DOCKETED

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Gas Compressed Natural Gas Energy Storage for Safe, Clean, and Rapid Deployment

Thank you for providing a forum to submit comments and new ideas on the Aliso Canyon response challenge.
General Electric provides many types of energy storage - We are an active participant in Pumped Hydro, Liquid and Compressed Air, Gas, and of course, Battery Energy Storage where we are proud to be constructing a 30MW/20MWh BESS for the Imperial Irrigation District with COD expected in 3rd quarter of 2016. We have submitted our Battery energy storage capabilities to this task force for both short and term deliveries via our membership within the California Energy Storage Alliance (CESA).
The comments below are targeted towards GE's capabilities to supply a Gas Energy Storage Solution utilizing GE's motor driven CNG in a Box(CIAB) product. By integrating GE's CIAB, with standard CNG tube trailer storage and expansion valve skids, GE is able to provide a well know safe cost effective solution to support the peaking demands of gas needs. The intent of this solution is to operate the storage in parallel with the Southern California Gas System at the power plants, or other optimal locations, and charge the gas storage during off peak hours to offset higher gas usage during peak hours.
A single, optimized CIAB, coupled with 12 150,000 SCF Tube trailers can store enough gas during 14 hours of off peak compression operation to store ~155MWhs of operation if supplied to a LM6000. The intent is not to run the LM6000 only on the stored gas but to run in parallel allowing a reduced gas flow from SoCal Gas but still deliver the remainder to enable full power output from the power plant. The CIAB uses ~300KWs when compressing, and over a 14 hour period would consume ~4.2MWhs, or ~3% of the stored energy.
The elegance of this solution is manifested in several ways:
â€¢ No new sources of emissions since the CIAB is motor driven
â€¢ No new electrical Interconnections or electrical interconnect studies since we are using exiting interconnected equipment
â€¢ Extremely cost competitive - Budget pricing provided to several has indicated a cost point a magnitude or more below battery pricing
â€¢ Black start capability
â€¢ Rapid deployment - with all parties leaning in to support expedited contracting by May 7th, construction permitting and deployment -GE has provided proposals to indicate the ability to support up to 1250MWs and 3750 MWHs by Aug 1st and double that amount by Dec 1st.
Thank you for allowing me to comment and provide a solution to help support the platform of solutions to respond effectively to the Aliso Canyon Challenge.
Respectfully,
Joe Heinzmann
GE Energy Storage
Attachments - Aliso GE Gas Energy Storage 4-2016E

Additional submitted attachment is included below.

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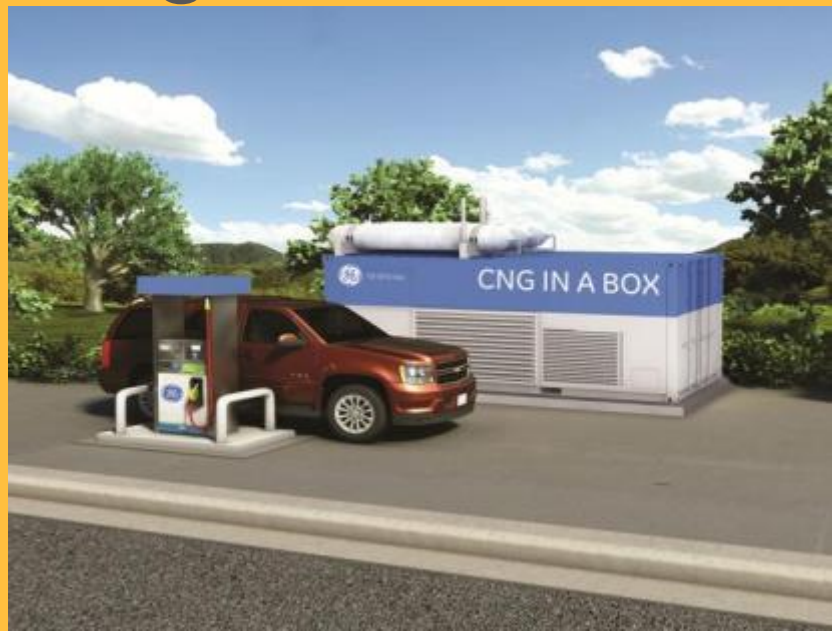
Aliso Canyon
Southern California
Natural Gas Energy Storage Solutions
CNG in A Box
200MWh
Gas Energy Storage



