

GEOHERMAL WELL PERMITTING IN CALIFORNIA

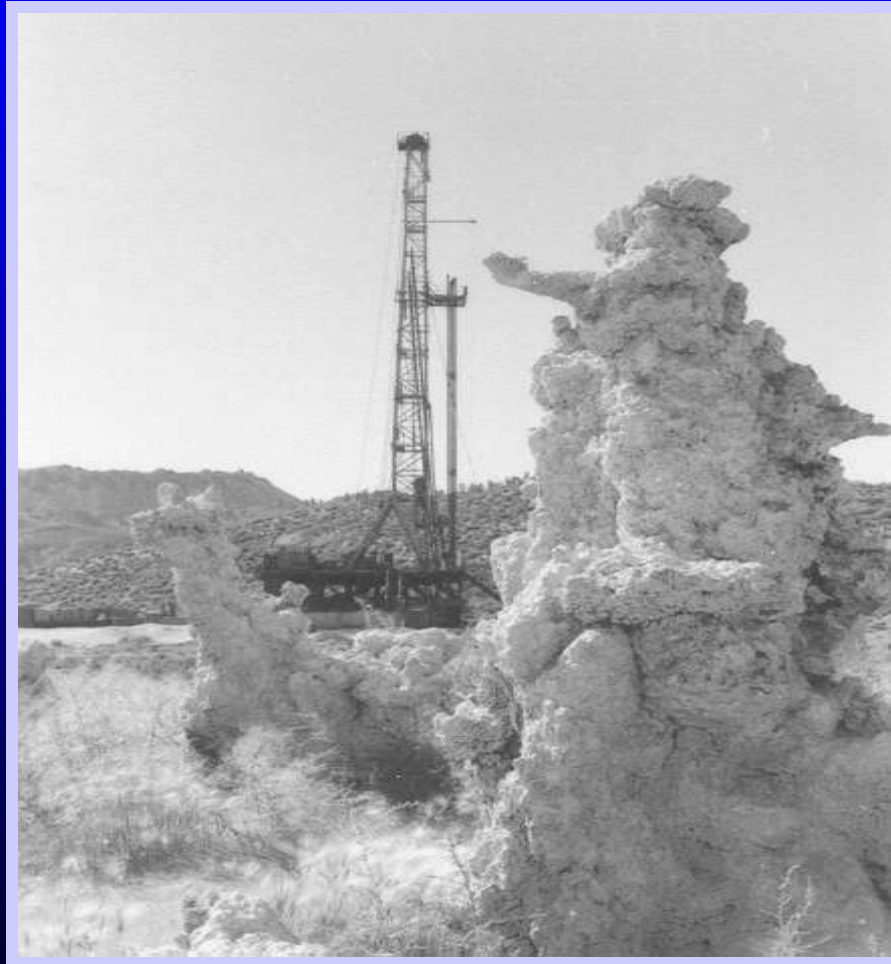
Elizabeth Johnson
Geothermal Officer



Department of Conservation
Division of Oil, Gas, and Geothermal
Resources

Managing California's Working Lands

Mono Lake





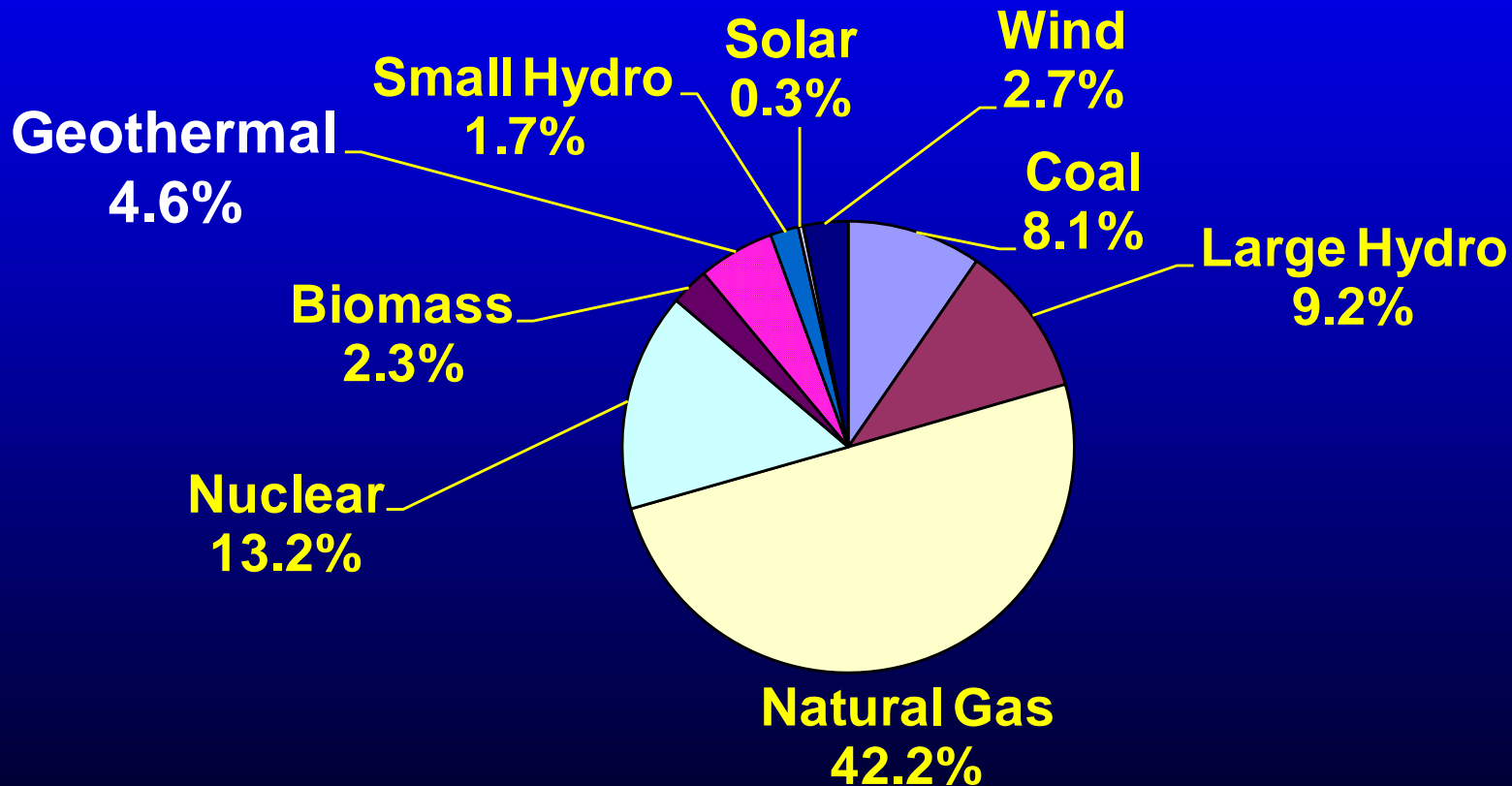
World's top 5 geothermal electrical producers (2010)

Country	Installed Capacity MW
USA	3093
Philippines	1904
Indonesia	1197
Mexico	958
Italy	843

