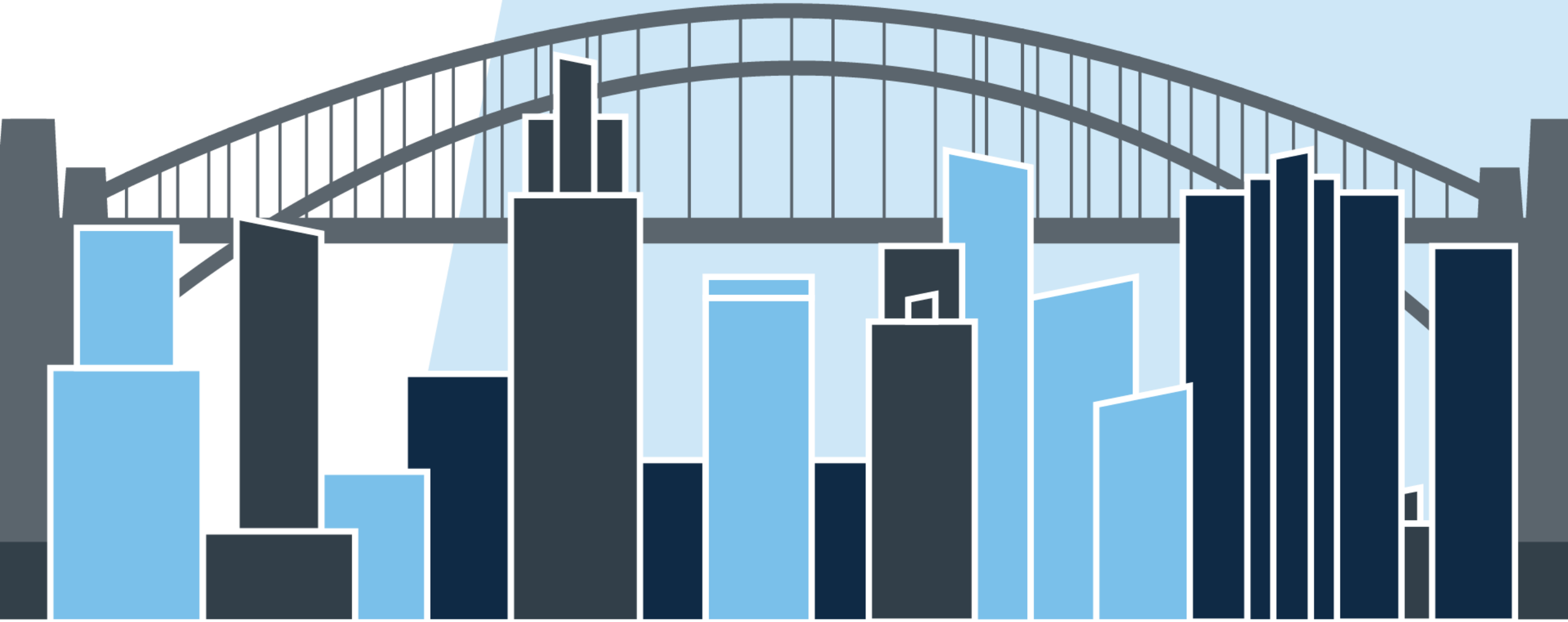
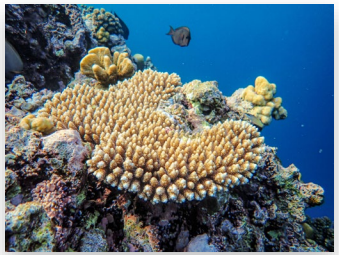
fortera

February 27, 2025



Timeline Milestones



2007

New Cement
Discovery
Inspired by Nature

2008

First Commercial Pour

2010

Redding Plant
Partnership Signed

2021

Fortera Redding ReCarb®
Commercial Plant
Development

2014

First Pilot Plant
Moss Landing, CA

2022

First Commercial
Product Airock®

2023

Groundbreaking
Redding, CA

2024

Commercial Grade
Product to Market

ReAct™

fortera

Cement is the Glue in Concrete

Concrete Ingredients

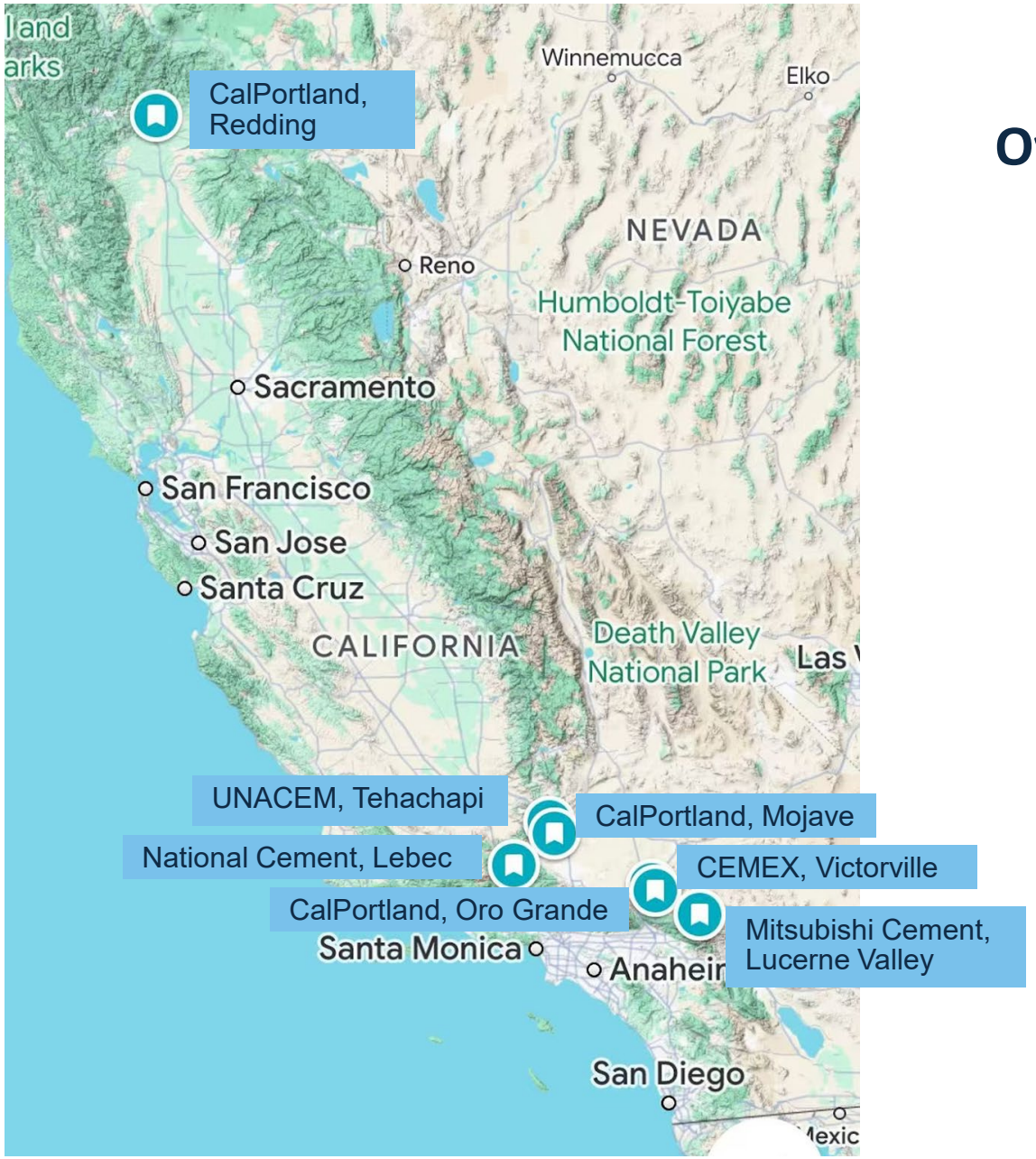
Cement
15%

Sand
25%

Aggregate
40%

Water
20%

Although cement only makes up 15% of concrete,
it accounts for 88% of the CO_2 emissions in concrete