April, 2016

Focus on Aliso Canyon Solution

GE Gas Energy Storage Solutions
Sized for LM6000 4 hour solution – 200MWhs
GE CNG in a Box Compression

Key 3 month Periods
‘16 Summer Peak
‘16/17 Winter Peak
‘17 Summer Peak

GE LM6000 4 hr Solution-200MWhs

Compression

CNG 400 VP HF

- 350-550 psi inlet
- 1.5-2.5 MMSCFD capacity
- Re-deployable design
- Pipeline and treated flare gas recovery applications

+

Storage

Tube Trailers
12 needed -1.8mmscf

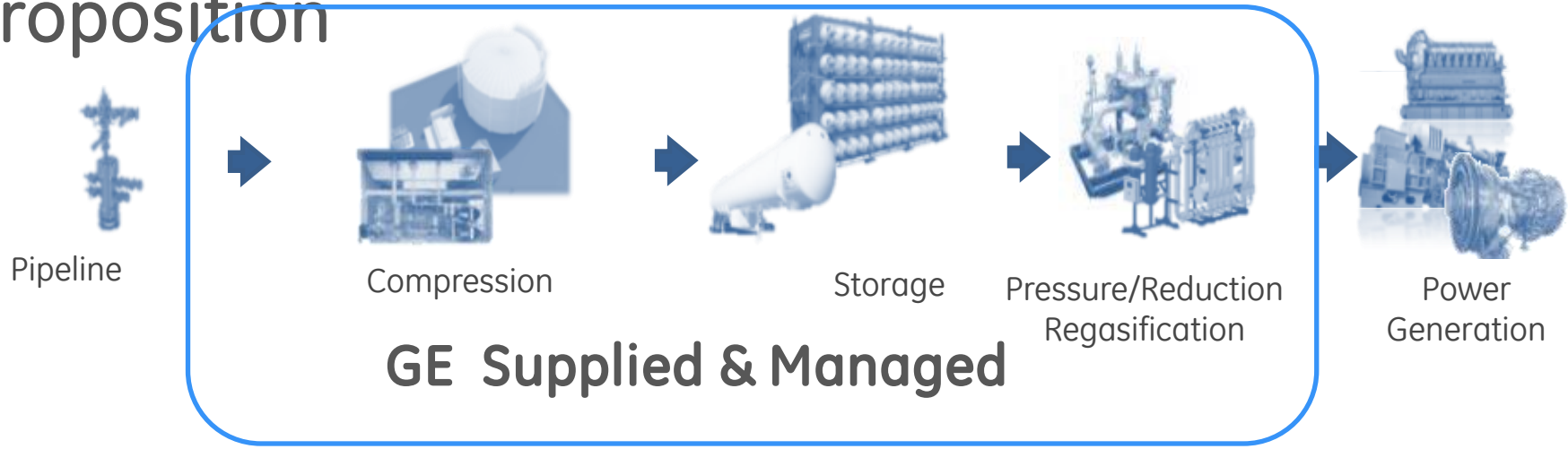
+

Expansion

Pressure Reduction Skid
2 for redundancy

- No new electrical interconnections
- Always paralleled with system
- Can provide gas balancing
- No New Emission Source
- No change in Operations or First Responders

Gas Compression/Store/Expand/ Value Proposition



Modular & Complete – Provides a single integrated solution with common system communication & control – bundled as completed virtual pipeline solution

Flexible – Ability to operate over range of operating conditions to meet most common site specifications

Fast Deployment – Modular skids designed to allow for truck-able deployment / retrieval with rapid set up where natural gas available

GE Holistic Approach – Apply GE expertise in Storage markets, compression, gas processing, modular skids, controls

