

Long Beach Pilot Plant Project



CASE STUDY LONG BEACH HARBOR

Hybrid Water/Electric Supply will provide a utility upgrade with the unique Water and Power System

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Enough water and electricity for 4000 homes with the new project at the Pico Substation

- Natural gas fuel for the electric generator
- Waste heat from generator will power the
Desalination system

Revenues from water and electricity make this Pilot Plant stronger than just an electric power project

- Sales of water can be priced at typical desalinated water rates in California
- Profits from water sales make this project viable due to a desalination system that only requires 10% of the electricity as a regular reverse osmosis plant.



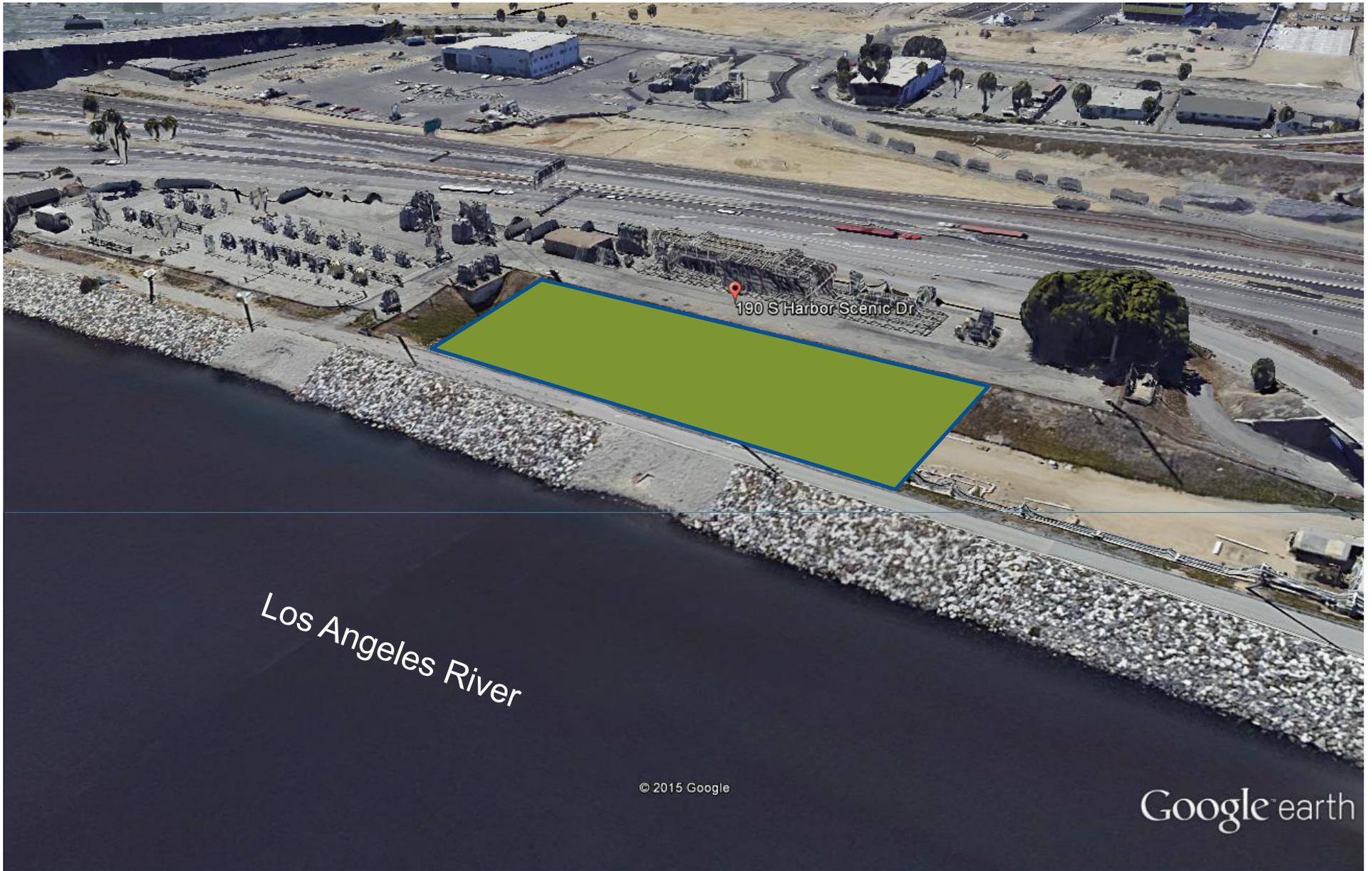
Pico Substation site

The “Pico Plant, LLC” will be a new organization owning and operating the new pilot plant

