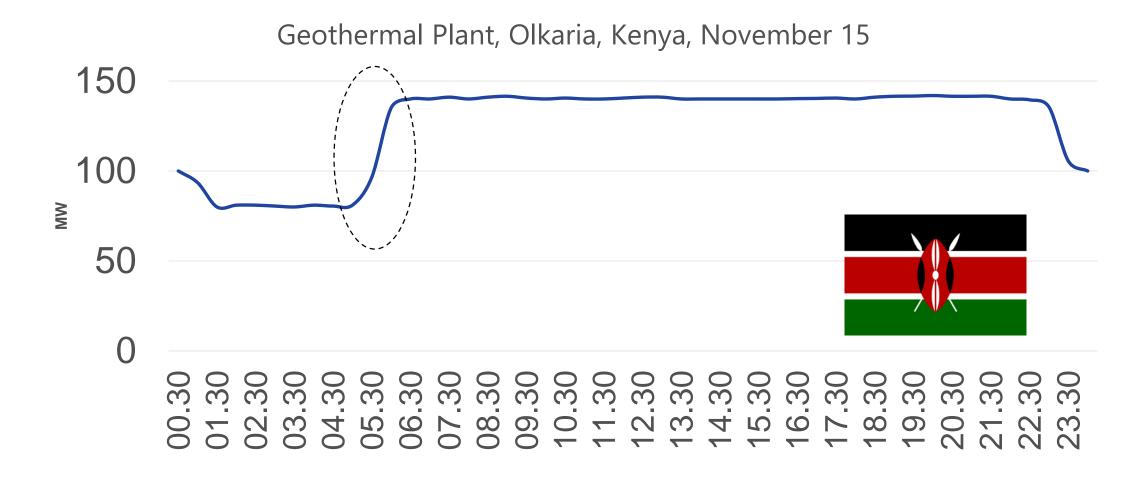
DOCKETED	
Docket Number:	19-SB-100
Project Title:	SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy
	Future
TN #:	230804
Document Title:	Tim Latimer - Geothermal
Description:	Presentation by Tim Latimer, Fervo Energy
Filer:	Harinder Kaur
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	11/20/2019 9:04:48 AM
Docketed Date:	11/20/2019



GEOTHERMAL DAILY RAMP CYCLE



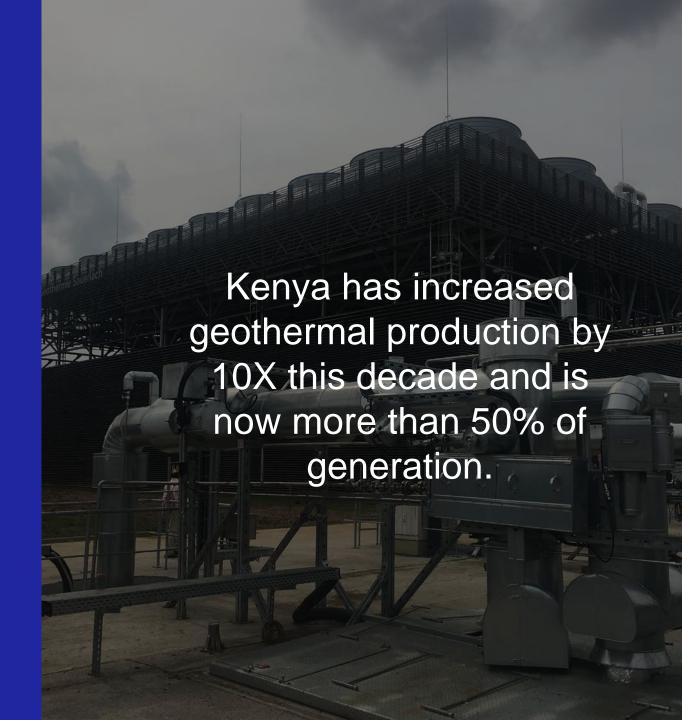
Clear Tariff
Fixed Feed in Tariff allows long term
Structure