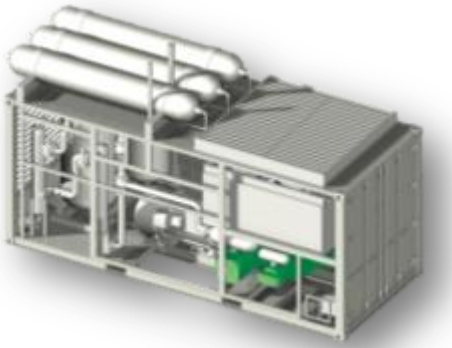
Reliable – Integrated solution – compressor and gas processing holistically developed system

Quality Control – consistent quality supply chain and manufacturing

Modular CNG Evolution

• Technology • Expertise • Capital experience

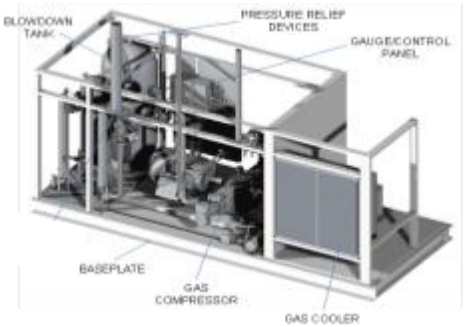
Per Compressor
LDC ~3-8 GGE/min / Pipeline ~ 9-15 GGE/min



- 400HP H304 compressor
- 2 to 4 stages
- High capacity cooler
- 20 MMSCF Dryer
- Opt. On-Board Storage
- Remote Power Panel

CNG 400

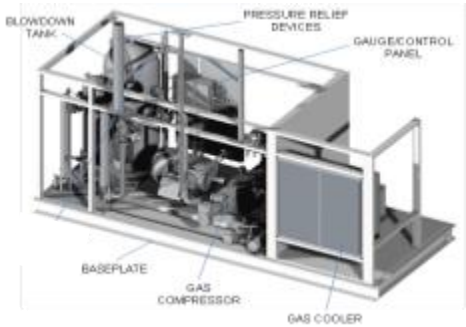
Per Compressor
LDC ~1.5-4 GGE/min / Pipeline ~ 4-7 GGE/min



- 200HP H302 compressor
- 2 to 4 stages
- Flexible Cooler
- Modular Dryer
- Remote or On-Skid Power Panel
- Flexible Enclosure

CNG 200

Per Compressor
LDC ~1-3 GGE/min / Pipeline ~ 3-4 GGE/min



- 120HP M302 compressor
- 2 to 4 stages
- Flexible Cooler
- Modular Dryer
- Remote or On-Skid Power Panel
- Flexible Enclosure

CNG 120

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Focus on large system

- For vehicles
- ViP features available
- 350-550 psi inlet
- 2.5 MMSCFD

CNG 400 HF System

- 350-550 psi inlet
- 1.5-2.5 MMSCFD capacity
- Re-deployable design
- Pipeline and treated flare gas recovery applications

CNG 400 VP HF

- New 550 -1000 psi inlet
- 2.5-4 MMSCFD capacity
- Re-deployable design
- Pipeline gas and tight or dry well gas applications

