

# The Mount Spurr Geothermal Project

*House Resources Committee  
Meeting  
January 27, 2012  
Juneau, AK*



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*We will not update these forward-looking statements, even though our situation will change in the future.*



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# Outline

- Introduction to:
  - Ormat Technology, Inc
  - Geothermal power
  - The Mt. Spurr geothermal project
- Project status and timeline
- Costs, matching funds and overall funding plan
- Local support
- Amount and cost of power supplied to Railbelt
- Economic and environmental impact



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# Ormat Brings Credibility

- A leader in geothermal power
- Owns and operates 553\* MW worldwide
- Supplied approximately 1,410 MW to 24 countries
- Vertically integrated:
  - Explores, develops, engineers, manufactures, constructs, operates
- Employs approx. 500 people in the U.S. ; >1,150 worldwide
- Publicly traded on the NYSE (“ORA”)

\*Including 50 MW of North Brawley in California and 15 MW of Jersey Valley in Nevada, which are currently below design capacity.

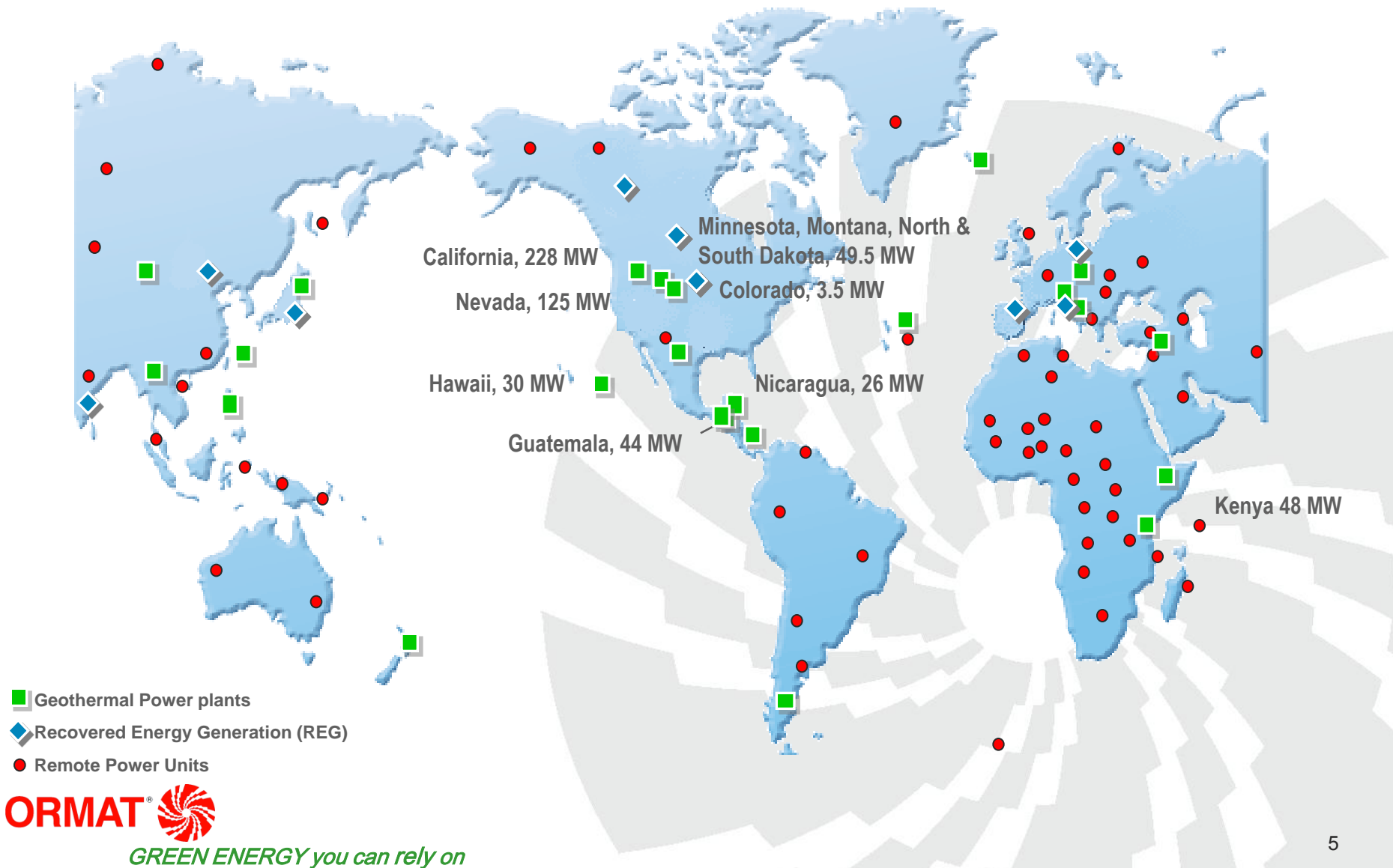


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# Global Presence

Meeting the Needs of Customers in 71 Countries



# Ormat's Commitment to Alaska

- >100 Remote Power Units
  - Serving remote gate valves
  - TransAlaska Pipeline
  - Since 1975
- First geothermal unit
  - Tested in 1979
  - University of Alaska Fairbanks
  - At Manley Hot Springs
- Approx. \$6 million of Ormat equity invested in Mt. Spurr to date



