



## Rural Cooperative Geothermal Development Electric & Agriculture

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**Principal Investigator:**  
Daniel Silveria, General Manager  
Surprise Valley Electrification Corp.

**Presenter:** Roy Mink  
Mink Geo Hydro Inc.

- Timeline
  - Feasibility Assessment, USDA VAP grant, 2008
  - Project start January 29, 2010
  - Projected Project end date September 30, 2011
  - Approximately 5 percent complete
- Budget
  - Total project funding \$9,356,022
  - DOE share \$2,000,000
  - Awardee share \$7,356,022 no funding received to date
  - Received Preliminary Certificate for Oregon Business Energy Tax Credit
- Barriers
  - Mineral Rights may limit the project area
- Partners – none at this time

## Objective of Project

- Develop a fully operating geothermal electric power plant
- Enable cascaded businesses that serve as an example of what communities can do when they work together
- A catalyst for many similar opportunities in the area
- Demonstrate local entities, including well drillers, pump and machine shops, ranchers and rural electric cooperatives can economically develop geothermal electric plants
- Existing hot well will be used for electric production while continuing to supply supplemental agriculture water and secondary heat for aquaculture
- Demonstrate the use of low-cost scientific resource testing methods



Demonstrate the use of low-cost scientific and technical methods for determining geothermal resource

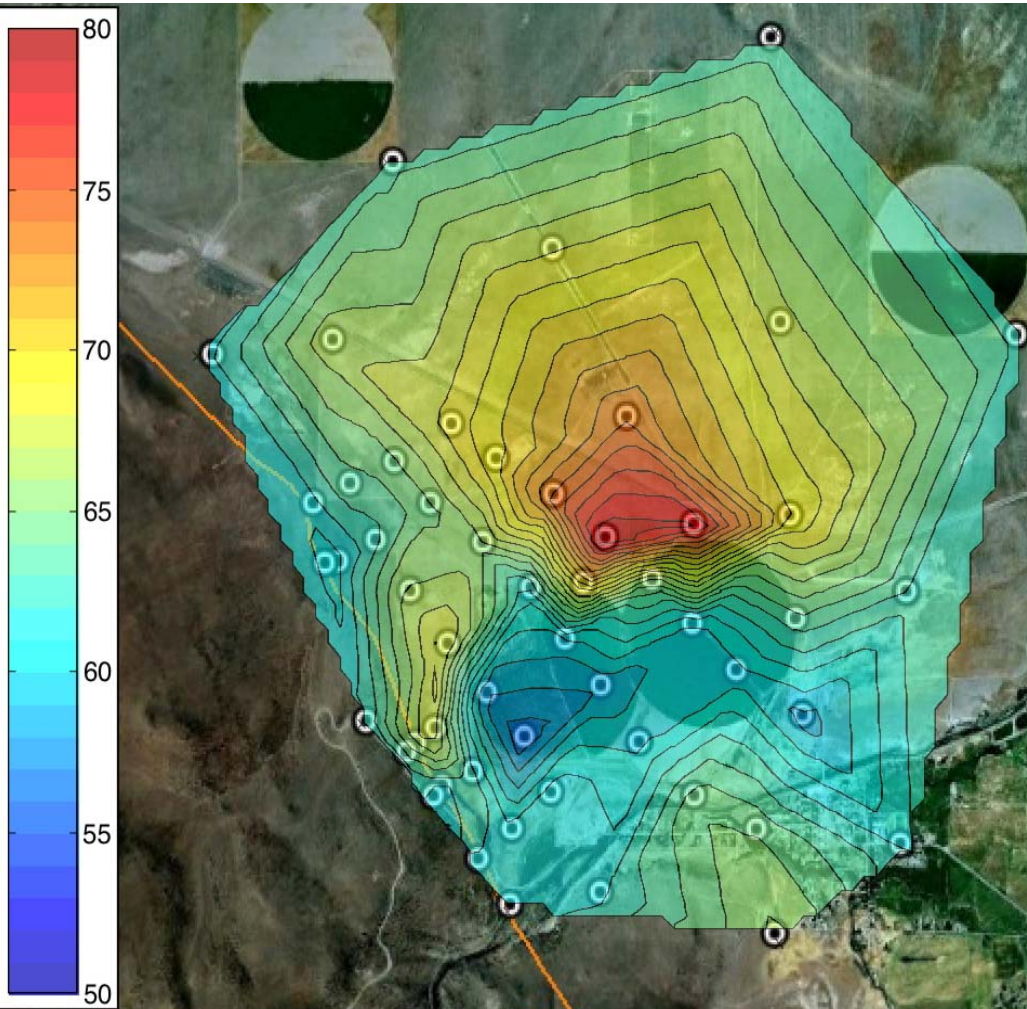
- Measure well flow using ultrasonic flow meter, orifice plate and weir built by landowner
- Use local well drillers and pump shops
- Use landowner equipment & expertise
- Use utility equipment & personnel



