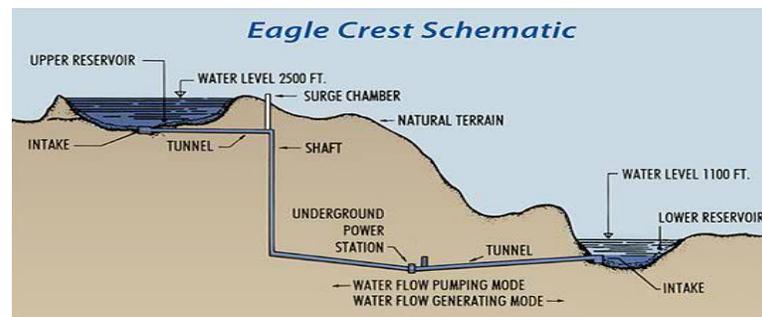


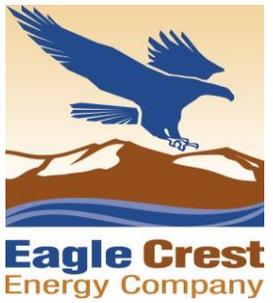
DOCKETED

Docket Number:	15-MISC-05
Project Title:	2015 Bulk Storage Workshop
TN #:	206695
Document Title:	ECE Pump Storage Presentation
Description:	N/A
Filer:	Collin Doughty
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	11/19/2015 10:15:32 AM
Docketed Date:	11/19/2015



Eagle Mountain Pumped Storage Project

Eagle Mountain Pumped Storage Project

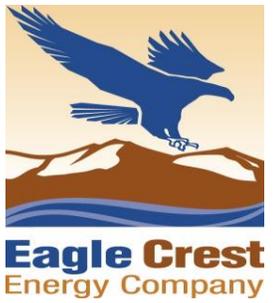


1,300-MW Closed Loop Pumped Storage Project

- Brownfield development reusing mine pits as upper and lower reservoirs
- Adjustable speed pump generators to provide quick response in all operating modes
- 13-mile gen-tie line will connect at SCE's Red Bluff Substation
- Will use non-potable water from the Chuckwalla Valley
 - Requires <1% of total Chuckwalla Valley aquifer volume and mitigation adopted to protect neighboring wells
 - Potential effects on the water basin studied exhaustively by FERC and the SWRCB

