PRESERVATION NEWSLETTER

SUSTAINABILITY & HISTORIC PRESERVATION

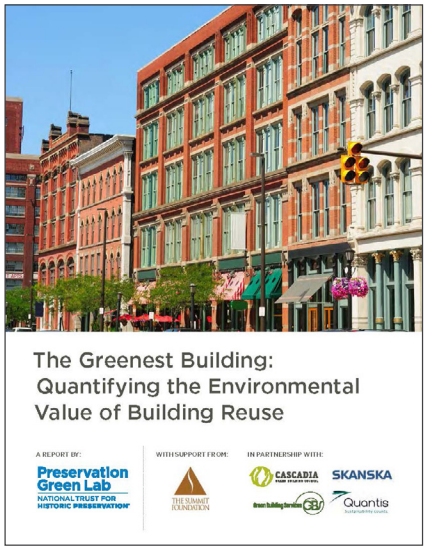
While energy efficiency is important, it is not the only thing to consider when determining if a building project is sustainable or environmentally friendly. While there are plenty of building materials on the market now claiming to be energy efficient, how environmentally friendly or 'green' is it to throw reusable building materials into the landfill? When it comes to buildings, reuse is the greenest option. Read on to find out why...

THE GREENEST BUILDING

"The greenest building is the one that is already built"

-- Carl Elefante, former president of the American Institute of Architects

In a time when climate change is at the forefront of many discussions, the use of historic preservation in the fight for a more sustainable planet is often overlooked. The most comprehensive study regarding the link between preservation and sustainability, "The Greenest Building: Quantifying the Environmental Value of Building Reuse", was released by the Preservation Green Lab of the National Trust for Historic Preservation in 2012. The key findings of the study were as follows:[1]



> *"**Reuse Matters**. Building reuse typically offers greater environmental savings than demolition and new construction. It can take between 10 to 80 years for a new energy efficient building to overcome, through efficient operations, the climate change impacts created by its construction. The study finds that the majority of building types in different climates will take between 20-30 years to compensate for the initial carbon impacts from construction.*
>
> ***Scale Matters**. Collectively, building reuse and retrofits substantially reduce climate change impacts. Retrofitting, rather than demolishing and replacing, just 1% of the city of Portland's office buildings and single family homes over the next ten years would help to meet 15% of their county's total CO_2 reduction targets over the next decade.*
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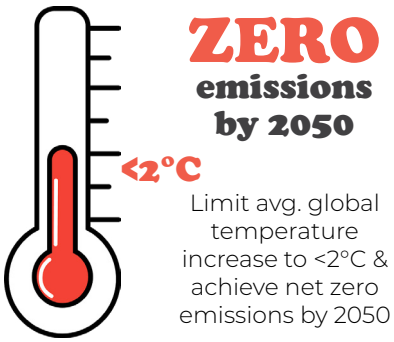
> ***Design Matters**. The environmental benefits of reuse are maximized by minimizing the input of new construction materials. Renovation projects that require many new materials can reduce or even negate the benefits of reuse."**

The bottom line of the "Greenest Building" report? "Reusing existing buildings is good for the economy, the community, and the environment". Studying the interconnectivity between social, economic, and environmental factors paints a more complete picture of the potential impact of historic preservation and is further explored in Robert Young's book, *Stewardship of the Built Environment*. As Carl Elefante writes in his forward to Young's book, "By conserving what we have, today's investment of material and energy resources can produce meaningful economic benefit while helping to avert negative environmental consequences... By appreciating the legacy of previous generations, we are challenged to understand the significance and value of our own actions in anticipation of generations and centuries to come."

