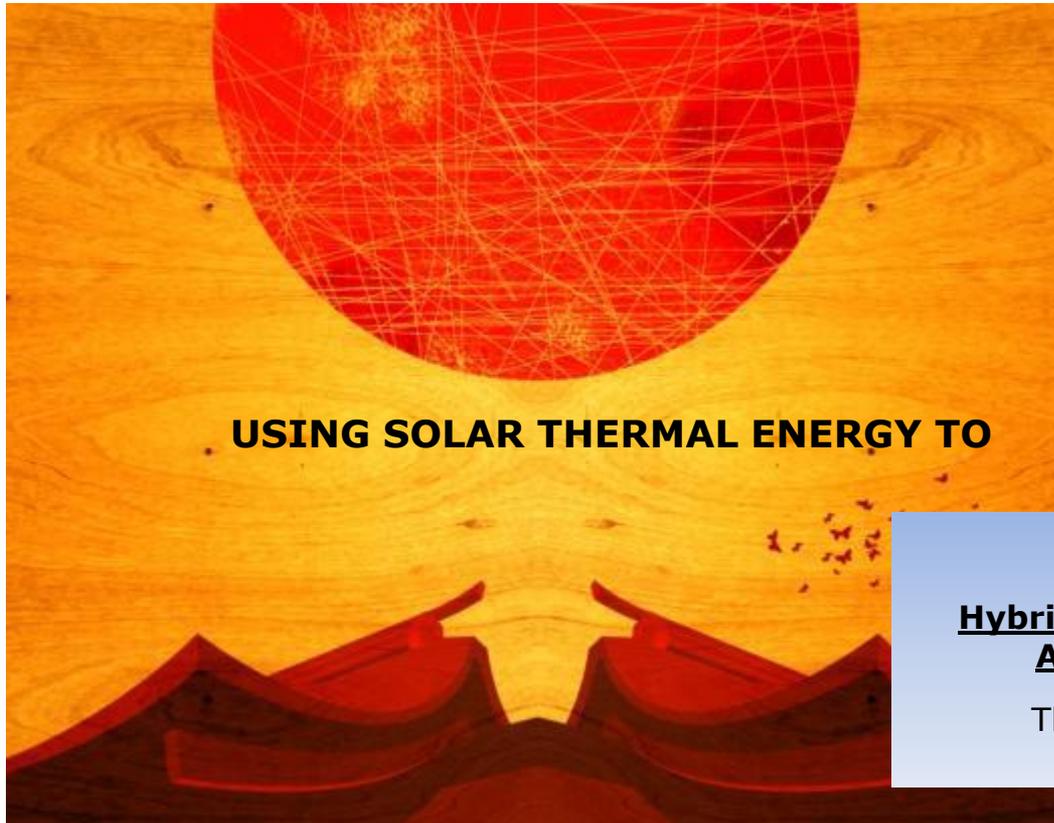


Deluge Natural Energy Engine™

Water & Power Expansion Projects



USING SOLAR THERMAL ENERGY TO



GREEN THE COMMUNITY

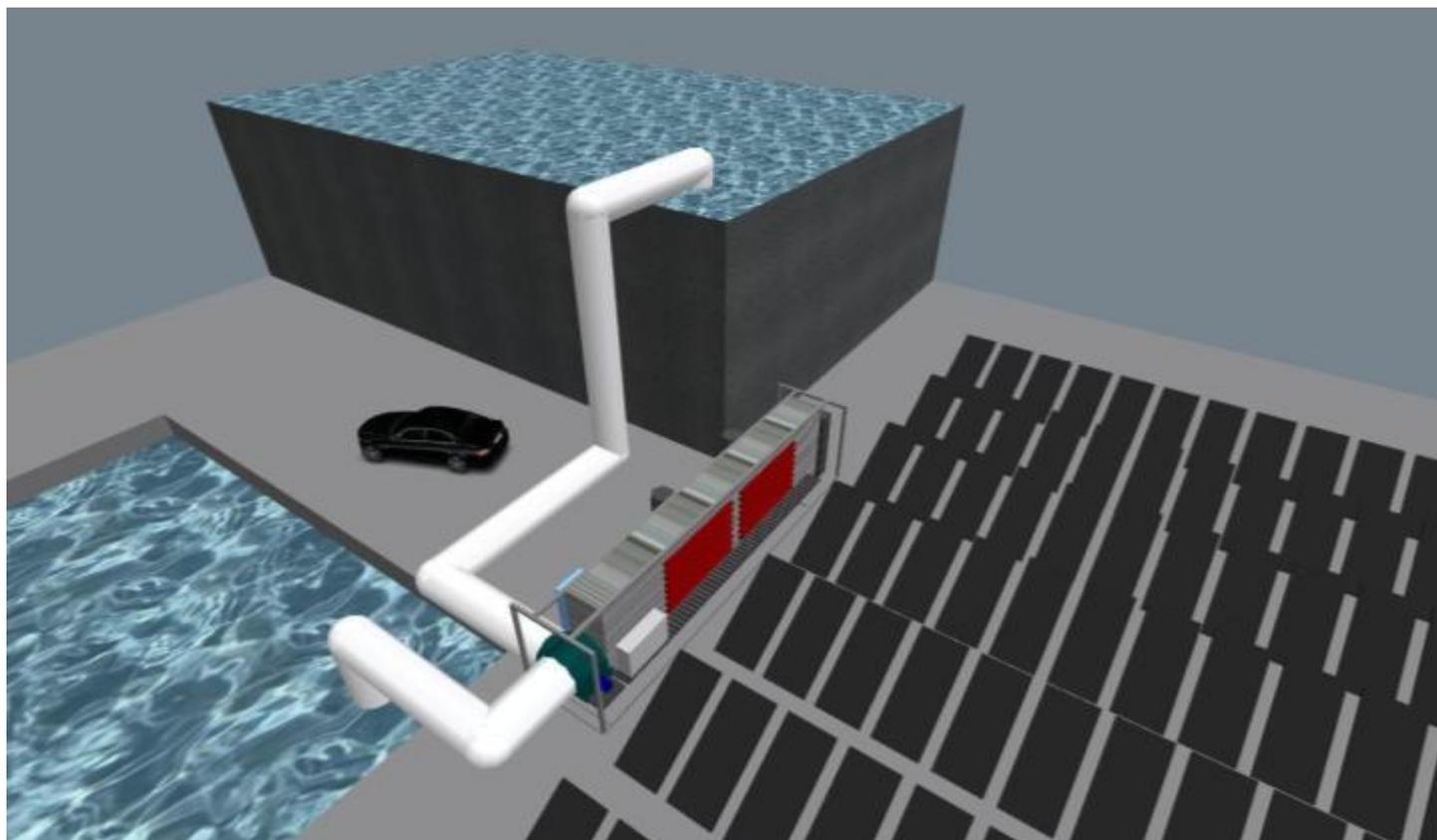
CASE STUDY

Hybrid Solar Thermal/SRP Electric Agricultural Water Supply

The Salt River Pima-Maricopa
Indian Community

Deluge, Inc.





Deluge Natural Energy Engine™ Water Pump
“Flat Plate” solar thermal collectors supply heat required

Deluge, Inc. 

Deluge 335 horsepower engine configured for water pumping, “fueled” by 180 F water