Overview of the California cement industry

- California has seven operating cement plants, concentrated in the LA Area
- Cement production is expected to grow by 20% in California from 2020 to 2030 (*Global Efficiency Intelligence*)
- California is the home of several low-carbon cement innovators
- California has several policies to decarbonize the concrete and cement sector
  - Net-zero cement sector by 2045; 40% cement sector emission reduction compared to 2019 by 2035 (SB 596)
  - 40% emission reduction in building material embodied carbon by 2035 (AB 2446)
  - Cap-and-trade policy covers California cement plants
  - Relevant federal level policies also apply to California cement plants, such as the Credit for Carbon Oxide Sequestration Tax Credit (45Q) which offers $85 per tonne of CO2 captured and permanently stored

Source: RMI Analysis

A Partnership that Keeps Cement Local and Affordable

Stay Local:
Keep Manufacturing and Infrastructure Jobs in CA

+

Provide a Solution:
CA HB 596 GHG Mandate / SB 905

+

Increase Manufacturing:
Cement Demand is Increasing but Manufacturing is Declining

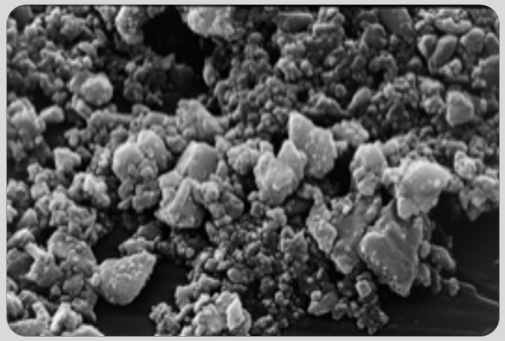
=

Keep Cement Affordable:
Increase Local Manufacturing with a Low CO_2 Solution

Leveraging Existing Cement Plants and Quarries

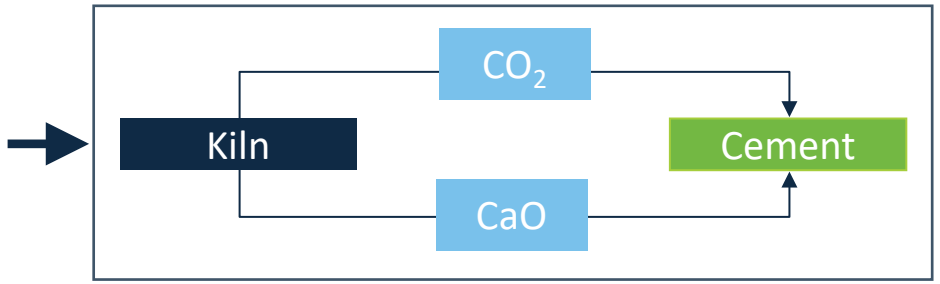
1 ton of $CaCO_3$

Mined Limestone



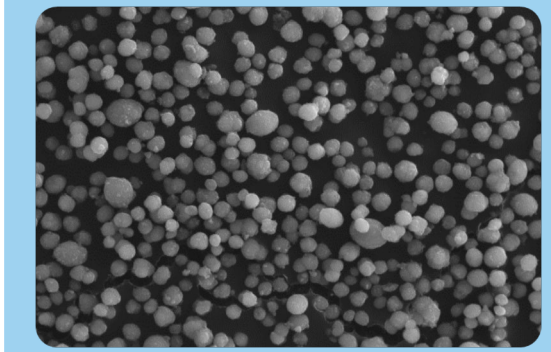
- × No binding ability
- × Inconsistent size and shape
- × Inert filler

ReCarb®



ReAct™

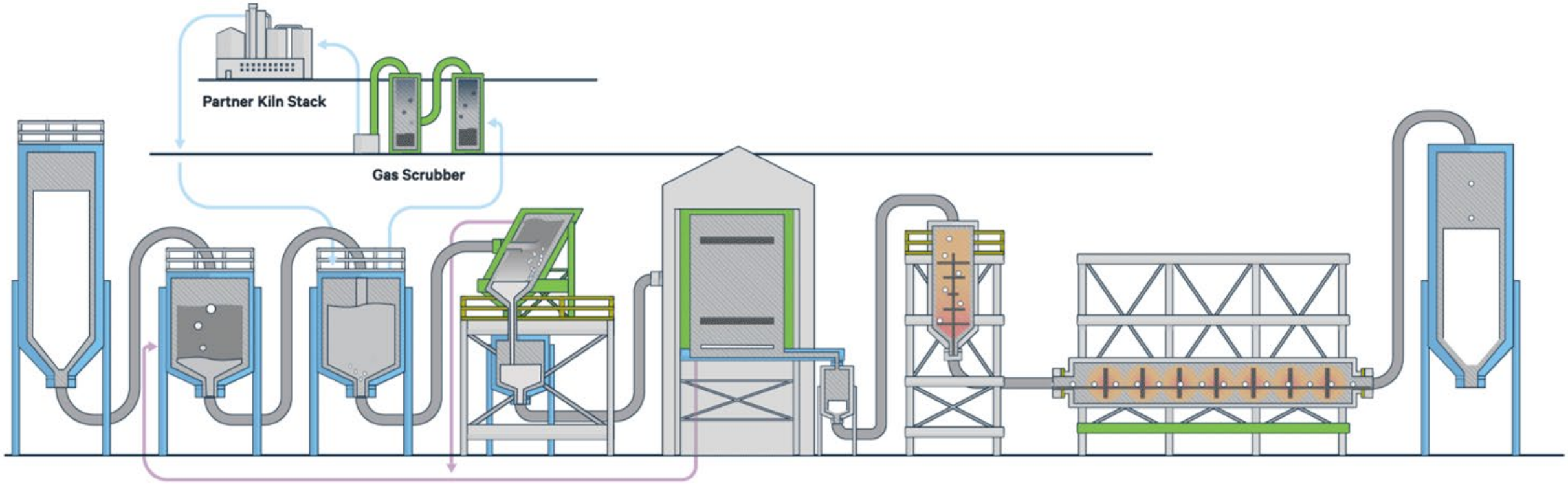
1 ton of Cement



- ✓ Water activated binding
- ✓ Spherical particles
- ✓ Reactive mineral

Fortera turns each ton of feedstock into a ton of cement by remineralization of CO_2

fortera



1 Raw Lime Silo

2 Dissolution Reactor

3 CO_2 Absorber

4 Clarifier

5 Filter Press

6 Dryer

7 Thermal Polishing

8 ReAct™ Product Silo

1. Raw Lime Silo

- Raw lime feedstock is stored

2. Dissolution Reactor

- Lime is dissolved
- Use of proprietary solvent

3. Absorber

- Carbonation process
- Precipitation formed
- Reactive Calcium Carbonate (ReAct™) produced

