

DOCKETED	
Docket Number:	20-LITHIUM-01
Project Title:	Lithium Valley Commission
TN #:	239459
Document Title:	Presentation - Convening of the Lithium Valley Commission 8-26-21
Description:	August 26, 2021 Lithium Valley Commission Presentation
Filer:	Elisabeth de Jong
Organization:	California Energy Commission
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Submission Date:	8/25/2021 1:56:24 PM
Docketed Date:	8/25/2021



Convening of the Lithium Valley Commission

August 26, 2021





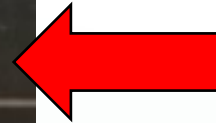
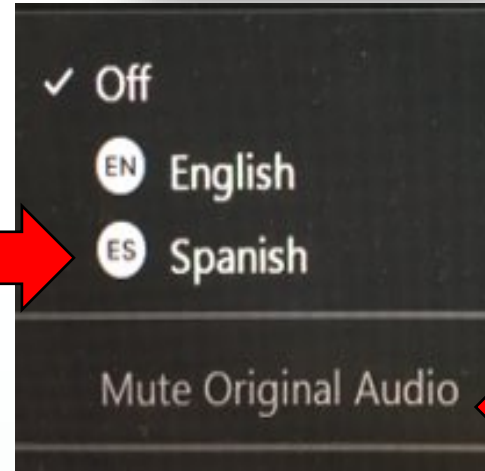
Interpretation / Interpretación

1) Click globe “Interpretation” icon.



2) Click “ES Spanish” option

3) Click “Mute Original Audio”



1) Haga clic en el icono del globo de interpretación

2) Haga clic donde dice “ES Spanish”

3) Haga clic en “Mute Original Audio”

NOTE: To access interpretation, download Zoom application on your device. Interpreter will relate everything from English to Spanish during meeting and will inform you when to make public comment. Speak in Spanish and interpreter will relate comments to English.

NOTA: Para utilizar la función de interpretación, descargue la aplicación Zoom en su aparato. El intérprete relacionará todo lo dicho en inglés al español durante la junta y le informará cuándo podrá hacer un comentario público. Hable en español y el intérprete relatará sus comentarios en inglés.



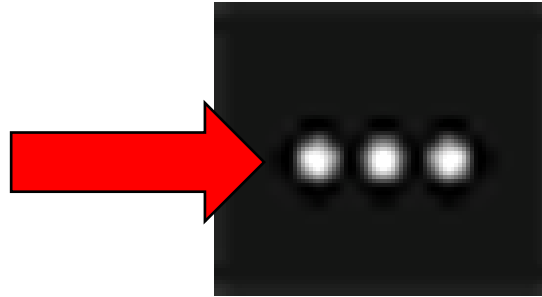
Interpreting on Tablet/Smartphone

Interpretación usando tableta o teléfono inteligente

To listen in Spanish, use controls to:

- 1) Tap for more options
- 2) Tap interpretation
- 3) Tap preferred language
- 4) Tap "Mute Original Audio"

Note: To use interpretation feature, download Zoom application on your device.



Para escuchar en español, use los controles para:

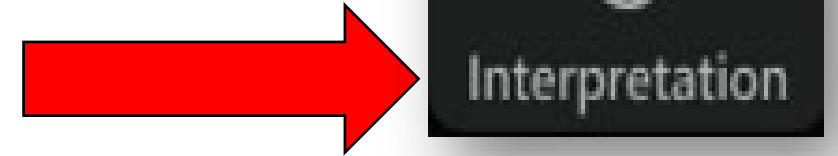
- 1) Tener más opciones
- 2) Hacer clic en interpretación
- 3) Escoger el idioma preferido
- 4) Hacer clic en "Mute Original Audio"

Nota: Para usar la opción de interpretación, descargue la aplicación Zoom en su aparato.

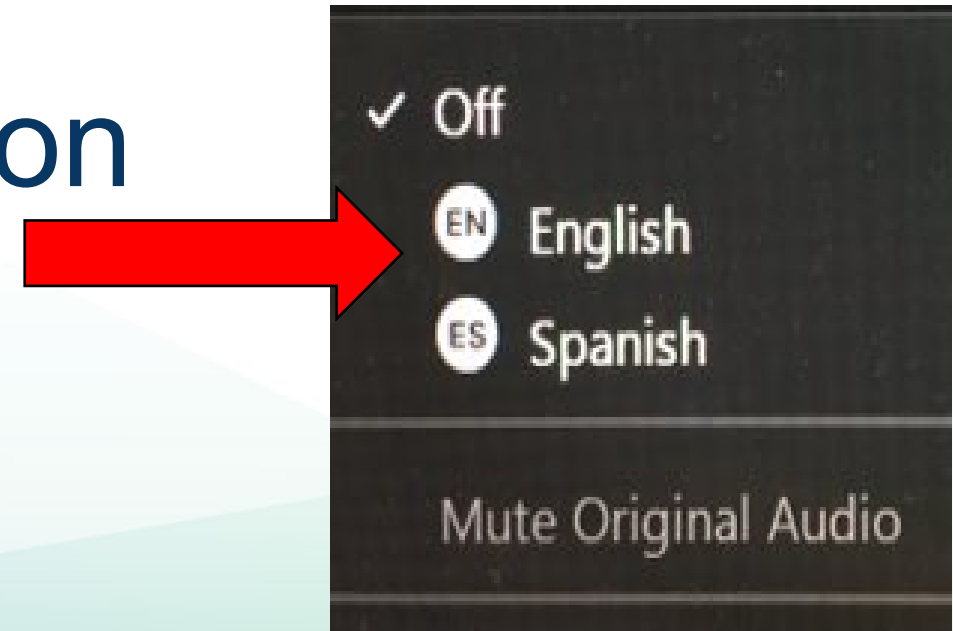


Steps to Select English Channel

1) Click “Interpretation” icon.



2) Click “EN English” option





Administrative Items

- Meeting conducted remotely via Zoom
 - Recorded and transcribed by court reporter
- To participate in public comment...
 - By computer: use the “raise hand” feature in Zoom
 - By telephone: dial *9 to “raise hand” and *6 to mute/unmute your phone line
- Written comments
 - Submit through the e-commenting system at:
 - <https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=20-LITHIUM-01>



Welcome and Roll Call



Agenda

- Welcome and Roll Call
- Administrative Items
 - Approval of July 29, 2021 Meeting Action Minutes
- Informational Items
 - Media and Legislation Updates
 - Lithium Valley Commissioner Updates
- Developing Geothermal and Lithium Co-Production Workshop
 - Furthering Geothermal Development Presentation
 - Developing Geothermal and Lithium Co-Production Panel Discussion
- Determination of Agenda Topics, Speakers, and Presentations for Future Meetings
- Public Comment
- Adjourn



Administrative Items

- **Approval of Past Meeting Action Minutes**



Public Comment

Comment Instructions:

Limited to 3 minutes per comment

By computer: use “raise hand” feature in Zoom

By telephone: dial *9 to “raise hand” and *6 to mute/unmute your phone line





Media and Legislation Updates



Lithium Valley Commissioner Updates



Developing Geothermal and Lithium Co-Production Workshop



California
**Department of
Conservation**
Geologic Energy Management Division

Geothermal Resources in CA

Charlene Wardlow
Geothermal Program Manager
charlene.wardlow@conservation.ca.gov

Geothermal Resources Definition

Public Resources Code §6903

“Geothermal resources” means “the natural heat of the earth, the energy, in whatever form, below the surface of the earth present in, resulting from, or created by, or which may be extracted from, such natural heat, and all minerals in solution or other products obtained from naturally heated fluids, brines associated gases, and steam, in whatever form, found below the surface of the earth, but excluding oil, hydrocarbon gas or other hydrocarbon substances.”

Geologic Energy Management Division

- Public Resources Code §3700 (page 112)
- California Code of Regulations
 - Title 14 Natural Resources
 - Division 2 Department of Conservation
 - Subchapter 4 State-Wide Geothermal Regulations
- 1991 MOU with EPA for Class V injection well primacy
 - (does not include wells on public lands)



Geologic Energy Management Division

Geothermal Legislative Mandates

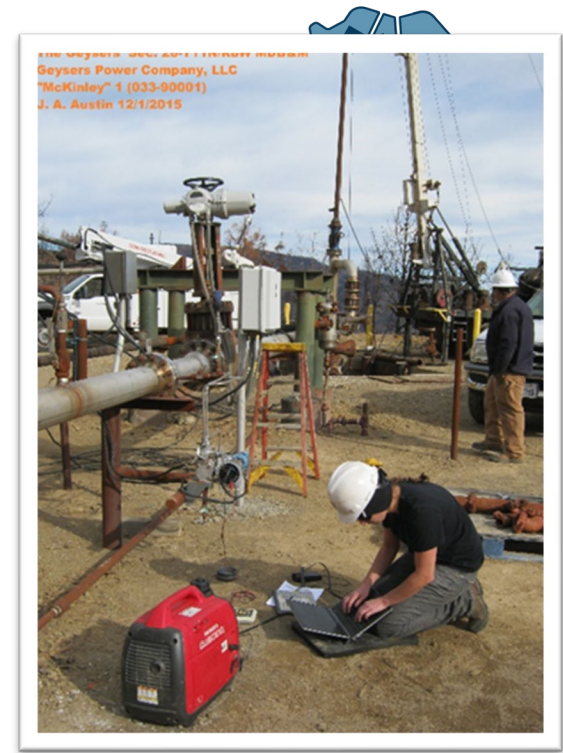
Public Resources Code (PRC) 3700 - 3776

“...exercise its power and jurisdiction to require that wells for the discovery and production of geothermal resources be drilled, operated, maintained and abandoned in such a manner as to safeguard life, health, property, and the public welfare, and to encourage maximum economic recovery.”