- Use of low-cost 2-Meter soil temperature probes to develop reservoir temperature gradient
  - Method developed and implemented by University of Nevada, Reno in studies of Great Basin geothermal resources
- Geologists determined grid pattern based on fault location and existing hot wells and developed resource model from temperature gradient.



# Accomplishments, Expected Outcomes and Progress



## Accomplishments-Phase 1

- Geochemistry of several local wells completed in 2008
- Preliminary Plant sizing & Transmission Design 2008
- Initial well testing in 2008  
additional well testing 2009
- Monitored well production and temperature 2009
- 2-Meter temperature survey & reservoir model 2009
- Drilling solicitation and bid received 2010
- Permitting in process 2010



# Accomplishments, Expected Outcomes and Progress

## Expected Progress-Phase 1

- Complete permitting process
- Begin rework of existing hot well
- Flow test production well
- Begin rework or drilling of injection well
- Size power plant and design plant and collection system layout

**Go/No-Go Decision** after obtaining test results of production well determine if project continues as planned

## Expected Progress-Phase 2

- Acquire installation permit
- Order and assemble power plant equipment and piping system



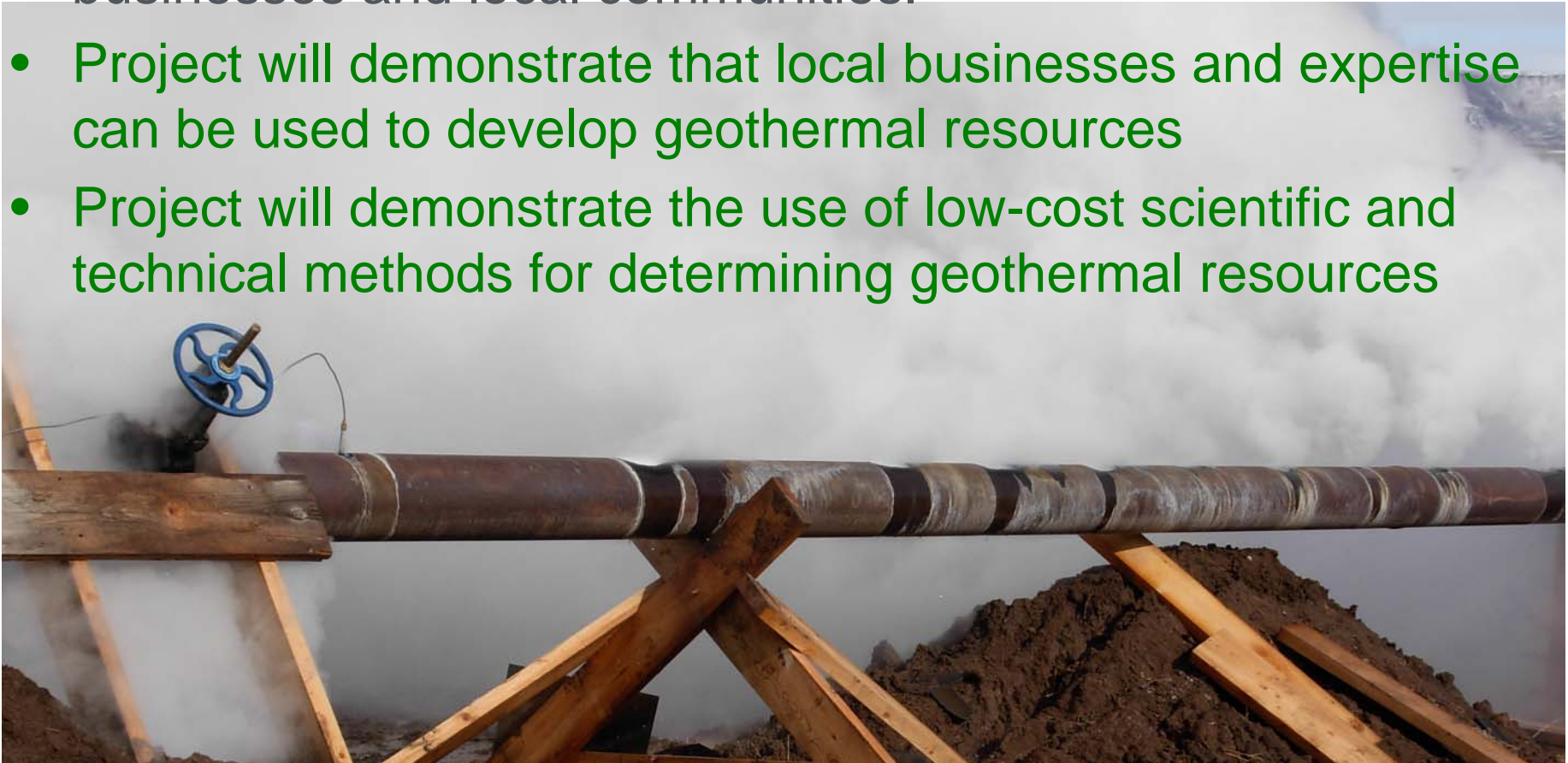
- **Team:**
  - Daniel Silveria, General Manager, Surprise Valley Electric (SVE)
  - Roy Mink, Geologist, Mink Geo Hydro Inc.
  - SVE Staff-technical, financial, project management
  - Daniel Hand, Mechanical Engineer, Sustainable Engineering
- Assistance from Geothermal experts in accounting, permitting, geology, hydrogeology
