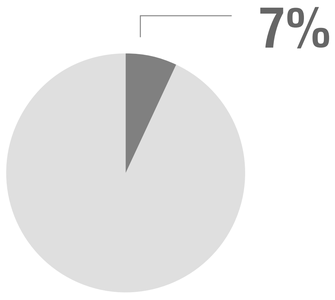
BUILDING A LOW-CARBON FUTURE WITH

LOW-CARBON CEMENT

CLIMATE ACTION RESERVE

WHY LOW-CARBON CEMENT IS NEEDED

Cement production accounts for approximately 7% of all global carbon dioxide (CO_2) emissions.



In 2021, U.S. cement plants emitted roughly 69 million tonnes of carbon dioxide emissions, which according to the EPA Greenhouse Gas Equivalencies Calculator is equivalent to:

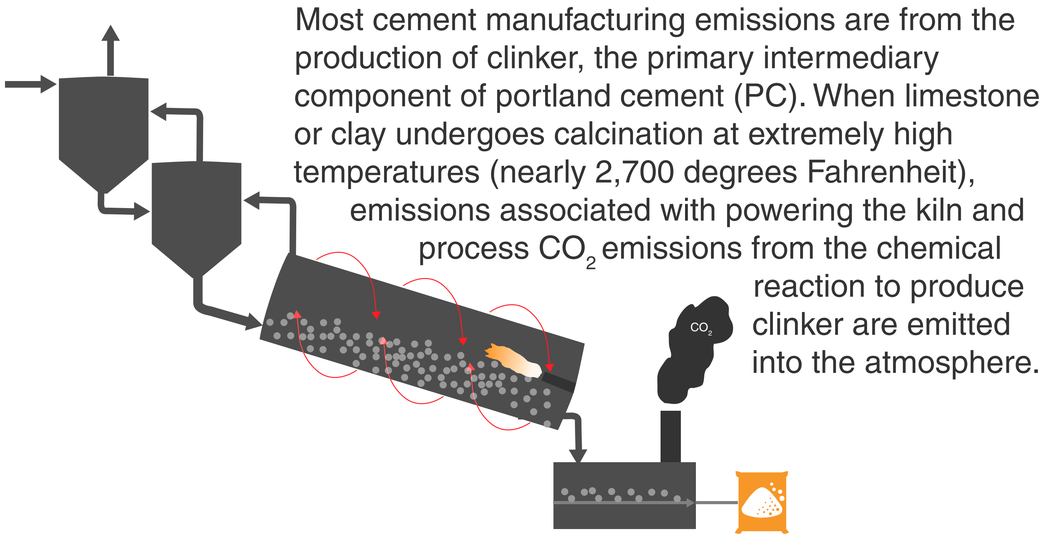
15 MILLION
gasoline-powered passenger vehicles driven for one year

- or -

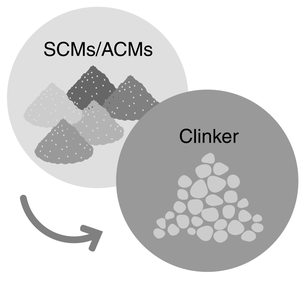
72 BILLION
pounds of coal burned

- or -

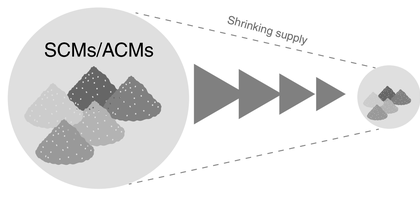
18.5
coal-fired power plants in one year



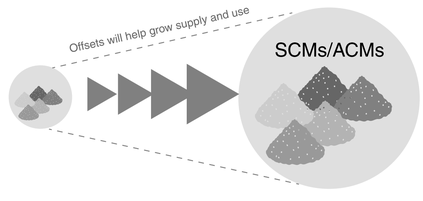
Most cement manufacturing emissions are from the production of clinker, the primary intermediary component of portland cement (PC). When limestone or clay undergoes calcination at extremely high temperatures (nearly 2,700 degrees Fahrenheit), emissions associated with powering the kiln and process CO_2 emissions from the chemical reaction to produce clinker are emitted into the atmosphere.



Byproduct, manufactured or naturally derived supplementary cementitious materials (SCMs), or alternative cementitious materials (ACMs) can potentially replace clinker in cement production and lower overall emissions.



But, supply of traditional SCMs are limited and shrinking, and insufficient to meet growing demand (a good thing - since traditional sources are fresh byproduct from emission-intensive industries like coal-fired power plants and steel manufacturing).