CNG 400 VP XF

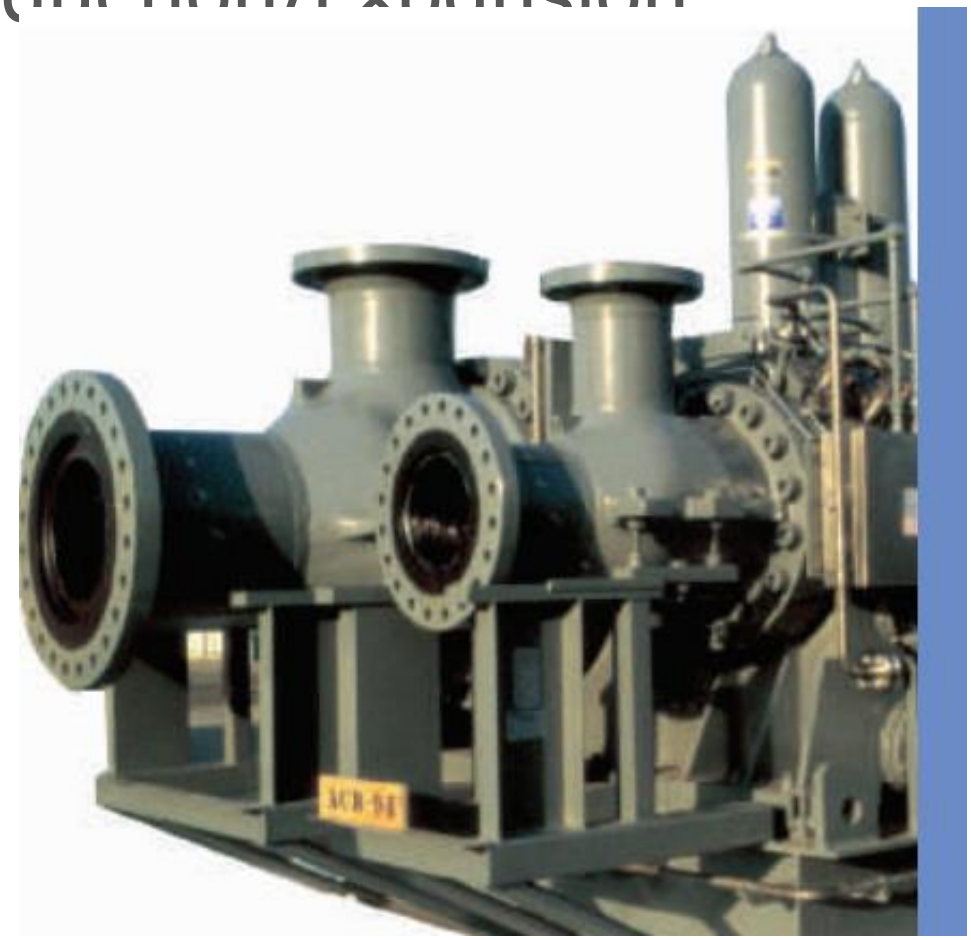
1
Last Mile
3/16/2014

- Typical 22 week lead time
- 2 Available in July
- 1 can compress enough gas in a day for LM6000

Modular Tube Storage

Tube Trailers are available for lease/rent
Need 12 to store gas for 4 hour LM6000 runtime

Pressure Reduction/Expansion



500K scf/hr to support LM6000

Table 7 Los Angeles Basin Gas Fired Electric Generation Plants

	Electric Generation Station
1	LADWP Haynes Generation Station
2	LADWP Scattergood Generation Station
3	LADWP Valley Generation Station
4	LADWP Harbor
5	SCE Alamitos Toll
6	SCE Huntington Beach Generating Station
7	SCE Redondo Beach
8	SCE Barre Peaker
9	SCE Center Peaker
10	El Segundo Energy Center, LLC
11	El Segundo Power, LLC
12	Long Beach Generation, LLC
13	City of Glendale
14	City of Burbank
15	City of Pasadena
16	City of Anaheim - Canyon Power
17	City of Vernon - Malburg
18	Southern California Public Power Authority – Magnolia

LADWP Haynes Generating Station

Address: 6801 E 2nd St Long Beach, California 90803
Available Land: (210'x240', 112'x268', 170'x320')

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LADWP Scattergood Generating Station

Address: 12700 Vista del Mar Los Angeles, CA 90293
Available Land: (185'x315', 165'x225')

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LADWP Valley Generating Station

Address: 11801 Sheldon St, Sun Valley, CA 91352
Space Available: 145’-220’

