



# Willow Rock Energy Storage Center

AV EDGE – October 2024

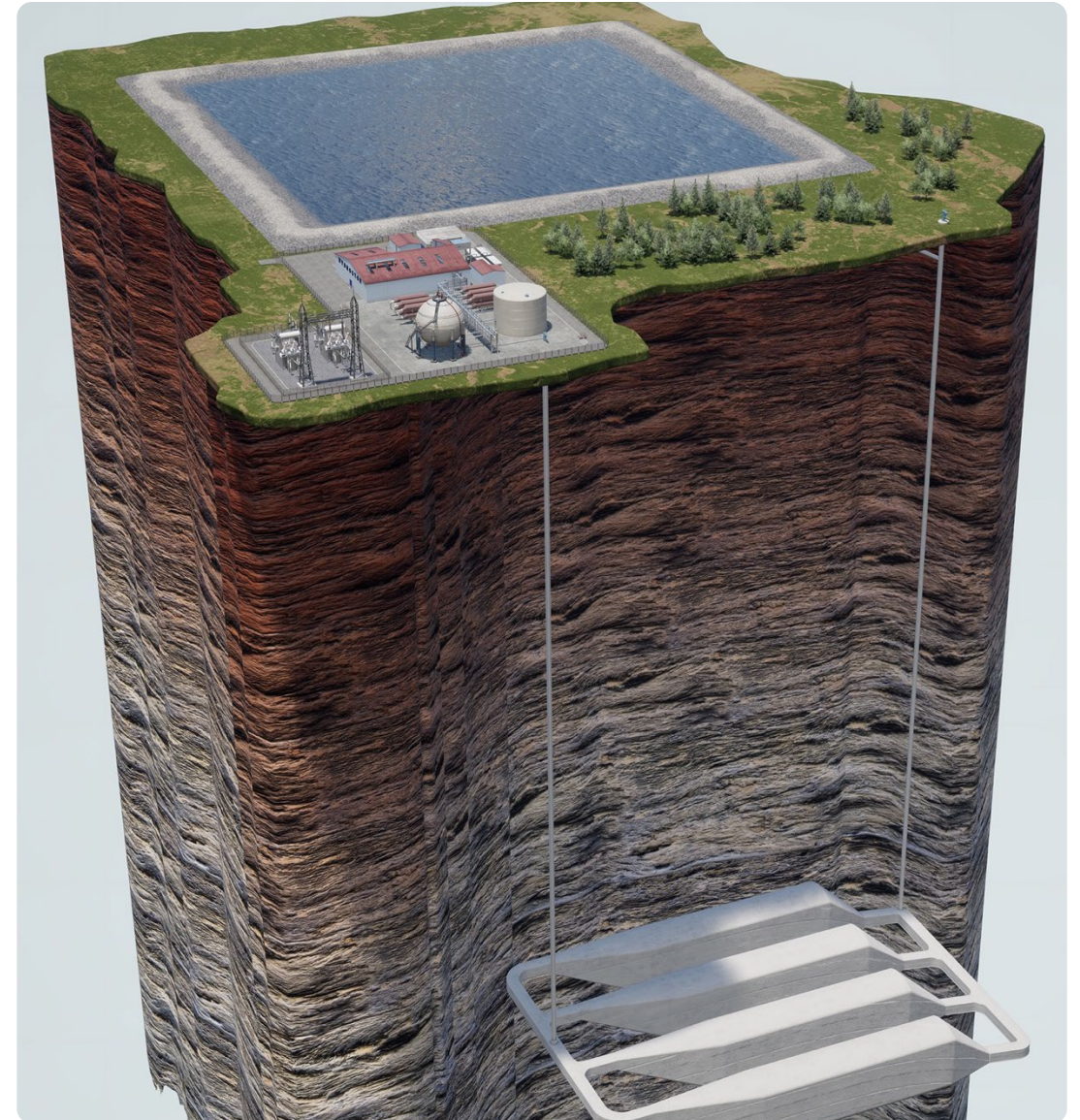
## Agenda

1. A-CAES Technology Overview & Attributes
2. Willow Rock Energy Storage Center Overview
3. Project Development Timeline
4. Project Visual Renderings
5. Local Economic Benefits
6. Optimized Project Location – Advantages & Benefits
7. Questions & General Discussion