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**ORMAT**

30 Years of Ormat in Alaska

1970-2006

ORMAT® Energy Converters (OEC) powering 62 Remote Gate Valve stations along the TransAlaska Pipeline, since 1976

OEC Prototype for TAPS Tested at UAF, 1970

4 kW Geothermal OEC at UAF, 1977

**Time,  
the Only True Test of  
Reliability**

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# Geothermal – Key Attributes

- Utilities' renewable energy of choice:
  - Base-load generation
  - Cost-competitive
  - Highly reliable; >95% availability
  - Proven technology: ~11,000 MW deployed worldwide
- No fuel cost risk; Fixed long-term pricing
- Sustainable & environmentally friendly
  - Closed loop system with near zero emissions
  - No water consumption [Mt. Spurr plant will be air-cooled]
  - Minimal surface and visual impact
- Creates long-term, high-quality jobs



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# Geothermal – Development Inhibitors

- Resources are scarce
- High upfront CAPEX and risk required in order to discover and confirm the resource



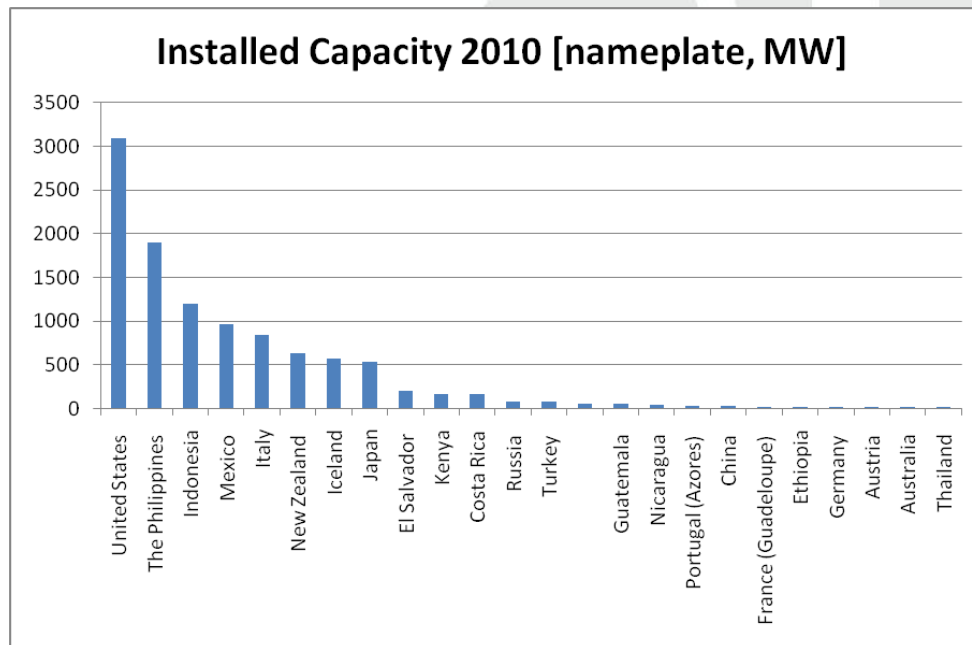
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# Worldwide Geothermal Deployment

- Approximately 11,000 MW deployed world-wide
- 24 nations have utility-scale geothermal generation
  - US is the world leader, with plants in CA, NV, HI, UT, ID
- Supportive policies have been key to success in all nations