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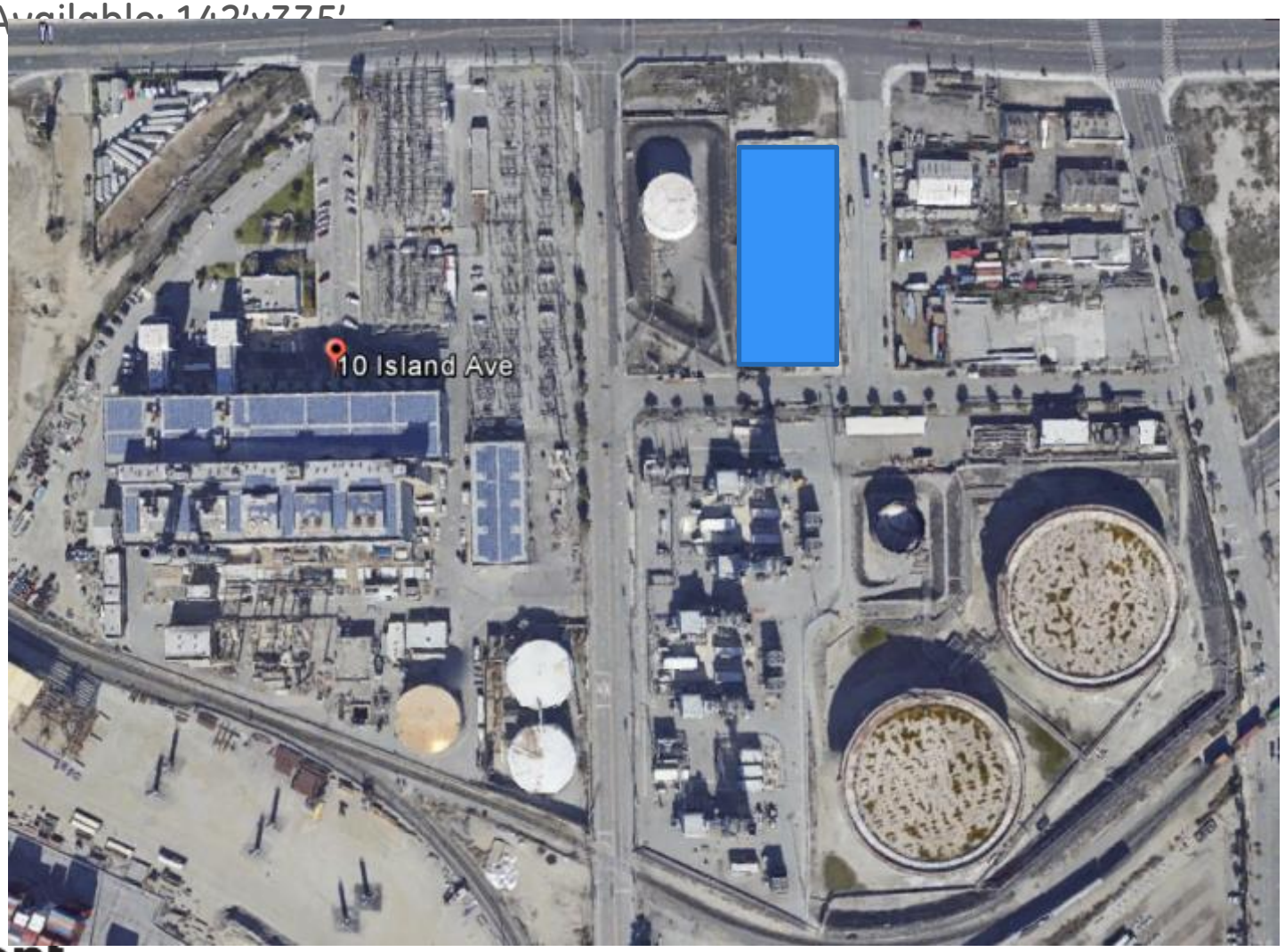
LADWP Harbor Generating Station

Address: 10 Island Ave, Wilmington, CA 90744

Space Available: 142’x775’



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El Segundo Power Plant

Address: 300 Vista Del Mar Blvd, El Segundo, CA 90245
Space Available: None Available. Customer may be identify for 145’x220’

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Long Beach Generation LLC

Address: 2665 West Seaside Boulevard, Long Beach, California
Land Available: 245’x240’