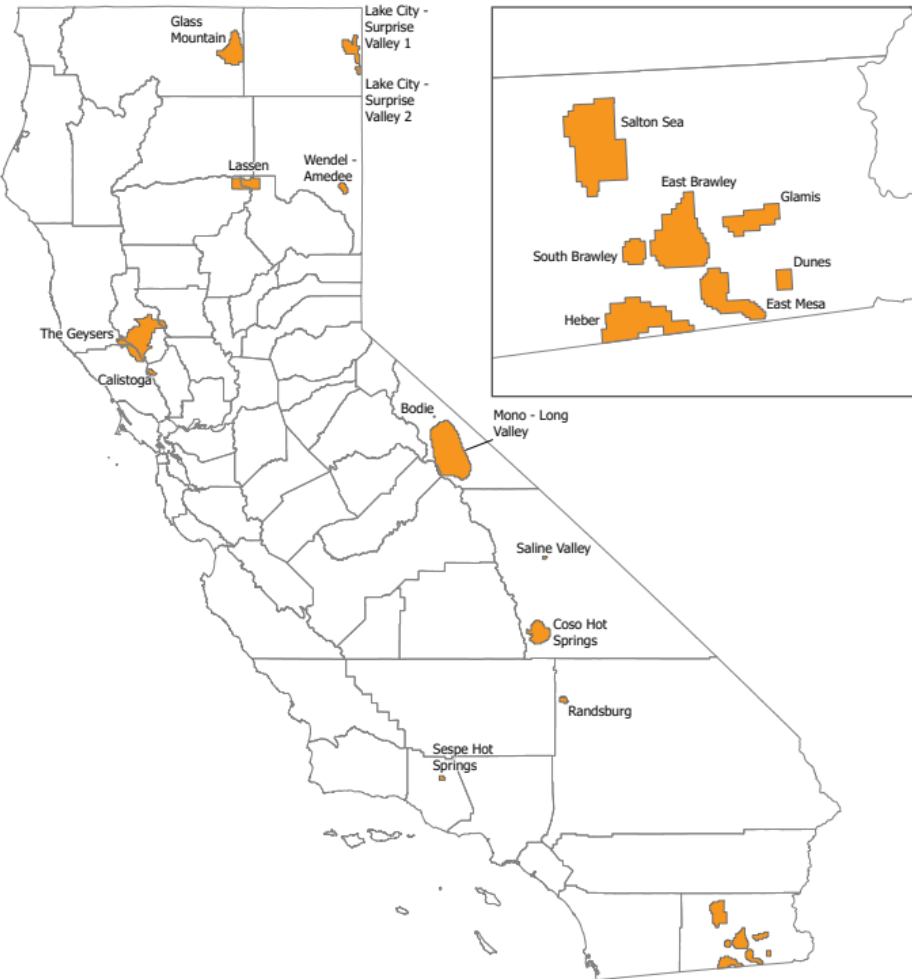


What we do!

- California Environmental Quality Act (CEQA)
 - Lead Agency for exploration up to 6 wells
 - Except in Imperial County
 - Responsible agency on development projects
- Permit drilling of new wells, workovers, abandonments
 - Staff analyze program for adequate casing and cement to protect resources, including waters of the state
- Monitor production and injection flow rates and pressures
 - Underground Injection Control (UIC) projects
- Inspect well fields
- Investigate spills and other environmental incidents



Known Geothermal Resource Areas California, 2020



 Known Geothermal Resource Area (KGRA)

Note: Known Geothermal Resource Area (KGRA) data is obtained from the California Department of Conservation, Geologic Energy Management Division (CalGEM, formerly DOGGR) from 2002.

Geothermal Fields in S.CA.

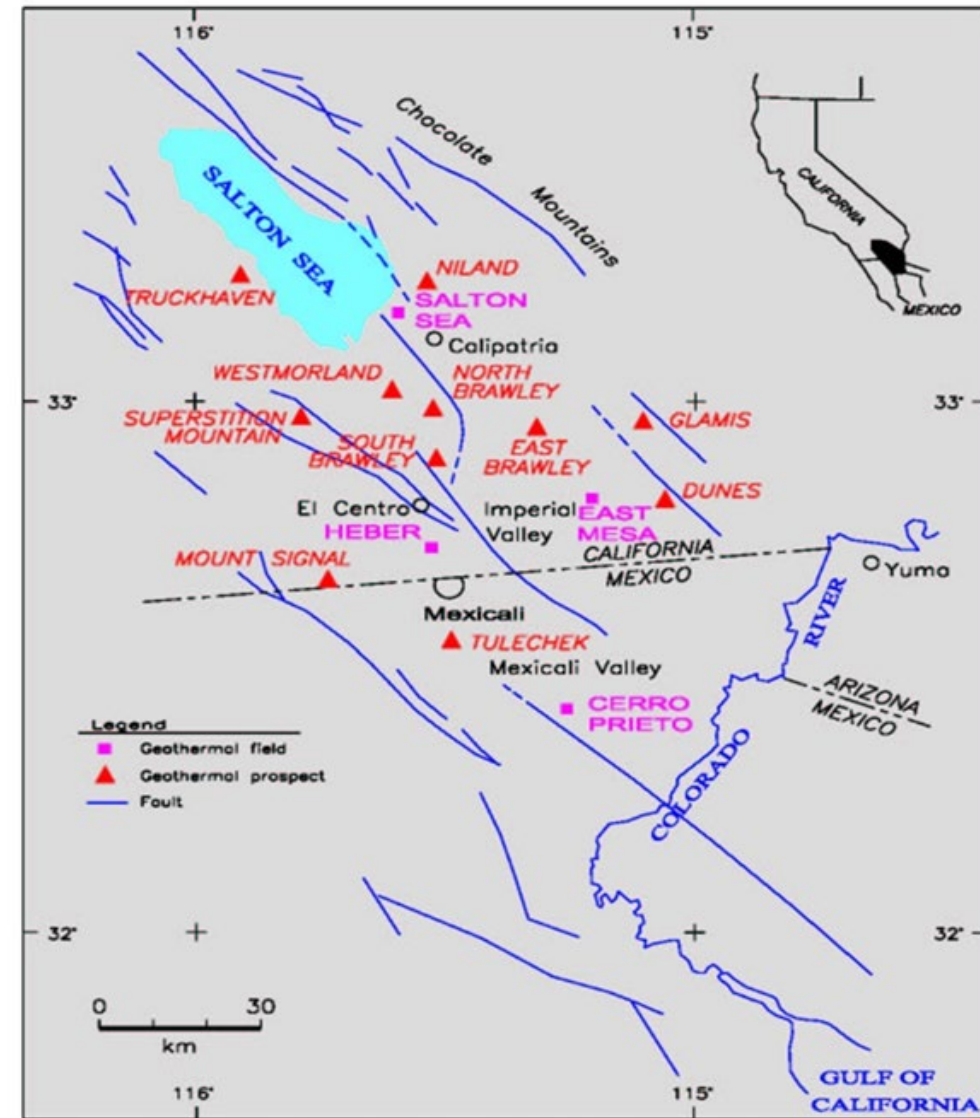


Figure 3.2: Location of geothermal fields in the Salton Trough geologic province

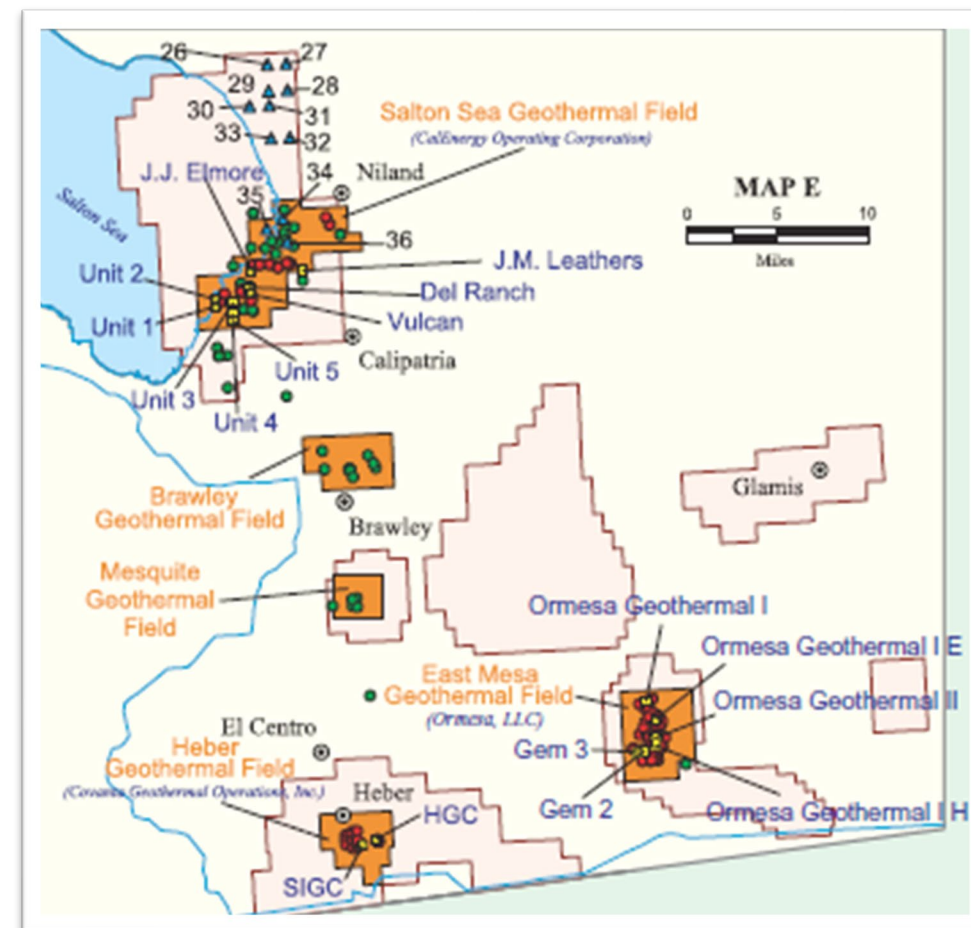
2003, GeothermEx, Inc. EN 103-2/003/10000000