- ✓ The Pico Plant, LLC will be owned by stakeholders in the Pilot Plant project
- ✓ The Pilot Plant will make available a standard Water and Power Plant design for expansion projects in Long Beach



Pico Substation has available property for
Generator/Desalination equipment



Site of new Pico Water and Power Plant

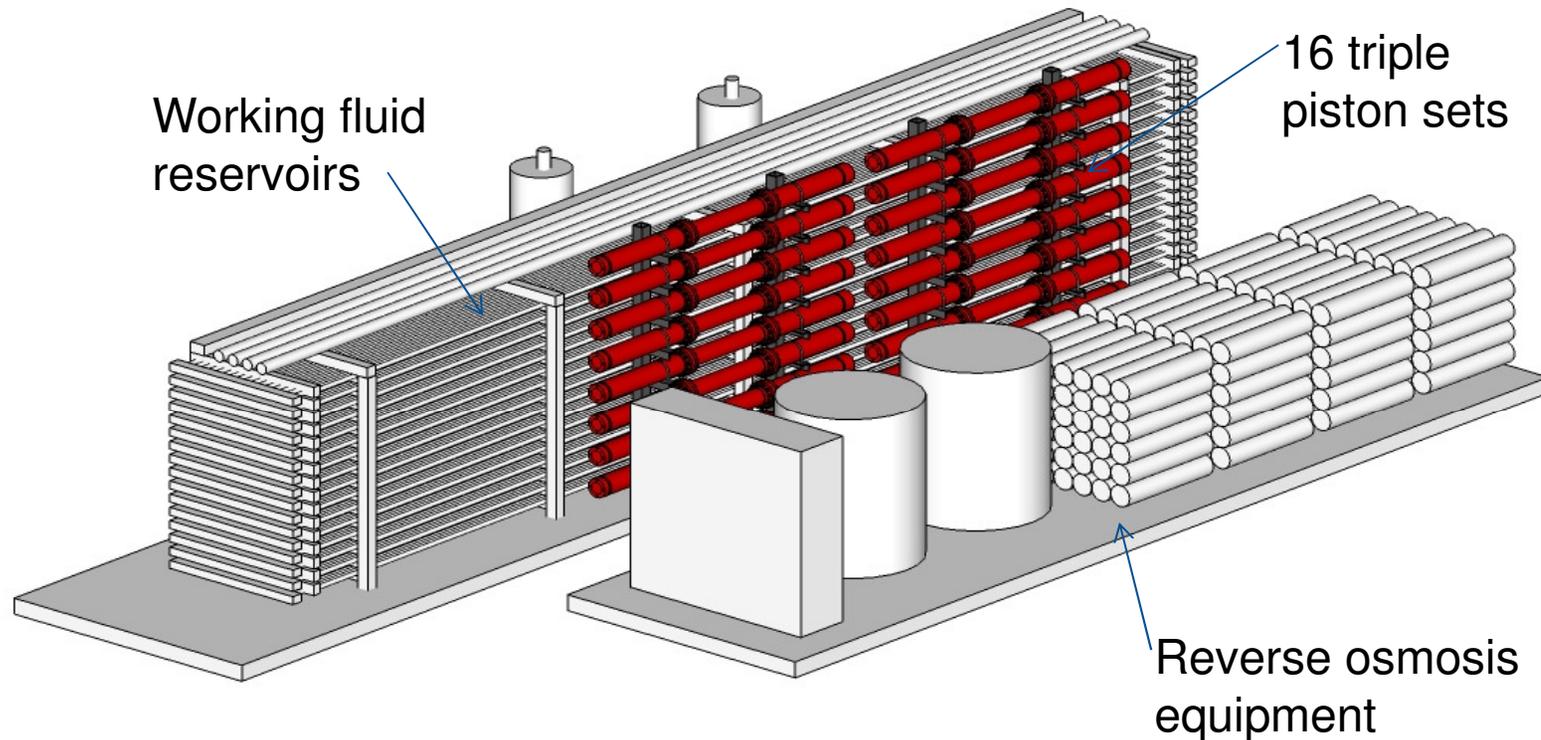


Natural Gas internal combustion engine generators such as Wartsila are the best fit for the Long Beach Pilot Plant

Deluge Desalination uses 90% less electricity than conventional Reverse Osmosis systems

Deluge Desalination is fueled by waste heat from the
natural gas internal combustion generator