4. Clarifier

- Slurry pumped in tangentially
- Solids separate through gravity

5. Filter Press

- Mechanical plates press out liquid
- Solid cake is separated and ejected at the bottom

6. Dryer

- Product cake is broken up with rotating blades
- Hot gas dries product into powder

7. Thermal Polishing

- Final heat step to remove impurities

8. Product Silo

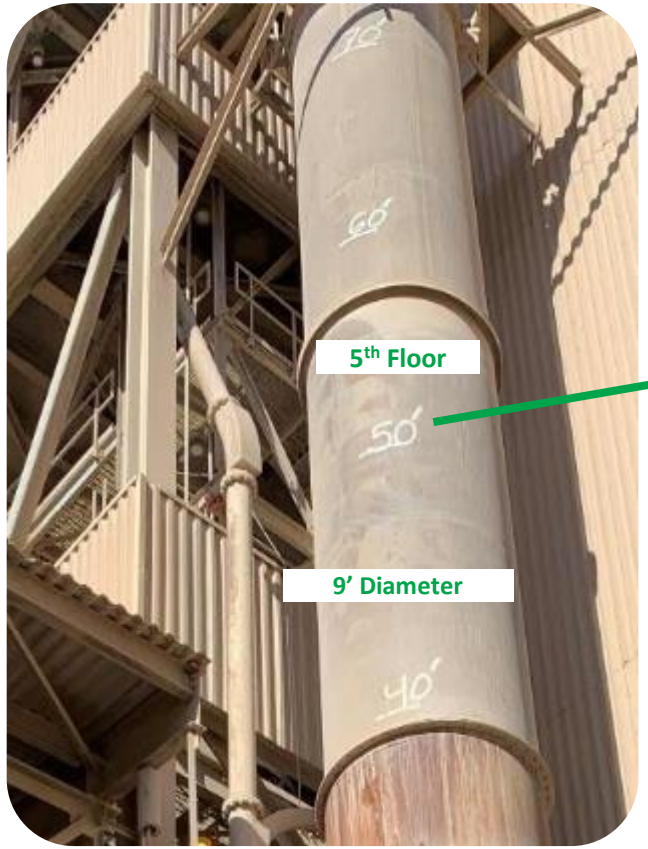
- Final product is stored in preparation for shipment

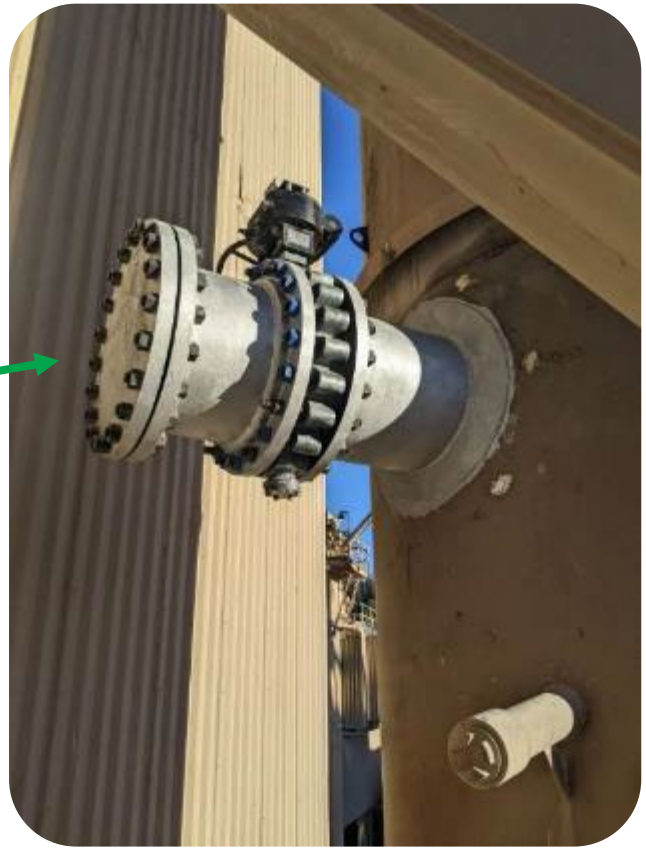
ReCarb Process

Fortera Redding Plant

fortera

CO_2 Comes From the Cement Kiln Emissions





- Tie-in directly to the kiln emissions
- No flue gas separation, filtration, or compression needed
- Industrial grade CO_2 is mineralized into ReAct™ in its raw form

Fortera is a true industrial grade CO_2 mineralization process that pulls directly from the kiln emissions and scrubs the flue gas as it is using our proprietary solvent chemistry.

