

DOCKETED

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Willow Rock Energy Storage Center

CEC Informational Hearing – August 2022

Presentation Outline

Hydrostor Introduction

- Company Background
- Technology Overview: Advanced Compressed Air Energy Storage

Willow Rock (formerly 'Gem') Energy Storage Center

- Willow Rock – Site Vicinity & Location
- Project Overview
- Conceptual Site Design
- Project Fundamentals & Overall Timeline
- Economic and Fiscal Benefits
- Project Permitting Process – CEC Lead Agency by California Statute

Questions & Answers

About Hydrostor

Hydrostor is the global leader in Advanced Compressed Air Energy Storage (A-CAES)

Founded: 2010

Offices: Toronto, Canada (HQ), SF Bay Area, Adelaide, Australia (satellite)

Operating Facilities:

2 (Canada – Toronto Hydro; Canada – IESO)

Company Financing:

\$250 M investment by Goldman Sachs – Jan. 2022

Project Pipeline:

900+ MW commercially bid in CA in 2020, 4 GW project pipeline (focused on U.S., Canada, Australia)

A-CAES is a breakthrough for long-duration energy storage:

- Uses only water, pressurized air and commercially proven equipment to provide long-duration, *emissions-free* storage.
- Provides similar characteristics to pumped hydro storage, but with the key advantage of being able to *flexibly site* where the grid needs it.

How Advanced-CAES Works (A-CAES)

A-CAES integrates proven technologies and construction approaches in innovative ways to produce a superior long-duration grid-scale energy storage solution

STEP 1

Compress air using electricity

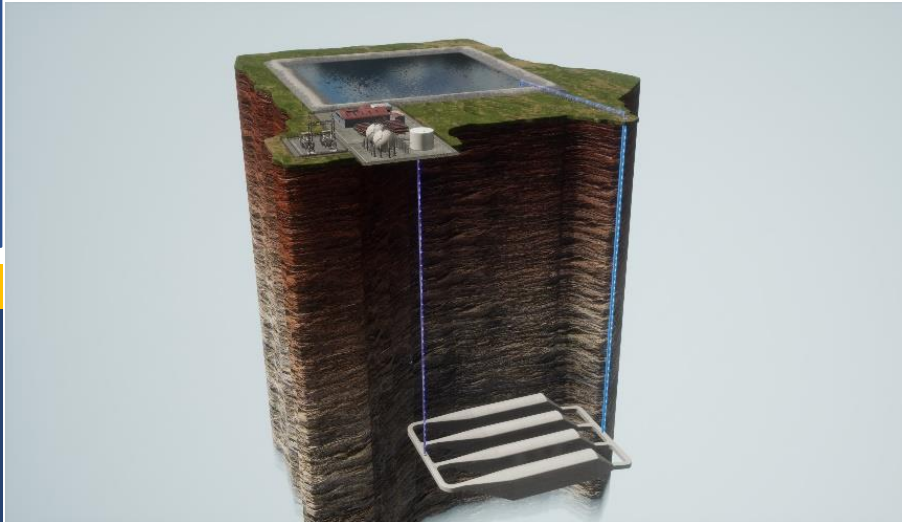
Electricity runs a compressor to produce heated compressed air

Unique to Hydrostor

STEP 2

Capture heat in thermal Store

Heat is extracted from the air stream and stored in a proprietary thermal store



Unique to Hydrostor

STEP 3

Store compressed air in purpose-built cavern

Air is stored in a purpose built cavern using water to maintain constant pressure

STEP 4

Convert the air to Electricity

Water forces air to the surface where recombined with heat and expanded through a turbine

- **Major Equipment:** Utilize off-the-shelf, commercially proven power generating equipment, including air compressors, turbo-expanders, generators and heat exchangers
- **Underground Storage Caverns:** Purpose-built underground cavern construction using industry standard and well-proven mining techniques
- **Efficiency:** Round Trip Efficiencies (RTE) of the A-CAES process are approximately **60%**

