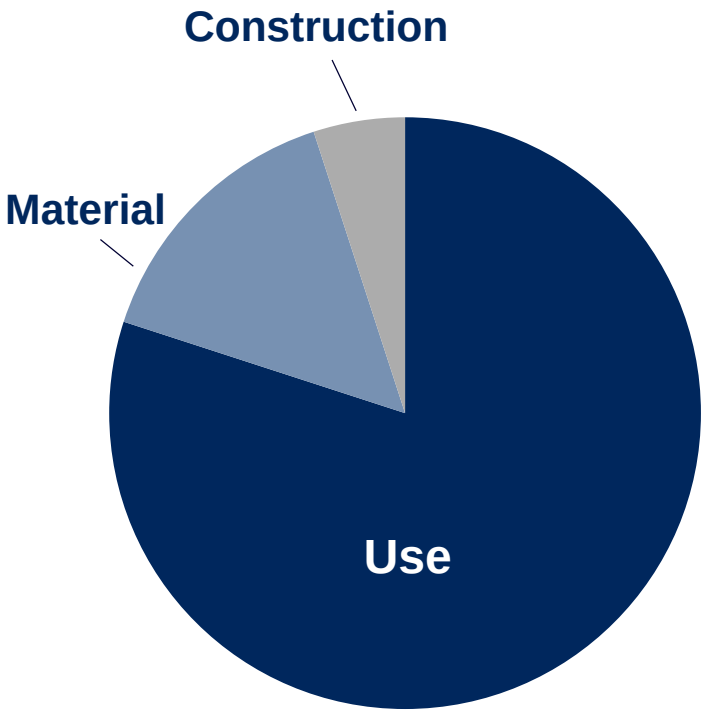
What can builders do to address climate change and thrive?

- The most important thing the construction industry can do is take responsibility for the impact of its operations on the environment.
- Reduce demand for energy, water and materials and eliminate waste on jobsites.
- Wean ourselves off fossil fuels and source all onsite power from renewable sources,
- Eliminate waste by design.
- If we do these things, we have the ability to transition to a net zero energy / zero carbon jobsite by 2030.
- This is most likely to happen if the entire construction industry, and indeed, the AEC community and the clients we work for, together demand a clean energy economy and a shift to renewable generation.

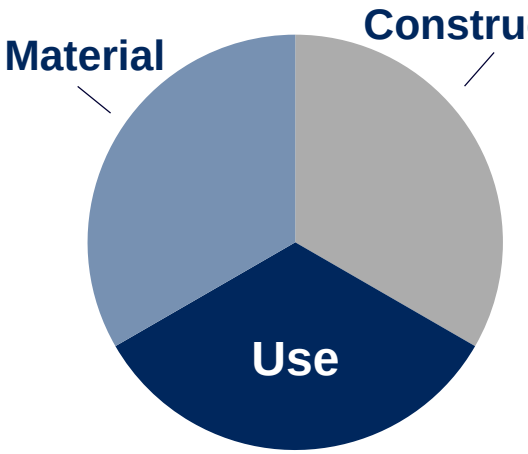
Life Cycle Assessment - Use Phase +/- 80%



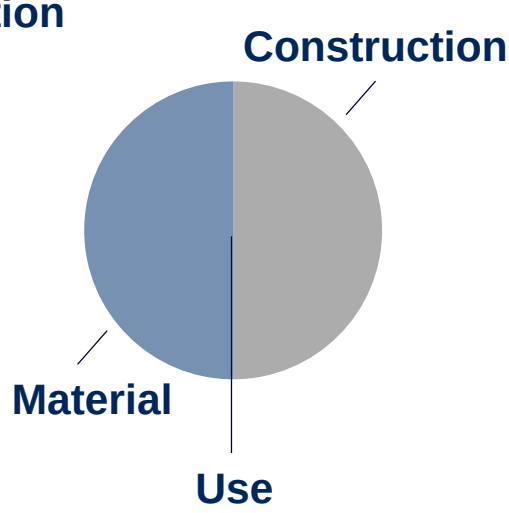
Importance of Embodied Energy as Operating Energy Moves to Zero



Now
(Assumed)