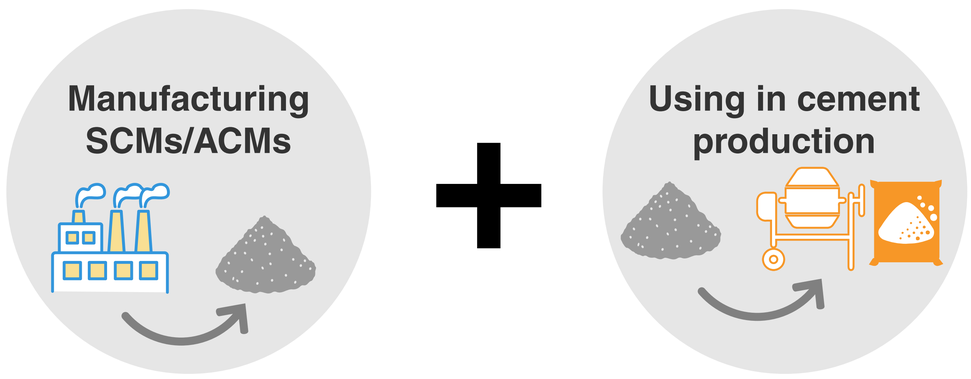


To harvest disposed of byproducts and deploy new low-carbon SCMs/ACMs at scale will require significant economic investment. Financial incentives through offsets will help increase production and use of new lower-emission SCMs/ACMs.

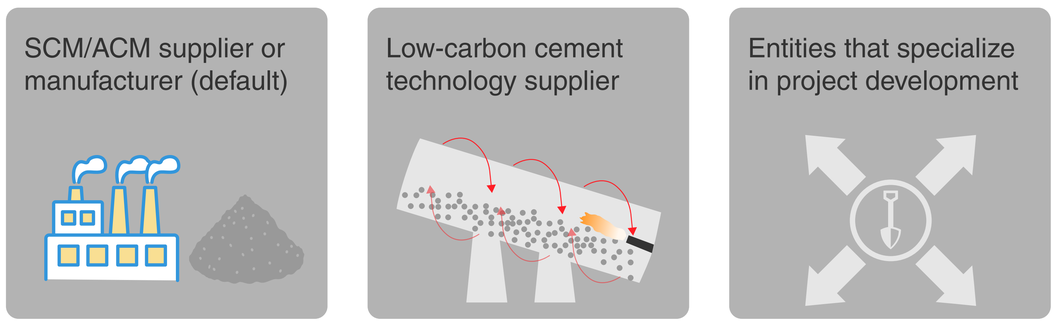
HOW THE U.S. LOW-CARBON CEMENT PROTOCOL SUPPORTS GHG REDUCTIONS

Under the U.S. Low-Carbon Cement Protocol, the Climate Action Reserve issues carbon credits for emissions reductions achieved through:

1. The manufacturing of SCMs or ACMs that can replace PC in ready-mix or concrete products; and
2. Usage in production of low-carbon cement to avoid GHG emissions from PC production. Credits are issued upon reasonable assurance PC was displaced with verifiable mechanisms.



The project developer by default is the SCM/ACM supplier or manufacturer, but a project developer may also be low-carbon cement technology suppliers, and/or entities that specialize in project development.

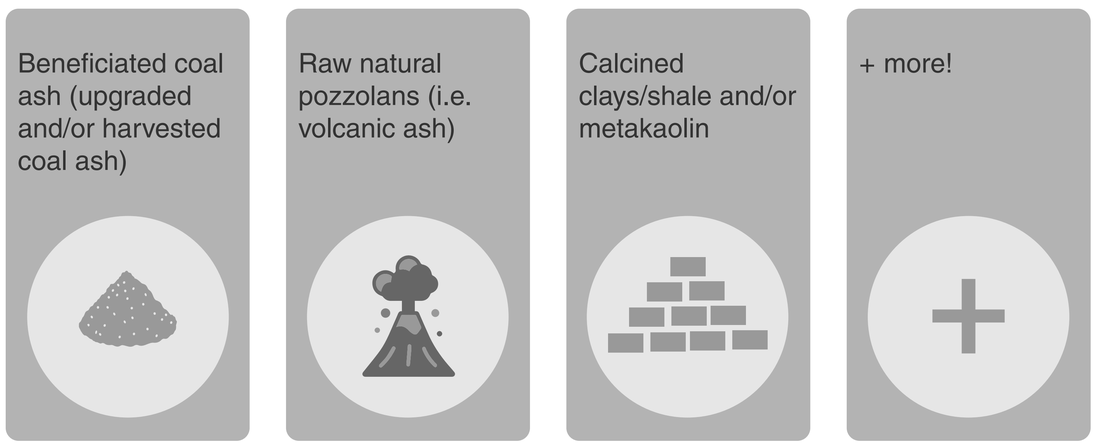


Eligible products have a usage rate in concrete at near zero (first-of-its-kind) or less than 5 percent

Products are required to meet quality standards, including applicable ASTM specifications

Major co-benefit: protocol targets harvesting and reclamation of coal ash disposed across the country

Examples of eligible SCMs/ACMs include:



www.climateactionreserve.org