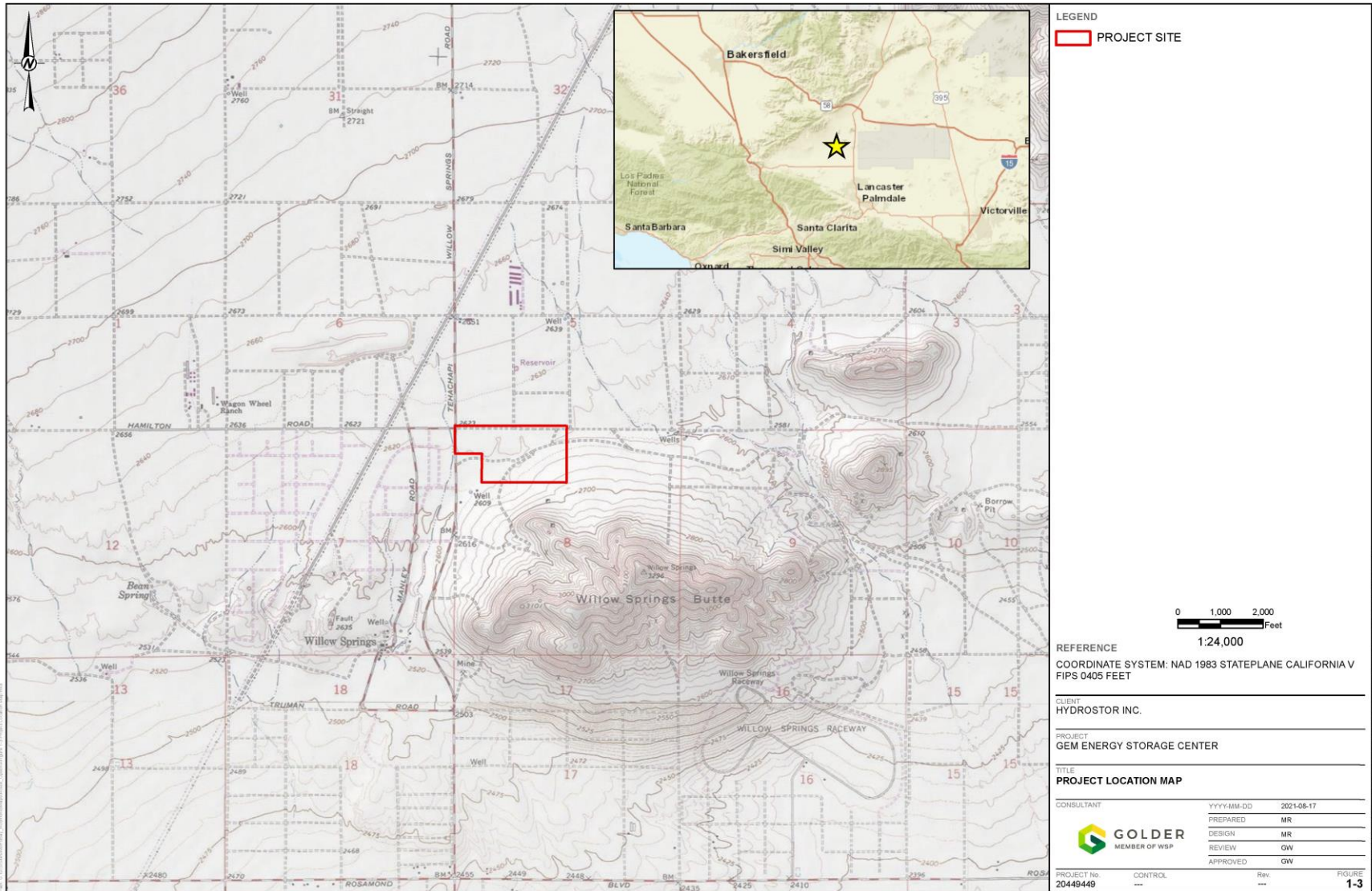
Hydrostor A-CAES – How It Works

(837) How Hydrostor Is Enabling The Energy Transition (2021) – YouTube *(Ctrl + Click to View)*

<https://youtu.be/cOWjwwKSR78>



Willow Rock Energy Storage Center - Vicinity Map



LEGEND

PROJECT SITE

0 1,000 2,000 Feet

1:24,000

REFERENCE
COORDINATE SYSTEM: NAD 1983 STATEPLANE CALIFORNIA V
FIPS 0405 FEET

CLIENT
HYDROSTOR INC.