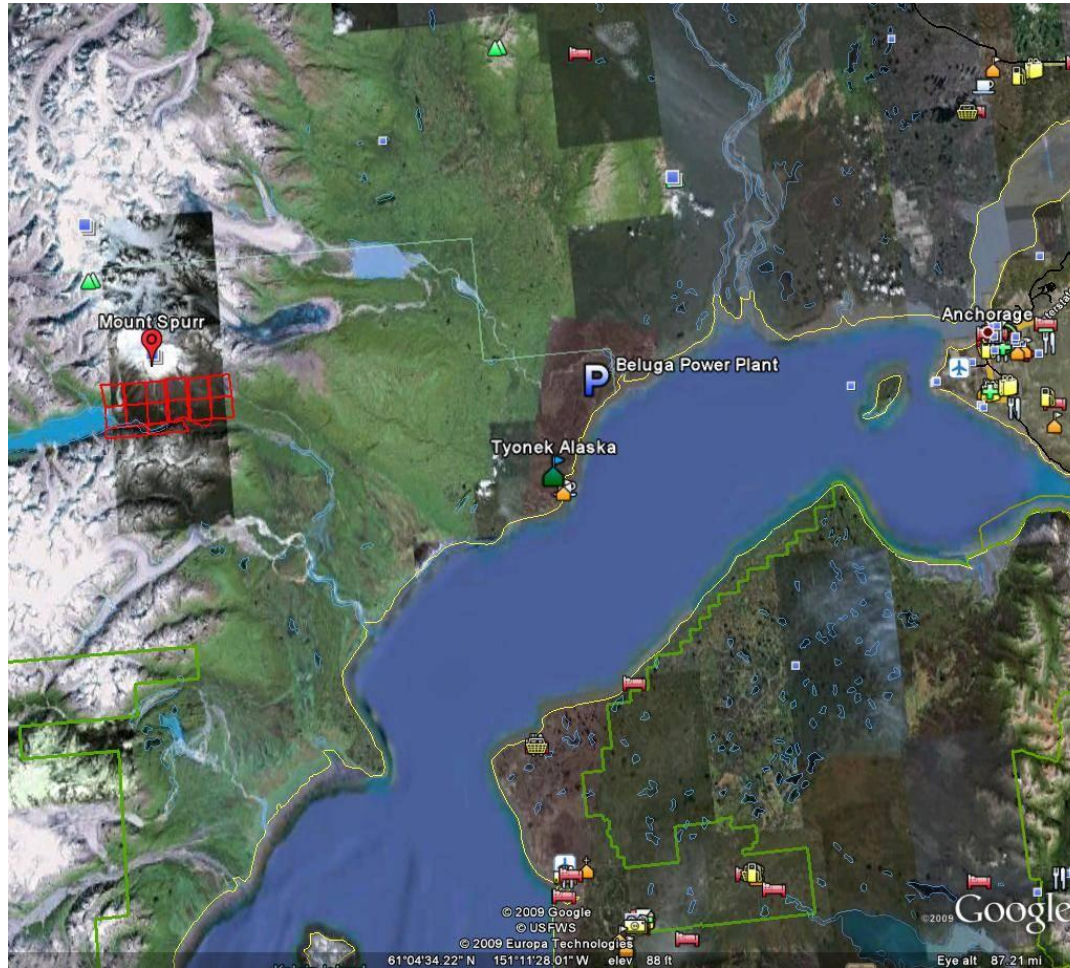


Source: International Geothermal Association



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# Project Location



West Cook Inlet  
~75 miles west of  
Anchorage

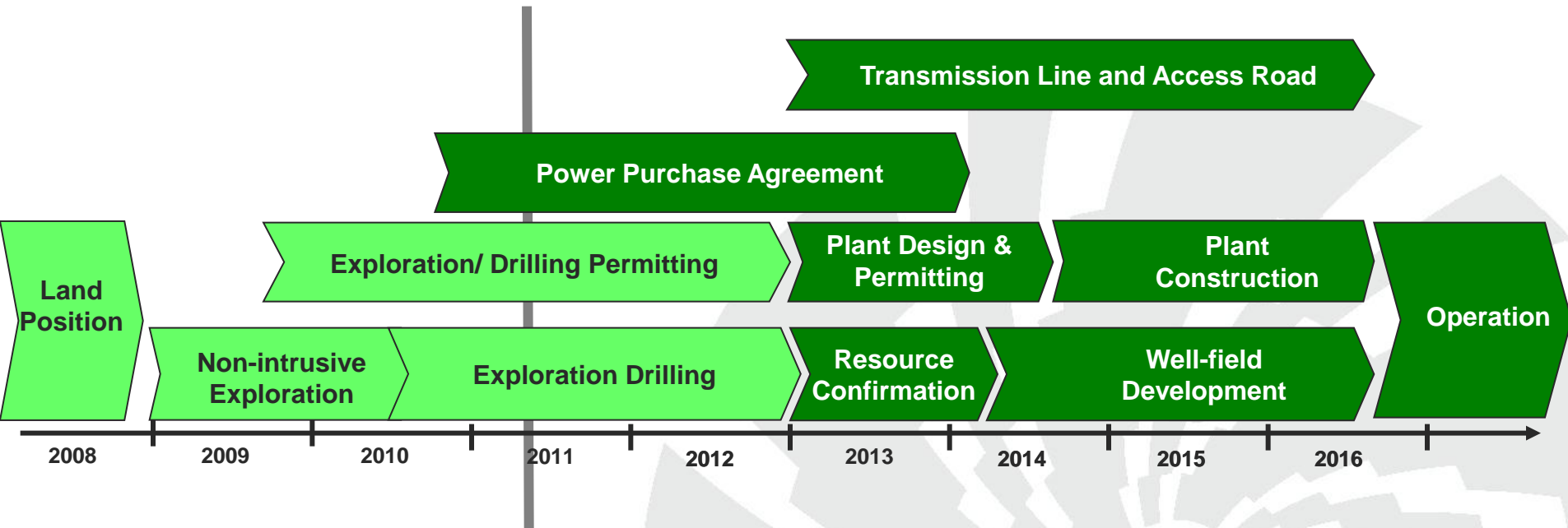
Source: GoogleEarth



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# Mt. Spurr – Status & Estimated Timeline



