

**DOCKETED**

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# IEPR Commissioner Workshop to Accelerate Industrial Decarbonization CA Energy Commission

August 3, 2021

Steve Coppinger – VP Corporate Services  
CalPortland Company

# CalPortland - Company Background

- Founded in 1891 in California
- Manufacturer of cement, concrete, asphalt and aggregates in the western US & Canada
- 3300 employees – 150 facilities – 3 cement plants
- Received EPA's ENERGY STAR Partner of the Year Award for Energy Management for 17 straight years



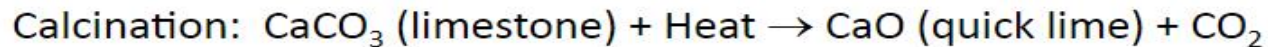
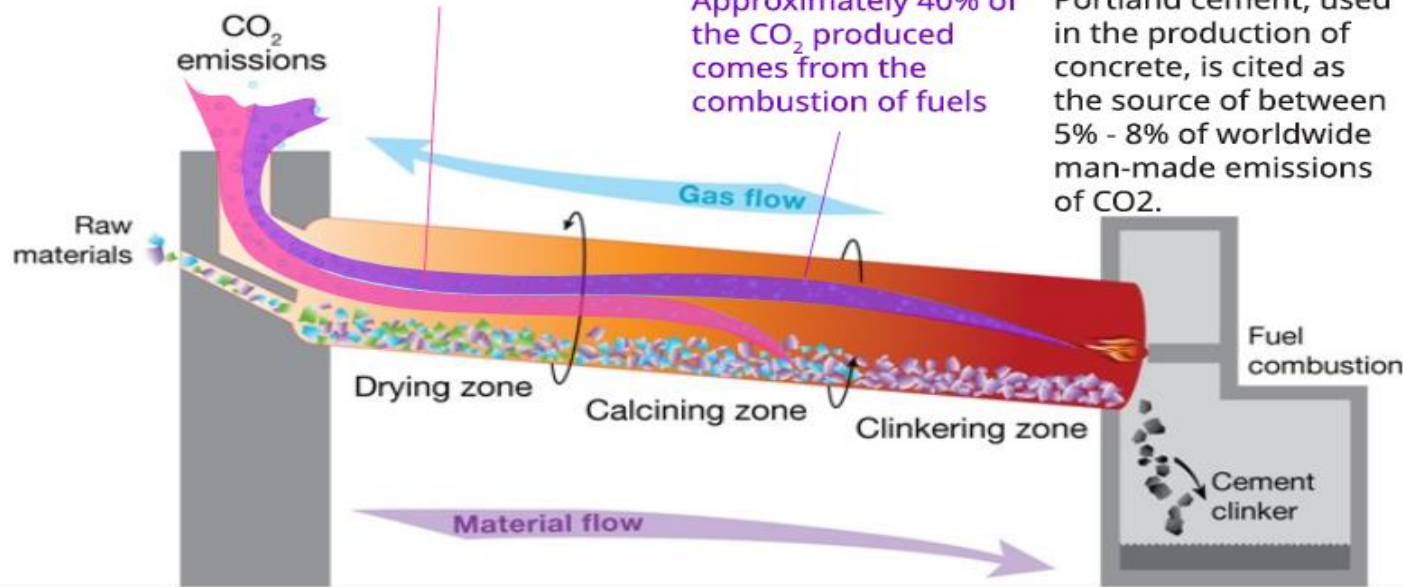


# Cement Process

Approximately 60% of the CO<sub>2</sub> produced comes from the calcination of limestone

Approximately 40% of the CO<sub>2</sub> produced comes from the combustion of fuels

Portland cement, used in the production of concrete, is cited as the source of between 5% - 8% of worldwide man-made emissions of CO<sub>2</sub>.



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- Concrete is the most widely used material in the world next to water
- Nearly all construction projects use some form of concrete
- Cement is the material that gives concrete its strength and hardness
- The cement process is very energy intensive – kiln fuel & electricity
- 60% of CO<sub>2</sub> emissions are due to calcination of limestone
- Concrete absorbs CO<sub>2</sub> during its lifecycle - carbonation