FERC licensed pumped storage project with pending CAISO interconnection request

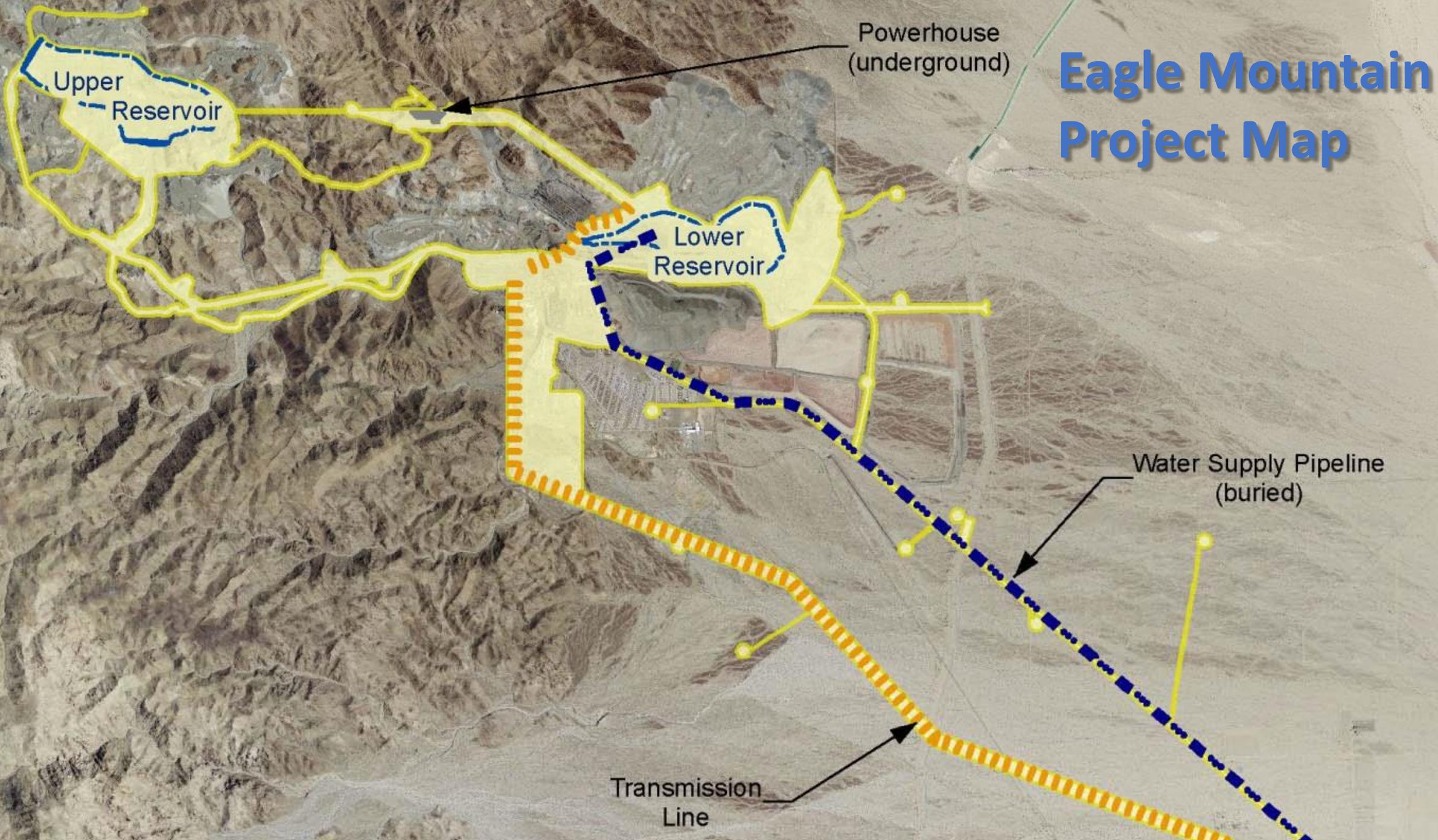
Benefits of Eagle Mountain



Eagle Mountain is a long-duration generator combined with automatic demand response

- Up to 17 hours of storage (22,000 MWh) at full capacity – daily diurnal storage
- Ramping capabilities as fast as 20 MW/sec
- Performs as a zero-emission peaking plant – generation side of the facility generates zero emissions and can be used to replace high-emission peakers reducing GHG emissions in the electricity sector
- Provides renewable integration – limits curtailment of renewable energy and helps CA move to 50% RPS by providing demand response
- Proven, known technology used around the world to integrate renewable energy; not an R&D project

Eagle Mountain Project Map



Upper Reservoir

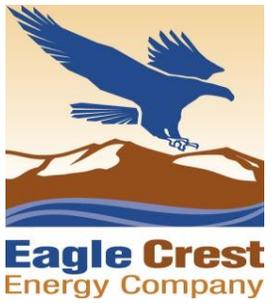
Powerhouse (underground)

Lower Reservoir

Water Supply Pipeline (buried)