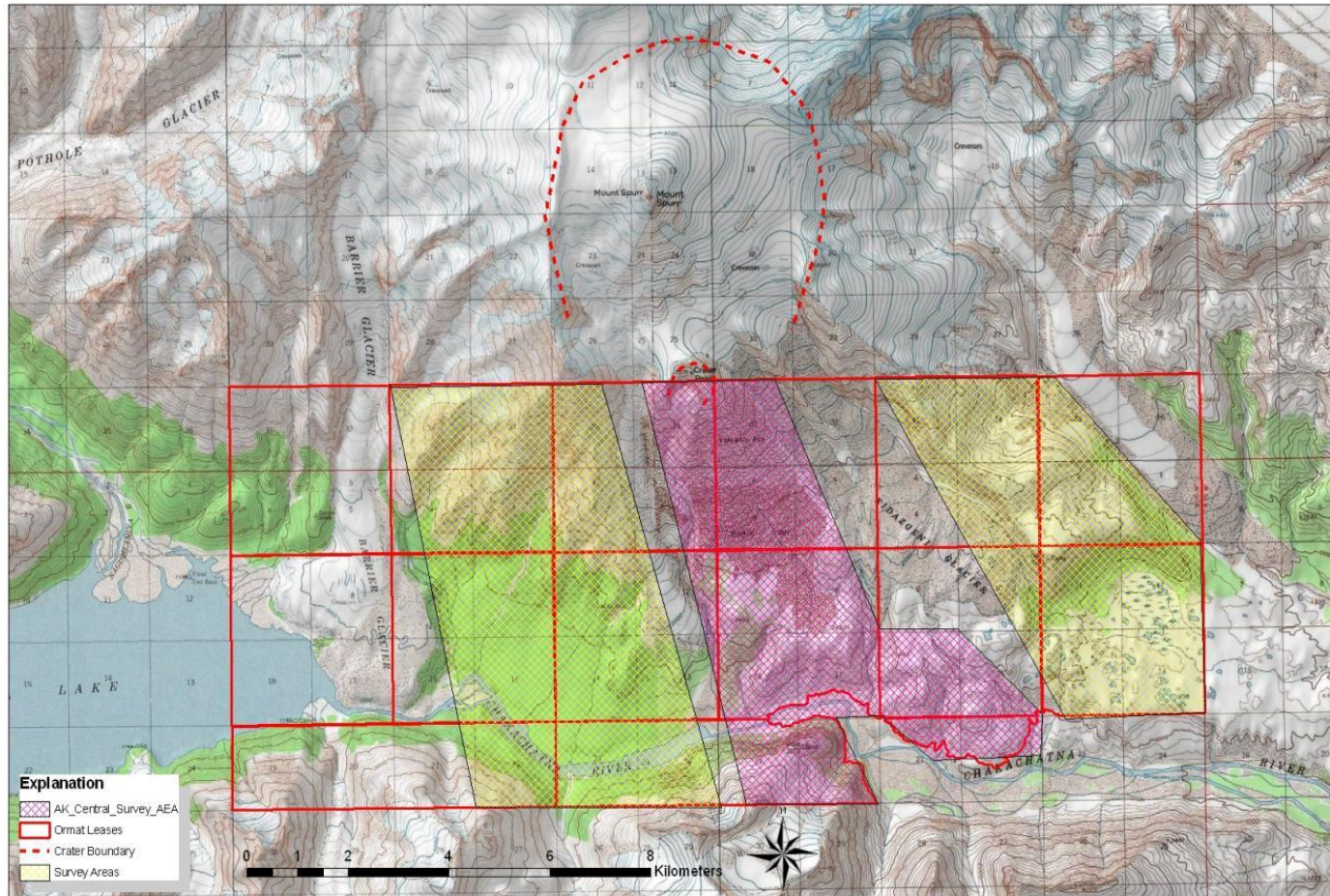
- 36,000 acres of state lands leased from DNR in October 2008
- Non-intrusive exploration conducted summer of 2009 and of 2010
- Two exploration core holes (~1,000 ft) drilled in September 2010
- One deep exploration core hole (~4,000 ft) drilled during summer of 2011



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# General Lease Area: 3 Regions