Public Private

Exploration facilitated by state-owned entity Partnerships

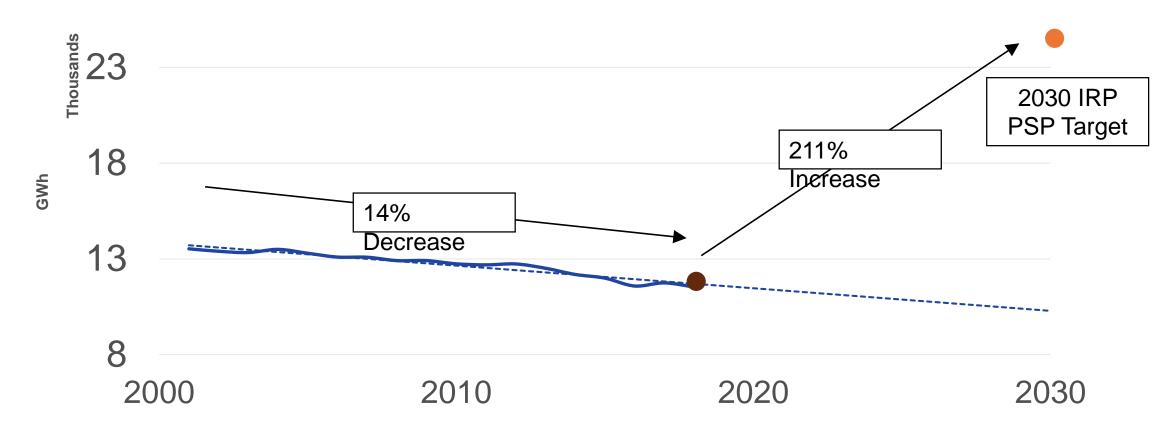
o 03 Innovative Risk

East Africa Risk Mitigation Facility
Financing



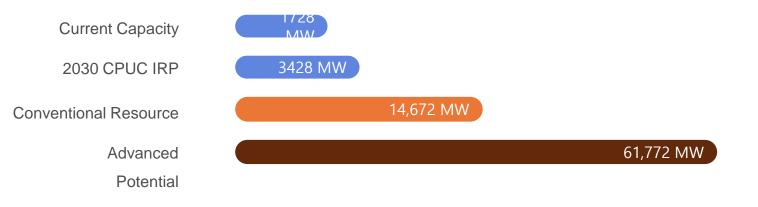
CALIFORNIA GEOTHERMAL ENERGY NEEDS

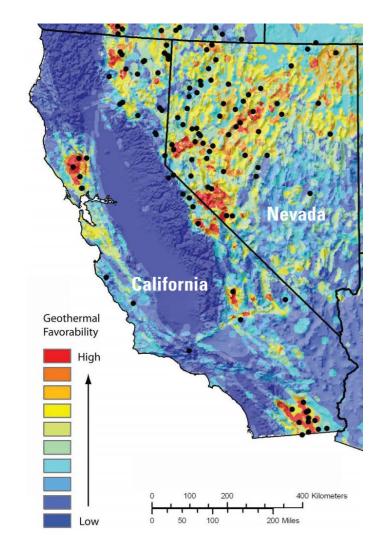
In State Geothermal Production



LIFORNIA HAS THE WORLD'S BEST GEOTHERMAL RESOURC

Geothermal potential in California is vast and remains largely untapped.





COST TRENDS

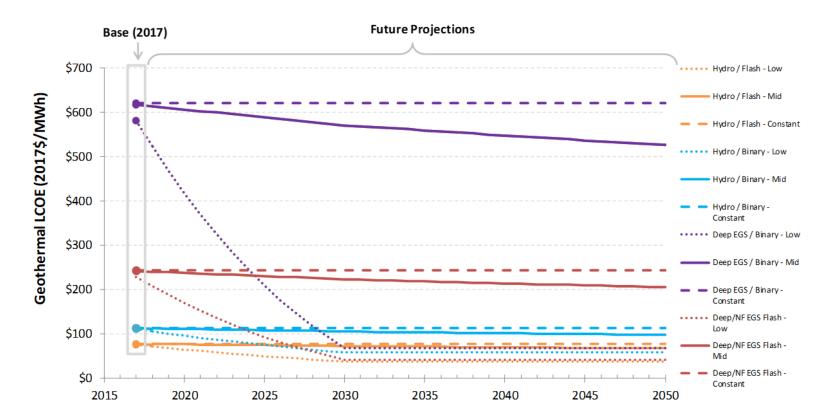
The average geothermal US PPA in the 2010s was \$84/MWh.

