COUNTDOWN ON CARBON

A mandate for the design profession

The American Institute of Architects Board of Directors committed to an ambitious climate agenda in September 2019. Proposed through a member-lead resolution at the 2019 convention, this landmark initiative defines immediate and long-term obligations of the architectural profession to stand against climate change.[1] The next few years will result in a paradigm shift of our industry, practice, and responsibility as we respond to climate change.

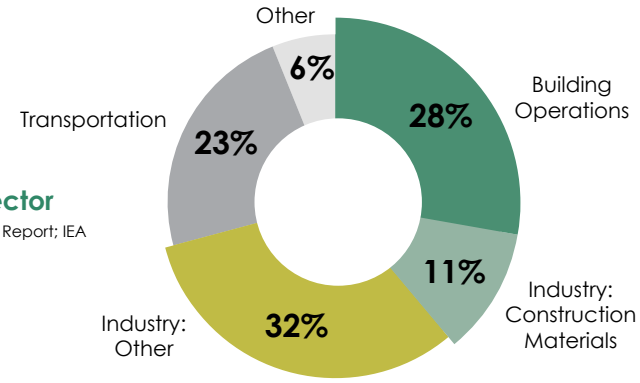
Prepared and adopted by the
Large Firm Round Table, October 2019

Climate change is one of the most urgent issues of our time and we're calling on our professions to do more.[2]

Increased levels of greenhouse gas ("carbon"[3]) emissions are tied to shifts in short- and long-term weather/climate conditions that have a direct impact on our clients, buildings, cities and communities. Building energy use generated from fossil fuels accounts for 28% of global carbon emissions. While we work to reduce these with higher performing buildings, we are only addressing part of the carbon reduction challenge. "Embodied" carbon emissions associated with construction materials account for 11% of global emissions, of which the majority are from concrete, steel and aluminum.[4] Over the next 10 years, 80-90% of the carbon emitted from new construction structures will be from embodied carbon.[5] Overall, building energy sources & their materials are estimated to impact around 39% of global emissions.[6]

Global CO_2 Emissions by Sector

Source: 2018 Global ABC Report; IEA



Carbon and climate planning represent a profitable and ecological leadership opportunity for our firms and our communities.

According to Architecture 2030, between 2015 and 2060, 2 trillion square feet of buildings will be built. 40% will take place over the next 15 years which represents an enormous business opportunity as clients and cities move toward voluntary 2030 targets. Many of our clients are already taking steps to address climate change within their organizations; they are looking to us to connect their corporate commitments to their built environments. Architects, engineers, and planners influence five key impact areas:

Building Energy Efficiency | **Energy Sources** | **Building Materials** | **Urban Planning** | **Firm Operations**

Firms that do not take a more active role in climate action are exposing themselves to undue risk.

Seventeen states, which make up 47% of the U.S. economy, have signed the U.S. Climate Alliance Agreement with the aim to reduce emissions by 26-28% by 2025.[7] Many cities have carbon and net zero legislation in place or in the works and we are anticipating wider-scale code change, as outlined in the AIA code report,[8] as we move towards 2030. The AIA Code of Ethics[9] was updated in 2018 to include mandatory action fulfilling professional obligations to the environment.

Make an impact.

1. **Sign on to the AIA 2030 Commitment, fully report, and achieve its goals.[10]**
2. **Account for climate action in your next strategic plan.**
3. **Advocate and design for building reuse.**
4. **Include embodied carbon as a key factor when selecting materials.**
5. **Support carbon education within your firm, academia, and professional networks.**

1. AIA launches landmark initiative to drive climate action.
2. United Nations: Shaping our future together and World Health Organization: Health and climate change.
3. or "CO2e" is typically used as a proxy for consistently measuring greenhouse gas emissions. Source: US EPA: Carbon Footprint Calculator.
4. Architecture 2030 Embodied Carbon
5. Skanska. Carbon reduction in construction: a net benefit, not just to the environment, but to the bottom line.
6. Global Alliance for Buildings & Construction
7. Examples include: California, Minnesota, Pennsylvania, New York City, Boston, Denver, Indianapolis, West Palm Beach. Source: Carbon Disclosure Project. 43 cities score an A grade in new cities climate change ranking.
8. AIA Blue Ribbon Panel Report. Disruption, evolution, and change: AIA's vision for the future of design & construction.
9. AIA 2018 Code of ethics and professional conduct.
10. AIA 2030 Challenge.

