



NET-ZERO INDUSTRIES

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Project Title	The Fortera Redding ReCarb® Plant, Fortera
Industry Partner	Fortera
Industry Sector	Cement & Lime
Technology Pathway (Primary)	Alternative Materials and More Efficient Processes
NIM Pillar	Technology Demonstration
Source	NIM Awards 2023
Description	<p>Fortera is a materials science, engineering and technology company focused on the development of low to zero CO₂ cement. Inspired by nature, Fortera's patented ReCarb(R) process generates cement with 70% less CO₂ from its proprietary chemistry, and when combined with Green Energy becomes zero CO₂ cement.</p> <p>Fortera's flagship product, ReAct(TM) is a customizable low CO₂ cementitious product solution tailored to cement producers' business needs and marketplace requirements and works with current standards, regulations, and applications as a standalone, mixed, or supplemental cementitious material.</p> <p>The new Fortera Redding ReCarb(R) Plant in Redding, CA will intercept the CO₂ emissions from the existing CalPortland kiln and convert them into a new kind of cementitious material, the plant will be mechanically ready Q4 2023 and ReAct(TM) product will be available Q1 2024.</p>
Innovations Employed	<p>Fortera has designed a process that enables the conversion of calcite to a stable form of vaterite, which then converts to aragonite in use. It remains as aragonite in use and does not re-convert to the less stable form.</p> <p>Fortera's process starts with the conversion of limestone (CaCO₃) to lime (CaO) at ~950C. The resulting lime - up to 2.5cm in diameter - is then dissolved into a proprietary solvent.</p> <p>The CO₂ from the decarbonisation step is then fed back to the solution in what is termed the ReCarb(R) process. This gives rise to a precipitated calcium carbonate.</p>
Dimension of Novelty	Company & Country It was new to Company, Country and International
Innovation Collaboration	In-house Yes Cooperation with scientific institutions No External Partners No
Intellectual Properties	Methods and Compositions Using Calcium Carbonate, Patent No. 7,922,809, Granted April 12, 2011 ReCarb(R) Process ReAct(TM) Product



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Project Title	The Fortera Redding ReCarb® Plant, Fortera ReSource(TM) Technical Services
IP Links	US Patent US20110067600 – Methods and Compositions Using Calcium Carbonate
Timetable & Progress	System complete and qualified. First of a kind commercial system (TRL 8) The Fortera Redding ReCarb(R) Plant in Redding, CA will be mechanically ready Q4 2023. ReAct(TM) product will be available Q1 2024. Started construction on Fortera Redding ReCarb(R) plant in 2021.
Financing (Public/Private)	Funding Public – No
Finance Links	
Project Phase TRL	TRL 8
Problems to be Solved and Risks to be Managed	Cement is the most widely-used substance on Earth after water. When mixed with water, it forms concrete that becomes the backbone of buildings, roads, dams and bridges. The Problem: The cement industry is responsible for about 8% of planet-warming carbon dioxide emissions. If the cement industry were a country, it would be the third-largest emitter of carbon dioxide in the world, after the U.S. and China. Problem to be solved is to decrease the carbon dioxide output in cement production. The Risks: As cement production increases globally due to the very low cost- between \$125- \$130 a ton, the CO2 impact on the planet will continue to rise. Fortera's solution partners with cement producers creating a green cement solution – at the plant level.
Preliminary or Final Results Achieved	The Fortera Redding ReCarb(R) Plant in Redding, CA will be mechanically ready Q4 2023. ReAct(TM) product will be available Q1 2024.
CO2 Emissions Reduction Potential – Implementation and Future Market	Fortera's patented ReCarb(R) process generates cement with 70% less CO2 from its proprietary chemistry, and when combined with Green Energy becomes zero CO2 cement.
Market Positioning	The Fortera Redding ReCarb(R) Plant will be one of the largest carbon mineralization plants in the world. This first plant will produce 15,000 tons a year and is considered "small scale". Fortera's project pipeline include "large scale" plants producing 300,000 tons a year.
Project Location	USA
Project & Technology Links	Fortera Redding ReCarb(R) Plant PDF Fortera Cement Producers Brochure Fortera 3rd Party Data and Additional Metrics PDF
Technology Links	Fortera Redding ReCarb(R) Plant Fortera Cement Producers Brochure