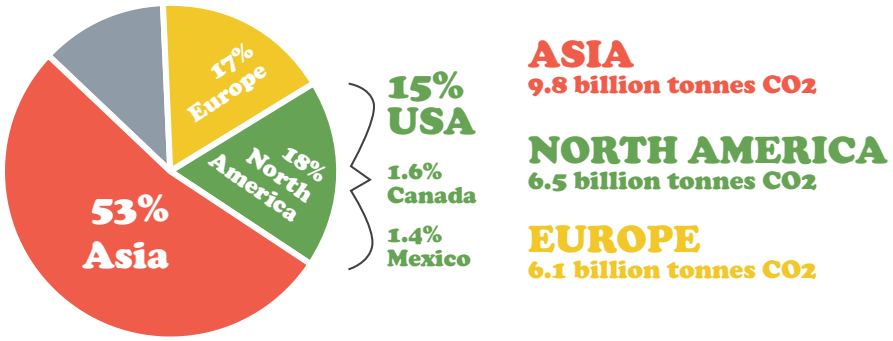
* For an in depth look at the study, please visit The National Trust for Historic Preservation's Resource Library online.

WATCH OUT FOR THAT... CARBON

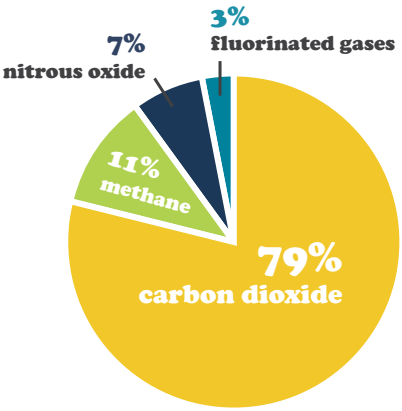
The building sector has a great effect on the state and health of our environment and planet as a whole. One of the biggest factors in climate change is greenhouse gas emissions. According to the Paris Climate Agreement, countries should limit greenhouse gas emissions to avoid more than 2° C global temperature rise by the mid-twenty-first century. In the building sector, we consider both operational and embodied carbon. According to the Carbon Leadership Forum, embodied carbon refers to the emissions from manufacturing, transporting, installing, maintaining, and disposing of building materials.[2] Operational carbon refers to the emissions caused by the building's energy use. Since most embodied carbon is released before the building is occupied, even if a building is constructed for low energy use, it can take decades before a new building achieves a smaller carbon footprint than a comparably sized rehabilitation. Simply put, reuse of buildings and building materials avoids embodied carbon now; rehabilitation of buildings provides the opportunity to reduce their operational carbon in the future.



PARIS AGREEMENT

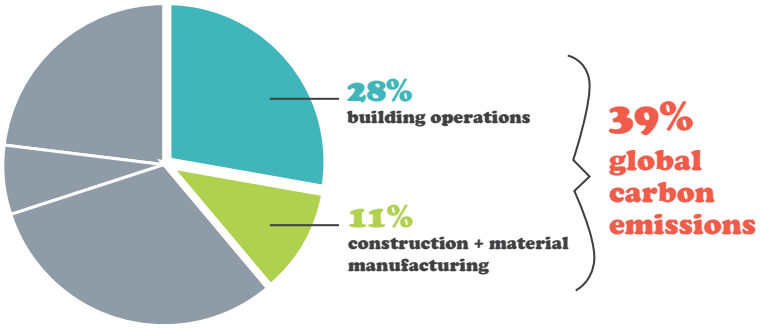


LARGEST GLOBAL CO_2 EMITTERS,[3] % GLOBAL EMISSIONS



US EMISSIONS, 2020

BUILDING LIFE CYCLE CARBON USE



GLOBAL CO_2 EMISSIONS, BUILDING SECTOR

In 2018, the International Energy Agency found that building construction and operations are responsible for 39% of global carbon emissions. Additionally, efficiency improvements have been outpaced by growth in square footage so that energy demand from new buildings today is 7% higher than it was in 2010.

REDUCE, REUSE, RECYCLE

Another key factor to consider when looking at the building sector and its impact on the environment is material management. The EPA classifies Construction & Demolition (C&D) materials as the "debris generated during the construction, renovation, and demolition of buildings, roads, and bridges."[4] In 2018, C&D debris equaled more than twice the tonnage as of municipal solid waste with nonresidential demolition generating the most C&D materials. The EPA encourages Sustainable Materials Management (SMM) to lessen the impact of C&D debris on the environment. Strategies for SMM include "practicing source reduction, salvaging, recycling and reusing existing materials, and buying used and recycled materials and products." Generally, source reduction prevents waste from being generated; one example of this is focusing on preserving existing buildings rather than building new.