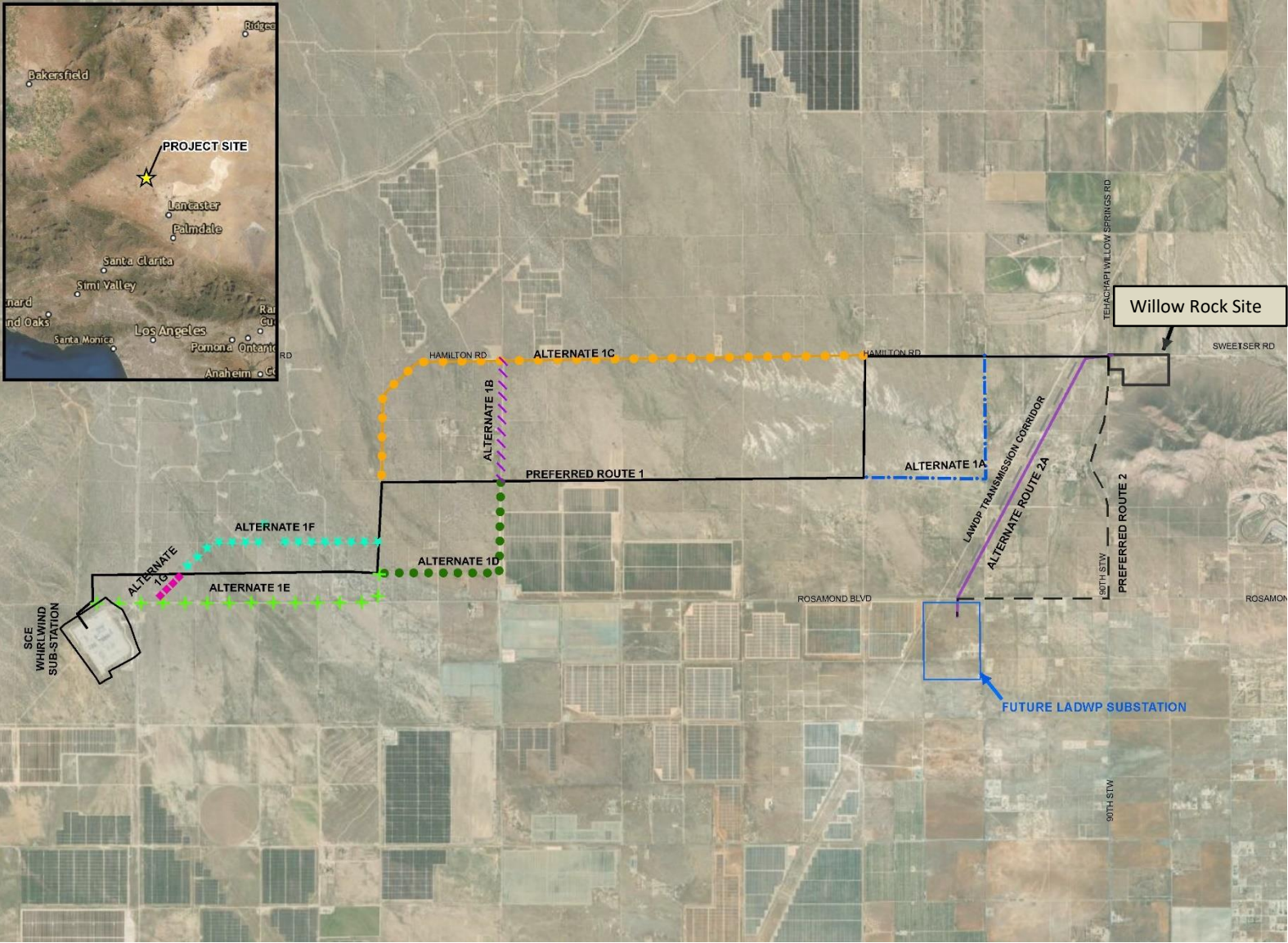
PROJECT
GEM ENERGY STORAGE CENTER

TITLE
PROJECT LOCATION MAP

CONSULTANT	YYYY-MM-DD	2021-08-17
GOLDER	PREPARED	MR
MEMBER OF WSP	DESIGN	MR
	REVIEW	GW
	APPROVED	GW

PROJECT No. 20449449 CONTROL Rev. FIGURE 1-3

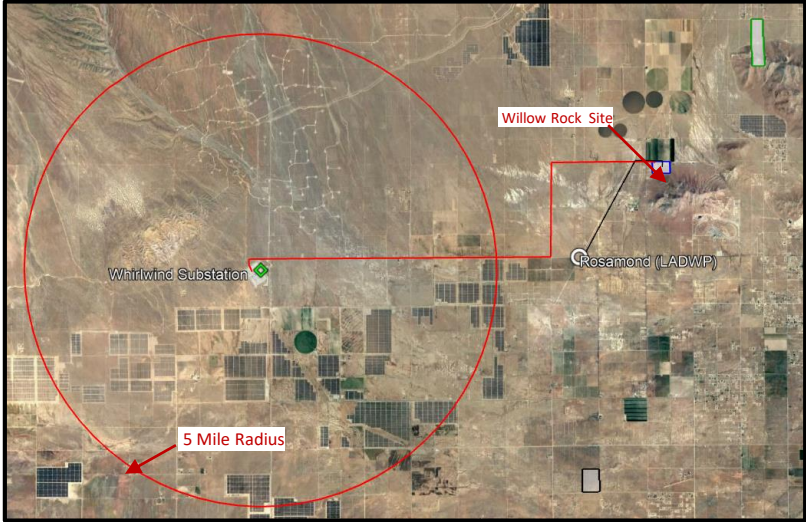
Willow Rock (formerly Gem) Transmission Routes