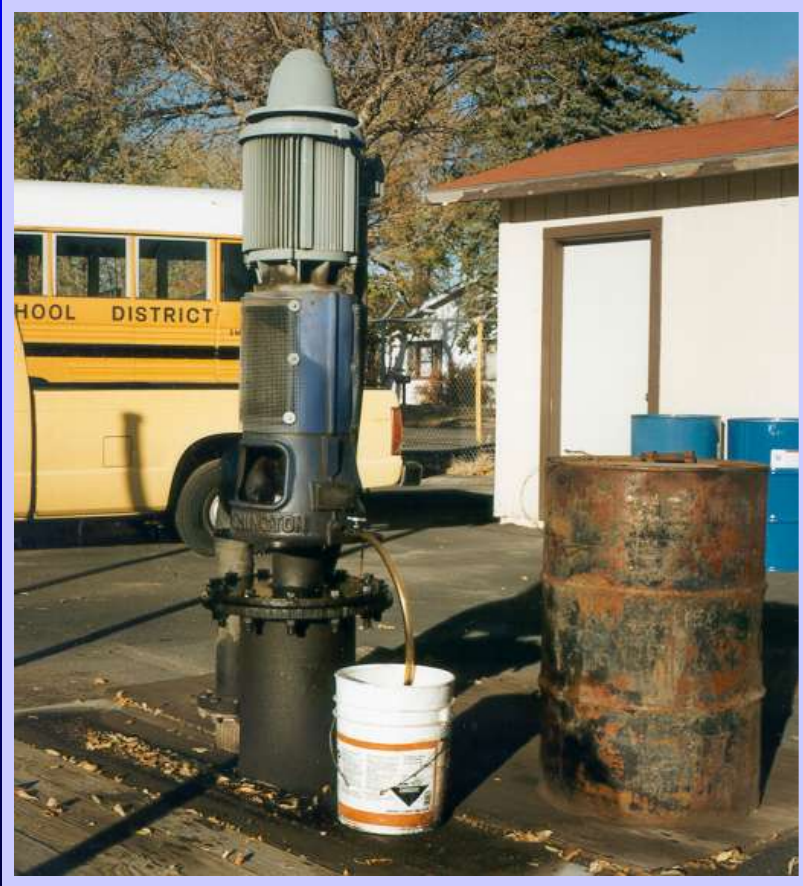
Electric Power Generation 2010

	Total Installed Capacity MW
CALIFORNIA	2605
NEVADA	448
UTAH	47
HAWAII	35

Sources of Electricity in CA, 2009







Active geothermal wells in California

- 455 steam wells
- 259 hot water wells
- 301 injection wells
- 61 observation wells
- 189 commercial low temperature wells
- 144 noncommercial low temperature wells
- 107 temperature gradient wells

