

## Geothermal Workgroup of the Energy Task Force Meeting

**Participants:** Chair: Dan White, Gwen Holdmann, Bill Sackinger, Doug Goering, Amanda Kolker.

Two types of geothermal plants are candidates for development in Alaska. One is a large power plant that may or may not be connected to a grid. In the case where it is not connected, the plant is located at a port where it can serve as a power plant for manufacturing, refining of minerals, or separation of liquids. The example for a large, grid connected power plant is the potential Mt. Spurr prospect that would serve the railbelt grid. In the case of large power plants we chose a 100 MW plant. The second type of geothermal plant would supply power to a small grid, such as the Chena Hot Springs Resort. In this case the plant would more likely be a lower temperature resource binary system geothermal development.

1. Write a short section for the business plan that identifies and cites the source of data and assumptions that were used in the cost model.

The data that was used by the geothermal group were derived principally from Hance, 2005, as well as costs developed by Amanda Kolker in her work with the AEA and Gwen Holdmann from the Chena Hot Springs Resort.

According to Hance, 2005, capital costs can be broken down according to Figure 1. The capital costs in Hance, 2005, ranged from \$3000 - \$3900/kW (in 2007 dollars) including all elements of development as shown in Figure 1.

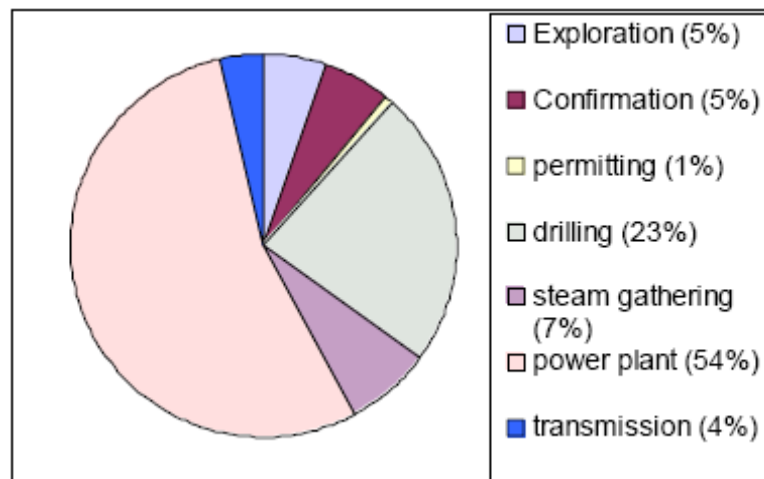


Figure 1. Distribution of capital costs for geothermal power plants (Hance, 2005).

Here, transmission is only 4% of the total cost of the project, or \$120-\$156/kw. For Mt. Spurr, there would be roughly 30 miles of transmission line built. According to Hance, 2005, the cost of transmission is \$400,000 - \$500,000 per mile. The 230 kilovolt Northern Intertie was recently constructed at a capital cost of \$1,000,000 per mile. For a 100 MW plant at Mt.

Spurr therefore, the capital cost would be approximately \$350,000,000 of which \$20M would be for transmission.

An equation was included in Hance, 2005, to generate costs for geothermal plants on a size basis. The equation suggests that a power plant at 10 MW would cost roughly 26% more on a per kW basis than a 100 MW. As such, a cost of 4410/kW was used for the CHSR model.

Operating and maintenance costs for geothermal are estimated to cost between \$15 and \$30/MW in 2007 dollars. In our estimates we assumed \$25/MW for both the large and small plants.

2. Rank the available options for inclusion in the presentation final short, mid, and long-term recommendations

Recommendations for the short term include: 1) evaluation of small grid, large grid and point of use applications in the state, 2) develop a resource research plan. Before selling leases or private investment, regional or state agencies should evaluate the geothermal resource potential.

Recommendations for the midterm include: 1) Implementation of resource evaluation and cost structures for leasing the resource, and construction/operation of the power plant. In the mid-term, exploration should begin on small and large scale plants.

Recommendations for the long term include: 1) Construction and operation of plants, 2) study the potential opportunities to convert geothermal power into a mobile fuel source (e.g. hydrogen).

3. Develop a socioeconomic model of alternatives that show relationships of alternatives and their externalities.

Henry??

Hance, C., (2005), Factors affecting costs of geothermal power development, Geothermal Energy Association, Washington DC.