Willow Rock A-CAES Project Overview

Willow Rock A-CAES Energy Storage Project:

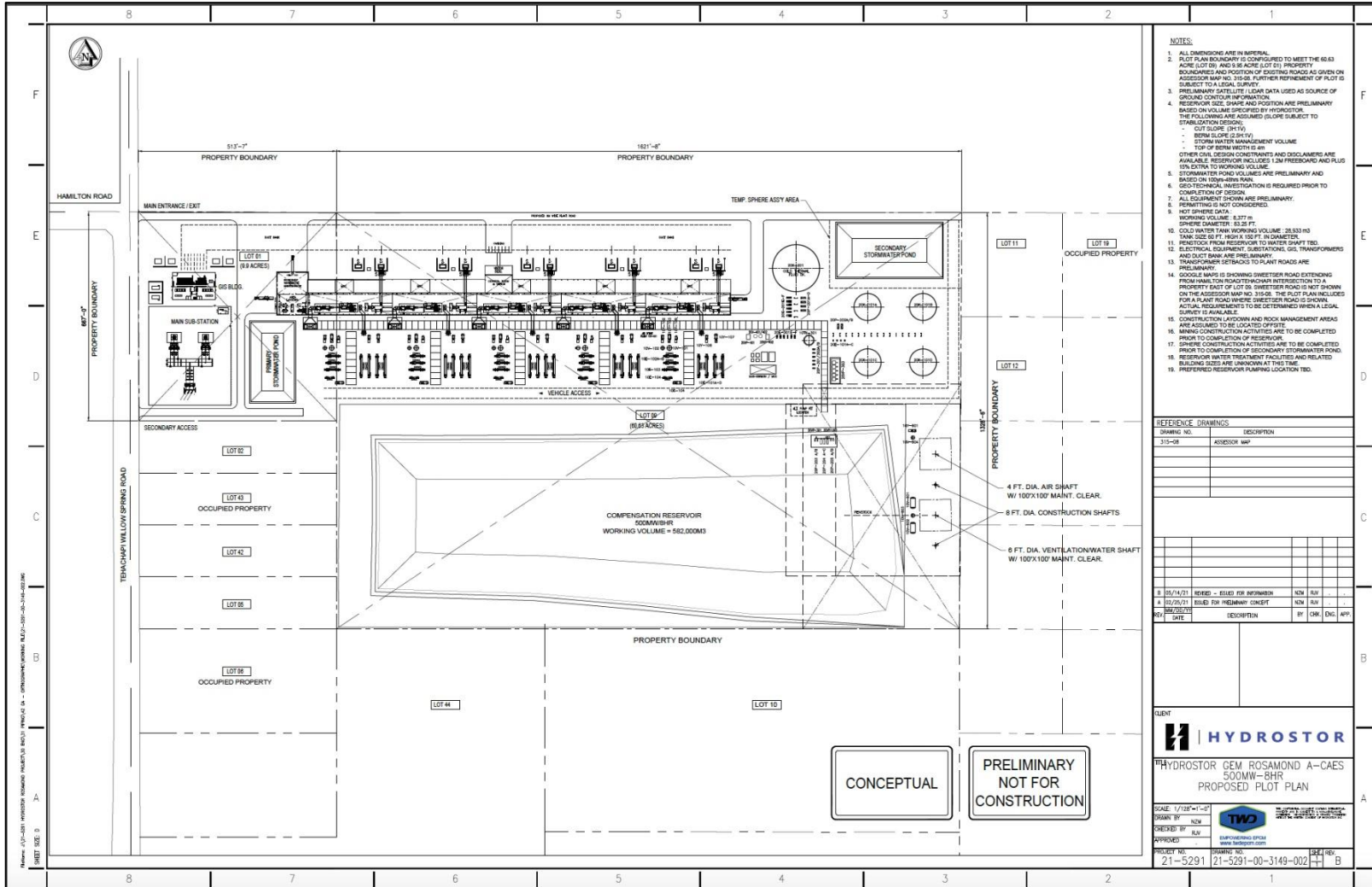
- Location: Near Rosamond, CA (Whirlwind Sub)
- Size/Duration: Up to 500 MW with 8 hours storage
- Development: 60 acre site control complete, Interconnection Phase 2 – Full Deliverability, AFC submitted to CEC; Data Adequate: July 2022
- Commercial: Active negotiations currently underway with multiple California Load Serving Entities
- Target COD: First Half 2028