90%

amount of C&D debris is generated by demolition

600 million tons

amount of C&D debris generated in 2018

455 million tons

amount of C&D debris directed to next use*

145 million tons

amount of C&D debris sent to landfills

Aggregate

the main next use for materials in C&D debris

Reuse

of materials saves resources & energy by avoiding production of new materials

doors, hardware, appliances & fixtures

can be repaired for reuse, donated, or used on other jobs

Brick, concrete & masonry

can be recycled on site as fill, sub-base material or driveway bedding

HISTORIC PRESERVATION

the ultimate form of reuse!

GET RETROFIT!

The US was slow to embrace building preservation. As Robert Young states in his book *Stewardship of the Built Environment*, "in a nation that valued everything new, the notion of saving something old was antithetical to popular beliefs." The mindset that newer = better still plagues many in the United States with viable building materials being thrown into landfills in favor of newer "energy efficient" options. However, studies show that existing buildings can be retrofitted to achieve energy efficiencies equivalent to new buildings, reducing carbon emissions and reducing waste in landfills.

Energy Audit - the first step in making historic buildings energy efficient. An energy audit is a professional assessment of how much energy your home actually consumes. Using techniques like blower door tests, thermal imaging, duct testing, and visual inspections of insulation, energy auditors can provide homeowners with specific recommendations for changes and fixes that will provide true financial benefit and reasonable return on investment.

In December 2017, preservation staff published a Preservation Newsletter on Energy Efficiency. Check it out for a number of strategies for cost effective energy retrofits for historic buildings.

*"Next use designates an intended next-use market for a C&D material, which depending on the material, may include fuel, manufactured products, aggregate, compost and mulch or soil amendment" per EPA.

DECONSTRUCTION OVER DEMOLITION

The practice of demolishing buildings, throwing the debris in landfills, and constructing new buildings with new materials in their place is inherently unsustainable. In the world of historic preservation, demolition should always be an action of last resort, but when demolition cannot be avoided, there are ways to go about it to lessen the environmental impact. One strategy recommended by the EPA is deconstruction.

"Recovering used, but still-valuable C&D materials for further use is an effective way to save money while protecting natural resources... Deconstruction is the process of carefully dismantling buildings to salvage components for reuse and recycling. Deconstruction can be applied on a number of levels to salvage usable materials and significantly cut waste."[4]

Deconstructing buildings is a valuable tool for many reasons. For one, it creates a circular economy, which mitigates supply chain issues that have plagued new construction in recent years. Deconstruction also creates better paying jobs than demolition. There are roughly 300 jobs per 10,000 tons of salvage work versus 1-6 jobs created for the same amount of demolition work. Many of the materials that are being salvaged are of higher quality than can be purchased today, and can fill the criteria set in historic districts to "replace like with like". Meaning to use similar, often hard-to-find materials to make repairs on historic buildings.

Deconstruction Policy. While no one likes having a vacant house on their block, many vacant houses still hold valuable materials such as old growth hardwood floors, decorative windows, and pocket doors. So how does a community safely and sustainably address these structures? In many areas this is being answered by the creation of deconstruction ordinances and incentives. A study conducted in San Antonio, TX, examined this and found that several cities and counties already have ordinances in place to require a deconstruction process on historic buildings in their community. These measures are being put in place so that a deconstruction requirement is added to the demolition process. That means that buildings must be evaluated for the amount of useable material is in the building. That material is then salvaged and reused, rather than hauled off to the dump, filling landfills and wasting valuable materials.

To learn more about deconstruction and other sustainable historic building practices, check out San Antonio Reuse

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1. https://forum.savingplaces.org/viewdocument/the-greenest-building-quantifying
2. https://carbonleadershipforum.org/embodied-carbon-101/
3. https://ourworldindata.org/co2-emissions
4. https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials

This newsletter was created by the Preservation Staff of the City of Columbia's Planning and Development Services Department. If you have any questions about your specific historic property please contact your district's preservation planner. Contact information can be found on our website. If you would like to be added to our newsletter mailing list please send an email to preservation@columbiasc.gov.