California Geothermal Sites



Steps to drilling a new well in California

- Complete CA Environmental Quality Act Documents
- Designate an Agent
- Submit a Bond
- Submit a Drilling Fee
- Complete a notice of intent to drill form

Laws and Regulations



- Spacing
- Casing design
- BOPE equipment
- Unstable areas
 - Landslides
 - Hot springs
- Rework/maintenance
- Plug and abandon

Injection Projects



Permitting Challenges CEQA and New Technologies



California Environmental Quality Act



- Similar to NEPA
- 3 types of Documents
 - Environmental Impact Report
 - Negative Declaration
 - Mitigated Negative Declaration
- Project may be exempt

Lead agency

- Division of Oil, Gas, & Geothermal Resources (DOGGR) is lead agency for exploratory wells (excluding Imperial Co.)
- Local authority is lead agency for developmental wells, pipelines, & plants

Agencies that DOGGR collaborates with on CEQA

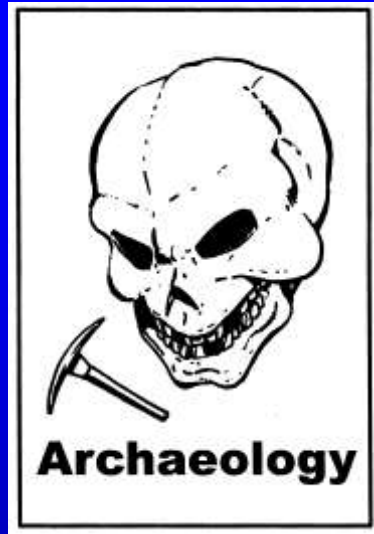
- Regional Water Quality Control Board-
sumps & discharge to land surface
- CA Dept of Fish & Game/U.S. Fish &
Wildlife Service-endangered species
- Local cities and counties-use permits,
zoning, noise, visual affects,water use
- Air Board-Dust, H₂S, other emissions
- Army Corps of Engineers-wetlands