Transmission Line

Permitting Overview



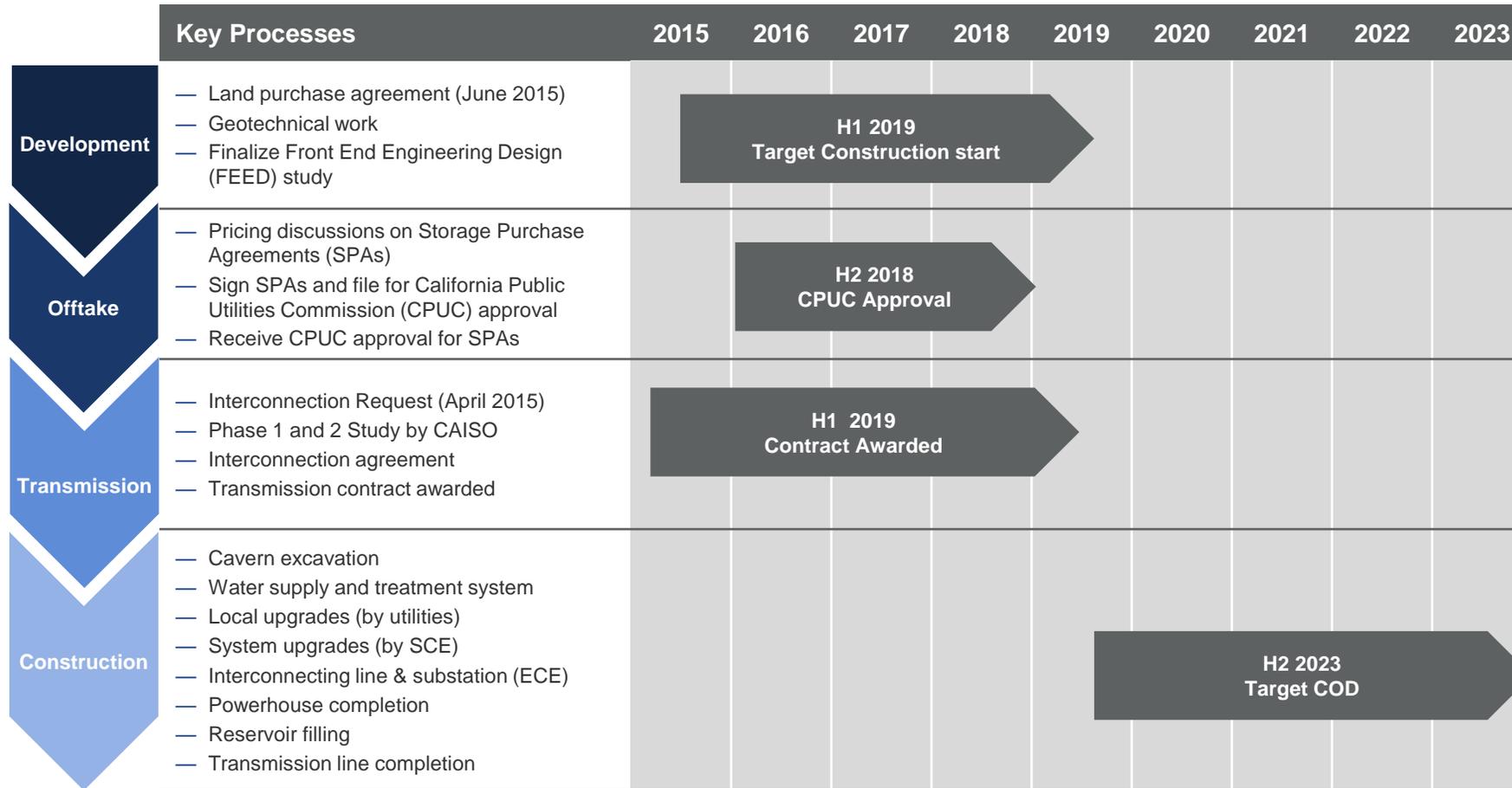
The Project has received all major required local, state and federal permits except BLM right-of-way (ROW)

Agency	Approval Status
Federal Energy Regulatory Commission (FERC)	License issued - June 2014 Petitions for Rehearing denied October 2015
State Water Resources Control Board (SWRCB)	401 Water Quality Certification, including CEQA FEIR - July 2013
US Fish and Wildlife Service (USFWS)	Federal Biological Opinion - April 2012
California Department of Fish and Game (CDFG)	CESA Consistency Determination - May 2012
State Historic Preservation Office (SHPO)	Programmatic Agreement for cultural resources - July 2011
US Bureau of Land Management (BLM)	ROW in process, FERC license grants right of eminent domain

Indicative Project Timetable



The Project is expected to reach construction start by June 30, 2019 and COD in December 2023



Barriers to Building Large-Scale Pumped Storage Projects



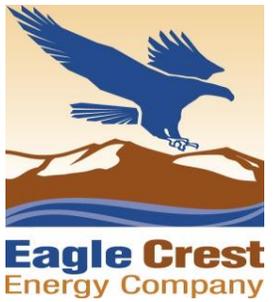
CAISO interconnection process treats flexible energy storage projects as large generators

- Unrealistic modeling situation because, unlike a generator, pumped storage will never be operated to add to peak electricity supply
- May trigger unnecessary transmission system upgrades that both “overbuild” the transmission system and unnecessarily increase the cost of such projects
- Possible trend towards allowing more energy-only renewable resources may ameliorate the issue