Geothermal Wells Regulated by Division*

Statewide:

- High temperature production and injection wells=702
- Observation wells-54
- Temperature gradient wells-8
- Low-temperature wells-224

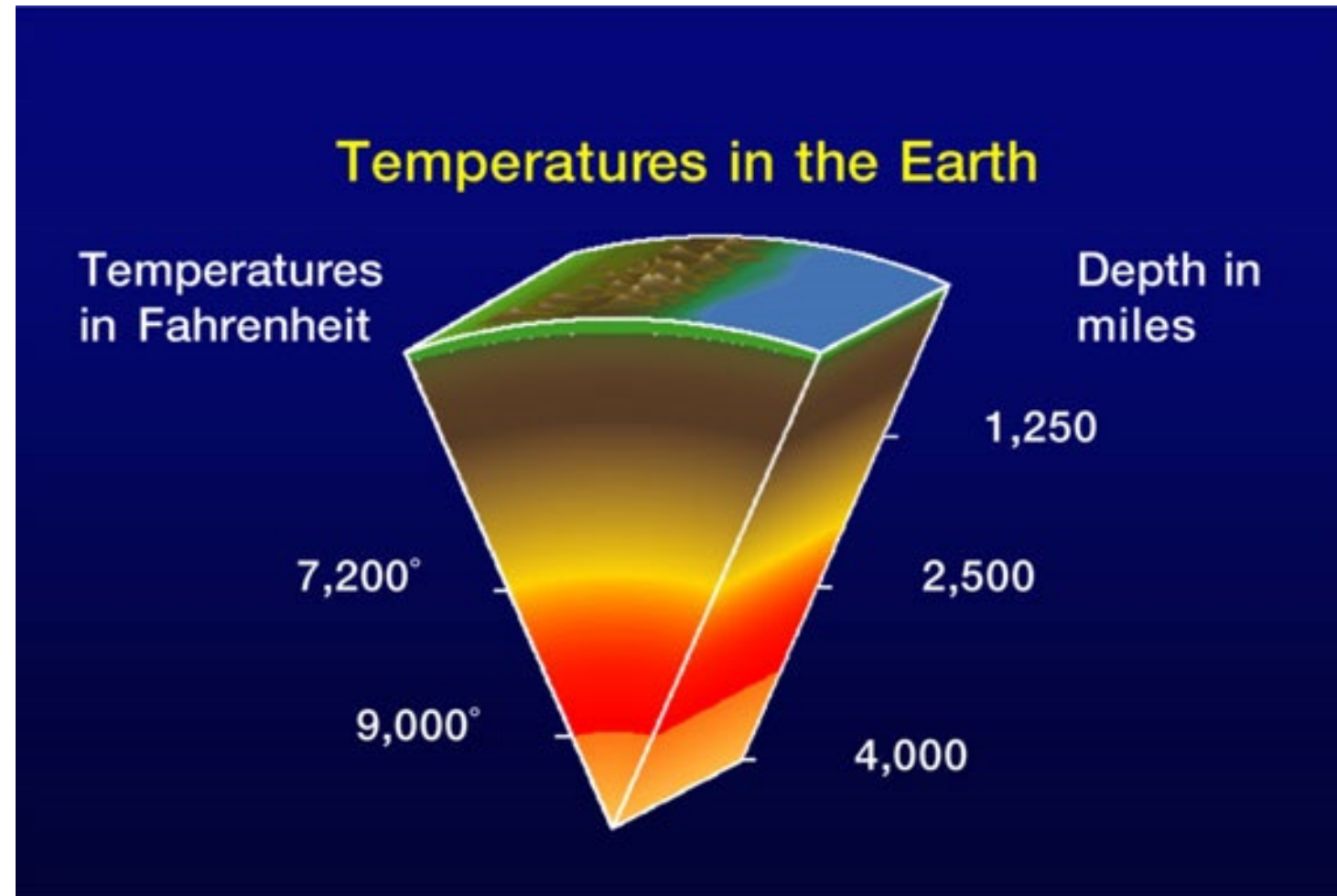
* Not with federal mineral rights



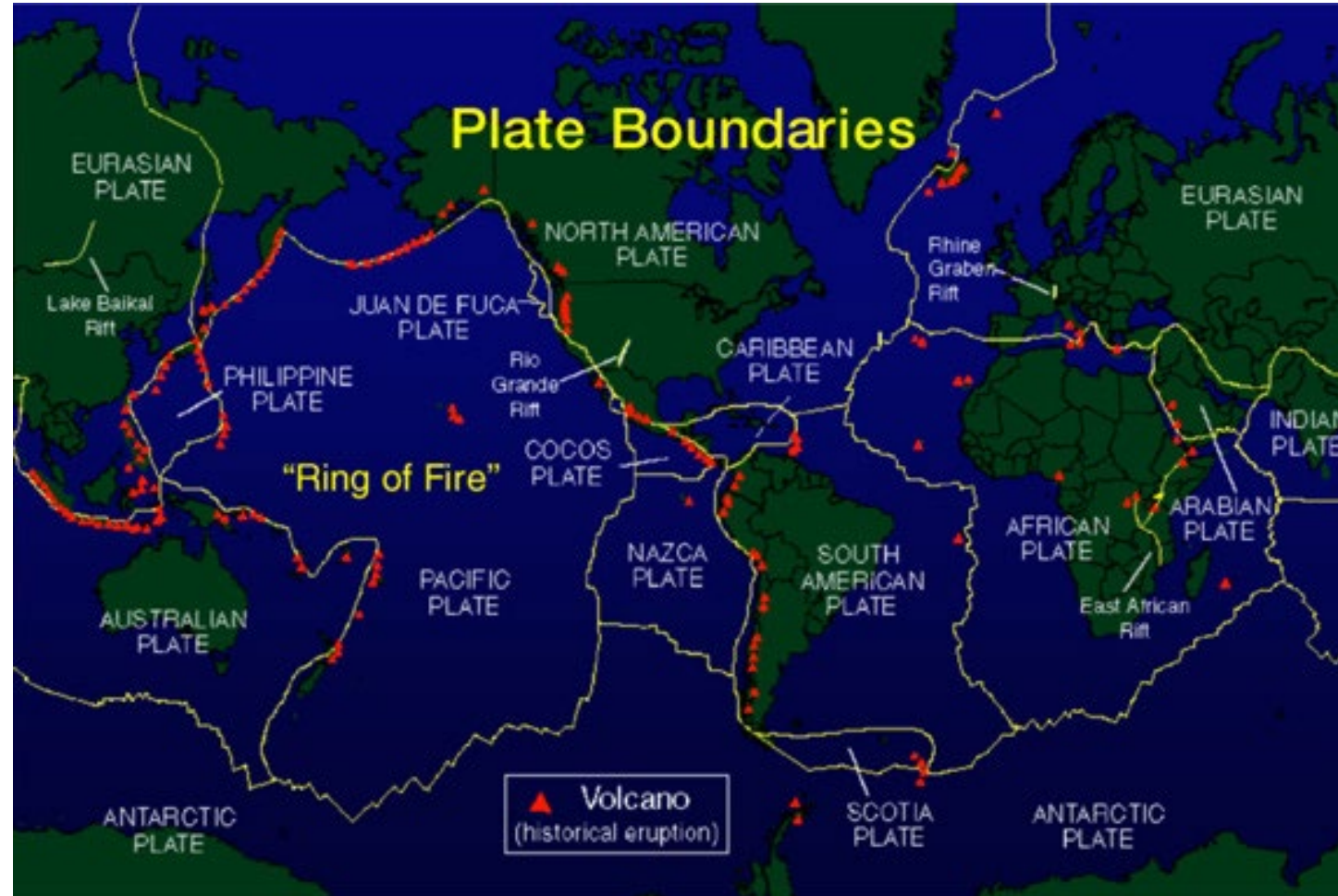
What does it mean?

- Geo = Earth
- Thermal = Heat
- Geothermal Energy = Natural Heat of the Earth

It's getting hot in here...