Deluge Natural Energy Engine™

Shop Tested – Field Proven

Patented in 40 countries

Testing with:
Sandia National Lab
Arizona State University
Indian Institute of Technology
Department of Interior Yuma Desalting Lab
Department of Energy RMOTC Wyoming



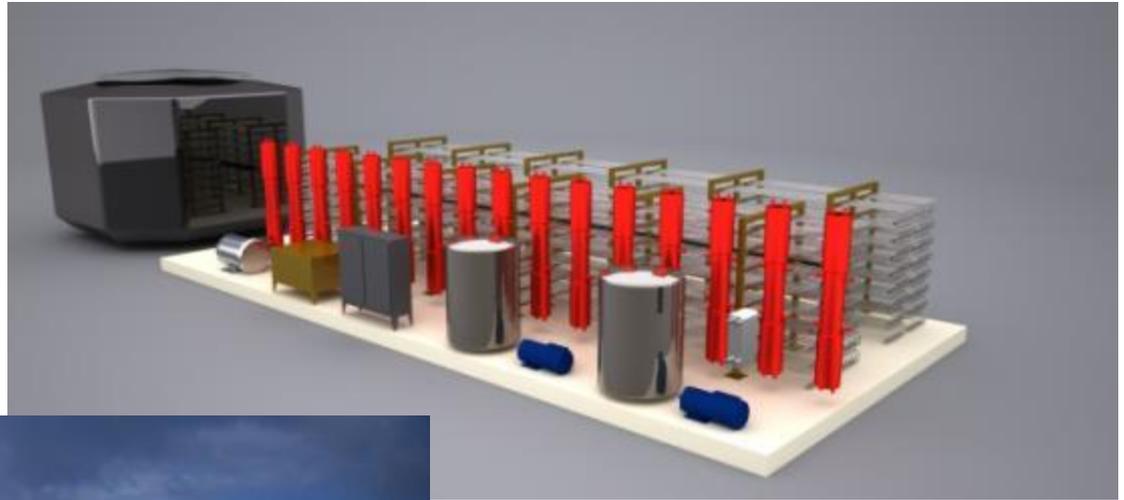
Award Winning Technology

Federal Laboratories Consortium's "Outstanding Technology Development Award" in 2005

Deluge, Inc. 

Over 150,000 hours of engine run time in the field

From Concept



To Reality

Deluge, Inc. 

