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# Pastoria NGCC Carbon Capture and Sequestration

2024 FECM/NETL Carbon Management Research Project Review  
Meeting

August 6, 2024

Doug Carlson

# Project Overview




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- Scope: FEED Study for Amine Solvent-based CCS Downstream of NGCC
- Funding: DOE \$7.0 MM, Calpine \$1.87 MM
- Schedule: August 2024 to February 2026
- Solvent Licensor: Honeywell UOP ASCC



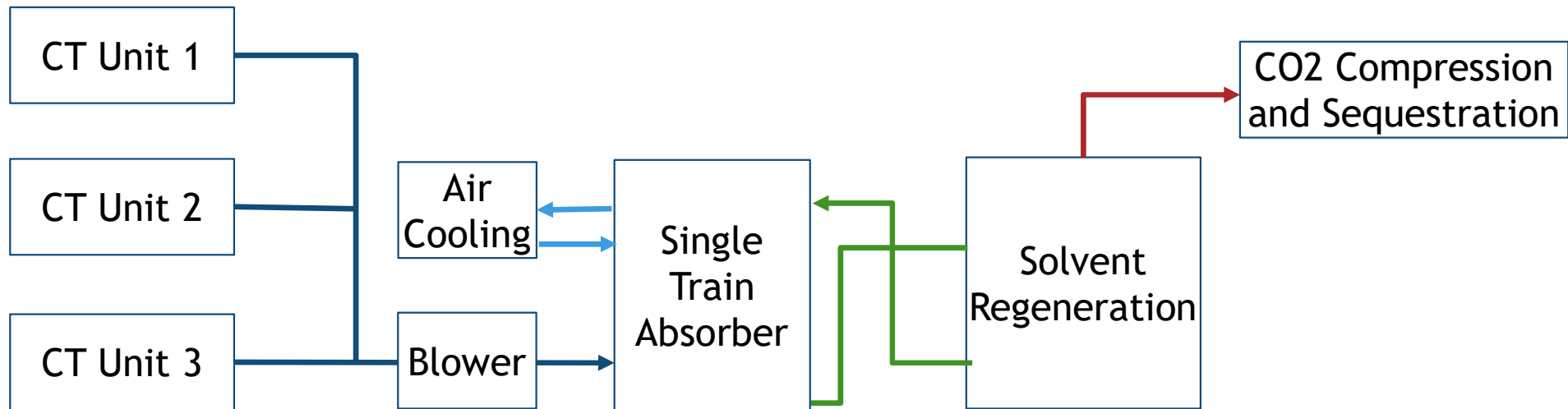
# Project Objectives

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- Capture and Sequester Output of Two NGCC Combustion Turbines (Nominal 500 MW)  1.8 MTPA CO<sub>2</sub> Captured
- Ensure Highly Operable Facility Design Resulting in a High Capacity Factor  >95% Capacity Factor
- Structured Execution Strategy to Reduce Total Installed Cost of Facility  >20% Cost Reduction

# Block Flow Diagram

(2 units feeding CCS, 3 ducted)