Earth's Crust



Imperial Valley: Step Over Basin Along San Andreas Fault System

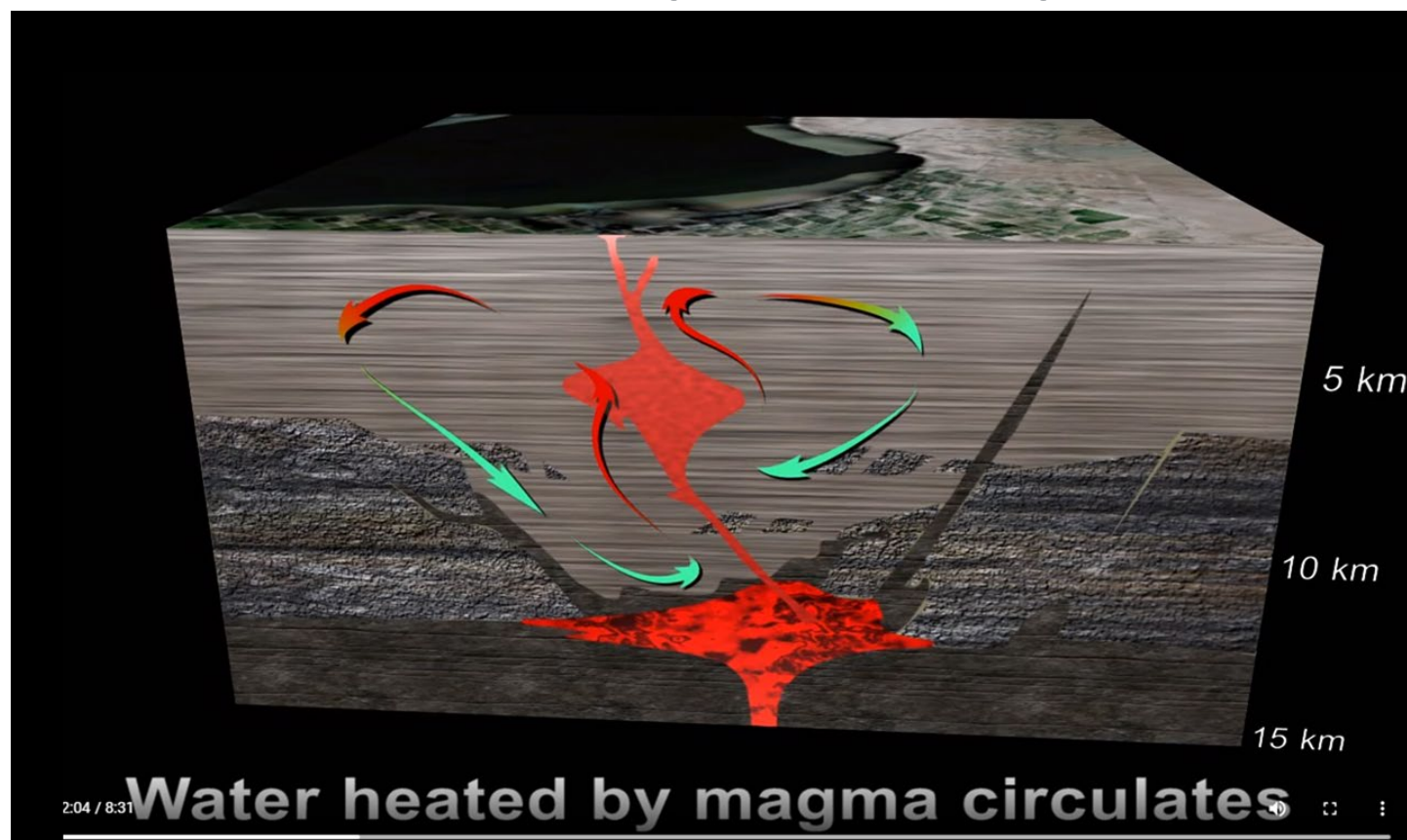


Geothermal Surface Anomalies



Exploration - What Are We Looking For?

- Heat
- Reservoir (permeability, geometry, stability)
- Injection - connected but with manageable cooling



Getting to the Hot Water



Getting closer to the hot water



24/7 Drilling Operations



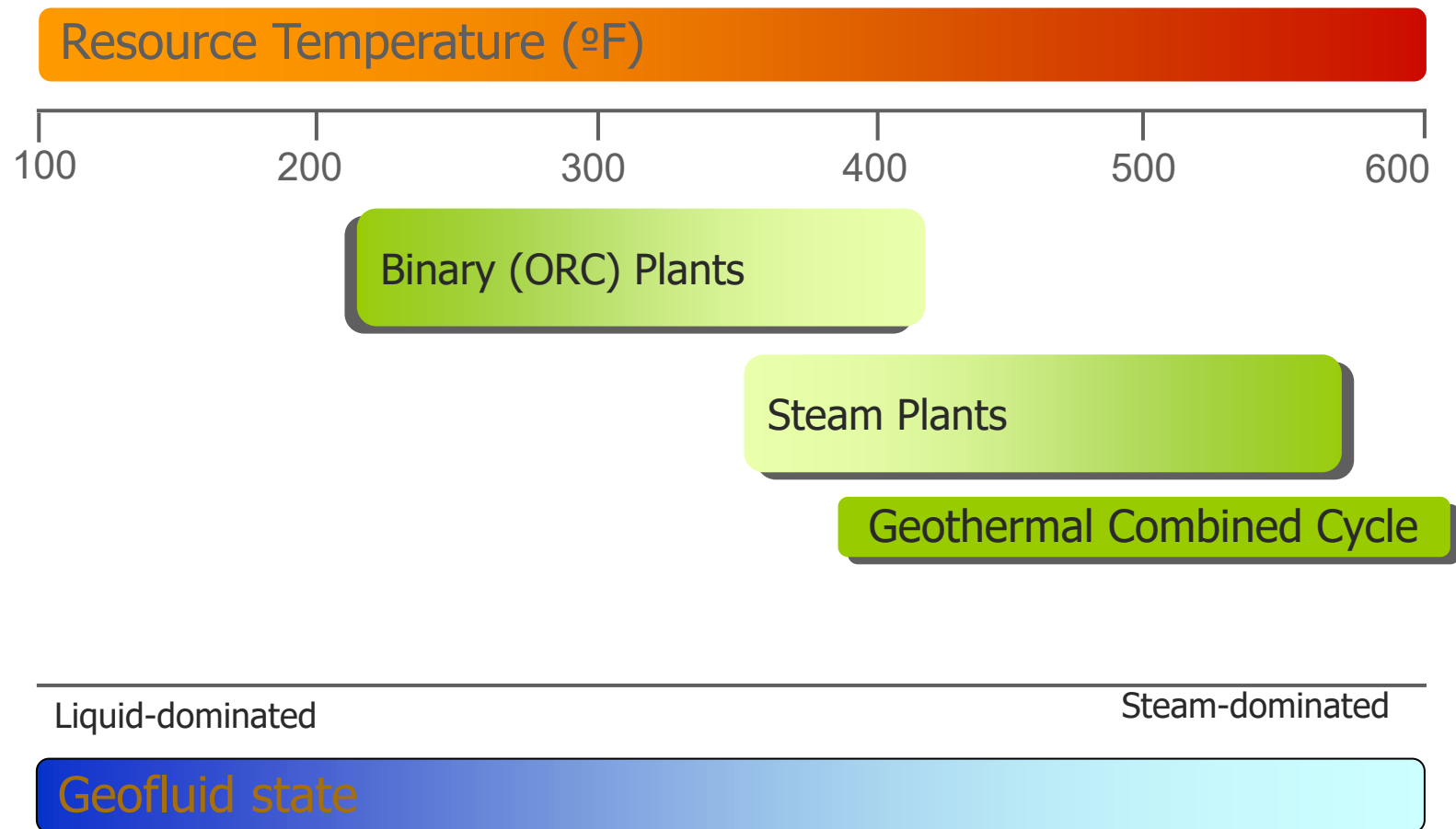
Bringing up the hot water



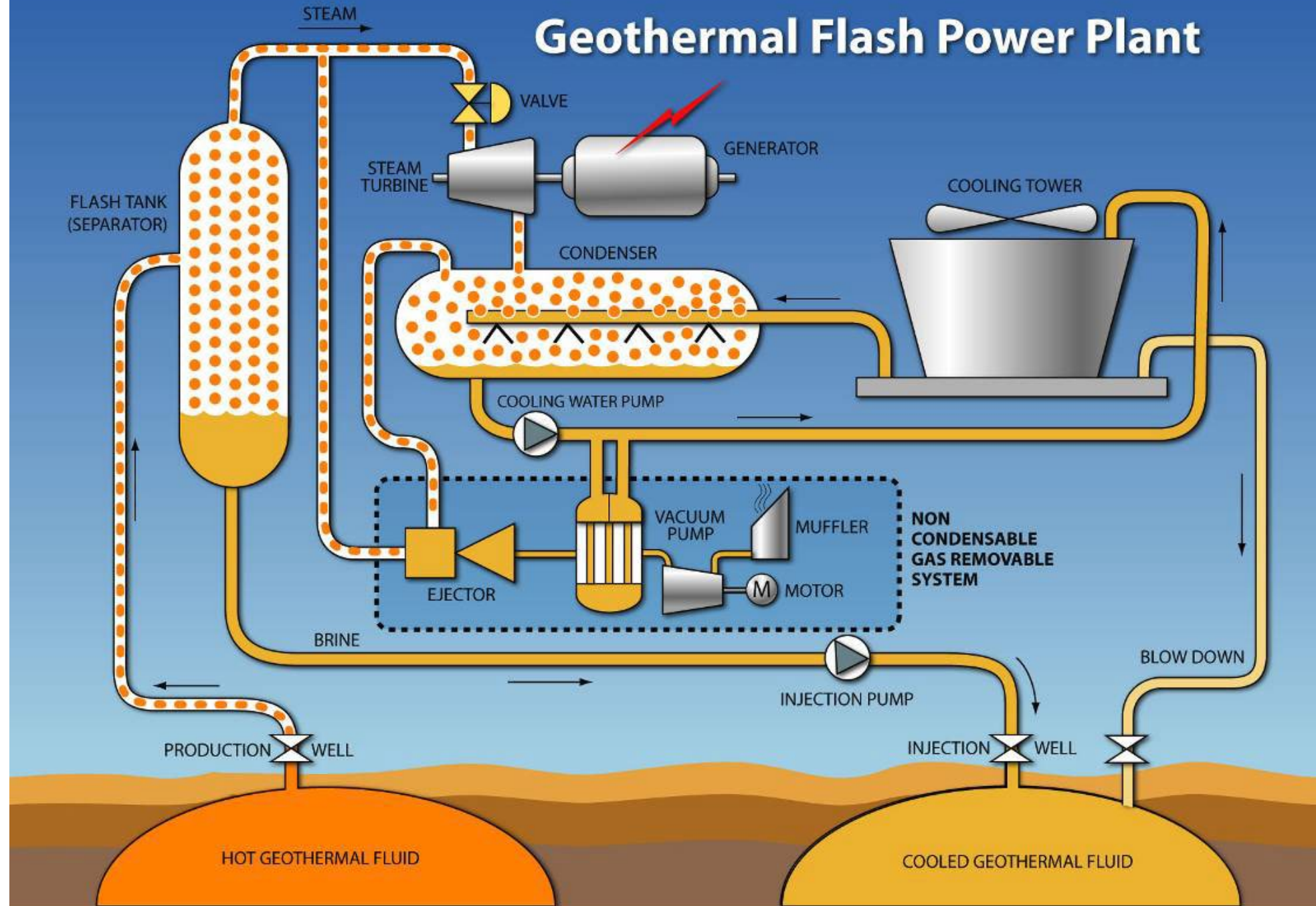
Geothermal Green Field Development Process