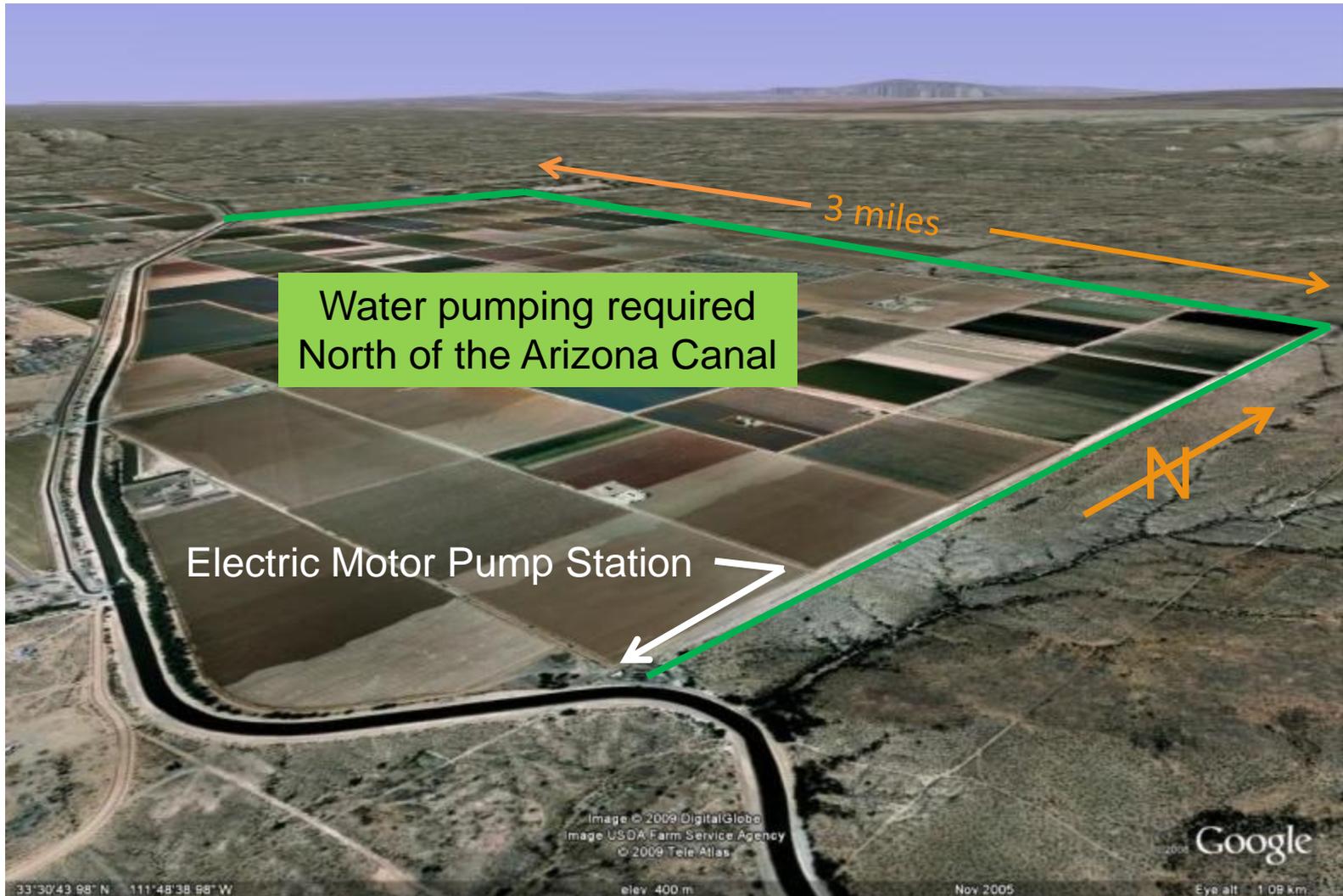
Providing design, engineering, manufacturing, installation and operations



The Salt River Pima-Maricopa Indian Community With SRP "Arizona Canal"