Willow Rock (formerly Gem) A-CAES Project Development and Construction Schedule																																																																								
	2022			2023			2024			2025			2026			2027			2028																																																					
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
PERMITTING																																																																								
Baseline Environmental Surveys	█			█			█			█			█			█			█			█			█																																															
AFC Accepted by CEC as Data Adequate	█			█			█			█			█			█			█			█			█																																															
CEC AFC Review, Analysis & Decision	█			█			█			█			█			█			█			█			█																																															
Fed/State/Local Permitting	█			█			█			█			█			█			█			█			█																																															
CEC and Other Permit Approvals	█			█			█			█			█			█			█			█			█																																															
CONSTRUCTION																																																																								
Financing & Execution of Major Contracts	█			█			█			█			█			█			█			█			█																																															
Pre-Construction Eng./Procurement	█			█			█			█			█			█			█			█			█																																															
Site Construction	█			█			█			█			█			█			█			█			█																																															
Commissioning	█			█			█			█			█			█			█			█			█																																															
Commercial Operation	█			█			█			█			█			█			█			█			█																																															

Project Milestones Dates:
 * File Permit Application (AFC): Q4 2021
 * Start of Construction: Q1 2024
 * Commercial Operations Date: Q2 2028

Willow Rock – Preliminary Site Layout



Willow Rock Project – Conceptual Bird's Eye View



Representative Willow Rock Visual Renderings



Looking South from off Tehachapi-Willow Springs Rd



Looking East from off Hamilton Rd

Willow Rock A-CAES: Project Fundamentals

- ***Project Site Control: 75 year Lease executed***
- ***Project Commercial Life: 50+ years***
- ***Transmission Interconnections (230 kV):***
 - 1) SCE Whirlwind Substation (CAISO), and/or***
 - 2) Proposed LADWP Rosamond Substation***
- ***Water Needs – All Non-Potable Water Sourcing:***
 - ***Initial Reservoir Fill: 450-550 acre-feet***
 - ***Annual Makeup (Preliminary): 20 to 60 acre-feet per year***
- ***Expected Geology: Quartz Monzonite @ cavern depth (granitic formation)***
- ***Cavern Volume: ~1.0 million cubic yards (~1.3 MCY rock volume @ surface)***
- ***Project will meet or exceed all applicable noise standards***
- ***No use of natural gas – Plant will be 100% emissions-free***

Willow Rock A-CAES: Economic and Fiscal Benefits

- **Total Installed Cost: \$1+ billion**
- **Construction Jobs:**
 - **Average Construction Workforce: ~250 over 4+ years**
 - **Peak Construction Workforce: ~700**
 - **Total Construction Labor: ~2 million man-hours**
- **Operations & Maintenance Jobs: 25-40 Full-time equivalent positions**
- **Fiscal Benefits: Over \$500 million in Regional Direct & Indirect Economic impacts**
- **Significant contribution to property tax base. Unlike state-imposed solar tax exemptions, Willow Rock is not exempt from property taxes.**
- **Hydrostor will work closely with Kern County to establish a Community Benefits Program in connection with the project**

Lead CEQA Agency for A-CAES Permitting

The California Energy Commission (CEC) has determined that Willow Rock is a thermal power plant 50 megawatts or greater, and thus subject to Commission jurisdiction. Nevertheless, Kern County, Willow Rock and the CEC are working cooperatively on the project.

- **Application for Certification (AFC) submitted to the CEC – December 2021**
- **AFC Deemed Data Adequate by the CEC – July 2022**
- **CEC serves as Lead Agency for CEQA under their CEQA functionally equivalent AFC review and licensing process**
- ***All Local, State and Federal Responsible Agency reviews – including Kern County – are incorporated into the CEC licensing process. There will be ample opportunity to participate in and provide critical input throughout the AFC process.***
- ***Hydrostor is fully committed to working directly with Kern County and local stakeholders to address any potential concerns***

Contact Information

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