Resources and Power Plant Technologies



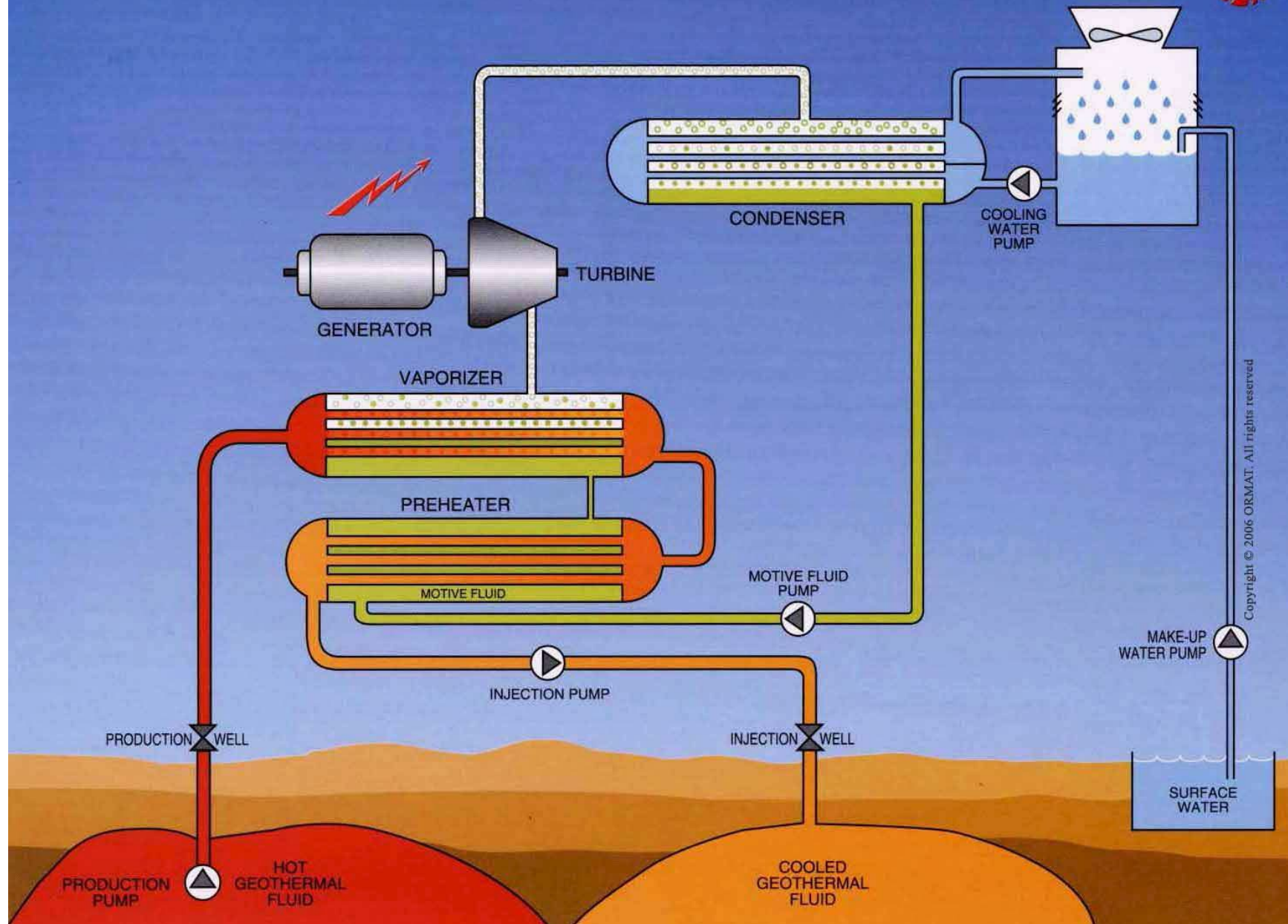
Geothermal Flash Power Plant



John L. Featherstone Plant 49.9 net MW



ORMAT® Water Cooled Binary Geothermal Power Plant



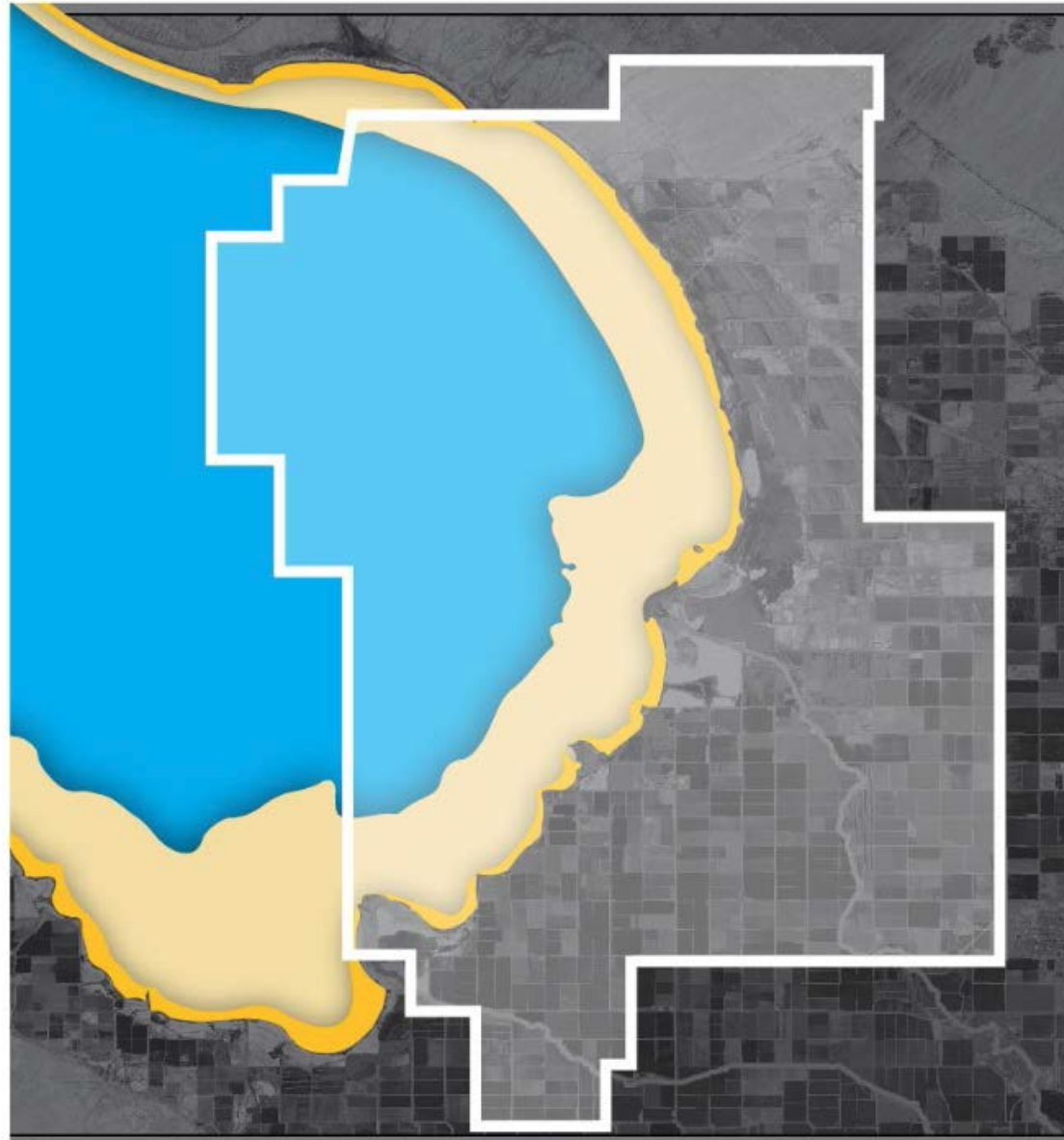
Heber 1 (Gould 1)



Imperial County Power Plant History

1979 McCabe Power Plant at East Mesa – 10 MW binary
1982 Salton Sea 1 - 1st plant using crystal-clarifier
1985 Heber 1 dual flash 50 MW + 2005 Gould 1 - binary
1986 Vulcan
1987 – 2007 Ormesa Complex – flash and binary
1989 Elmore
1989 Del Ranch
1989 Salton Sea Unit 3
1990 Salton Sea Unit 2
1990 Leathers
1993 Heber 2 + 2006 Gould 2, 2008 Heber South - binary
1996 Salton Sea Unit 4
2000 Salton Sea Unit 5
2000 CE Turbo
2008 North Brawley - binary
2012 Hudson Ranch 1 (John Featherstone) – Simbol minerals pilot