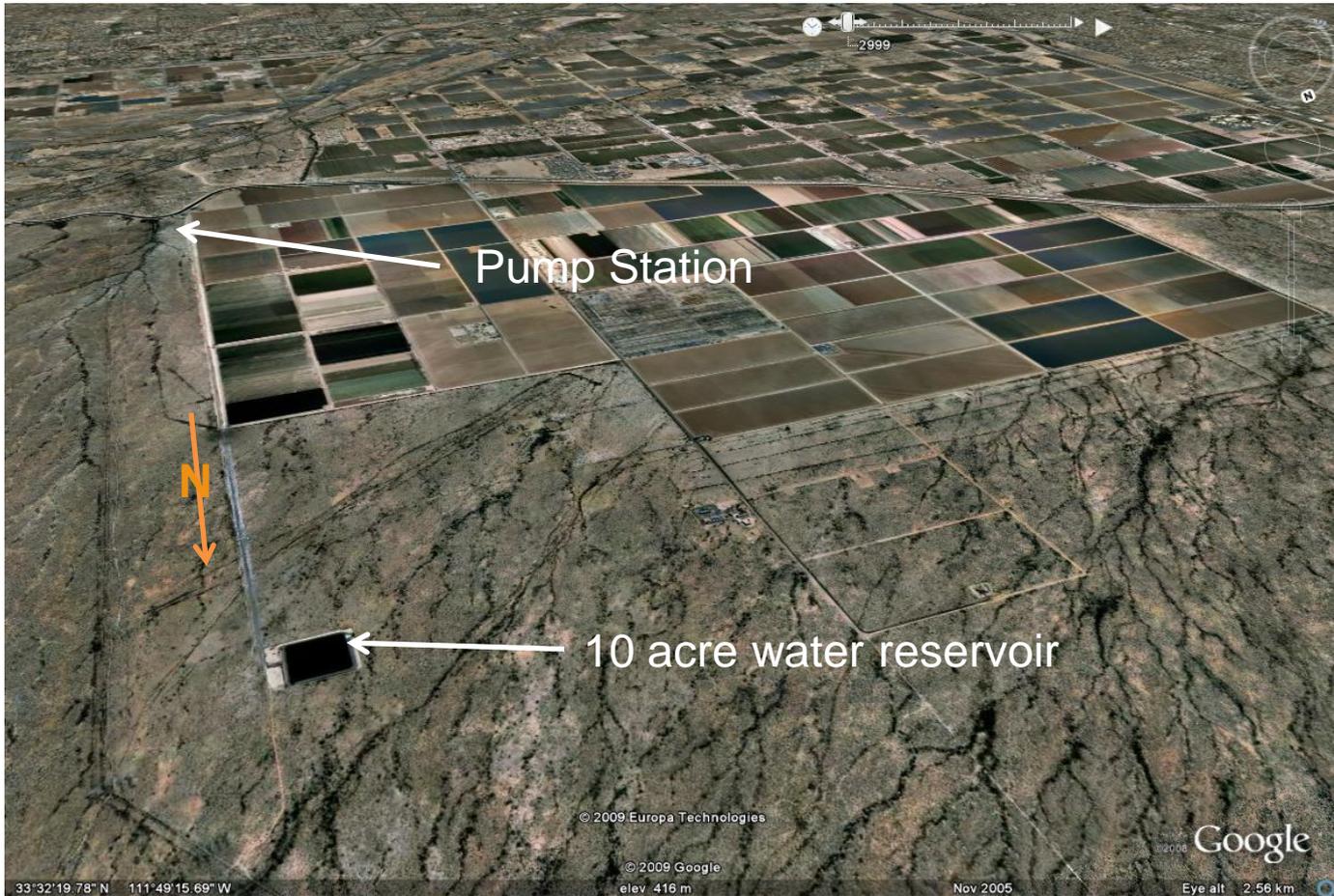
Farming in community uses traditional electric and diesel fueled irrigation



Water is pumped twice, first with electric then diesel engines for sprinkler pressure