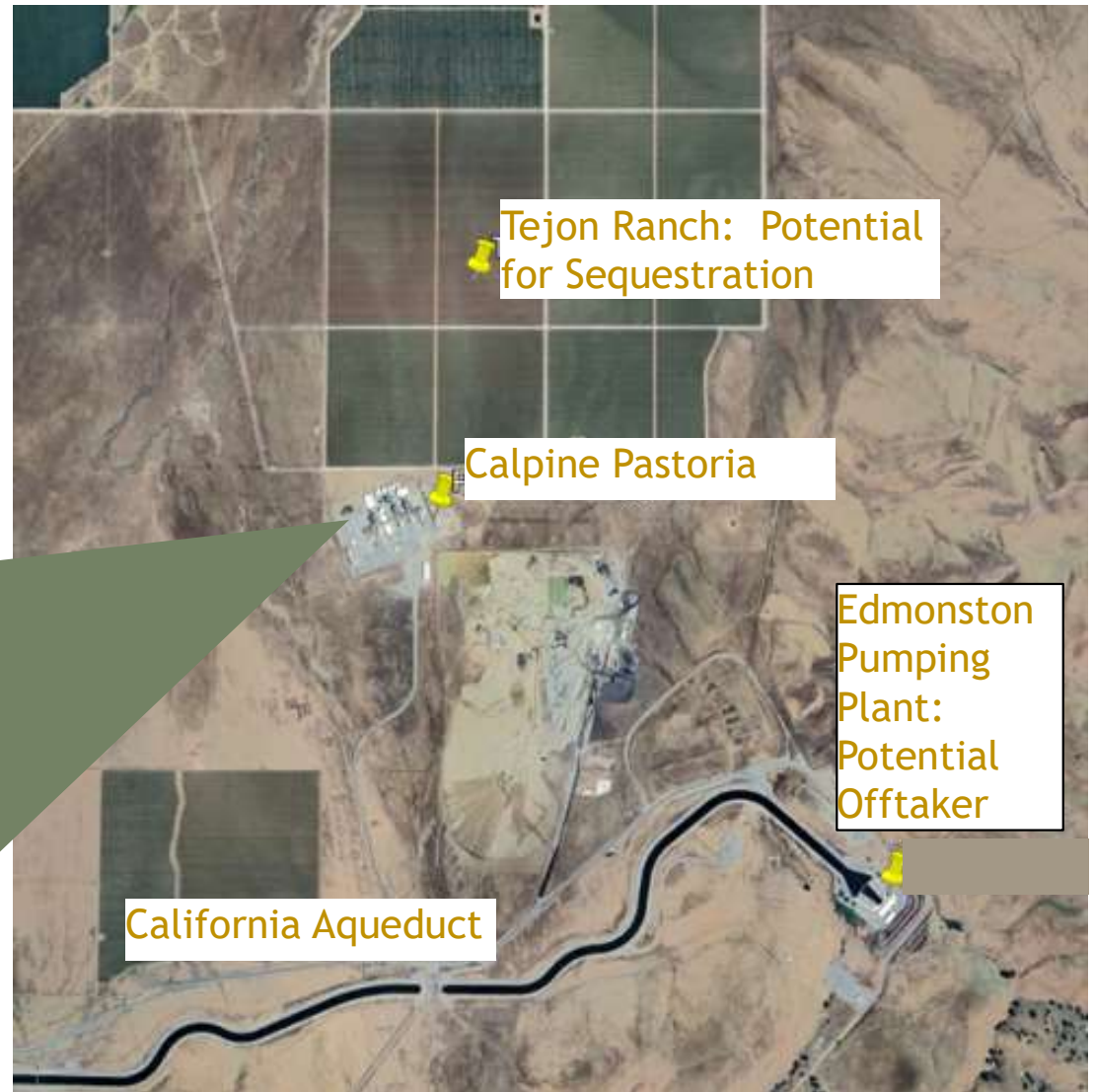
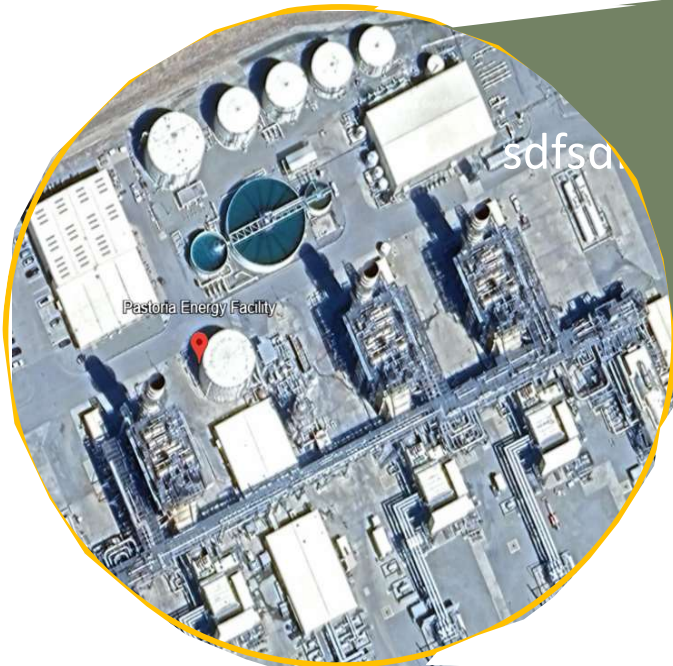


- Maximum Single Train Capacity – Two CTs
- Three CTs Ducted to Ensure High CCS Capacity Factor Despite Turbine Maintenance
- Single Blower and CO2 Compressor
- Maximize Air Cooling to Limit Water Consumption



# Site: Pastoria Energy Center

- 40 Miles south of Bakersfield, CA
- 3x2 NGCC, 780 MW
- Saline Aquifers in Area
- Edmonston Pumping Plant, 800 MW of Pumps



# Project Execution Strategy

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- Singular Team Focus: Capital Cost Reduction
- Design with Intent to Construct
  - Build strong construction team engaged from kick-off
  - Construction approach/cost analysis to shape engineering decisions
- Diversity=Better Outcomes
  - Hybrid team with both power and process industry background
  - Construction/Estimating working closely with Engineering and Design
- Build on Lessons Learned – Do Not “Recreate the Wheel”
- Document Execution Plan in Detail and Get Full Team Buy-in
- Employ Value Engineering Early in Design
- Plan for Competitive Bidding of Execution Contract

# Value Enhancing Studies

Kick-off Week	Study	Objective
-12	Project Team Alignment/Execution Planning	Team alignment around strategy and cost reduction objective
0	Absorber Recovery/Sizing/Structured Packing Optimization	Early freeze of H&MB around optimized cost/CO2 recovery parameters
4	Steam sourcing study	Model impacts to STG efficiency, consider hybrid with new auxiliary boiler
13	GA Optimization	Minimize ducting runs, optimized pipe rack, minimal footprint
15	Site Erected Towers	Concrete vs steel (solid and clad), hybrid approaches, height vs diameter and form factor trade-offs
27	Material Cost Analysis	Pre-Assembled Unit (PAUs), hybrid foundation approach, conductor direct bury, remote IO, etc.
31	Piping Prefab	Identify shop partners, design for install of spools with minimal field welds

# Development: Future Steps

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- Sequestration Partner and Site Selection
- Potential Offtake Agreement with CDWR (Edmonston operator)
- Vet Possible Partners to Bid EPC Contract



# Community Benefits

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- Continuing to Identify Potentially Impacted Communities
- CB/SCI SMART objectives
  - Scoping a community-based participatory research project (CBPR)
  - Reporting on the economic and workforce impacts of the retrofit (via NREL's JEDI)
  - Host internal conversations regarding site safety improvements
  - Assess community groups familiarity with CCS

# Summary

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- Execution Strategy Focused on Capital Cost Reduction
- Construction-Centric Design Critical to Success
- Build a Team with Diverse Capabilities and Backgrounds
- Detail an Execution Strategy that Maximizes Teamwork/Seamlessly Involves Construction and Estimating
- Fully Leverage Lessons Learned for Design Evolution to a Less Capital-Intensive CCS

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Thank You