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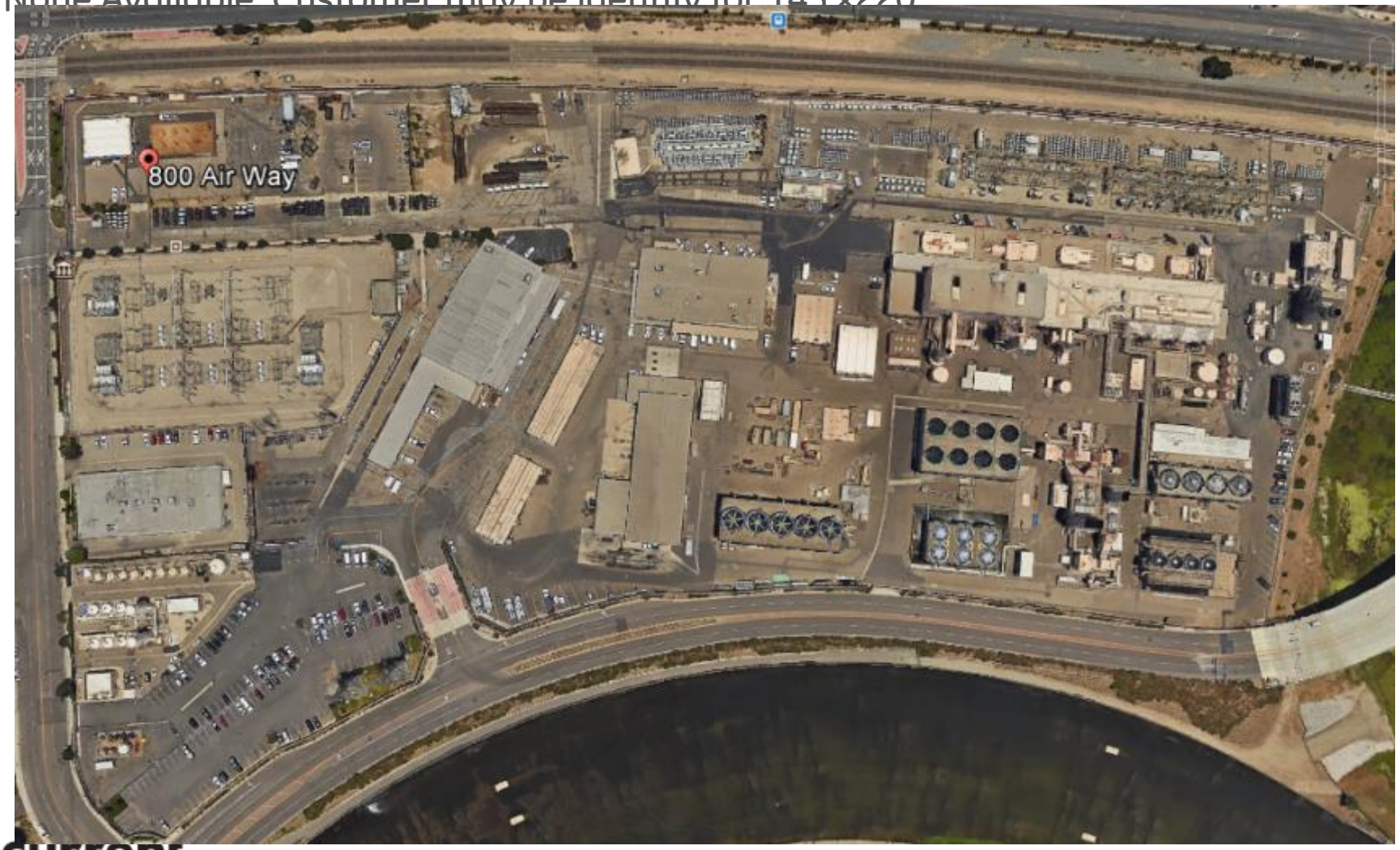
Glandale (Grayson Power Plant)

Address: 800 Airway, Glendale, CA 91201

None Available. Customer may be identify for 145'x220'



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City of Burbank (Magnolia Power Project)

Address: W Magnolia Blvd, Burbank, CA 91502
Land Available: Non Available for 220'x145'