- Use of local well drillers, pipe fitters and pump shops



- Surprise Valley Electric management and staff is overseeing the day to day implementation of the project
- Surprise Valley Electric Board of Directors, in conjunction with DOE, has the decision making authority over the project and will decide if the project should proceed at the Go/No-Go decision points
- Team will provide weekly summary to DOE during drilling process
- Situation reports will be provided to DOE Project Coordinator anytime significant event occurs

- Expect to have the production well reworked and the injection well drilled in FY10.
- Expect to have a 2-4 MW binary geothermal plant on line in FY11.
- Expect cascaded businesses, to be developing within this time.
- Key decision point is if rework of existing well proceeds as planned. If not, a decision in conjunction with DOE project coordinator will be made whether to continue rework or drill a new production well.

- Project will demonstrate that Rural Electric Cooperatives working with their membership can develop a fully operating geothermal electric power plant in conjunction with cascaded businesses and local communities.
- Project will demonstrate that local businesses and expertise can be used to develop geothermal resources
- Project will demonstrate the use of low-cost scientific and technical methods for determining geothermal resources



- The following Presentations have been given to demonstrate the opportunity for small scale geothermal projects:
  - Oregon Rural Electric Cooperative Association
  - Northwest Requirements Utilities
  - Corridor of Renewable Energy Conference
  - Oregon State Geothermal Working Group