Procurement processes don't accommodate large pumped storage projects

- Storage targets and competitive solicitations currently exclude pumped storage in excess of 50 MW
- All-source RFOs are ill-suited to large pumped storage projects
 - Pumped storage projects have longer lead times than other technologies: minimum 5-7 years of environmental permitting, additional development engineering required before construction start, 2-5 years of construction (including fill of lower reservoir, if necessary)
 - Large projects like Eagle Mountain likely require off-take agreements with multiple LSE's given substantial capital costs and system-wide benefits; RFOs are not structured to allow for this

Need for Alternative Procurement Options



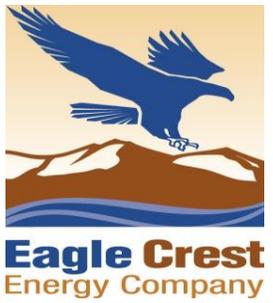
Despite cost/benefit studies showing substantial ratepayer savings, given scale of Eagle Mountain, IOUs reluctant to act absent CPUC regulatory nudge

CPUC might consider structures that encourage procurement, including:

- Directing IOUs to commence negotiations for Storage Purchase Agreement (SPA) or otherwise set deadlines for IOUs to report back to CPUC → Need to include pathway to allow multiple off-takers to procure benefits of bulk storage projects
- Contingent procurement → impose low-risk, collaborative procurement approach for one or more IOUs to begin making no regrets capital investment to encourage project development

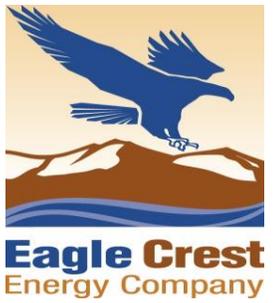
Would build upon CPUC's direction in original storage decision urging IOUs to bring pumped hydro projects to Commission for consideration; has not happened to date

Multilateral Storage Procurement Agreement



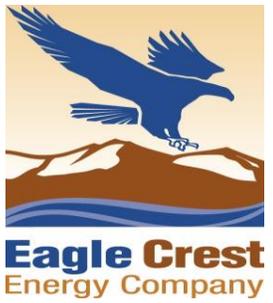
- Could be prompted by formal request from CPUC and CEC to IOUs and other interested entities to meet and confer with developers like Eagle Crest Energy
- Would eliminate uncertainty associated with years of hearings and workshops to determine if California is serious about developing large-scale energy storage projects
 - Important for ability of developers to finance projects
- Negotiated SPA would undergo normal Procurement Review Group review process (*i.e.*, with TURN and CURE) for review of pricing, terms and conditions prior to submission to CPUC for review
- Total length of SPA negotiation and approval process could be less than 2 years; faster than developing a new RFO process for such projects
 - Time is of the essence – bulk energy storage needs to be online by 2023 to help with over-generation and GHG reduction goals
- Aspects of multistage SPA:
 - Three stages: (1) advanced development period; (2) construction period; (3) commercial operations
 - Target price window and adjustments; price finalized at end of advanced development period
 - Development security replaced by execution of development budget until construction finance
 - Determination of appropriate level of transmission deliverability to achieve benefits
 - Ratepayer benefits

Contingent Procurement



- Contingent procurement concept originally proposed by SCE and approved by CPUC to build pipeline of projects under development that would provide backstop should projects under contract with IOU fail; concept has possible application to bulk storage
- Staged procurement process at the CPUC with initial investment approved by CPUC would send positive signal to market and unlock access to capital markets
- With CPUC encouragement , one or more IOUs could agree to fund initial engineering and development stages to allow greater precision in final pricing and commercial terms
- Only after project meets certain benchmarks would IOU(s) sign on to full SPA
 - Minimizes ratepayer risk with long lead-time project
 - Enables Eagle Mountain to move forward in order to meet looming 2023 need

Concluding Observations on Pumped Storage Development Challenges



Time is of the essence – ISO needs energy storage projects to be online by 2023 to help with over generation and GHG reduction goals

- Large-scale projects have long lead time to be operational by this date

No one-size-fits-all solution – Large-scale projects do not fit into the regular RFO process. Separate bilateral process makes sense because of project size and need for multiple counterparties

Procurement Path Uncertainty – Regulatory uncertainty associated with years of hearings and workshops on procurement undermine ability to develop large-scale energy storage projects in California

- Bilateral process directed by CPUC creates a path to an SPA and gives project developers the ability to finance their projects