Salton Sea Known Geothermal Resource Area



Salton Sea KGRA Statistics

Estimated potential additional 2000 megawatts

- Enough power for 1.5 million homes (750 mw/household)
 - Current generation from 11 power plants
 - (~300,000 homes)
 - Cal Energy - 10 power plants: 327 net mw
 - Energy Source - 1 power plant: 55 net mw

Agencies involved in Geothermal Energy in Imperial County

- Imperial County
 - Planning & Development Services
 - Public Works
 - Environmental Health
- Environmental Protection Agency
 - Department of Toxic Substances Control
- CalGEM
- California Energy Commission - power plant siting >50 net megawatts.
- Air Resources Board
 - Imperial County Air Pollution Control District
- State Water Resources Control Board
 - Colorado River Basin Regional Water Quality Control Board



THANK YOU

Division Resources

<http://www.conservation.ca.gov/calgem/geothermal>

GeoSteam - Query Well Records, Production & Injection Data

<http://geosteam.conservation.ca.gov/WellSearch/GeoWellSearch.aspx>

Charlene Wardlow
charlene.Wardlow@conservation.ca.gov

GEOHERMAL & MINERAL RECOVERY

IMPERIAL COUNTY PAST, PRESENT AND FUTURE

Jim Minnick, Director ICPDS



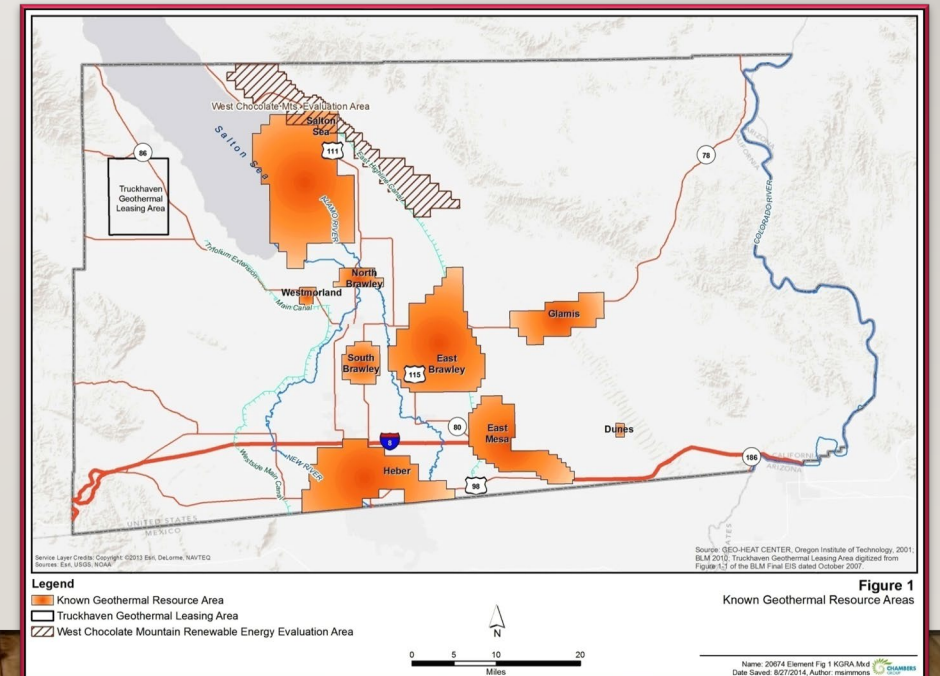
PAST

- 1920s First wells drilled in the valley
- 1940-50s Oil well exploration
- 1960s Mineral recovery exploration
- 1970s Geothermal wells power plants and permitting started
- 1980-1990s Geothermal plants expanded
- 2000s Development of Zinc recovery test facility
- 2010s Permitting of mineral recovery of Lithium facilities R&D



PRESENT

- Geothermal/Renewable Energy & Transmission Element
- 9 Known Geothermal Resources Areas
- 20 Geothermal power plants
- 560MWs Baseload grid power
- Proven tract record of geothermal development



FUTURE

- Develop mineral recovery facilities at existing geothermal plants
- Develop new geothermal/mineral recovery co-gen plants
- Repurpose unused wells
- Improve Local and State new development entitlement processes



Hudson Ranch I



Lithium Valley Commission

August 26, 2021

Henry Martinez, General Manager

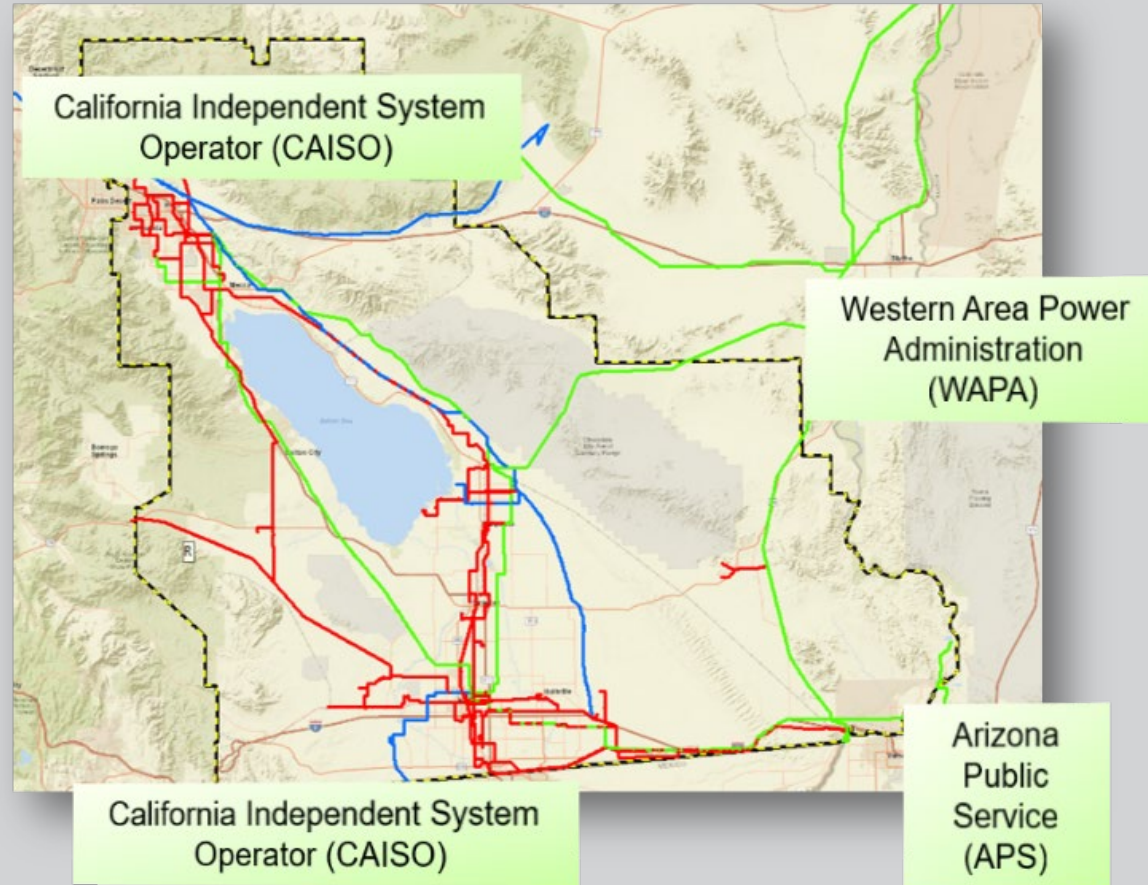


About IID

- Irrigation district and public power provider
- 3rd largest public power provider in California
- One of eight energy-balancing authorities in California
- Manages over 1,000 MWs of renewables
- Over 3,900 miles of distribution and transmission lines
- Largest irrigation districts in the nation
- Trustee of 3.1 million acre-feet (MAF) of water annually from Colorado River
- Services and maintains over 3,000 miles of gravity flow canals and drains



Energy Service Area



- Spans more than 6,400 square miles including most of Imperial County and sections of Riverside and San Diego counties



Energy Demand

- Approximately 159,235 customer accounts
- IID reached a historic peak load of 1,133 megawatts on August 4, 2021
- Total energy consumption for 2020 was 3,511,826 MWh
- The average peak load during the summer months is 1,023 MW and 533 MW during the winter months