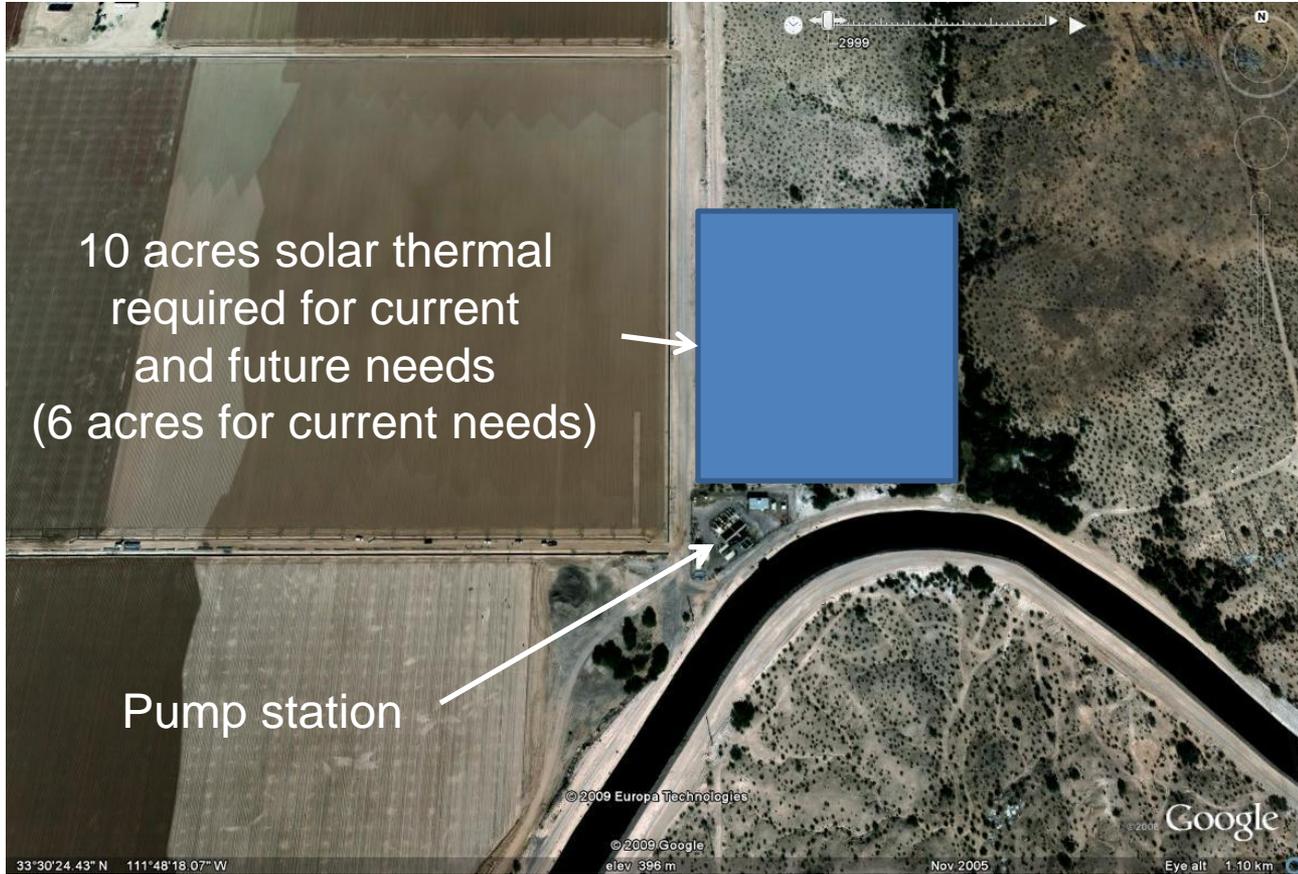


Pump station with 5 sump pumps deliver water north about 3 miles



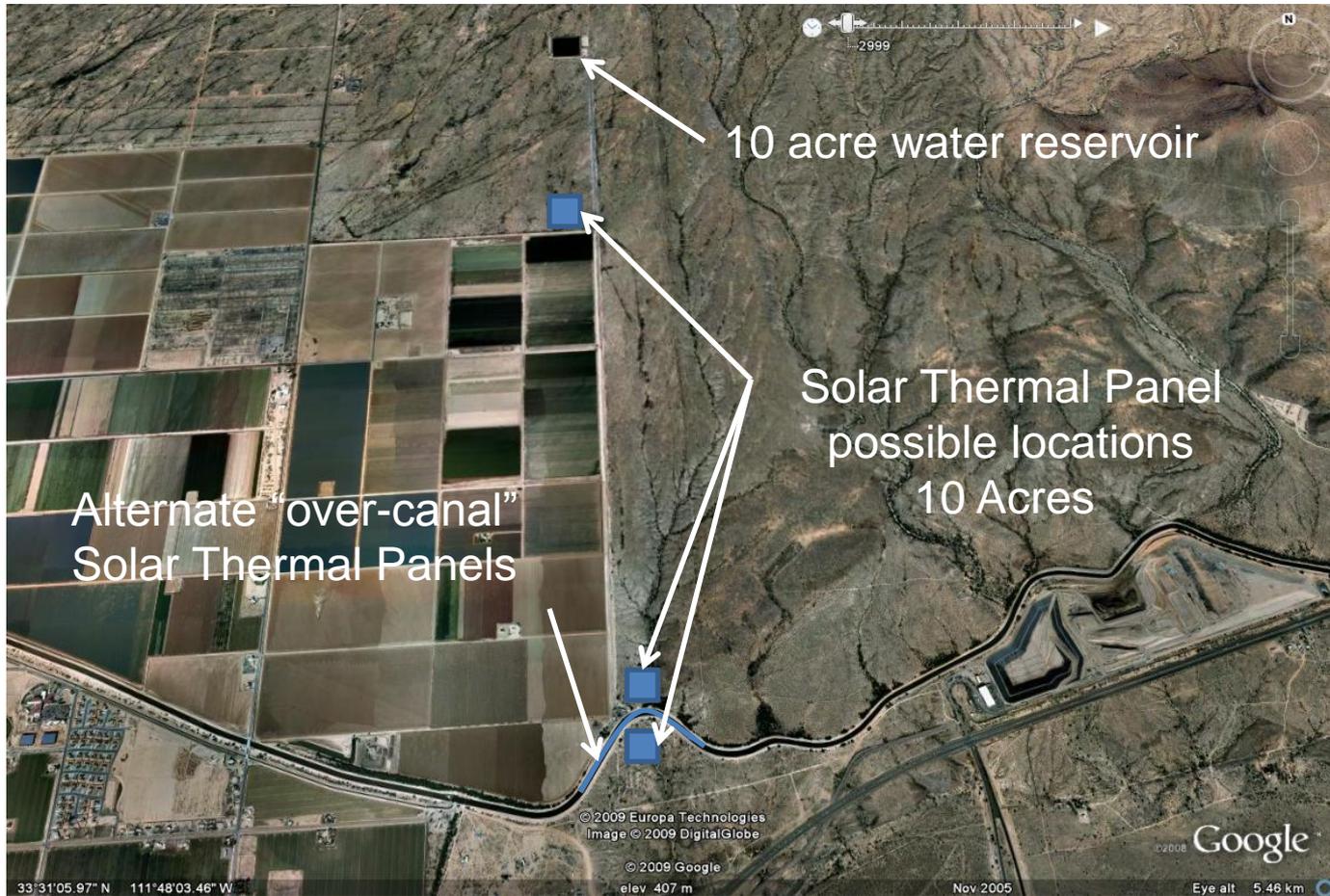
Looking South

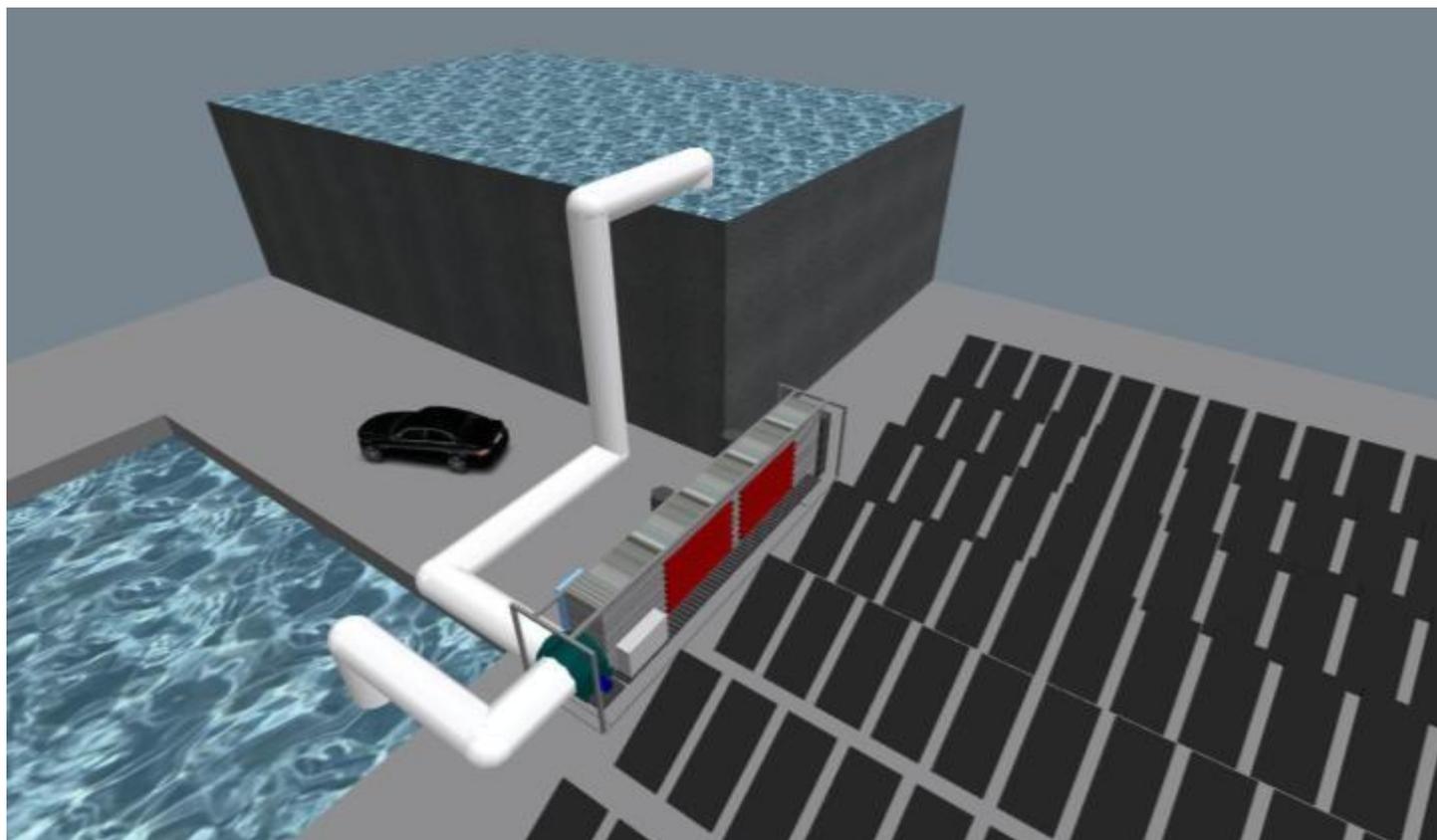
Reservoir at north end of farmland



10 acres solar thermal
required for current
and future needs
(6 acres for current needs)

Pump station





The Deluge Natural Energy Engine™ 335 HP Water Pump will provide an average of 56 acre feet of water pumped 25 foot in elevation every day

40,000 gallons per minute, 19.2 million gallons per day

Deluge, Inc. 