Permitting Challenges- CEQA





Landslides



Archaeology



Neighbors

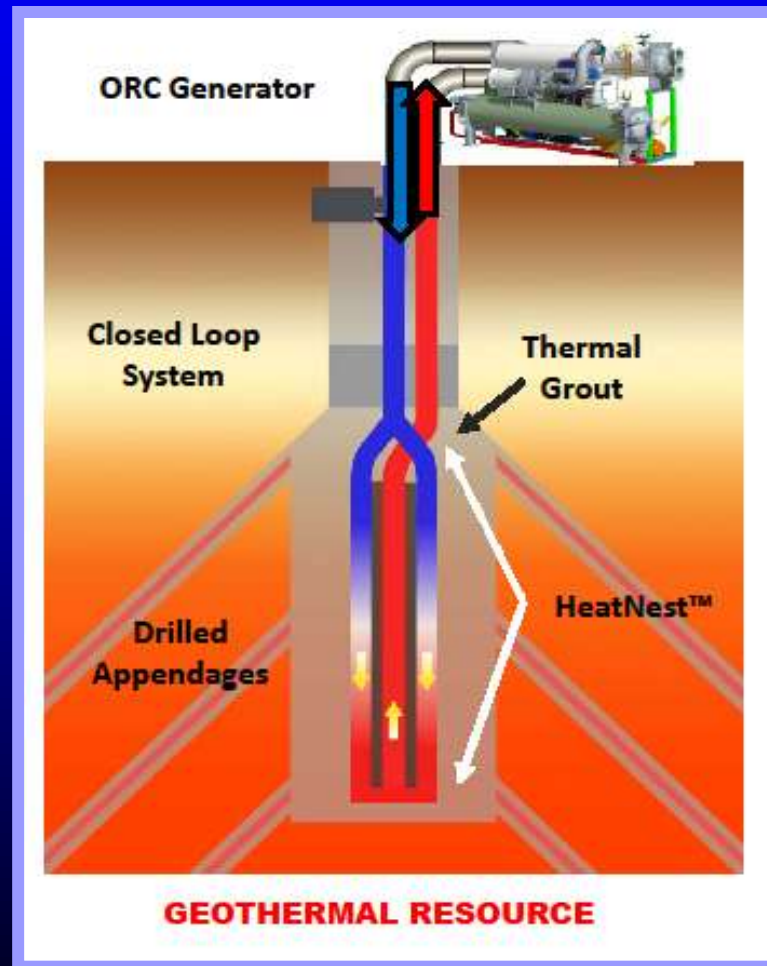


Wetlands



**Endangered
Species**

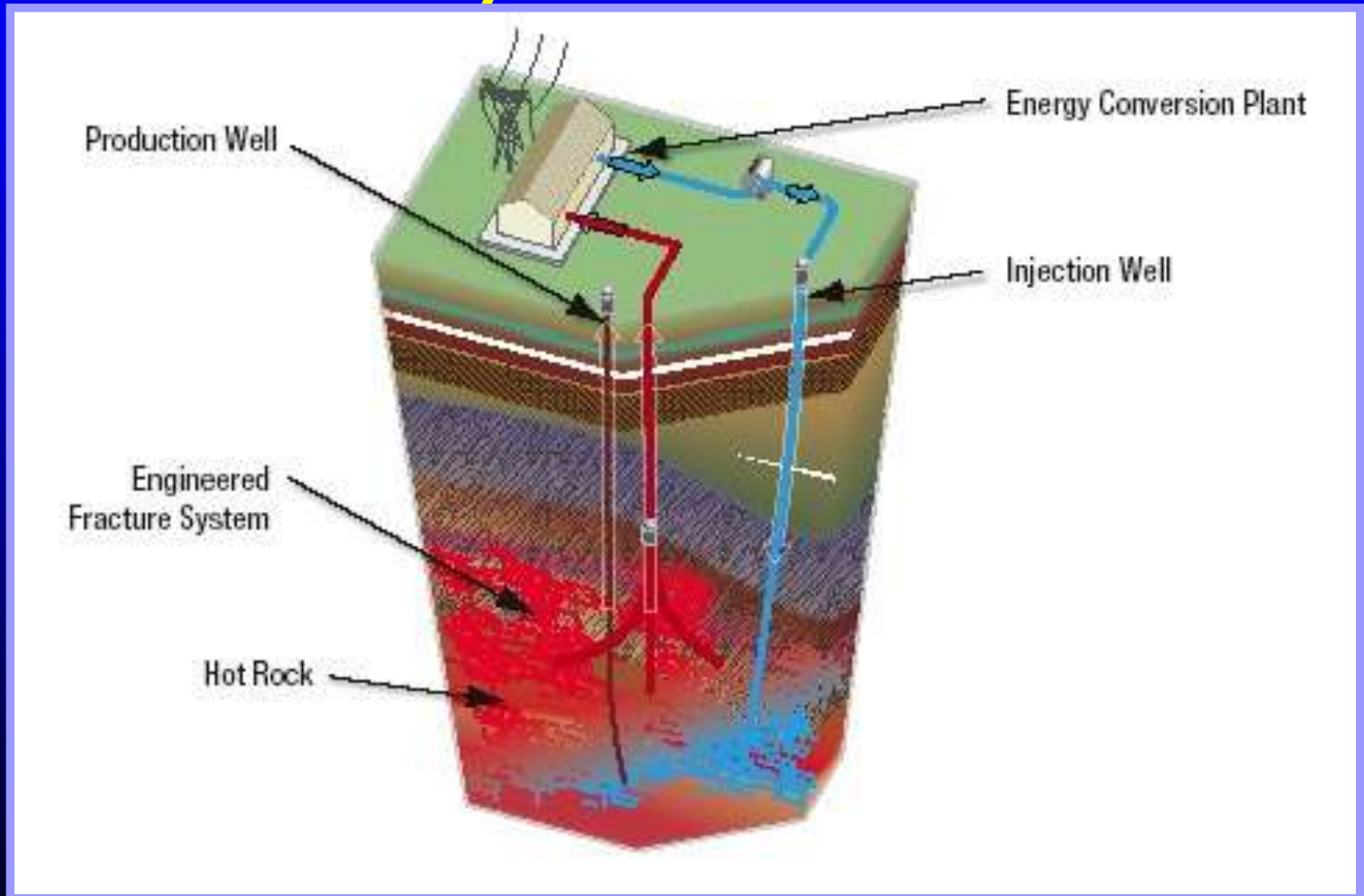
Permitting Challenges- New Technology



Coproduced Fluid



Enhanced Geothermal Systems



**www.
conservation.
ca.gov**





**Thank
You!**