

CONSTRUCTION:

CLINKER
Key chemically
reactive ingredientCEMENT
The binderCONCRETE
Critically useful
material to societyCONSTRUCTION
Service life /
use phase impactsCARBON UPTAKE
Concrete is
a CO₂ sink

The built environment must play its part. Buildings designed with sustainability in mind not only reduce emissions but also are more resilient.

Optimization in the design phase takes a whole-life building design approach that involves both an integrated design approach and an integrated team process—a modern “start with the end in mind.”



Construction can leave a smaller environmental footprint.

PCA's Roadmap encourages a rational approach to eliminate overdesign, keeping codes and standards updated with actual building performance, as well as the latest developments and research.

Every structure has basic principles like strength, durability, stiffness, stability, and long-term performance.



Structural systems can be optimized by considering the size, shape, and spacing of structural components—including how and where those components are connected to transfer loads most efficiently.



For example, a higher strength concrete may require higher cement contents, but the overall structural system can be designed with a lower carbon footprint because the overall system was optimized.



Optimization in the design and construction phase can achieve construction efficiencies of 10% by 2030, 20% by 2040, and 30% by 2050—or a 1% increase each year.

Optimized construction also means zero waste on the job site and zero returned concrete. Today, more than 5% of concrete is returned from construction sites. With more precise design and limiting excess materials, our goal is to reduce that to 4.25% by 2030 and 2.5% by 2050.

The foundation of sustainable cities



Homes with concrete walls can use up to **15%** less energy than other homes.



A reduction of **46.5 million** metric tons of GHG emissions per year could be realized if the entire U.S. road system used concrete pavement, according to MIT Concrete Sustainability Hub.



The amount of CO₂ that concrete buildings, structures, and pavements can permanently absorb from the air is at least **10%**.