Pictured is a 335 HP hydraulic motor that replaces the electric motor

Note the compact size of the hydraulic motor

Electric motor



Deluge Natural Energy Engine™
configured for standard 40,000 gpm sump pump



Engine is powered by any heat source such as solar, geothermal, or waste heat



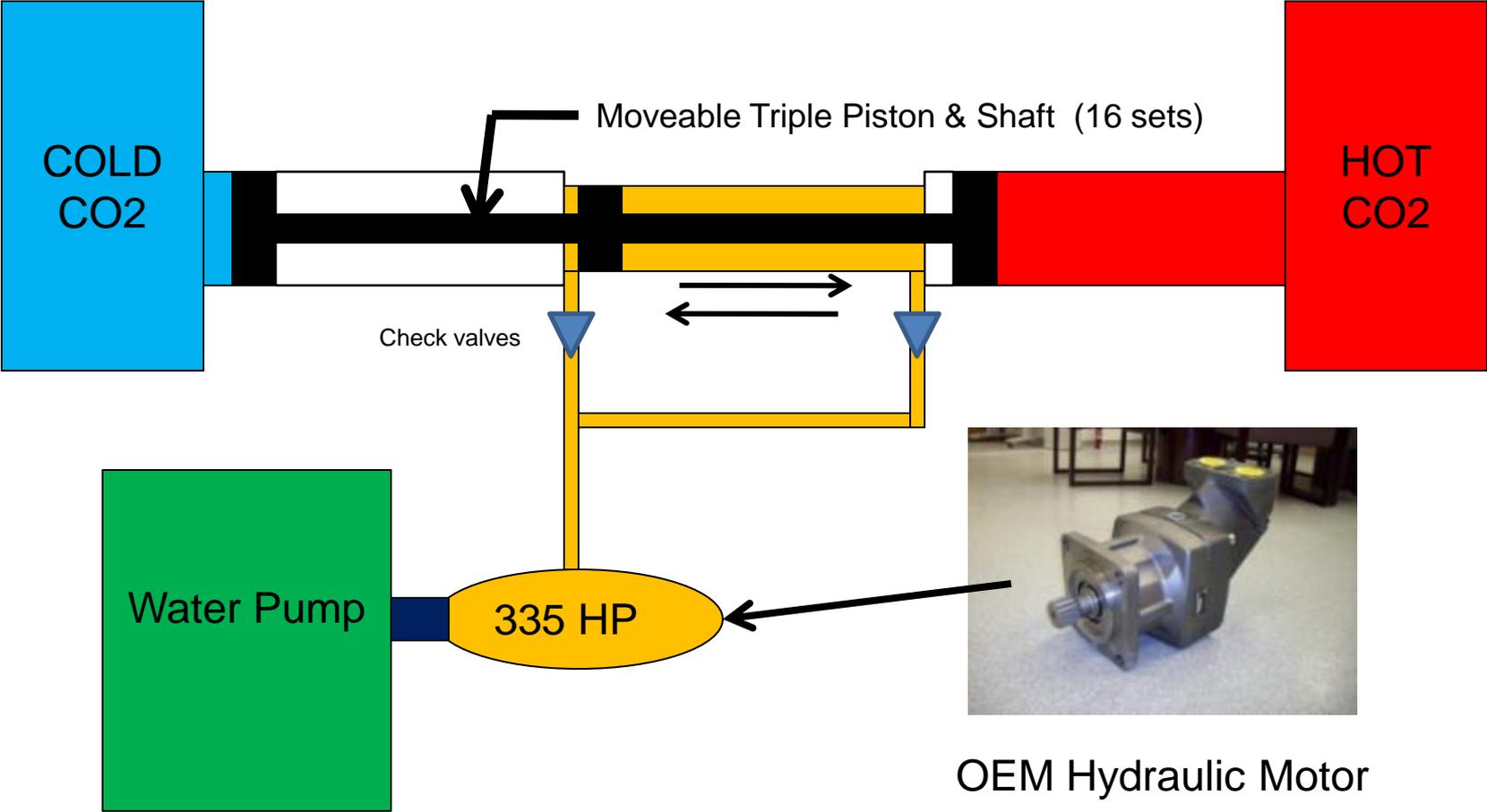
1340 HP Deluge Engines
4 each 335 HP
2 each (future)

Underground Hydraulic pipes



Pump station with 5 sump pumps deliver water north about 3 miles

335 HP Water Pump Configuration



90% less electricity use than electric motors

90% reduction in “carbon footprint”