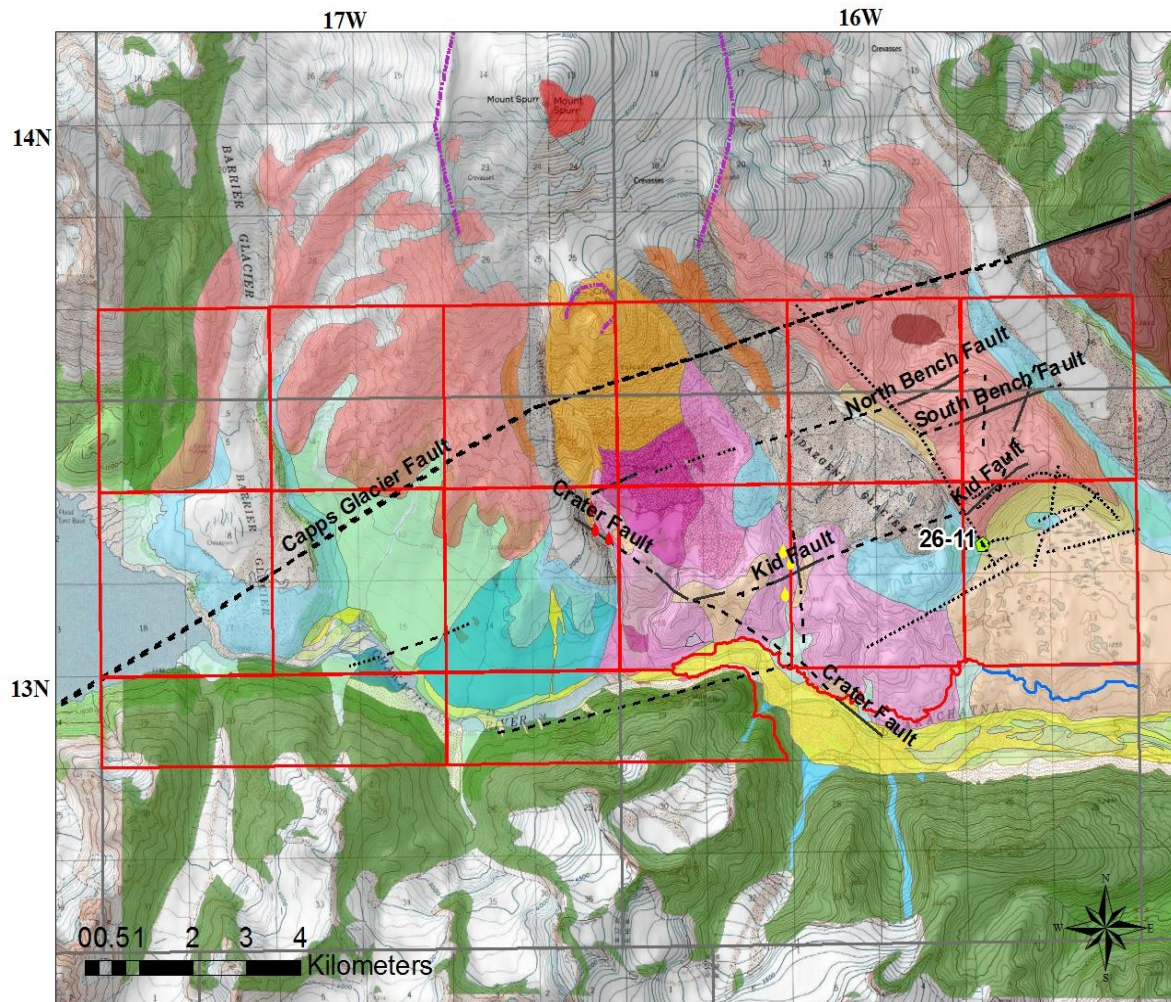


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# Drilling Work Focused on Eastern Region



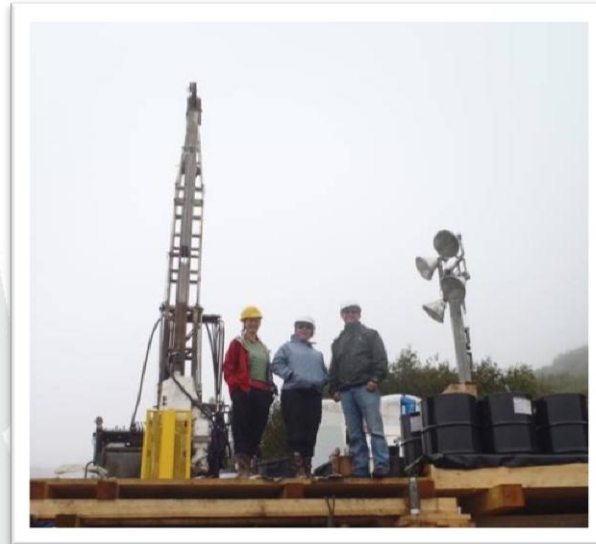
- Closest to infrastructure (road, transmission)
- Outside the known volcanic hazardous zone
- Geologic faults identified could potentially accommodate a geothermal resource