fortera

Over 10 Years of Real-World Testing and Use

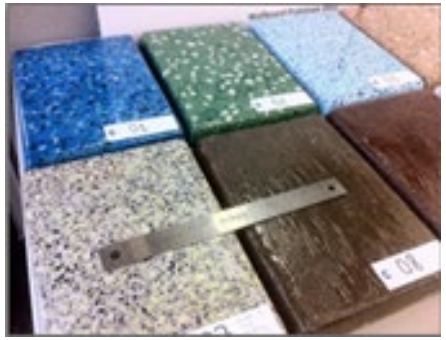
ReAct™









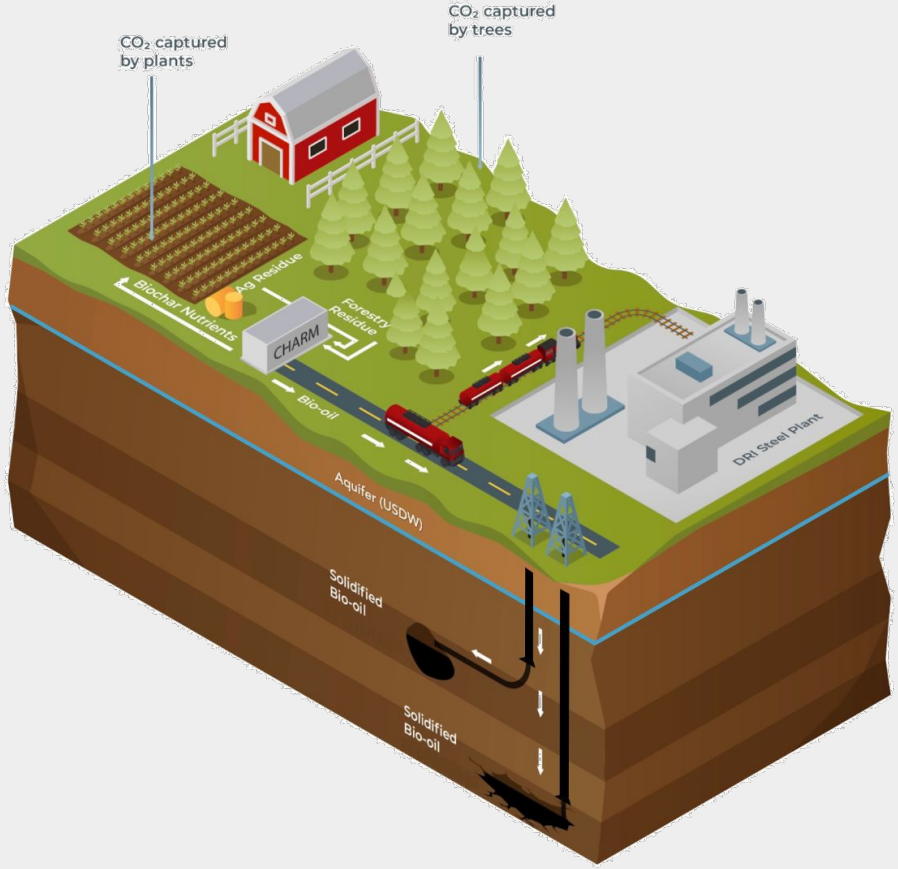
ReAct chemistry is compatible with additives, fillers, and fibers.

fortera

Charm Industrial

Putting Oil Back Underground

Charm Industrial processes biomass residues for permanent storage underground

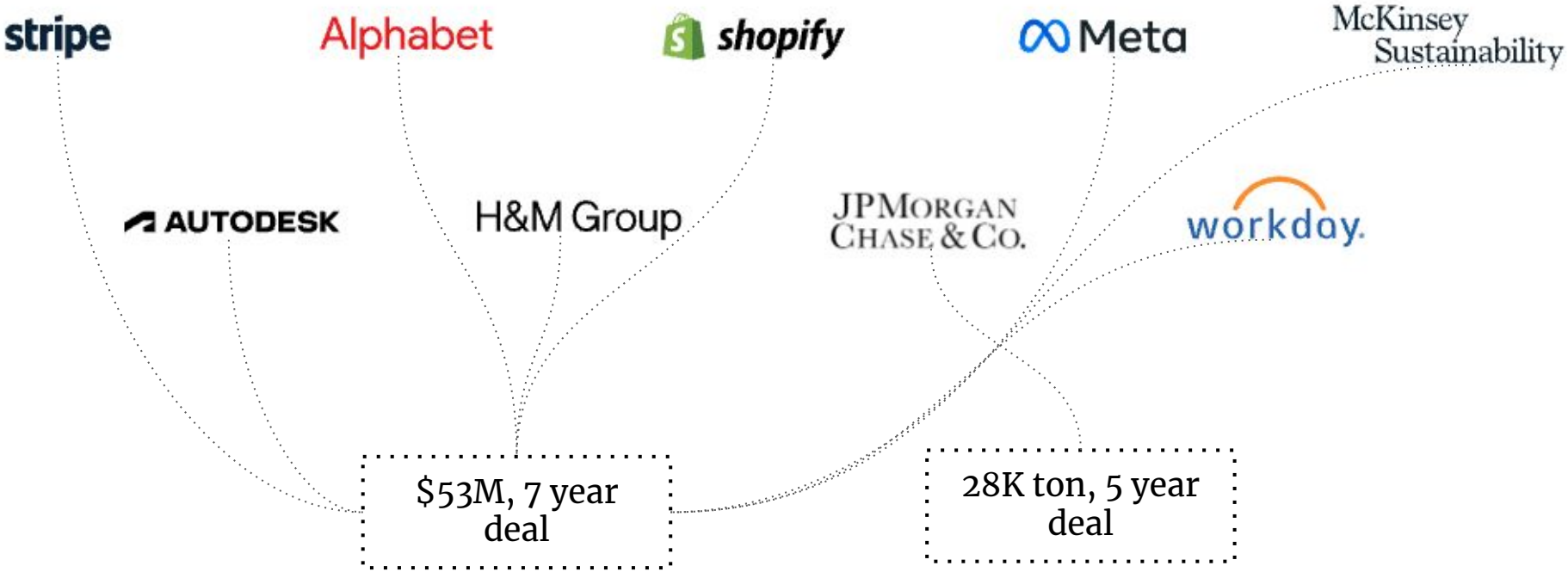


CHARM INDUSTRIAL

Charm is currently operating multiple mobile pyrolyzers

CHARM INDUSTRIAL

Select Charm Buyers



CHARM

Investment in Agricultural and Rural Communities

Job Creation

Wildfire Mitigation

Fixing Abandoned Wells

Improving Air Quality

Catastrophic Wildfire Mitigation: Inyo National Forest

CHARM INDUSTRIAL

The recent release of a methodology to govern Charm Industrial's carbon credits sets a high water mark for scientific and financial integrity.

Charm's credits will be...

- measured against a protocol Charm did not fund.
- housed on a registry with a new payment model that will eliminate over-crediting, by charging a flat fee for its services, based on tons to be inspected, not tons verified and registered.

Bio-oil Geological Storage

This protocol is specific to CO_2 sequestration via the conversion of biomass to bio-oil and injection into natural or engineered subsurface features and geologic formations.

science.isometric.com

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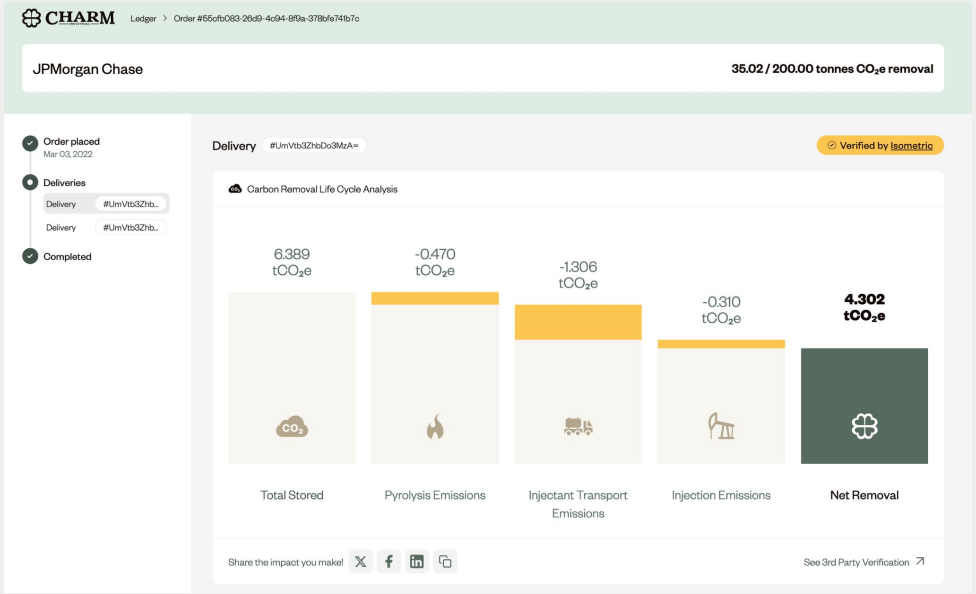