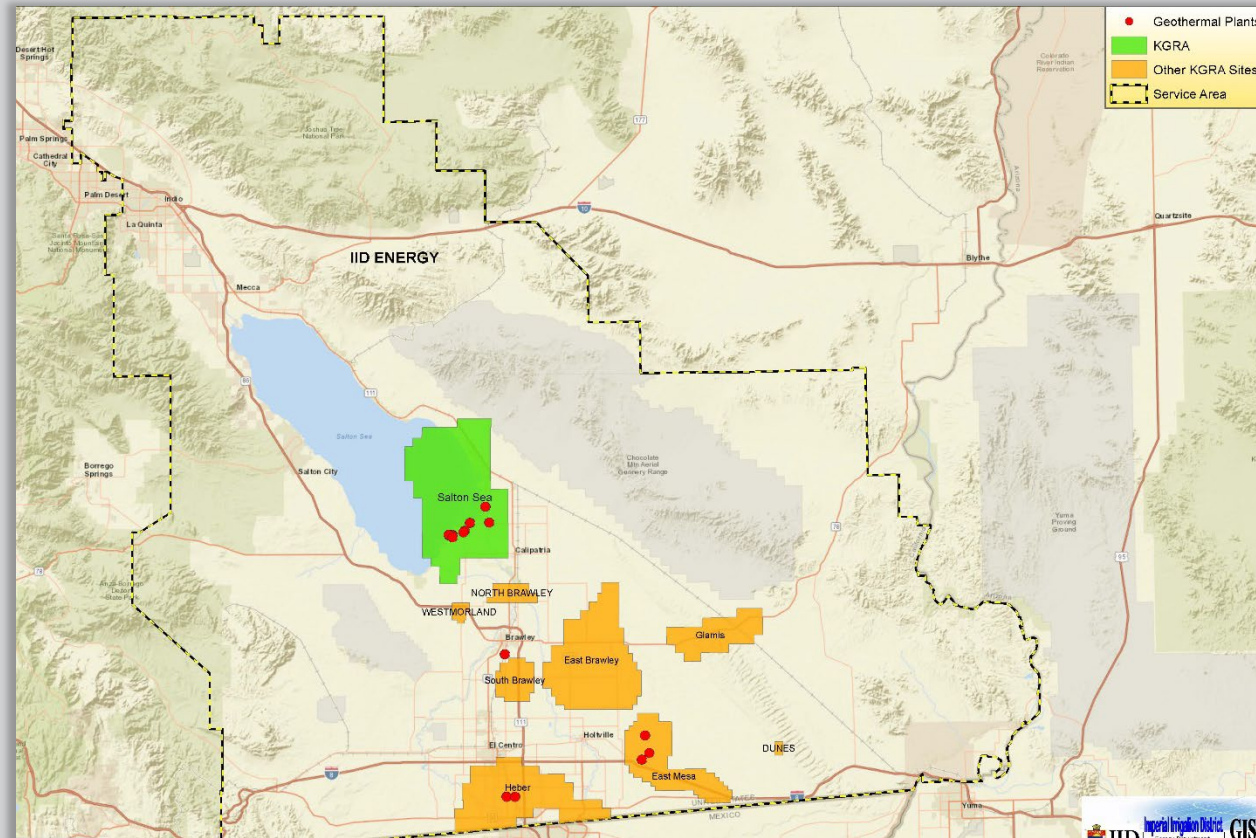
Energy Resources Portfolio



2020 POWER CONTENT LABEL	
ENERGY RESOURCES	POWER MIX
Eligible Renewable¹	41.0%
Biomass & Biowaste	9.1%
Geothermal	13.3%
Eligible Hydroelectric	6.4%
Solar	12.3%
Wind	0%
Coal	0%
Large Hydroelectric	5.8%
Natural Gas	28.5%
Nuclear	3.5%
Other	0.1%
Unspecified sources of power²	21.2%
TOTAL	100%
Percentage of Retail Sales Covered by Retired Unbundled RECs	0%
¹ The eligible renewable percentage above does not reflect RPS compliance, which is determined using a different methodology.	
² Unspecified power is electricity that has been purchased through open market transactions and is not traceable to a specific generation source.	
³ Renewable energy credits (RECs) are tracking instruments issued for renewable generation. Unbundled renewable energy credits (RECs) represent renewable generation that was not delivered to serve retail sales. Unbundled RECs are not reflected in the power mix or GHG emissions intensities above.	
For specific information about this electricity product, contact: Imperial Irrigation District at 1-800-303-7756.	
For general information about the Power Content Label, visit www.energy.ca.gov/pcl/ .	
For additional questions, please contact the California Energy Commission at 1-844-454-2906 or 916-653-0237(outside of California).	



Salton Sea KGRA



- Largest landowners are IID and the Federal Government
- IID owns approximately 44,000 acres in Salton Sea KGRA



Geothermal Growth

- New Transmission
 - *~75 miles from geothermal region to Path 42*
 - *Functional requirements scale with amount of geothermal influx*
 - *Likely to come as Network Upgrades from Interconnection Projects*
- Upgrading existing transmission
 - *Limiting RAS penetration*
 - *Bottleneck elimination/underlying 92kV system*
 - *Upgrade existing infrastructure*
- MIC into CAISO
 - *ATC on CAISO tie lines*
 - *CAISO-end upgrades*

Water Delivery System



Water Entitlement

- IID's consumptive uses capped at 3.1 MAFY
- IID delivers Colorado River water to 474,000 acres of productive farmland and nine communities in Imperial County
- IID in-valley consumptive use 2,558,136 AF (2019)
 - *Delivered 2,225,089 AF to farms*
 - *Delivered 106,131 AF to non-ag, which includes: municipal, industrial and commercial*
- 23,800 AF of conserved Colorado River water is available for contracting to new non-ag development under the Interim Water Supply Policy.
- Due to IID's senior water rights it is not subject to drought shortage reductions.



Developing Geothermal and Lithium Resources

Lithium Valley Commission Meeting

August 26, 2021



Panorama Environmental, Inc.



- Focused on
 - CEQA/NEPA
 - Technical Studies
 - Permitting
- Small, women and minority-owned
- Consultants to geothermal industry for over 30 years
- Consultants to CTR since 2017



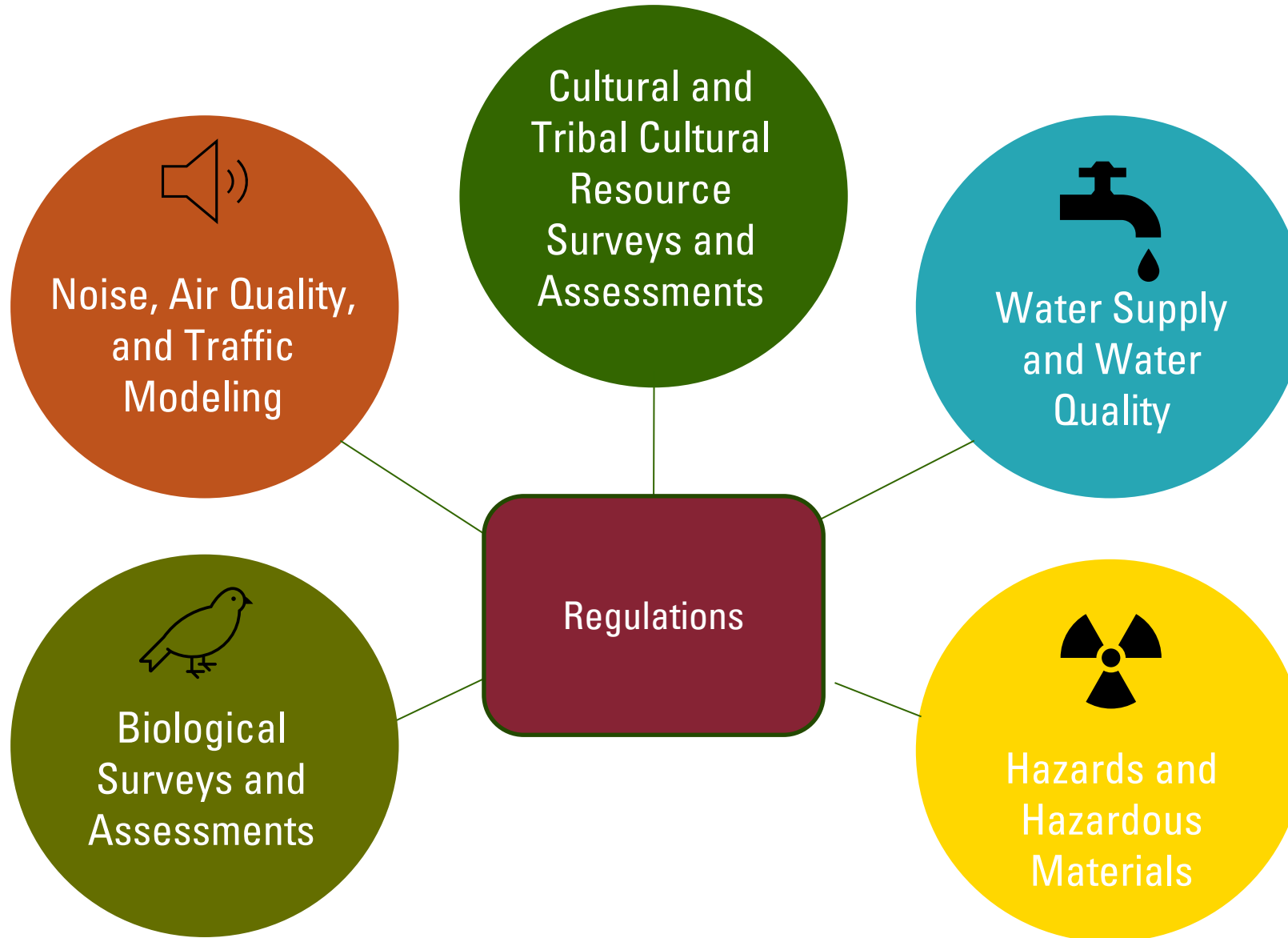
San Francisco
717 Market Street, Suite 650

Sacramento
1722 J Street, Suite 218

Stages of Environmental Review

1. Due Diligence
2. Environmental studies
 - Incorporate into design for resource avoidance or minimization
3. Permits/Authorization
 - CEQA
 - NEPA
 - Federal Permits
 - State Permits
 - Local Permits
4. Monitoring and Reporting
 - Compliance during project implementation