Green credits available to SRP

**Financing may be available through
Federal Energy Loan Guarantees and Grants**

- 1200 HP current capacity
- 2200 HP future capacity

CURRENT SOLAR HYBRID ADDITION

Deluge 335 HP x 4 units = 1340 HP
Solar array approx 6 acres

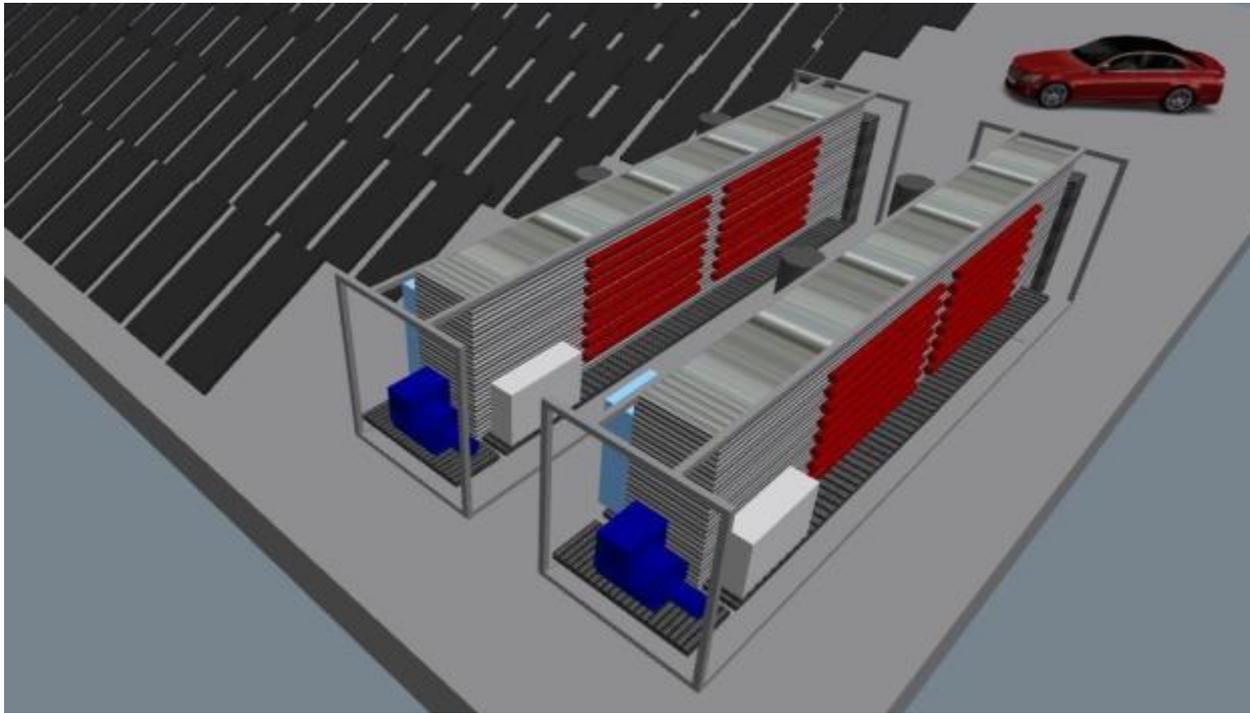
INSTALLED COST \$7.2 - \$10.4 MILLION

FUTURE UPGRADE

Deluge 335 HP x 6 units = 2010 HP TOTAL
Solar array under 10 acres TOTAL

ADDITIONAL \$3.6 – 5.2 MILLION

*Pumping system would be a Hybrid
Solar Thermal / SRP electric system*

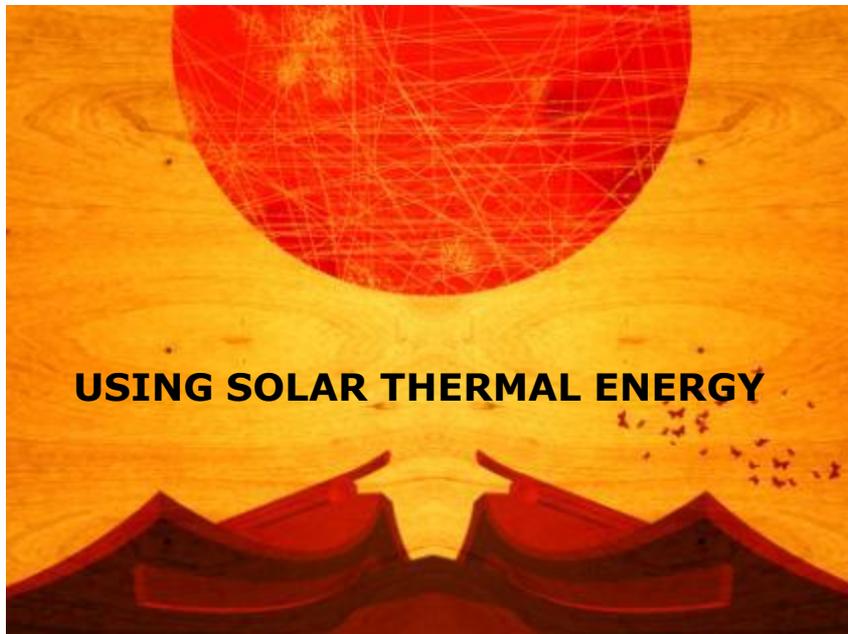
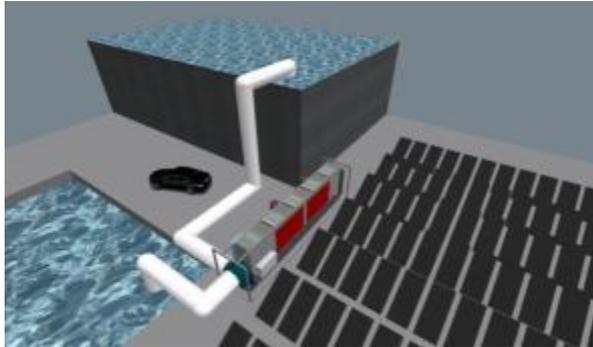


Electric generators also available
Shown is 500 kW requires 4 acres solar thermal

Deluge Natural Energy Engine™

Water Expansion Project

PROJECT CAN BE BUILT IN 6 - 10 MONTHS



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Agricultural Water Supply

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