Charm removals independently verified and managed on the Isometric registry

www.charmindustrial.com/ledger

CHARM INDUSTRIAL

California needs Carbon Removal to reach its climate goals

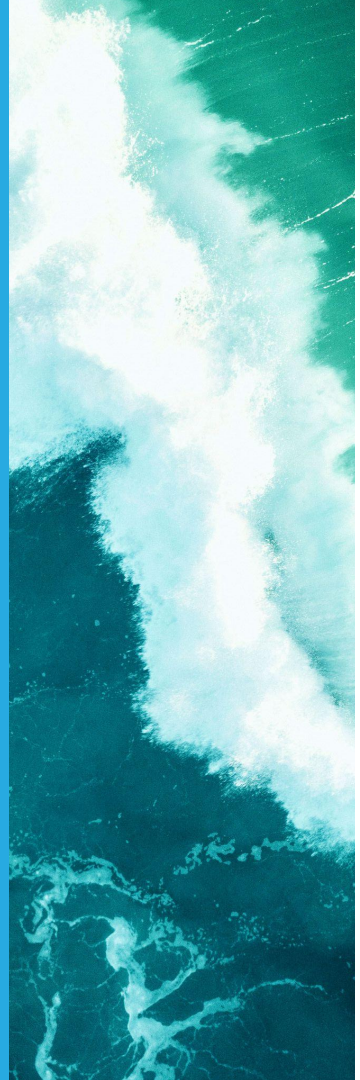
- Carbon Removal companies can create jobs and economic growth in California
- Regulatory frameworks help companies secure investment and financing
- Carbon removal technologies are ready to be responsibly deployed in California, and can bring many environmental, public health, and economic benefits to Californians


ebb carbon
CARB
February 2025

We are Ebb Carbon

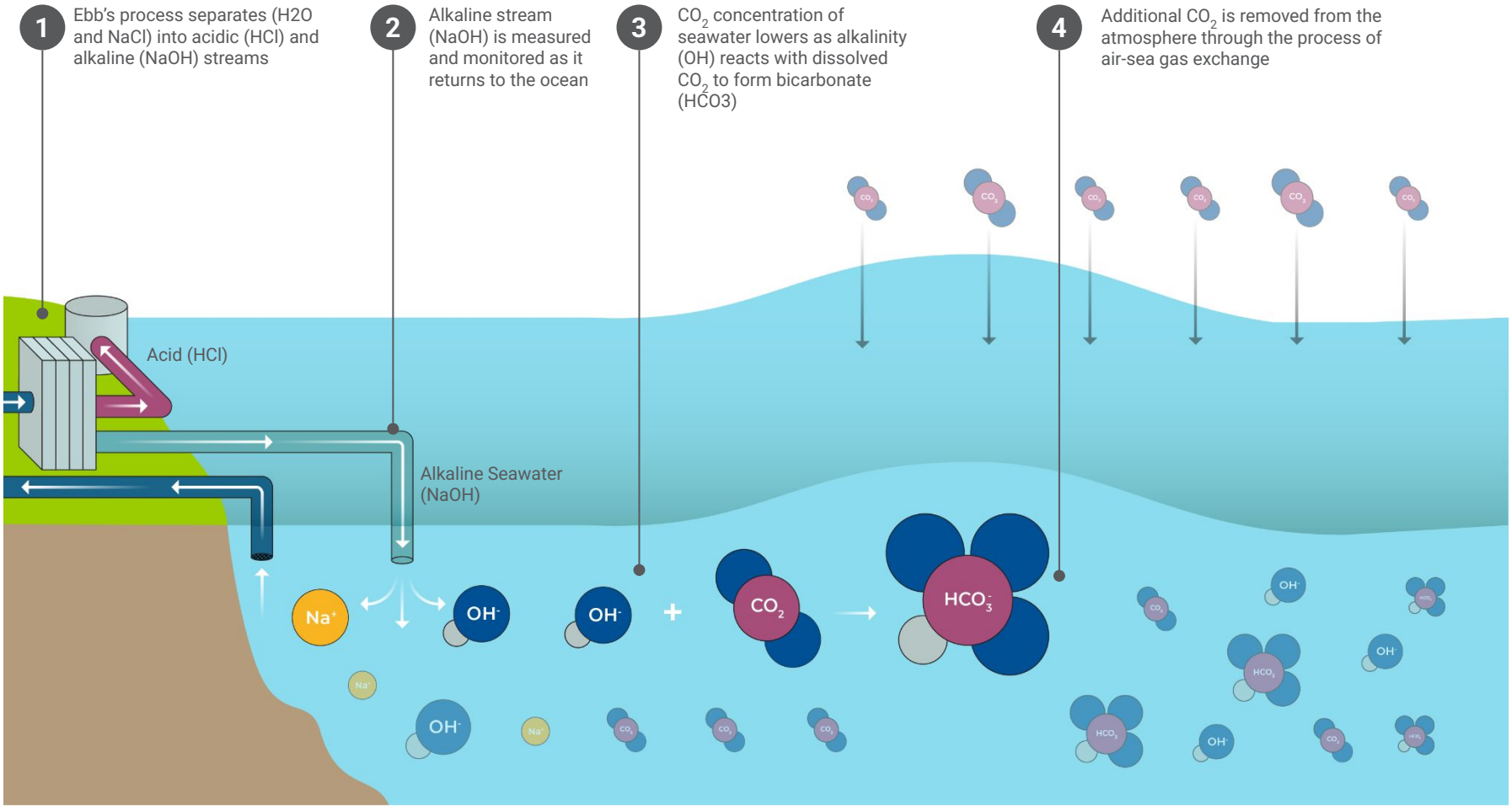
Ebb Carbon is a California-based marine carbon dioxide removal (mCDR) company.

Our mission is to remove billions of tons of legacy CO_2 pollution while addressing coastal acidification.