Environmental Studies

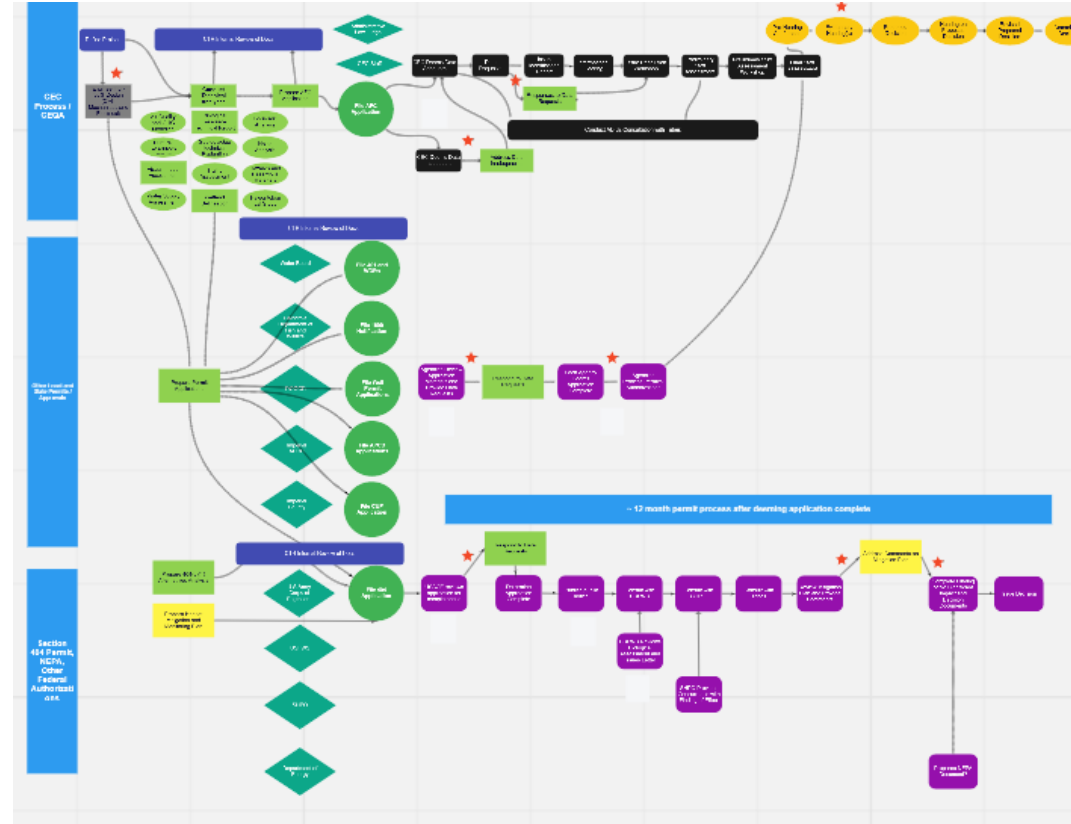


Environmental Permits and Authorizations



Process Overview

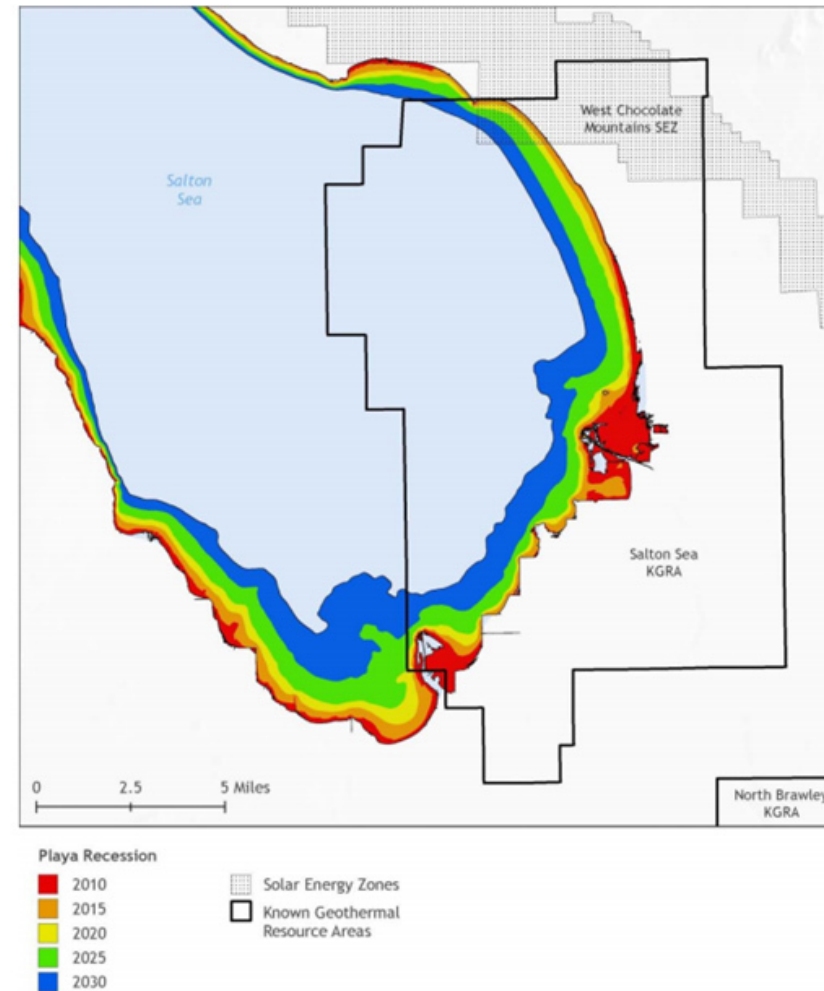
- Opportunities for public input and comment during CEQA, NEPA, and permitting processes
- Fewer permits required where lithium added to existing power plant



CEC permitting process for new geothermal facility

Salton Sea Recession and Lithium

- High lithium concentrations in KGRA under the Salton Sea
- Changing site conditions for environmental analysis with sea recession
- Toxic dust - opportunity for management of exposed playa with lithium and geothermal development
- Irrigation drain runoff has created wetlands and wildlife habitat



Data Sources: National Renewable Energy Laboratory; Desert Renewable Energy Conservation Plan; Tetra Tech Playa Recession Data

Environmental Compliance

- Mitigation monitoring and reporting required by CEQA and permit conditions
- Environmental monitoring and reporting throughout project life

2018 Annual Compliance Report to the California Energy Commission 79-AFC-1C Geysers Unit 17 Power Plant

SECTION 1: AIR QUALITY

Compliance Plan Condition	Agency	Compliance Task	Status	Task Implementation
Condition: 1-1	NSCAPCD CEC CARB	GPC shall summarize in an annual compliance report any interactions with the NSCAPCD. GPC shall immediately inform the CEC and CARB in writing of any formal appeals filed with the NSCAPCD.	On-going	The Annual Compliance Report is provided below.

Annual Compliance Report: Geysers Power Company LLC (GPC) interactions with the NSCAPCD occur during the course of the year as routine reports, and non-routine submittals.

Quarterly Operating Reports Submittals: The following Quarterly reports were submitted to the NSCAPCD and CEC CPM with the required elements addressed in the report sections entitled: Continuous Compliance Monitor Availability; Summary of H2S Abatement Incidents Requiring Corrective Action and Monitor Irregularities; Source Test Results. The required elements pertaining to this CEC licensed Power Plant was submitted to the CEC Compliance Manager as follows:

- ☒ Fourth Quarter 2017 (Oct – Dec) Submittal to NSCAPCD, 1/31/2018, ref. GPC18-002
- ☒ First Quarter 2018 (Jan – Mar) Submittal to NSCAPCD, 4/28/2018, ref. GPC18-037
- ☒ Second Quarter 2018 (Apr – June) Submittal to NSCAPCD, 7/26/2018, ref. GPC18-074
- ☒ Third Quarter 2018 (July – Sep) Submittal to NSCAPCD, 10/22/2018, ref. GPC18-086

Other Routine Reports Submittals:

- ☒ Annual Title V Operating Permit Compliance Report and Certification of Compliance for the year 2017, to NSCAPCD, 6/26/2018, ref. GPC18-013
- ☒ Criteria Pollutant Report: Year 2018 to NSCAPCD, 2/14/2019, ref. GPC19-016
- ☒ Semi-annual Deviation Reports to NSCAPCD: 2nd half 2017, 2/1/2018, ref. GPC18-005 (No deviations); 1st half 2018, 7/31/2018, ref GPC-18-078 (Deviation reported: Criteria Pollutant Report due 2/14/2018).
- ☒ 2018 annual request for a statement of compliance verification, 7/1/2018, ref. GPC19-046.

Non-routine Submittals:





Moderated Discussion

- Moderator:
 - Charlene Wardlow, CalGEM
- Panelists:
 - Jim Minnick, Imperial County Planning Department
 - Henry Martinez, Imperial Irrigation District
 - Susanne Heim, Panorama Environmental, Inc.



Lithium Valley Commission Q&A

- Moderator:
 - Charlene Wardlow, CalGEM
- Panelists:
 - Jim Minnick, Imperial County Planning Department
 - Henry Martinez, Imperial Irrigation District
 - Susanne Heim, Panorama Environmental, Inc.



Public Comment

Comment Instructions:

Limited to 3 minutes per comment

By computer: use “raise hand” feature in Zoom

By telephone: dial *9 to “raise hand” and *6 to mute/unmute your phone line





Future Meeting Discussion

- Determination of Agenda Topics, Speakers, Presentations
 - September – Market Opportunities for Lithium
 - October – Environmental Impacts
 - December – Incentives and Economic Impacts
 - January –



Public Comment

Comment Instructions:

Limited to 3 minutes per comment

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Public Comment

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Adjourn



Webpage: <https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources/geothermal-energy/lithium-valley>

List Serv: Lithium Valley Commission

Thank you!

LithiumValleyCommission@energy.ca.gov



Break

LithiumValleyCommission@energy.ca.gov