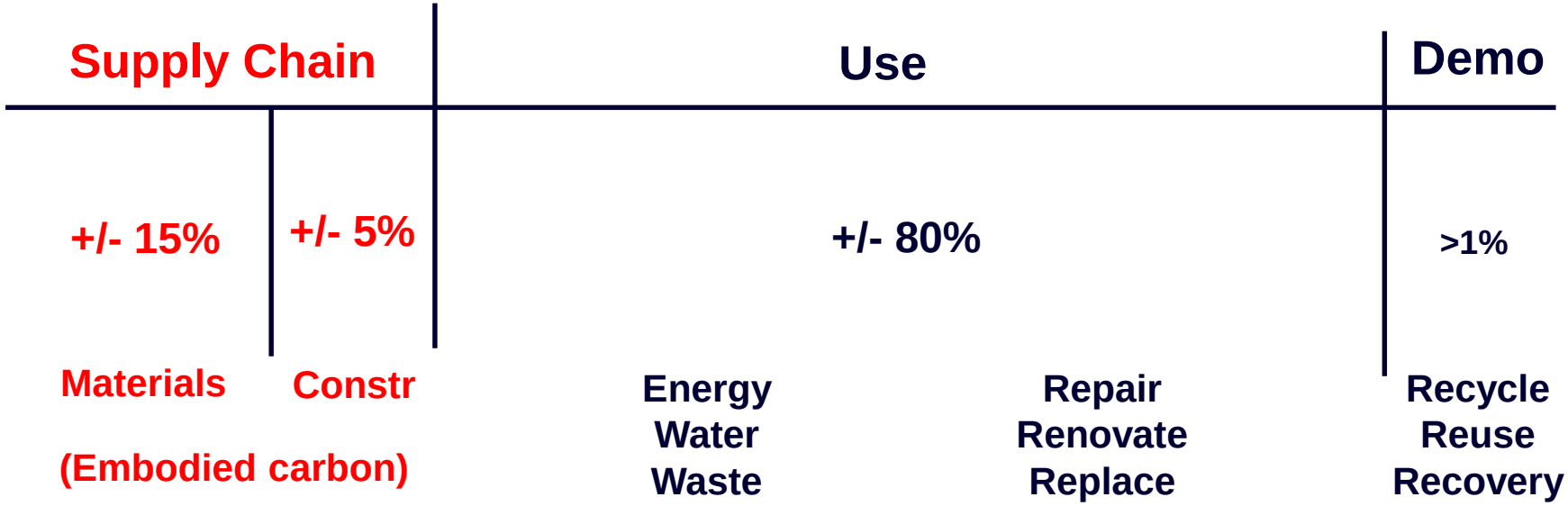


Soon



Ideal
(Net Zero Energy)

Life Cycle Assessment - Supply Chain +/- 20% (Const. +/-5%)



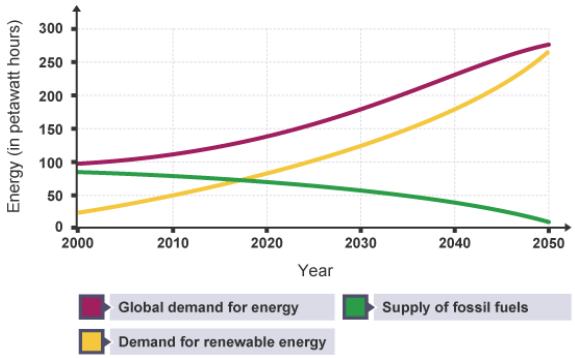
The Post Carbon Jobsite – Can we get there From Here?

The Plan

- Reduce demand: Review all job processes to maximize efficiency and eliminate waste
- Increase use of electricity for as much jobsite power as possible.
- Eliminate fossil fuel use for onsite mobile and stationary equipment – replace with electric, hybrid and battery power
- Increase investment in R&D (partner with academia, manufacturers and practitioners)
- Most Important: Create market demand for grid supplied renewable energy!!

Will the conditions be in place to achieve this outcome?

- What is the Likelihood of a Renewable grid by 2030?



- What is the Reality of Electric Vehicles by 2030?