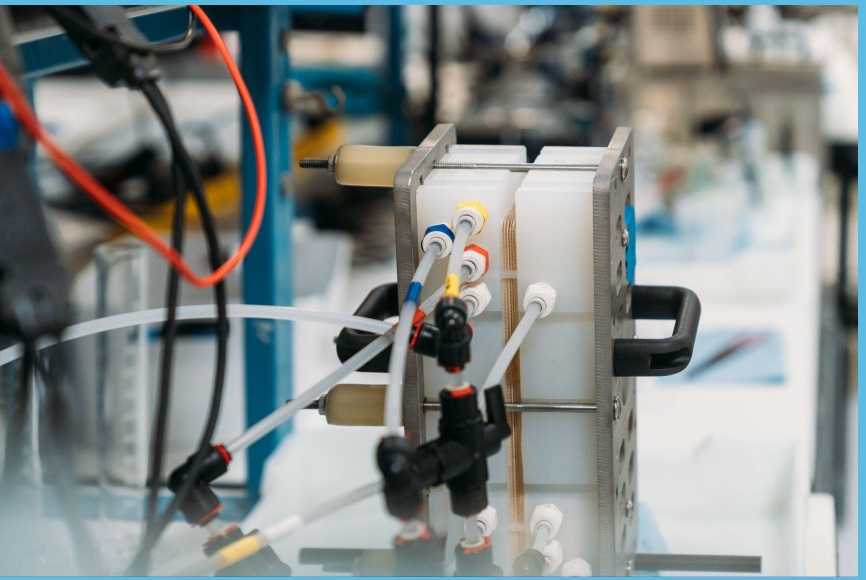


Nature’s engine for scalable carbon removal

- We need to remove 5 - 10 gigatonnes of CO_2 to mitigate worst impacts of climate change (IPCC)
- The ocean naturally absorbs gigatonnes of CO_2 through air-sea gas exchange.
- Removing acid from seawater enables the ocean to absorb more CO_2 while reducing the acidity of seawater
- This process mimics the inorganic carbon cycle - providing durable CO_2 storage for 10,000+ years


1
Ebb's process separates (H2O and NaCl) into acidic (HCl) and alkaline (NaOH) streams
2
Alkaline stream (NaOH) is measured and monitored as it returns to the ocean
3
CO_2 concentration of seawater lowers as alkalinity (OH) reacts with dissolved CO_2 to form bicarbonate (HCO3)
4
Additional CO_2 is removed from the atmosphere through the process of air-sea gas exchange
Acid (HCl)
Alkaline Seawater (NaOH)
Na^+
OH^-
CO_2
HCO_3^-

Electrochemical technology

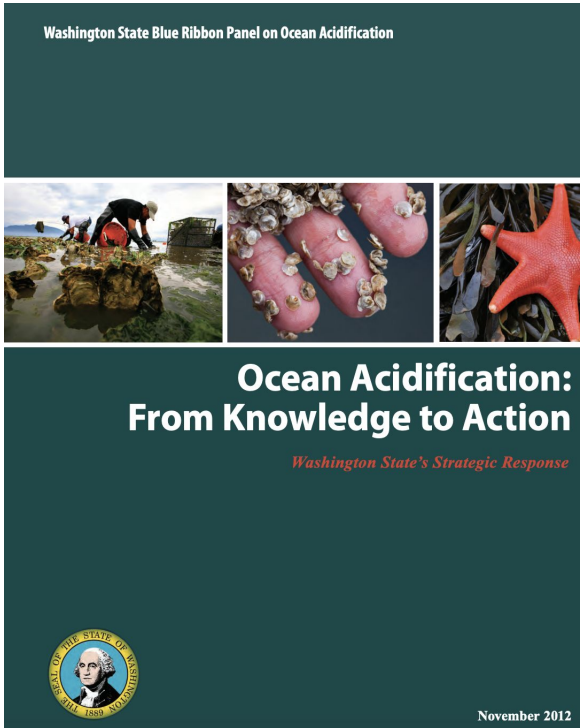


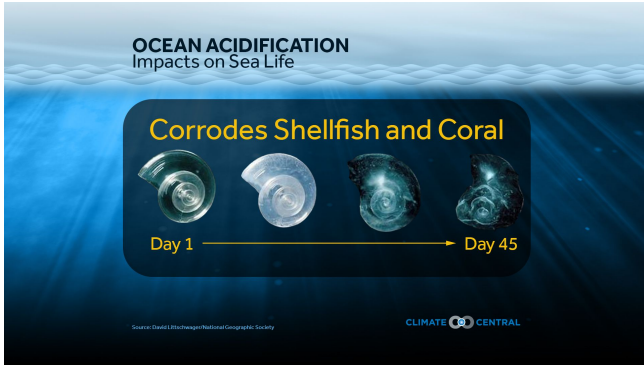
Demonstrating our technology at PNNL-Sequim

Validating safe + effective carbon removal

U.S. DEPARTMENT OF ENERGY | NOAA | Pacific Northwest NATIONAL LABORATORY | PMEL | UNIVERSITY of WASHINGTON

Ocean acidification in WA





SEACHANGE

Oysters dying as coast is hit hard

A Washington family opens a hatchery in Hawaii to escape lethal waters.

Story by
CRAIG WELCH

Photographs by
STEVE RINGMAN

About project →

HILO, Hawaii — It appears at the end of a palm tree-lined drive, not far from piles of hardened black lava: the newest addition to the Northwest's famed oyster industry.

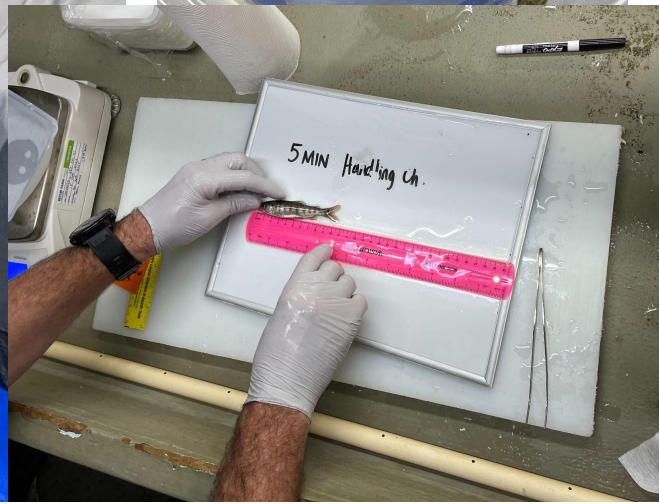
Half an ocean from Seattle, on a green patch of island below a tropical volcano, a Washington state oyster family built a 20,000-square-foot shellfish hatchery.

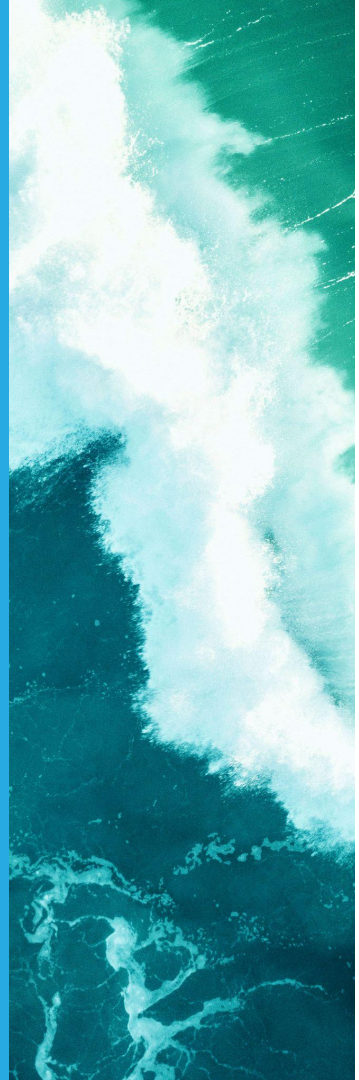
Ocean acidification left the Nisbet family no choice.