# Advanced Compressed Air Energy Storage (A-CAES)

- Based on proven CAES platform and demonstrated commercially at small-scale
- Low-cost, large-scale and emission-free long duration energy storage (LDES)
- Uses only water & pressurized air with standard equipment from proven supply chains
- Can be flexibly sited where the grid needs it, using 1/20th the water and land vs. equivalent size pumped hydro storage
- A-CAES flexibility to add hours over time to projects unlike pumped hydro
- Complementary to green hydrogen / ammonia production

[Watch the video](#)



# The A-CAES Process

**1 COMPRESSION**  
Off-peak or renewable electricity powers a compressor, that compresses the air and generates heat in the process

**2 HEAT EXCHANGE**  
Heat generated during compression is extracted from the air and captured by the thermal management system for reuse

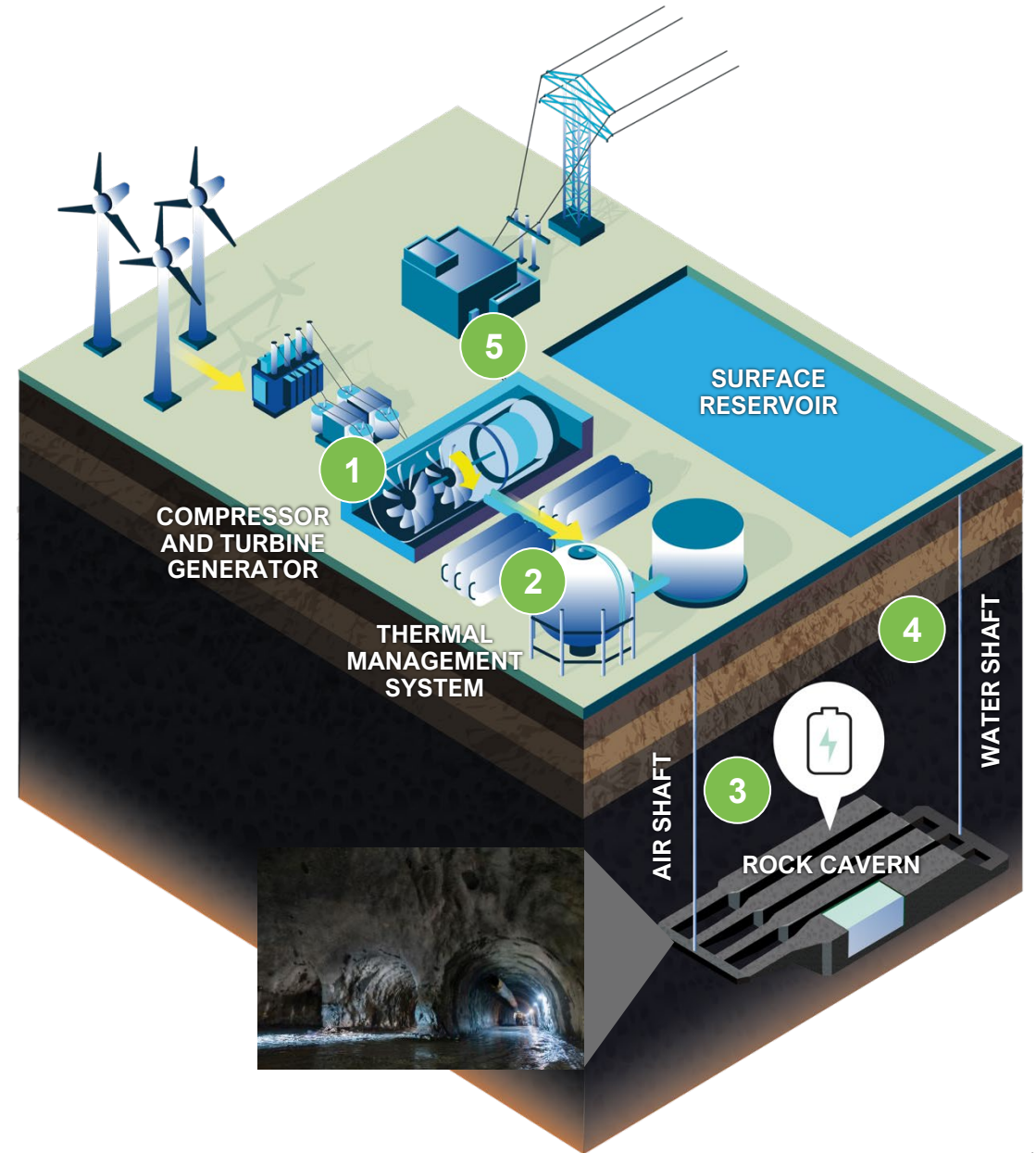
**Hydrostor IP: Adiabatic heat storage** improves efficiency and makes the process emissions free