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# Core Drilling in 2010 and 2011

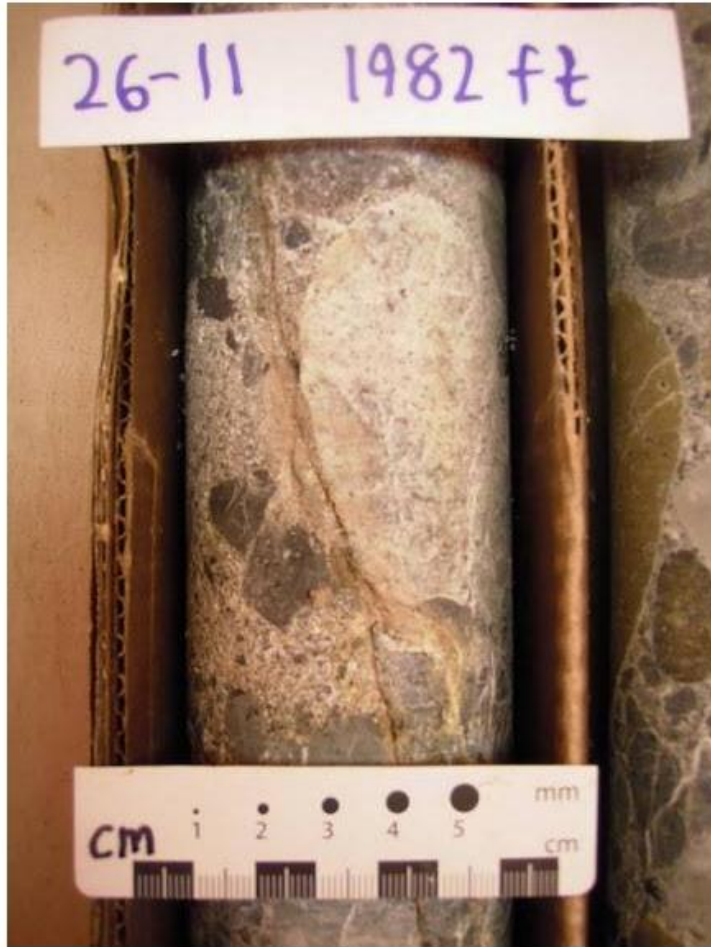


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# Core Collected – Donated to DNR/DGGS



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# Results to Date

- Results from the 2009-2010 exploration and drilling work were encouraging as to the potential existence of a geothermal resource at commercial depths, primarily in the central (harder to develop) region but also in the eastern region
- Results from the 2011 deep core hole in the eastern region were not encouraging as the rock type encountered was not a good reservoir rock and the temperatures measured were colder than expected
- Current geologic model predicts low likelihood of finding a commercial geothermal resource at the eastern region
- However, geologic data still support the potential existence of a commercial resource at the central region



