

# CMU: BUILT FOR DECARBONIZATION

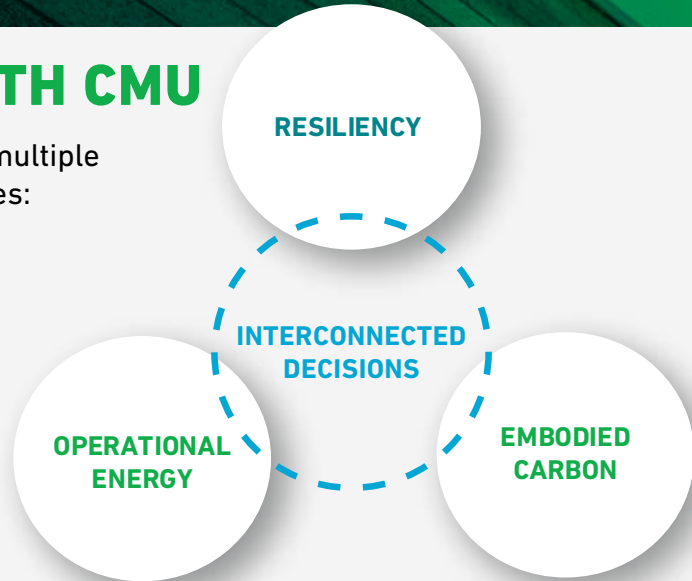
## CARBON REDUCTION WITH DRY-CAST CONCRETE MASONRY



### CLIMATE STRATEGY STARTS WITH CMU

True sustainability within the built environment requires multiple interconnected decisions, drawing from three core strategies:

- Operational energy use:** Materials with high thermal mass have the ability to absorb, store and release heat. This helps improve energy efficiency in all climate zones.
- Resilience:** Concrete masonry construction delivers built-in protection against the extremes of our environment.
- Low embodied carbon:** Concrete masonry offers low embodied carbon both in manufacturing (cradle-to-gate) and in the use phase — its longevity and durability mean fewer replacements and less maintenance.



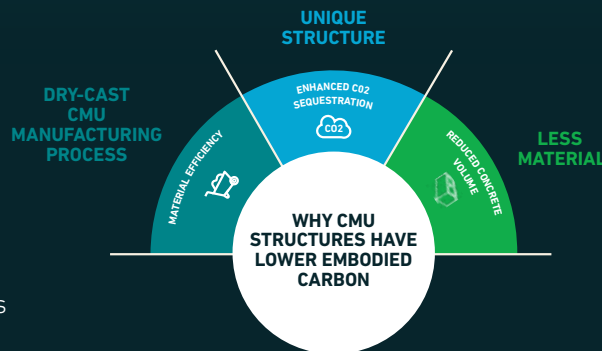
Over the past several years, the Concrete Masonry & Hardscapes Association (CMHA) has conducted research to better understand the embodied carbon impacts of concrete masonry products and the role of carbon sequestration in decarbonization efforts. That research now quantifies CO<sub>2</sub> sequestration, showing that carbonation in CMU occurs faster and at higher levels than previously understood.

Through carbonation, concrete masonry permanently sequesters atmospheric CO<sub>2</sub>, converting it into limestone within the material itself.



Concrete Masonry Units (CMU) are a climate-forward solution in the built environment. CMU has three distinct advantages that significantly reduce its embodied carbon:

- Material efficiency** due to their dry-cast manufacturing process.
- Enhanced CO<sub>2</sub> sequestration** due to CMU's unique structure within the concrete matrix.
- Reduced concrete volume** due to their hollow shape and the ability to be partially grouted results in less material use.



These benefits position concrete masonry as a key material for architects aiming to meet both low embodied carbon and resiliency goals.

# FAST, DEEP & PERMANENT CARBON SEQUESTRATION

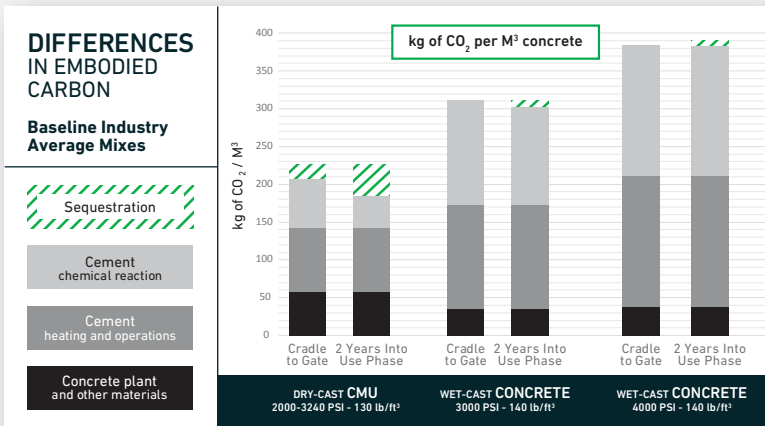


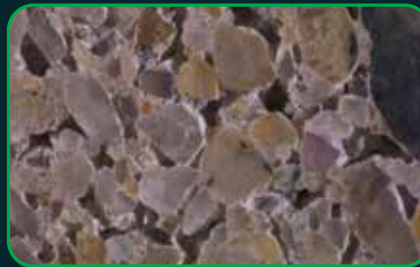
Image courtesy of CMHA

- **“21% CO<sub>2</sub> potential sequestered in 28 days”**
  - 8% of total CMU production emissions
- **“49% CO<sub>2</sub> potential sequestered at 2 years”**
  - 18% of total emissions
- **Carbon sequestration initiates immediately after production and continues into the use phase of the building. These benefits are not reliant on end-of-life processing.**

## KEY DISTINCTIONS THAT INFLUENCE CARBON IMPACT

- **Mix Design:** CMU uses less cement and water (zero-slump, vibrated, compacted).
- **Structure:** Interconnected voids in the concrete itself enable air to penetrate the concrete deeper and faster, enabling more sequestration.
- **Result:** Significantly faster sequestration.

### Dry-Cast CMU



Dry-cast concrete has an open, interconnected void structure that lets air penetrate deeper, accelerating carbon sequestration throughout the unit.

### Wet-Cast Concrete



Conversely, wet-cast concrete has a more closed void structure, so carbon sequestration occurs more slowly and primarily at the surface.

Photos courtesy of ACM Chemistries

CARBON SEQUESTRATION	28 DAYS	2 YEARS	20-25 YEAR PROJECTION
<b>Total Sequestration</b>	<b>18</b> kg CO <sub>2</sub>	<b>41</b> kg CO <sub>2</sub>	<b>59</b> kg CO <sub>2</sub>
<b>% of potential</b> (emissions associated with calcination only)	<b>21%</b>	<b>49%</b>	<b>70%</b>
<b>% of total associated emissions</b> (emissions associated with the whole process of CMU manufacturing)	<b>8%</b>	<b>18%</b>	<b>26%</b>

The 2025 industry average EPD includes 28-day carbon sequestration in the cradle-to-gate Global Warming Potential numbers and 2-year sequestration rates that designers can use for use-phase Whole Building Life Cycle Assessment (WBLCA) carbon accounting.

CMU uniquely combines low embodied carbon, rapid carbon sequestration and resilient performance, without compromising design flexibility.

**RESILIENT CONSTRUCTION DOESN'T HAVE TO MEAN HIGH EMBODIED CARBON. WITH CMU, YOU GET BOTH: LOW EMBODIED CARBON AND BUILT-IN RESILIENCE.**

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