duced, in part, with

project
macoma

Ecological safety





Permitting

- Clean Water Act - NPDES permit per U.S. EPA guidance
- First NPDES permit for mCDR (Project Macoma)
- 10 local, state, federal permits secured

Realizing community benefits

Educational programming with community boating program

Educational hub at Feiro Marine Life Center

Research with local Tribe

2030 Zero Carbon Plan and CCS

February 27, 2025

Bryan Swann
Director, Resource & Market Planning, and Commodity Settlements

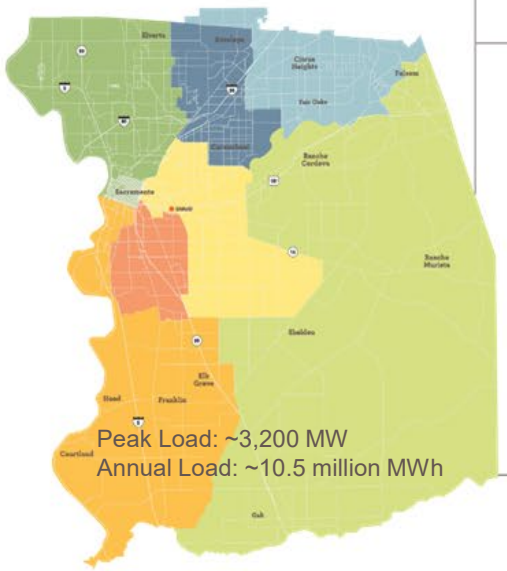
Powering forward.
Together.

SMUD®

About the SMUD (Sacramento Municipal Utility District)

SMUD is your community-owned, not-for-profit electric service.

6th largest community-owned **in the U.S.**



75+ Years
Est. 1946

2023 Power mix about **78%*** **carbon-free**

100%
Zero carbon by 2030

The most ambitious goal of any large utility in the United States

~645,000 Customers

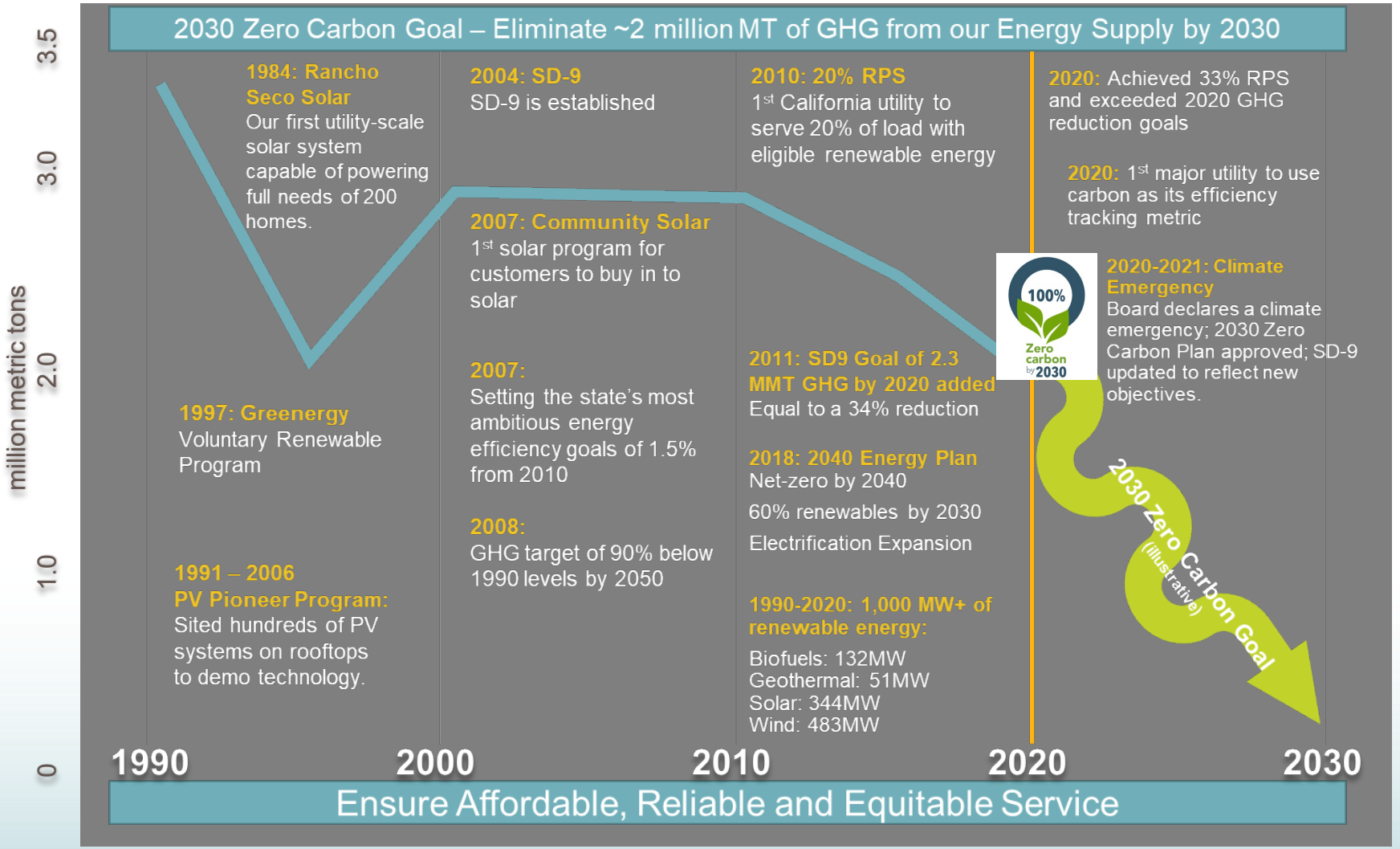
~2,300 Employees

7 member Elected Board of Directors

SMUD's rates are among the lowest in California

SMUD®

SMUD's History of Environmental Leadership

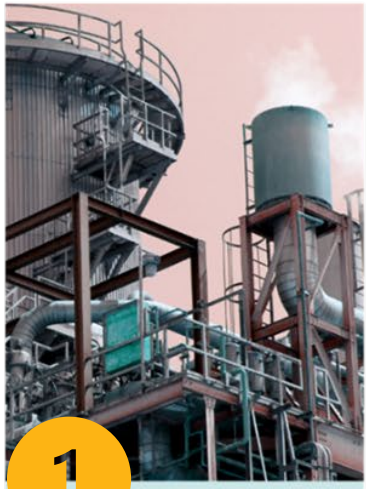


*SD-9 or Strategic Directive 9, contains SMUD's core Resource Planning objectives.

SMUD®

Where we're headed

Affordable . Reliable . Equitable



1

Repurpose natural gas generation

Replace 2 power plants with renewable and storage resources and retool remaining 3 to minimize emissions.

2

Expand proven clean technology

Grow SMUD's renewable and battery storage by 3.5x. Support customer's resources via solar and battery storage.

CCS was identified as a promising technology in this area of the plan

3

Pilot & scale new technology and business models

Increase education and demand flexibility, spread adoption of customer-owned virtual power plants & invest in grid-scale technology.