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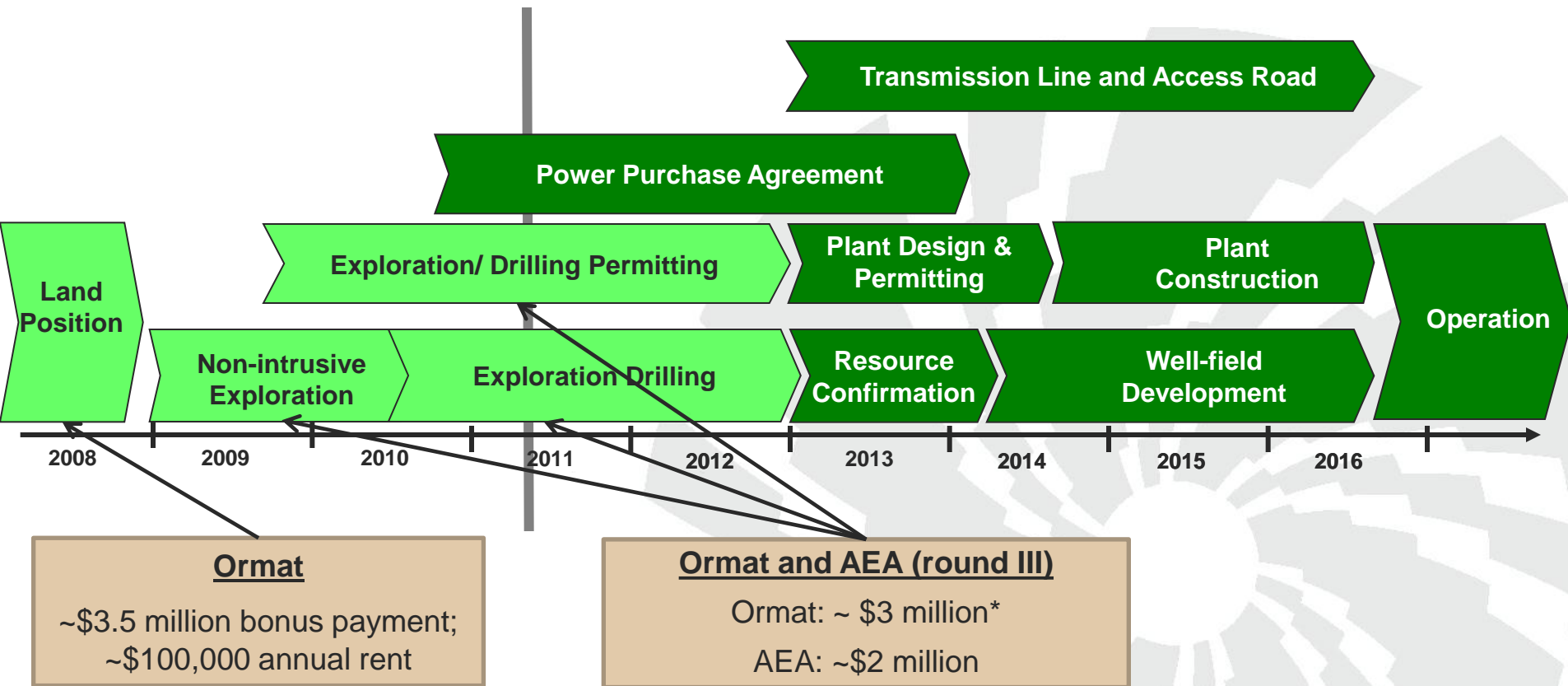
# Status and Next Steps

- Current efforts focus on trying to find a location in the central region that satisfies all major requirements:
  - Reasonable likelihood of finding a commercial resource
  - Volcanic hazard risk can be mitigated
  - Access road and transmission line could be connected to it at reasonable costs



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# Sources of Funding So Far



\* \$2.1 million as matching funds per the grant agreement and the rest outside it



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# Energy to the Railbelt

- Capacity estimated at 50~100 MW net, average. Target is:
  - ~50 MW in 2016
  - Expand to ~100 MW in 2019
- Near-term solution, bridging the gap to longer-term mega-solutions, e.g. Suisitna/Watana hydro and/or gas pipeline
- At 95% availability: 416~832 GWh/year



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# Cost of Power to Railbelt Utilities

- Estimated at ~12 c/kWh
- Fixed price, not coupled with fossil fuels
- Geothermal is a baseload 24/7 resource, therefore utilities will not incur any integration costs
- Price is higher than current avoided costs (5-10 c/kWh), however:
  - Is comparable to other alternatives, e.g. Suisitna/Watana
  - Railbelt utilities' avoided costs are likely to go up with the continued depletion of Cook Inlet gas reserves