Electric Vehicles for Construction, Agriculture and Mining 2017-2027

Hybrid & pure electric vehicles for construction, maintenance, agriculture and mining: technologies, markets, forecasts

Brand new for January 2017

By Mr Franco Gonzalez and Dr Peter Harrop

> Electric vehicles for construction, mining and agriculture will be a $81 billion market in 2027

The Time Value of Carbon (2015 – 2035)

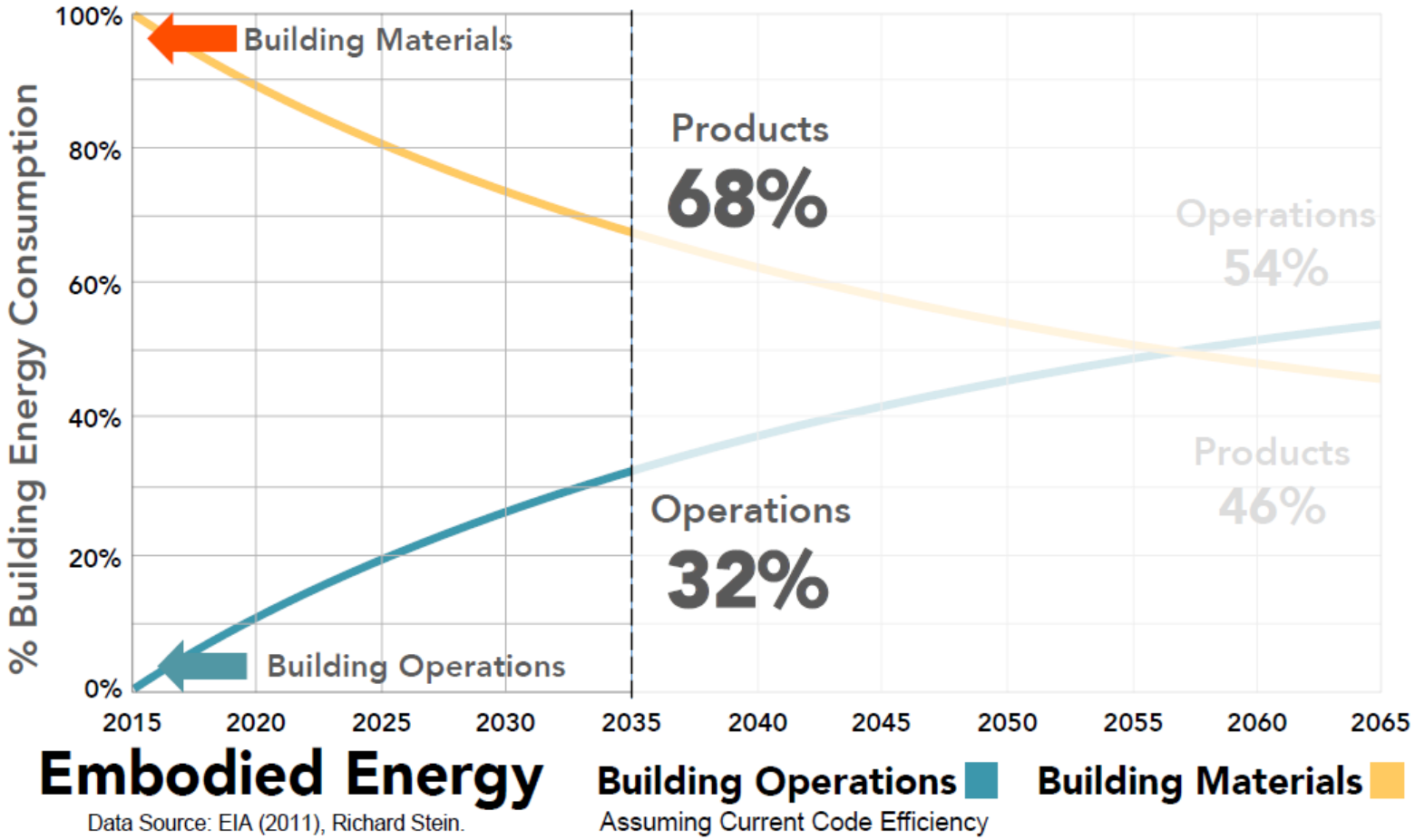
Over the next 20 years

900 billion square feet

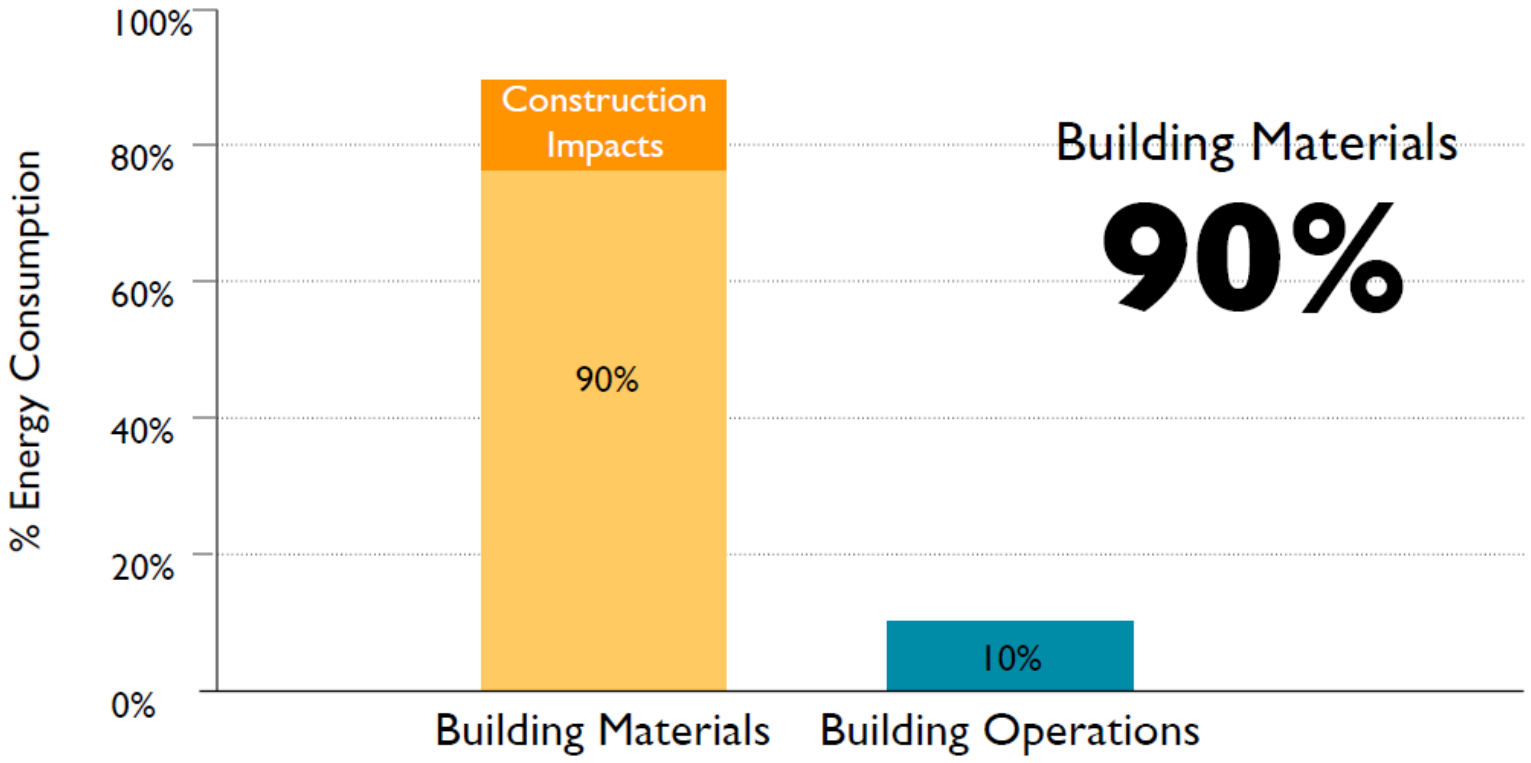
of new and rebuilt buildings

will be constructed in cities worldwide

The Time Value of Carbon (2015 – 2035)



The Time Value of Carbon (2015 – 2035)



900 Billion Sq. Ft. Energy Consumption Footprint 2015–2035

Data Source: EIA (2011), Richard Stein, CBECS (2003), McKinsey Global Institute

A Call To Action

- No one company, no matter how large, will be able to make this market transformation happen alone.

- I would like to see the construction industry join together with designers, manufacturers and our clients and call for a rigorous examination of how we construct buildings, including what materials, processes and sources of energy we use to do so.

- I propose an industry-wide focus on efficiency and demand reduction of all kinds - material, water, energy and the elimination of waste, with a goal to shift as soon as possible to a net zero energy, zero carbon jobsite by 2030.

Thank you

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