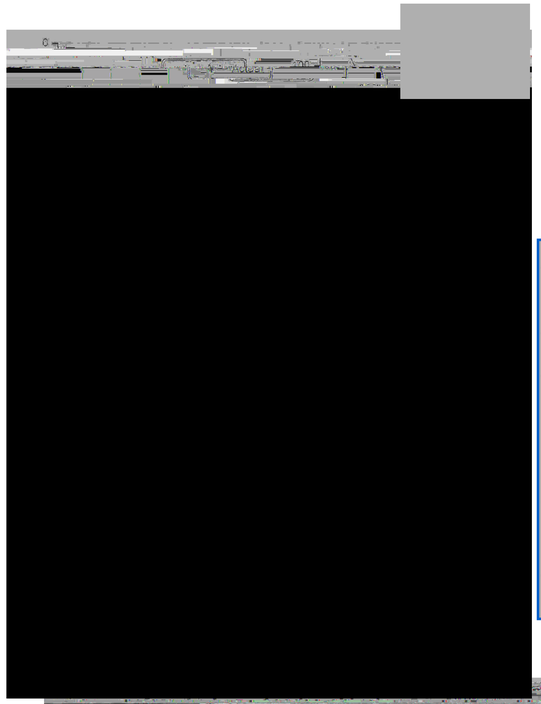
Renewable Energy in a Petroleum-Dominated Society
Geothermal in the Middle East

Jamie E. Hutchins, P.E., LEED AP

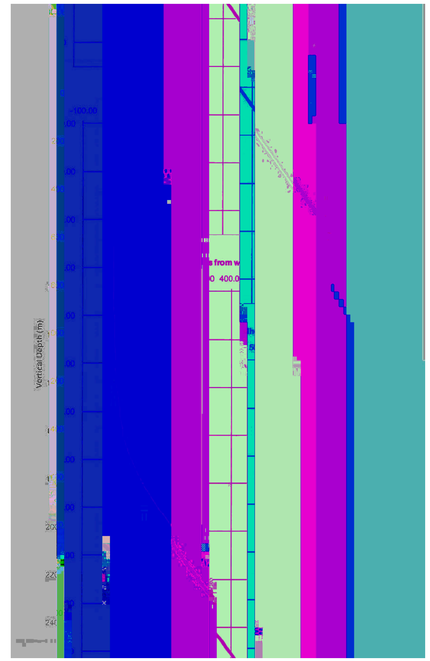


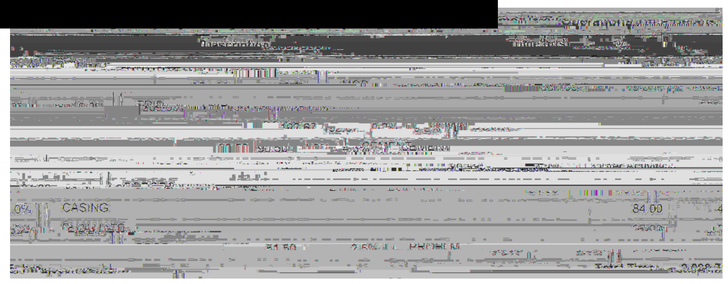
A pair of geothermal wells (injecəon and producəon) were installed in the middle east. The geothermal reservoir consists of a high –salinity limestone formaəon aquifer about 375m thick and about 2150m deep.

The wellheads are drilled adjacent to each other, then diverged such that the boğoms are about 1700m apart. The first and second wells were drilled verəcally to depths of 550m and 350m, respecəvely, then direcəonally kicked at 2° per 30m in opposite direcəons, to a final nominal inclinaəon of 30°.

Drilling and compleəon for the first well lasted 76 days, largely delayed due to slower than expected drilling rates and rig breakdowns, with a total cost of US$8,282,661. Drilling and compleəon for the second well lasted 50 days with a total cost of US$6,818,441.

Preliminary esəmates indicate a flowrate of 100 liters per second (about 55,000 barrels of water per day) with water temperature at the wellhead ranging from 90 to 95°C. Flow is from reservoir pressure.. *Figures presented on this poster are for the first geothermal well only.*





Hole & Casing Details	Surface Casing	Intermediate Casing	Anchor Casing	Production Casing	Slotted Production Liner
Hole Size (inches)	36"	26	17½"	12¼"	8½"
Hole Depth (metres MD RT)	50	500	1200	2000	2640
Casing Details	Seamless	ERW	ERW	Seamless	Seamless
Weight	26 lb/ft	234.00 lb/ft.	133.00 lb/ft.	68 lb/ft	47 lb/ft
Grade	H-40	H-40	H-40	K-55	K-55
Connection	Buttress	Buttress	Buttress	Threaded & Coupled	Welded	Buttress
Approximate No. of Joints	4	40	96	124	98	220 x 15 mm dia holes per metre, 1 metre blank at each end.
Perforation						
Setting Depth (m MD)	47	498	1190	450 to 1990	1973 to 2640
Casing Cementing	Cemented back to surface.	Cemented back to surface.	Cemented back to surface	Cemented back to hanger.	Not cemented.
Drilling Fluid	Spud mud	Spud mud	Polymer sweeps as required.	Drill-in fluid	Aerated brine water with

The data presented on this posted is for demonstraəon purposes only. The wells described herein are currently in the producəon tesəng phase. Once the resource has been successfully confirmed, data will be published for public use.