



WESTCARB Overview

***Phase I Accomplishments,
Phase II Plans***

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Who Is WESTCARB?

- **Partnership between about 70 organizations; new participants for Phase II:** Air Liquide, Alaska Department of Natural Resources, Bascom Pacific LLC, California Forest Products Commission, Calpine, Collins Company, DNV Research—Det Norske Veritas, Greenwood Resources, Jeld-Wen Timber and Ranch, Lake County Resources Initiative, Oregon Forest Resources Institute, Oregon State University, Pacific Gas & Electric, Portland General Electric, Rosetta Resources Inc., Schlumberger, USDA Forest Service, US National Park Service, University of California—Berkeley, Western Shasta Resource Conservation District, Wheelabrator Shasta Energy Company, W.M. Beaty and Associates
- **Led by California Energy Commission**











WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 2




Phase I Accomplishments

- Centralized GIS source and sink database
- Major point sources and geologic sinks identified and characterized
- Geologic and terrestrial storage estimates made for major sinks
- GIS-based method for source-sink matching implemented; marginal cost curves developed
- Terrestrial baselines and supply curves developed
- Current regulatory structure outlined
- Heightened awareness of sequestration among state, community, and industry leaders
- New approach for screening and ranking sequestration sites

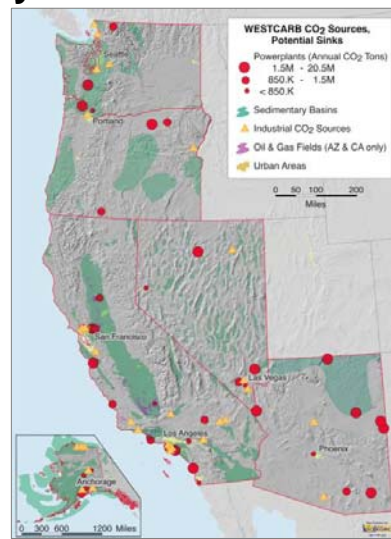


WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 3



Point Sources in Proximity of Broadly Distributed Sedimentary Basins

- Characterized sources account for about 80% of total industrial and utility sector emissions
- Storage potential is large – in California, 100 to 500 Gt in saline formations, 3.4 Gt in oil reservoirs, 1.8 Gt in gas reservoirs
- Data reside at Utah AGRC, publicly accessible, part of national database



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 4



Development of Supply Curves for Geologic Storage Improve Cost Estimates

- CO₂ source characterization
- Capture cost estimation
- CO₂ storage capacity estimation
- Transportation cost estimation
- Source-sink matching



Matching sources to sinks
(From H. Herzog, MIT)

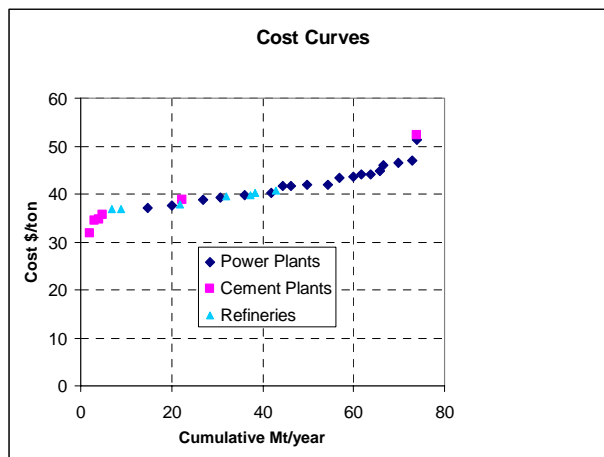


WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 5



Capture is Most of the Cost of Geologic Sequestration

- Using current, amine-based technology, capture is 70-80% of total cost
- New approaches are being studied