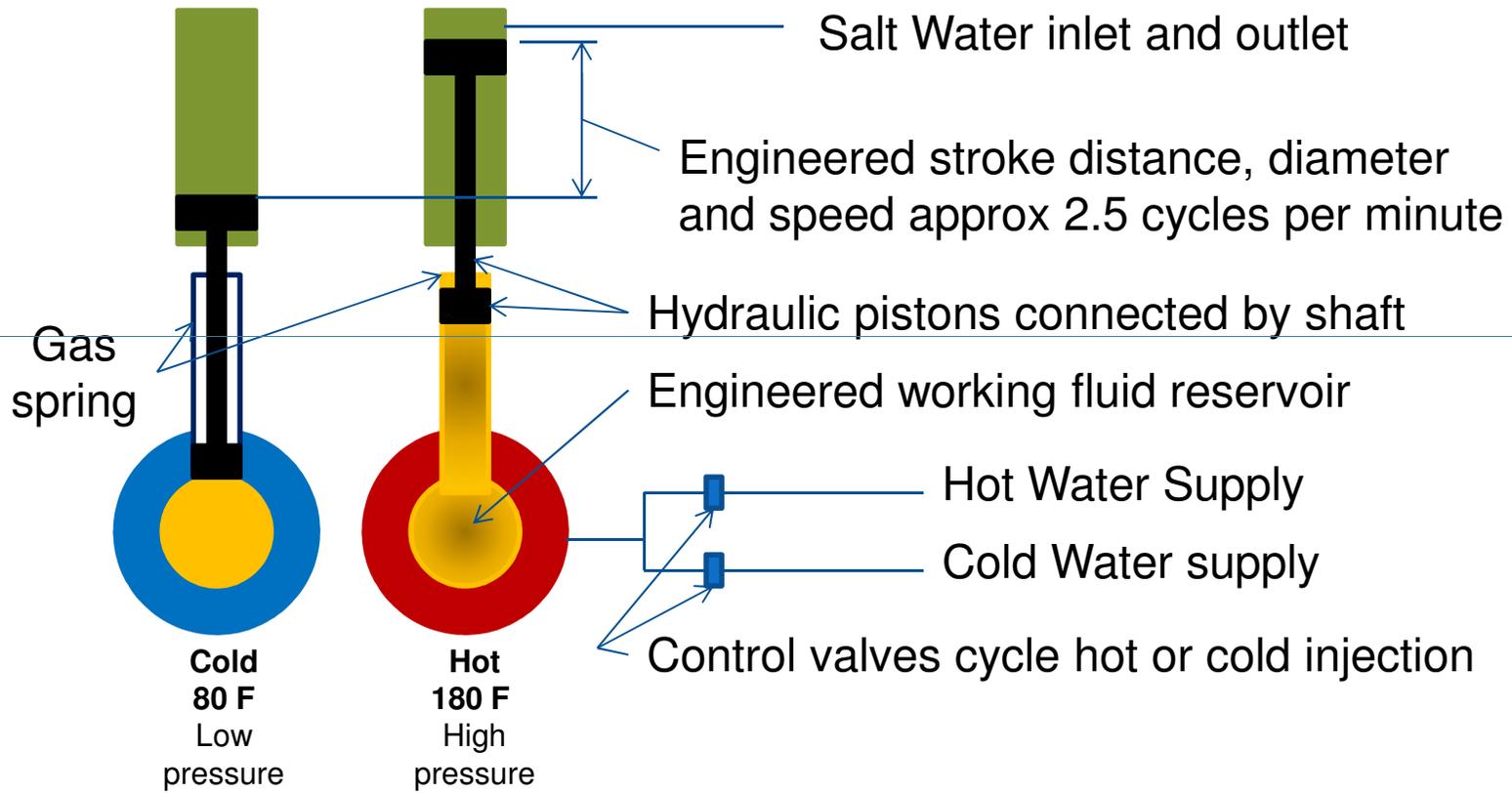
32 cylinder Hageman 350 horsepower engine pump replaces the electric motor pump in reverse osmosis systems