4

Pursue grants, partnerships and limit rate impacts

5

Maximize community benefits

Stay affordable and reliable, improve air quality and overall community health while supporting under-resourced communities.

Goal:

CO_2

Eliminate CO_2 from SMUD's power supply

100%

Zero carbon by 2030

Create thousands of new regional clean tech jobs

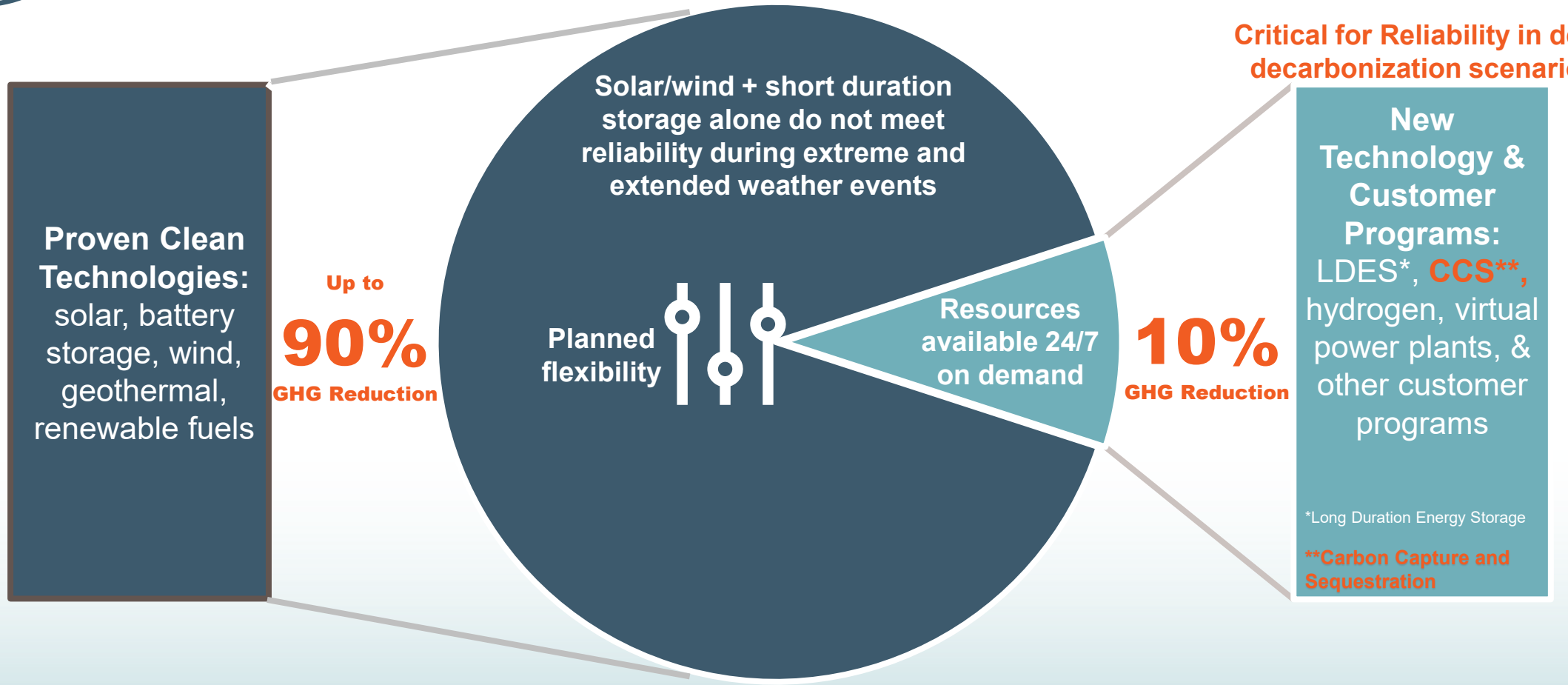
Lean on proven technologies to get up to 90% of the way

+ Electrify Vehicles and Buildings to reduce GHG emissions by 1.365 million MT by 2030

SMUD

Need for New Clean Technology

It takes a portfolio approach to achieve zero carbon.



SMUD

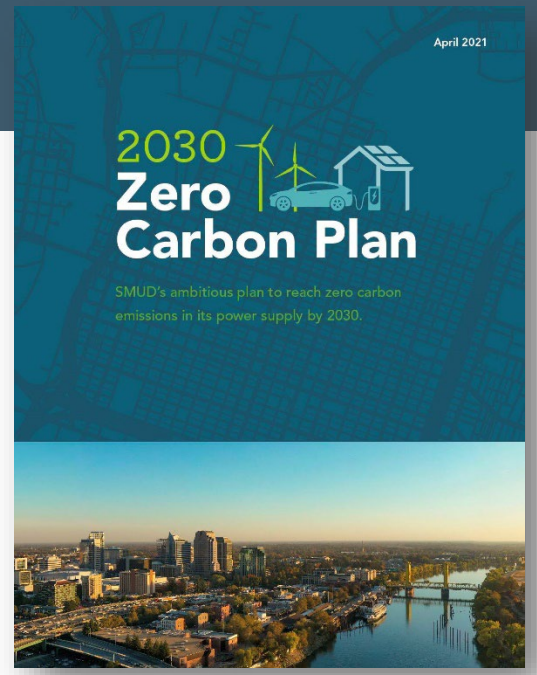
Calpine Sutter Decarbonization Project (CCS) Opportunity

- The Sutter CCS project is being developed by Calpine Corporation
  - Conversion of an existing 550 MW Natural Gas plant to include CCS; located in Sutter County in Northern California.
  - Calpine's sequestration partner to develop, build, own and operate sequestration site near by the existing gas plant.
  - SMUD's interest is as a potential off-taker of the energy from the plant (SMUD to consider a power purchase agreement in 2026)

- Sutter CCS Retrofit Project Details:
  - Online date 2029
  - Up to ~1.7 million metric tons GHG stored per year.
  - Capture rate expected to be 95-98%.
  - First in the world air-cooled CCS facility
  - No new transmission or interconnection needed; transport pipeline will look to use existing right-of-way to nearby geologic storage site.
- Funding: Calpine received a grant award of up to $270 million in 2023 by the U.S. Department of Energy for this project

Sutter CCS Portfolio Benefits

- Reduces GHG emissions sooner than other promising technologies that are being developed
- Provides a transitional clean resource to hydrogen and other clean fuels and technologies not yet mature.
- Supports SMUD's local reliability needs with clean, reliable, efficient generation
- DOE funding significantly reduces the cost of this resource to SMUD.



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SB 905 – CCS Program Recommendations

CCS Program should:

- Ensure a careful and safe deployment of the technology including risk analysis and monitoring of well sites and transportation. Examples include monitoring for pipeline leaks and actions upon leak detection, and well monitoring for containment integrity and sustainable injection flows.
- Provide regulatory certainty to adopters of CCS technologies and projects, including describing how CCS reduces a resource's carbon emissions and related carbon obligations under Cap and Trade.
- Facilitate alignment across state agencies for consistent CCS-related reporting and accounting (e.g., SB 100, Power Source Disclosure)

SMUD

Thank you!

SMUD®