# CalPortland's Decarbonization Actions

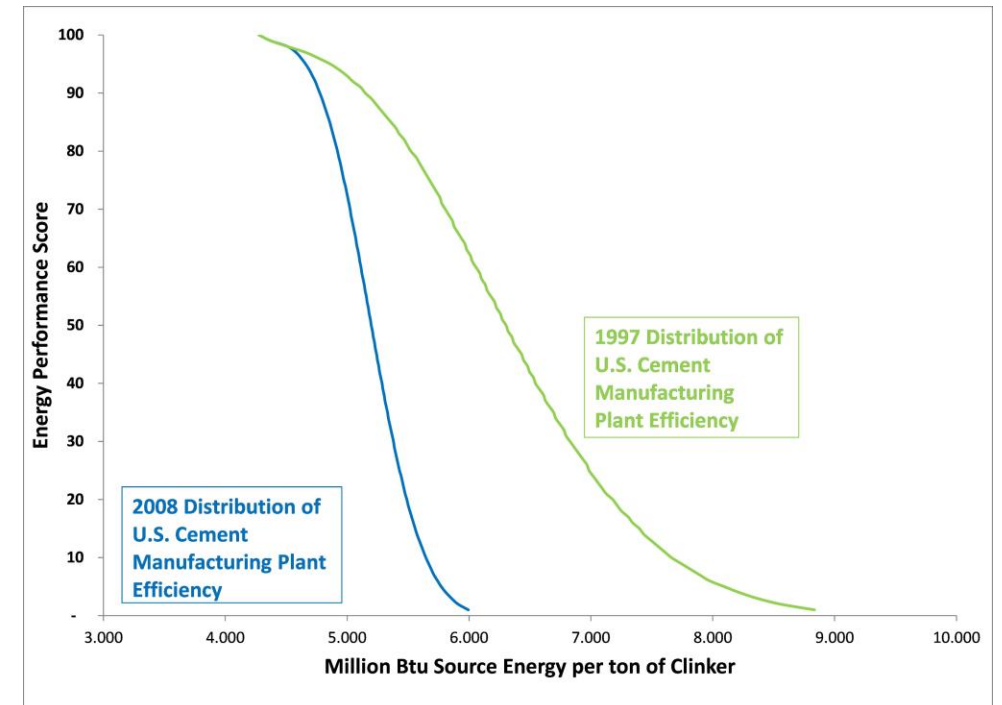


- Energy management & efficiency
  - Process improvements
- Mobile fleet emission reductions
  - CNG/RNG fleet, hybrid trucks
- On-site renewable energy
  - 24 MWatts wind turbines at Mojave, CA cement plant
- Sustainable products
  - Advancement, Portland Limestone Cements, Pozzolan
- Carbon capture & utilization feasibility study underway
- Investigating stack scrubbing and CHP
- Alternative fuels & raw materials
  - Only get credit for biogenic fuel portion unlike most of the world
- Recycling & reclamation

# Cement Industry De-Carbonization Initiatives



- Industry-wide development of “Roadmap to Net Zero by 2050”
  - PCA (Portland Cement Association)
- CA Cement Industry – “Carbon Neutrality Plan 2045”
  - CNCA (California Nevada Cement Association)
- Active participation in EPA’s ENERGY STAR program
  - industry-wide energy benchmarking performance indicator & plant certifications
- DOE grants for CCUS and energy efficiency pilot projects
- Alternative fuels & raw materials
- Portland limestone cements



# Nine Levers - CA Cement Industry Carbon Neutrality Plan - 2045

Levers	Timing <i>If unlocked, time to deploy</i>	Impact <i>GHG abatement potential</i>	Summary of Key Barriers
<b>Process Emissions: 4 Levers</b>			
Portland Limestone Cement	Near-Term	~10%	Caltrans acceptance necessary (anticipated in October 2021).
Carbon Capture Use & Storage	Long-Term	>50%	Extremely capital-intensive, require significant public sector support. Gaps in existing incentives. Time-intensive & contingent permitting.
Alt Raw Materials	Mid-Term	10%-50%	Constrained (and tightening) supply. Testing & investment in natural pozzolans. Public acceptance necessary.
Alt Cements & Clinkers	Long-Term	<10%	Limited supply and specialized production. Not commercially viable or sufficiently tested for large-scale construction. Scarcity of certain materials. Limited substitution potential.
<b>Combustion Emissions &amp; Fuel Switching: 3 Levers</b>			
Natural Gas	Near-Term	10-50% <i>(total additive potential)</i>	Not frequently cost-competitive. State-wide storage & supply constraints.
Waste-Derived Fuels	Near-Term		Narrow definition of recycling. Burdensome permitting and public acceptance challenges. Classification of engineered fuels constrains availability and creates costs. Competition w/ landfilling.
Biomass-Derived Fuels	Near-Term		Lack of coordinated & concerted support. Regulatory ambiguity. Burdensome permitting. Limited supply due to insufficient collection and distribution network.
<b>Electricity Generation: 2 Levers</b>			
WHR / Cogeneration	Mid-Term	<10%	Financial penalty from departing load charges. Cumbersome permitting with marginal returns. High cost per installed KW.
Renewable Electricity	Mid-Term	<10%	Financial penalty from departing load charges. Limited incentives from rate schedules & electricity programs. High costs (including fees) & limited return.