Project Opportunities to Reduce Embodied Carbon

Version 1, October 2019
These recommendations are based on current information and will be updated as practice and industry progress.

ACTION ITEM	REASON
GENERAL	
Reuse existing buildings as much as possible, including interior components	Avoid use of new materials
Simplify design features and components as much as possible	Minimize use of new materials
Add embodied carbon to annual AIA 2030 data collection and reporting (pending updates to the AIA 2030 DDx)	A growing database of metrics from industry leaders will raise awareness and accountability
Carry out whole-building LCAs and adjust design decisions accordingly	Build carbon literacy and include in the design process
Consider embodied carbon criteria in parallel with energy, healthy materials and other sustainability issues	Multiple priorities require an integrated approach
Evaluate Site and Landscape materials with The Climate Positive Design Toolkit[1]	Materials used outside the building envelope also contribute embodied carbon
STRUCTURE – responsible for approximately 50% of embodied carbon in buildings	
Advocate for structural engineers to sign on to SE2050 Challenge	Structural design significantly impacts embodied carbon
Ask structural engineers to produce multiple material options and compare carbon impact	Reduce overall material mass -AND/OR- use materials with less embodied carbon
Consider mass timber as a structural approach	Timber has much less embodied carbon than steel or concrete, especially when managed sustainably (Forest Stewardship Council)
Steel: Specify 90% recycled content or higher for available structural shapes	Incentivizes electric arc-furnace (EAF) production over basic oxygen furnace (BOF) production. EAFs produce less than half the CO_2 of BOFs and can be powered by renewable energy
Concrete: Reduce the amount of cement used	Portland cement is responsible for the majority of concrete's CO_2 emissions.[2]
ENVELOPE - responsible for approximately 30% of embodied carbon in buildings	
Storefront & curtain wall: Use glass and aluminum judiciously and/or consider alternate materials	Glass and aluminum have very high embodied carbon
Insulation: Avoid foam, especially XPS	XPS has the highest carbon footprint of typical foam insulations[1]
Framing: Increase metal stud spacing, and/or use FSC certified wood studs where possible	Minimizes use of new materials, and avoids negative embodied carbon impacts of deforestation
Cladding: Use concrete and masonry judiciously and/or consider alternate materials	Portland cement has very high embodied carbon
INTERIOR - responsible for approximately 20% of embodied carbon in buildings	
Design to avoid/minimize churn	Interior materials are replaced frequently, increasing their embodied carbon impact
Request EPDs and review the Green House Gas (GHG) impact category	Find low embodied carbon options, and increase market demand for and literacy around EPDs
Select reusable, reconfigurable, and durable materials, especially furniture	Furniture typically has high embodied carbon
Review local/regional products and materials	Reduces transportation-related carbon emissions
Specify lighter weight, recycled content Gypsum Wallboard (GWB) when available	Minimizes use and quantities of new materials
Advocate for and use FSC certified wood and materials composed of agriculture waste.	These materials can actively sequester carbon and support sustainable forestry.
Ceiling Tiles and Carpet: Specify materials with take-back programs and high recycled content	Minimizes use of new materials and promotes a circular economy

RESOURCES

[1]Climate Positive Design Toolkit
[2]Carbon Smart Materials Palette
Embodied Carbon Network
Carbon Leadership Forum
BSA Embodied Carbon Resource Page
Building Green "The 12 Product Rules"
Athena Sustainable Materials Institute

TOOLS

AIA Framework for Design Excellence Toolkit
Tally
EC3 Tool (release Nov. 2019)
One Click LCA and Carbon Designer
eToolLCD
Athena EcoCalculator, Impact Estimator