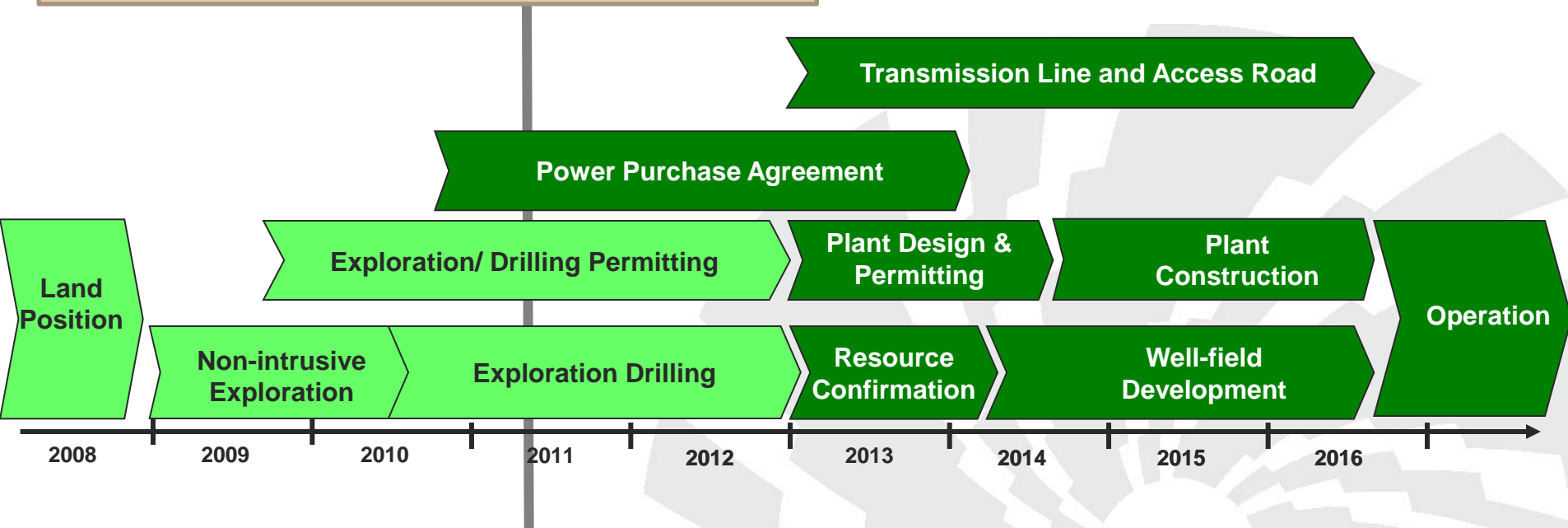


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# Additional Appropriated Funds

FY 2012 Direct Appropriation: \$12.5 million  
AEA round IV grant: \$2 million



We would greatly appreciate making these appropriations available to this project in 2013, should Ormat and the State decide further drilling in the central region is justified



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# Local Support

## ■ From nearest communities:

- Tyonek:
  - Cooperative agreement with Tyonek Native Corporation (TNC) in place
  - TNC provided Ormat with letters of recommendation
- Kenai Peninsula Borough
  - Mayor provided Ormat with letters of recommendation
- Anchorage
  - Mayor provided Ormat with letters of recommendation

## ■ Environmental and renewable energy communities:

- Cook Inletkeeper
- Renewable Energy Alaska Project (REAP)



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# Regional Priority and AEA Vetting

- Project supported by all 6 Railbelt utilities, separately and via ARCTEC, as a potentially viable near term solution
- Identified by the AEA-sponsored 2010 Railbelt Integrated Resource Plan as a beneficial component in the Railbelt's generation portfolio
- Selected by AEA for round III and IV of the Renewable Energy Fund Grant (REFG)



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# Economic Impact

- Alaska's 100 MW of geothermal power could:
  - Provide 50-80 long term high paying jobs
  - Provide more than 300-450 construction jobs
  - Impact >400 local vendors
  - Fuel local economy with >\$850 million over 30 years



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# Environmental Impact

## ■ Alaska's 100 MW of geothermal power could annually:

- Save ~6,000,000 MMBTU of depleting Cook Inlet natural gas
- That's roughly the equivalent of Anchorage's entire residential heating consumption
- Avoid emission of ~320,000 tons of CO<sub>2</sub>\*

\*Calculated for natural gas, assuming 53 Kg of CO<sub>2</sub> per MMBtu (DOE/EIA <http://www.eia.doe.gov/oiaf/1605/coefficients.html>)



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# Summary – Mt Spurr Benefits

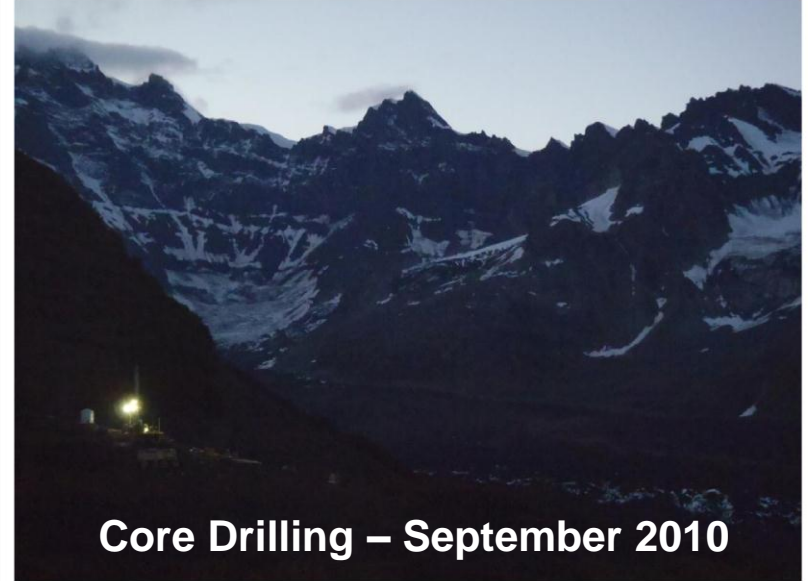
- Clean, reliable, field-proven, base-load power to the Railbelt
- Significant relief in Cook Inlet natural gas consumption
- Significant contributor towards 50% renewables by 2025
- Provides long-term price stability
- Near-term solution, bridging the gap to longer-term mega-solutions, e.g. Suisitna hydro and/or gas pipeline
- Provides high quality, long term green jobs



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# Thank You!



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