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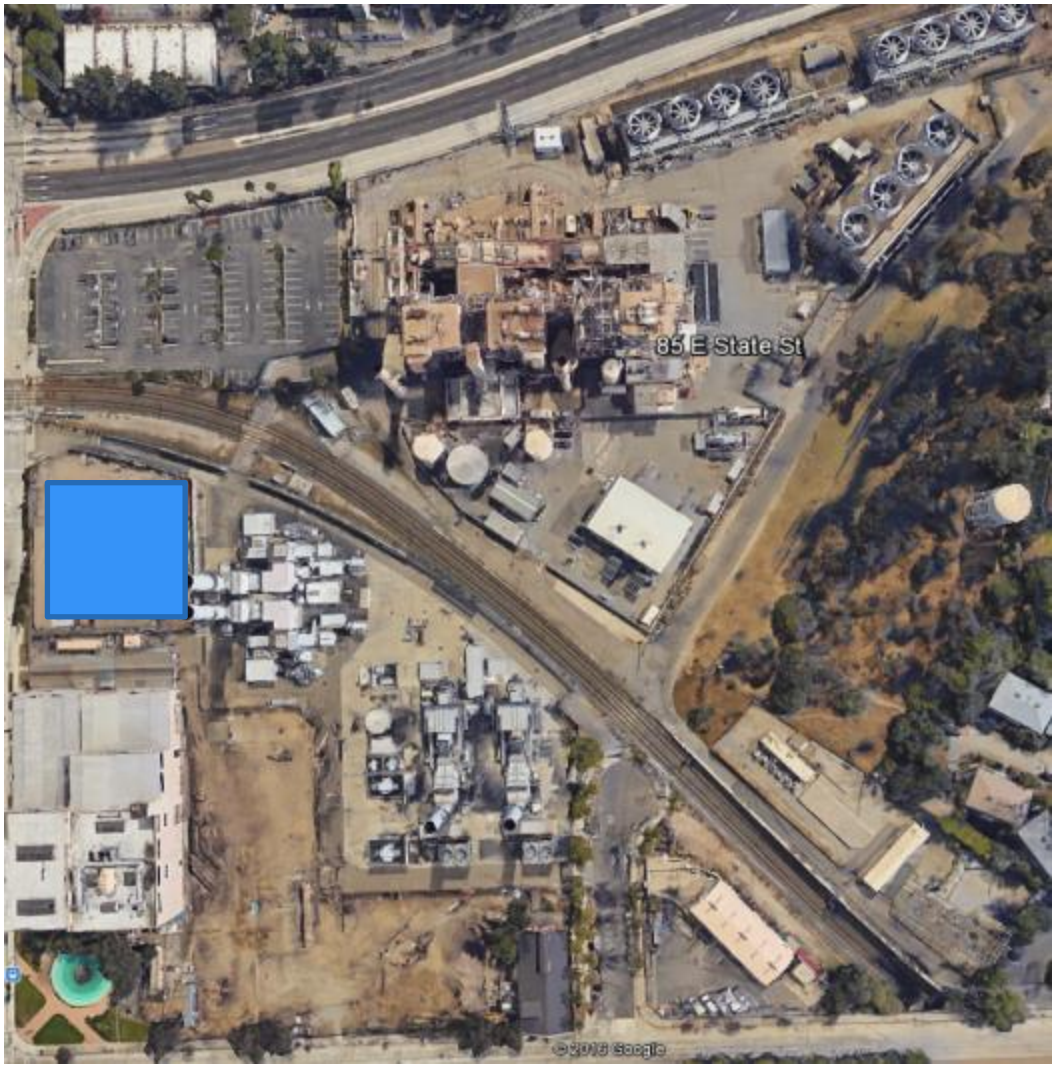
City of Pasadena (Glenarm Power Plant)

Address: 85 E State St, Pasadena, CA 91105
Land Available: 150'x150'



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City of Anaheim (Canyon Power Plant)

Address: 3409 **E Miraloma Ave, Anaheim, CA** 92806
Land Available: 275'x286'

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City of Vernon (Malburg Generation Station)

Address: 2799 E 50th St., Vernon, CA 90058

Land Available: 278'x519' (Land is not confirmed if part of the plant)

current
powered by GE

Magnolia Power PLant

Address: W Magnolia Blvd, Burbank, CA 91502

Land Available: Non Available for 220'x145'

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Next Steps

Level of Interest

Soil analysis

Interconnect Support

For more information please contact your GE Account Manager:

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