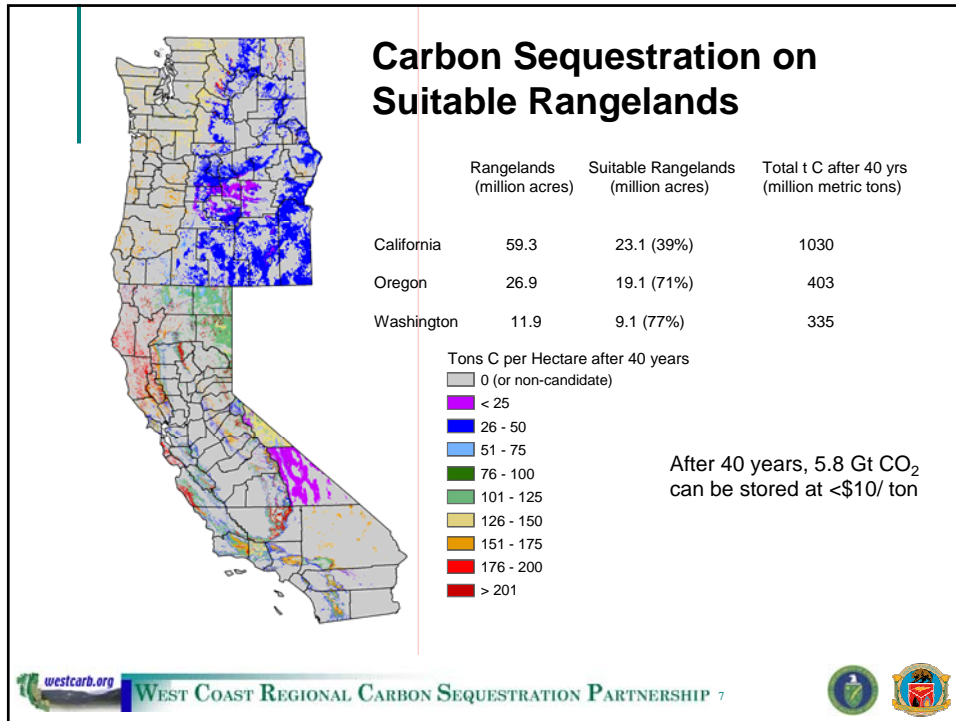


Capture costs for retrofitting existing CA plants



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 6





Other Opportunities Have Co-Benefits

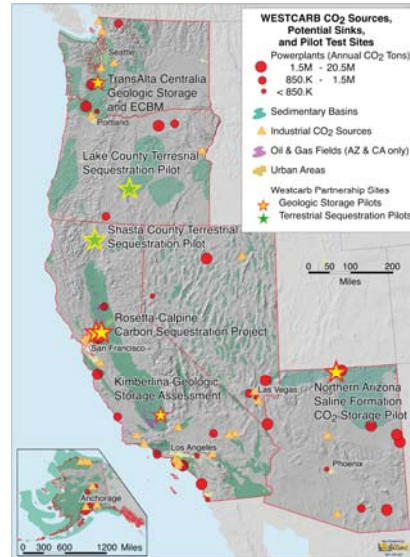
- Conservation
 - Habitat preservation
- Improved Fire management
 - Avoid ecosystem-changing fires
 - Fuel treatments provide biomass for power generation

Source: S Sandberg

westcarb.org WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 8

Pilots Planned in Arizona, California, Oregon, and Washington

- Pilots are representative of best sequestration options, unique technologies and approaches, in region
- Pilots involve site-specific focus for
 - Testing technologies
 - Assessing capacity
 - Defining costs
 - Assessing leakage risks
 - Gauging public acceptance
 - Testing regulatory requirements
 - Validating monitoring methods

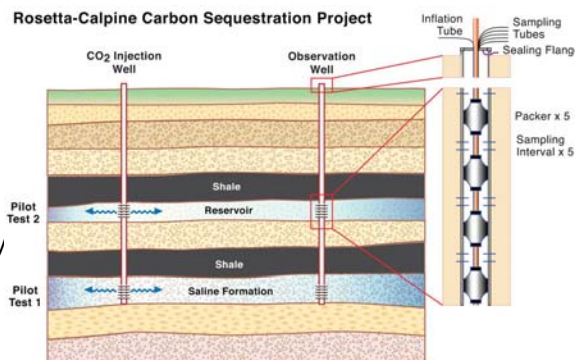


WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 9



Rosetta-Calpine Gas Reservoir and Saline Formation Pilot Test

- Lead industrial partners: Rosetta Resources and Calpine
- Validate sequestration potential of Central Valley sediments
- Test CO₂ Storage Enhanced Gas Recovery
- Focus on monitoring

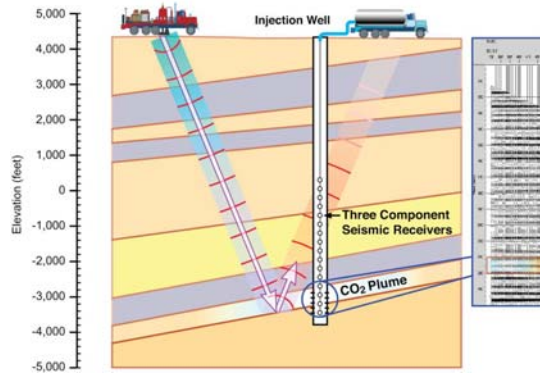


WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 10



Northern Arizona Saline Formation CO₂ Storage Pilot

- Lead industrial partner: Salt River Project, through EPRI Tailored Collaborative program
- Test sequestration potential of Colorado Plateau sediments
- “Greenfield” saline formation injection
- Focus on monitoring



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 11



Two Site Characterization Pilots

- Lead industrial partner: TransAlta Centralia plant
- Evaluate ECBM potential of deep coals near plant; saline formation potential

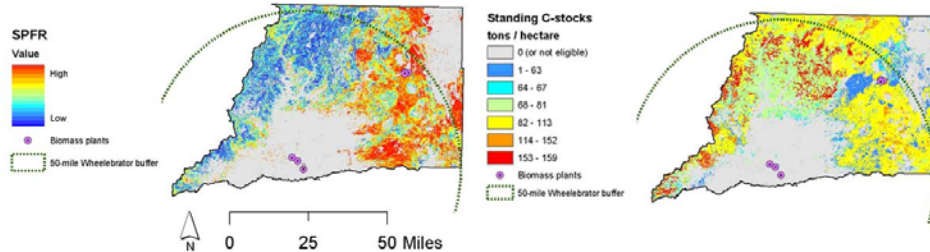
- Lead industrial partner: Clean Energy Systems
- Evaluate EOR and saline sequestration potential near Kimberlina plant



WEST COAST REGIONAL CARBON SEQUESTRATION PARTNERSHIP 12



Shasta County Pilot will Involve Reforestation, Fuel Reduction and Forest Management Studies



- Validation of forest growth type for rangelands
- Develop and test fuel management activities; baselines and measurement and monitoring
- Validate emissions reductions from conservation and sustainable forest management practices

Lake County, Oregon Terrestrial Pilot

- Research fire models
- Carry out fuel treatment, measurement and monitoring activities
- Assess potential of hybrid poplar "plantations"