Recent PPA costs have trended downward.

The two most recent California PPAs have been at \$68 and \$76/MWh.

Cost trends from NREL show a path to reduce costs from conventional geothermal and EGS by 2030.

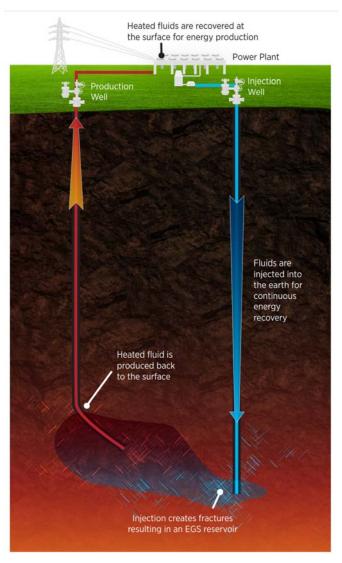
Geothermal would be much more cost competitive if it had access to the Federal ITC.



Geothermal plant LCOE projections with R&D financials

Source: National Renewable Energy Laboratory Annual Technology Baseline (2019), http://atb.nrel.gov

MAJOR TECHNOLOGY DEVELOPMENT UNDERWAY





FORGE Initiative

\$140 million geothermal test bed located in Utah.



Technology Transfer Opportunities

Many technologies from oil and gas can have an impact on geothermal.



Lithium Coproduction

Strategic mining initiatives are underway.

FERVO SOLUTION

First ever horizontal, multi-stage design.

We have identified solutions to the most significant barriers in geothermal development. Our solution leverages technology from the horizontal drilling and distributed fiber optic sensing, designed and implemented using advanced computational modeling and research breakthroughs from Stanford University.

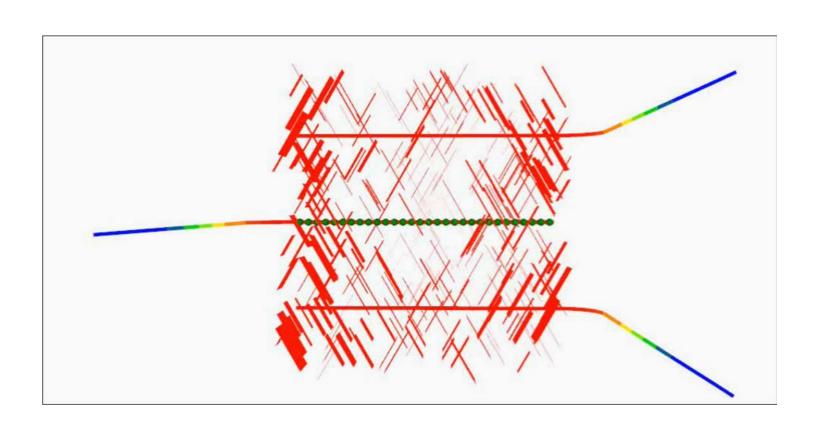
WELL FLOW RATE: 80 I/s

ASSET LIFE: 20+ years

TARGET DEPTH: 2500-4000m

TRIPLET OUTPUT: 10-12 MW

COST (LCOE): <7 c/kWh



01

Field Level Drilling and Reservoir Research

Finance field level demonstrations of new technologies that can make an impact on drilling costs or flow performance.

02

Flexibility Studies and Market

Evaluate value of flexibility and put long term market incentives in place. With a development cycle of 3+ years geothermal requires longer term planning.

03

Mineral Coproduction Scale Up

Invest in demonstration facilities for lithium production at the Salton Sea and other areas.



Future of Geothermal

Geothermal in California in 2030:

- -Flexible
- -Reliable
- -Long term
- -Emission Free
- -Low land footprint
- -Produces lithium

With the right technology and market incentives, we can hit these deployment targets:

2030: 2,000 New MW 2045: 10,000 New MW

