| DOCKETED | |
|---|---|
| **Docket Number:** | 21-IEPR-06 |
| **Project Title:** | Building Decarbonization and Energy Efficiency |
| **TN #:** | 239144 |
| **Document Title:** | Presentation - CalPortland for the IEPR Commissioner Workshop to Accelerate Industrial Decarbonization CA Energy Commission |
| **Description:** | S2.3C Steve Coppinger, CalPortland |
| **Filer:** | Raquel Kravitz |
| **Organization:** | CalPortland |
| **Submitter Role:** | Public |
| **Submission Date:** | 8/2/2021 11:32:24 AM |
| **Docketed Date:** | 8/2/2021 |

# IEPR Commissioner Workshop to Accelerate Industrial Decarbonization CA Energy Commission

August 3, 2021

Steve Coppinger – VP Corporate Services
CalPortland Company

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# 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


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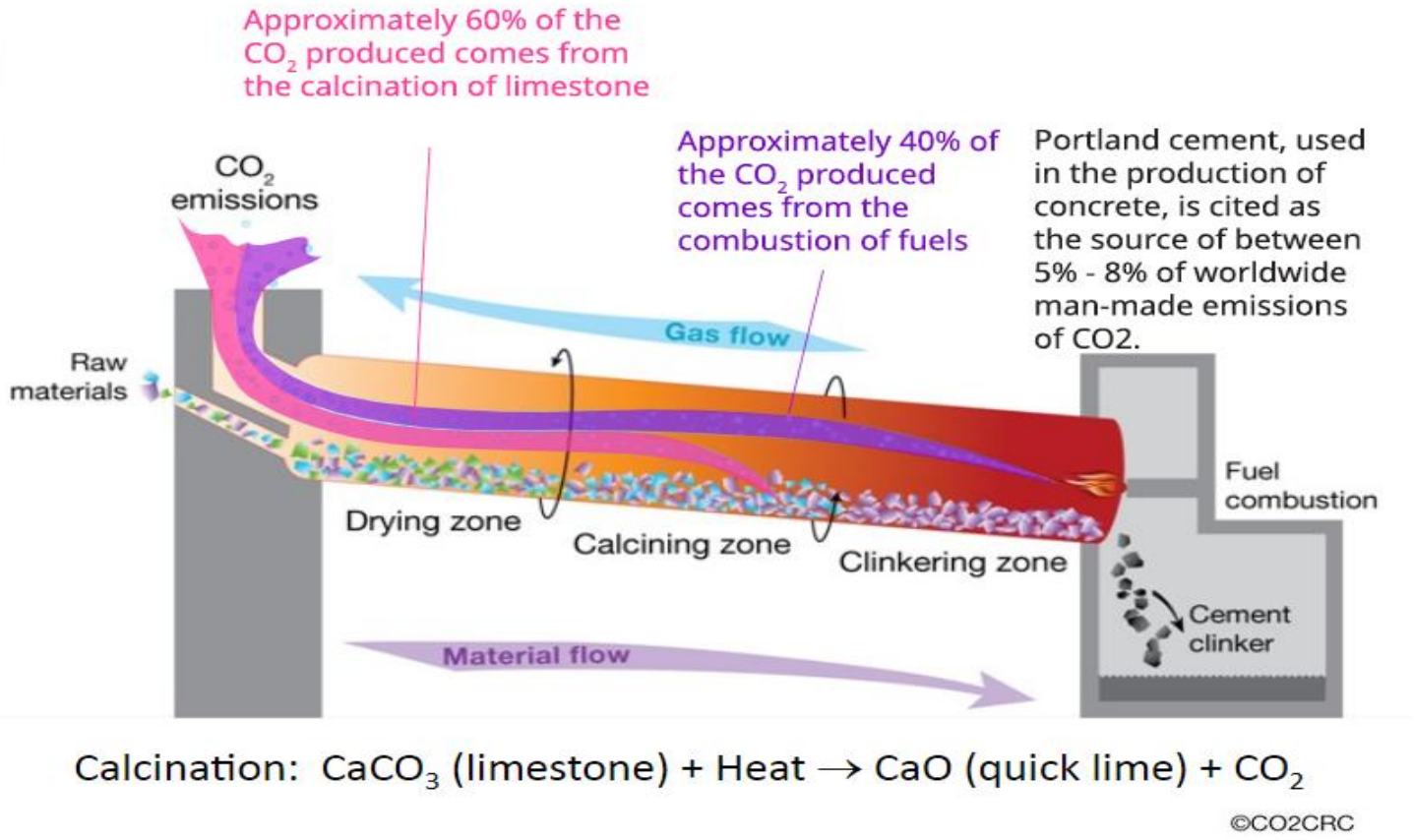
# Cement Process




- 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 CO2 emissions are due to calcination of limestone
- Concrete absorbs CO2 during its lifecycle - carbonation

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# 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

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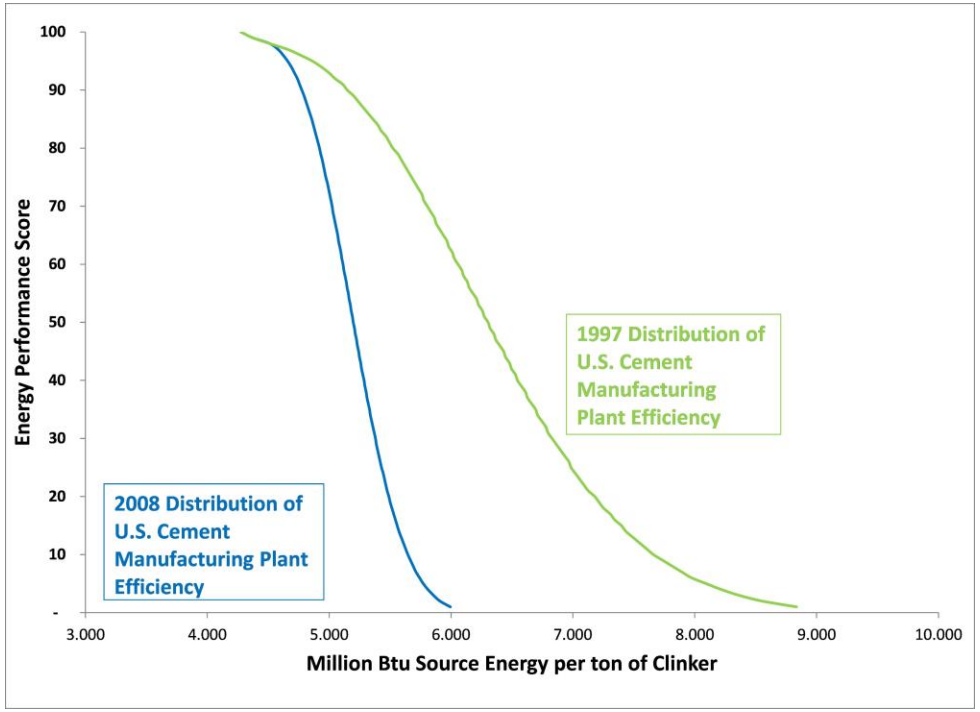
# Cement Industry De-Carbonization Initiatives

- 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<br>*If unlocked, time to deploy* | Impact<br>*GHG abatement potential* | Summary of Key Barriers |
|---|---|---|---|
| **Process Emissions: 4 Levers** | | | |
| 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. |
| **Combustion Emissions & Fuel Switching: 3 Levers** | | | |
| Natural Gas | Near-Term | 10-50%<br>*(total additive potential)* | 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. |
| **Electricity Generation: 2 Levers** | | | |
| 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. |