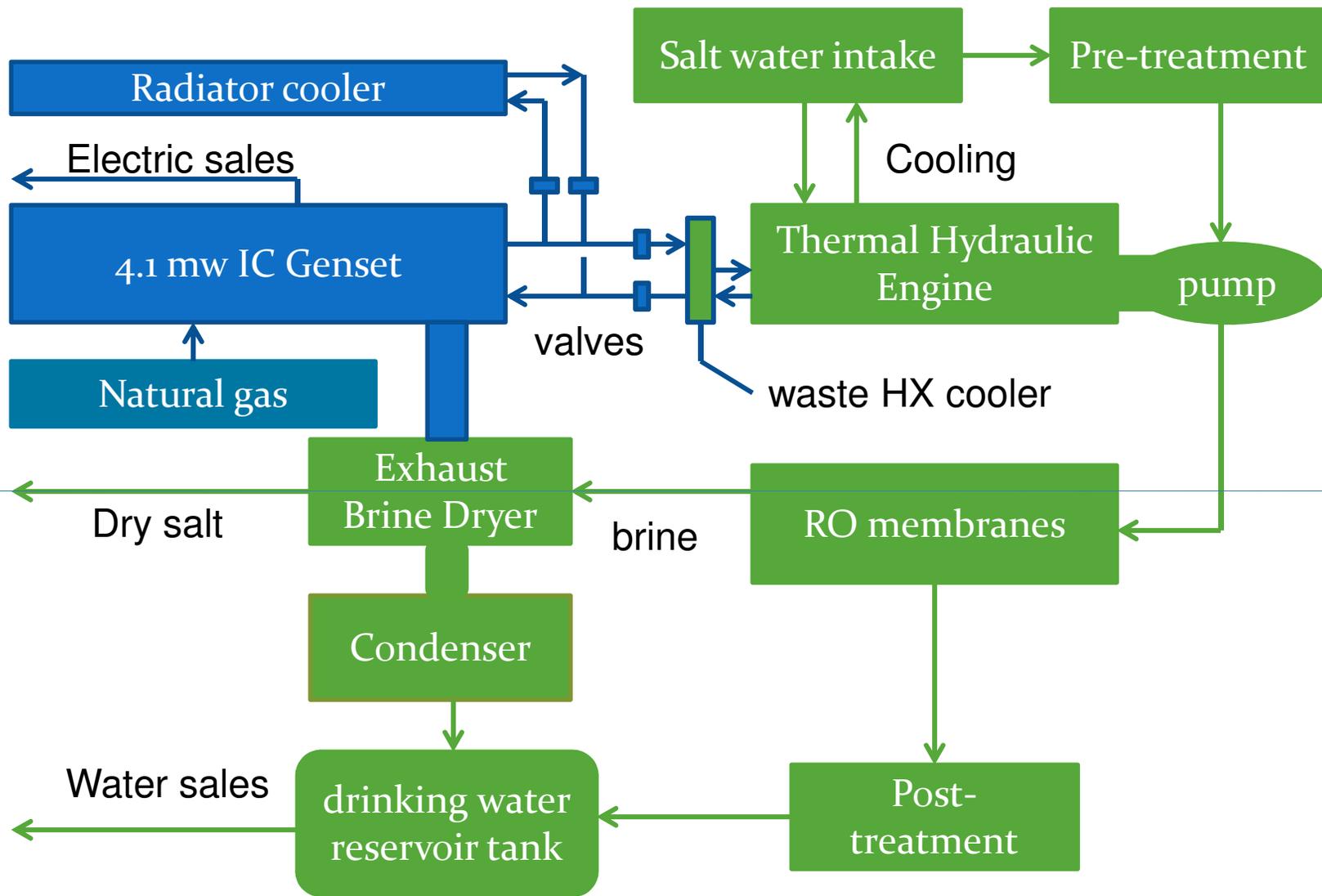
Deluge Desalination System

1.2 million gallons per day processed

Expansion of working fluid push pistons at high pressure
✓ Liquefied gasses have **very high** expansion rates



Deluge Single Cylinder Flow Diagram



Hageman Hybrid System Flow Diagram

Partial regulatory and permit requirements from:

HDP (Harbor Development Permit) From Port of Long Beach.

Grading Permit from City of Long Beach.

Building and Safety Permit form City of Long Beach.

Planning Department Permit from City of Long Beach.

Fire Access permit from City of Long Beach.

SCAQMD Permit to construct

LA Flood Control

California Coastal Commission

Los Angeles River Authority

(More may be needed)

Pilot Plant projected cost - \$14 million

Pilot Plant projected revenue per year

Electricity - \$1,700,000

Water - \$2,450,000

Total revenue per year - \$\$4,150,000

Funding for \$14 million

\$14 million at 6% interest with 10 year loan

\$1,865,200/year payments

Total interest - \$4,650,000 over 10 years

\$14 million at 6% interest with 20 year loan

\$1,203,600/year payments

Total interest - \$10,072,000 over 20 years

Fuel cost – natural gas



Electric generator fuel cost - \$760,000 per year
At \$3.00 mmbtu

Water desalination fuel cost - zero

Construction schedule



Feasibility Study – 6 months
Field construction - 12 months
Commissioning – 3 months

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For information about the Hybrid Water/Electric
Supply contact us below:

Brian Hageman
bhageman@delugeinc.com
www.delugeinc.com

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