**3 AIR STORAGE**  
Compressed air is pumped down and stored in a purpose-built, water-filled cavern

**4 WATER DISPLACEMENT**  
Compressed air displaces water, forcing it up the shaft to the surface reservoir

**Hydrostor IP: Hydrostatic compensation** maintains cavern pressure, improves efficiency, and enables siting flexibility, which minimizes cavern cost and size requirement

**5 FULLY CHARGED STATE AND DISCHARGE**  
Once reservoir is filled, the plant is ready to provide energy on-demand by reversing the process and turning the above-ground turbine to generate electricity



# Willow Rock – Optimized Project Overview

Site is located at the northwest intersection of Sierra Highway and Dawn Road near CA Highway 14

- **Optimized Project Location: North of Rosamond – CA Hwy 14 & Dawn Road**
- **Project Size: 500 MW net with 8 Hours of Storage Capacity (4,000 MW-hrs)**
- **Transmission Interconnection (230 kV): SCE Whirlwind Substation (CAISO)**
- **Project Development Status:**
  - **Project site control complete**
  - **Supplemental Application for Certification (SAFC) filed with CEC: March 2024**
  - **AFC Data Adequacy Achieved: July 2024**
  - **Geotechnical investigation continues; 6 deep boreholes drilled to 2,500+ feet**
- **Commercial Status: First Offtake Contract signed 1/2023 with 3CE for 200 MW; additional commercial negotiations are ongoing**
- **Project Development Timeline:**
  - **Targeted CEC Approval Date & Start of Construction: Q3 2025**
  - **Targeted Commercial Operation Date: Q4 2029**

# Willow Rock – Optimized Project Location

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## Willow Rock – Optimized Project Location

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- **Project Site Control: Land Purchased for 89-acre Project Site**
- **Expected Project Commercial Life: 50+ years**
- **Project Water Needs: Total Required Volumes:**
  - **Total Water Requirements: 1,100 - 1,200 acre-feet**
  - **Annual Water Surplus (Preliminary): ~30 acre-feet per year**
  - **Water Supply: AVEK via adjacent 36-inch water pipeline**
- **Subsurface Geology: Granite @ cavern depth; suitable for project**
- **Cavern Volume: 850,000 cubic yards (~1.3 MCY volume @ surface)**
- **Excavated Rock: Haul 8 mi to Holliday Rock Mojave Quarry for Re-use**
- **Noise: Project will meet all applicable noise standards**
- **Equipment Height: All major equipment at or below 100 feet tall**
- **Emissions: A-CAES operation is 100% emissions-free**

## Willow Rock – Recent Site Photos



Drill rig on project site drilling boreholes for geologic assessment - 2024






# Willow Rock – Project Rendering

Rendering depicts proximity of nearby infrastructure including CA State Highway 14, Sierra Hwy., Dawn Road and the Union Pacific Railroad tracks.



# Willow Rock - Target Milestone Schedule

	
Project Development Milestone	Schedule Date
File Supplemental AFC (SAFC) with CEC	Q1 2024
Target Date for SAFC Data Adequacy	Q2 2024
CEC Preliminary Staff Assessment Issued	Q1 2025
CEC Final Decision & Approval	Q3 2025
Close of Project Financing & Commence Construction	Q3 2025
Full Project Commercial Operation	Q2 2030

# Willow Rock A-CAES: Economic and Fiscal Benefits

**Total Construction Cost:** ~\$1.5 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 Direct & Indirect Economic impacts to Kern County Region over the project's commercial lifespan

**Property taxes:** Unlike state-imposed solar tax exemptions, Willow Rock is not exempt and will make significant contributions through local property tax payments to Kern County

**Community:** Hydrostor will work closely with Kern County and local residents to ensure the project is compatible



# Willow Rock A-CAES: Optimized Project Site Advantages

**Less Impactful to Local Community:** There are no residences or business located within close proximity to the optimized site

**No Local Groundwater Impacts:** Water to be supplied by AVEK; no new ground water wells will be required

**Project Access:** The optimized site location has excellent ingress and egress to SR-14

**Subsurface Geology:** The subsurface geology has been determined to be optimal quality for cavern construction





# Powering renewable energy progress

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