

## Proposed Agreement between California Energy Commission and Imageair, Inc.

**Title:** Surface Deformation Baseline in Imperial Valley from Satellite Radar Interferometry (InSAR)  
**Amount:** \$672,234.00  
**Term:** 21 months  
**Contact:** Pablo Gutierrez  
**Committee Meeting:** 5/10/2011

### Funding

FY	Program	Area	Initiative	Budget	This Project	Remaining Balance
09	Geothermal	Renewables	Geothermal	\$4,500,000	\$672,234	\$0   0%

### Recommendation

Approve this agreement with Imageair, Inc. for \$672,234. Staff recommends placing this item on the discussion agenda of the Commission Business Meeting.

### Issue

In view of the intense geothermal development in Imperial Valley, this project proposes to develop a satellite based land survey to detect surface deformation at current and future geothermal power plants. This project will enable geothermal developers to distinguish between tectonic and man-made causes of subsidence. Project results will also be useful in resource assessment, exploration, and mitigation activities. The proposed project will provide uniquely valuable data base which will be used for years to come.

### Background

The Imperial Valley in southern California is renowned for its geothermal potential. It is the site of four current geothermal fields (Salton Sea, Heber, East Mesa, North Brawley), and a number of future geothermal developments.

Currently there are a total of 16 plants operating in Imperial Valley, 10 of which are at the Salton Sea geothermal field operated by CalEnergy. The breakdown of operating geothermal plants are as follows: Salton Sea (350 MW installed capacity), Heber (130 MW), East Mesa (95 MW) and North Brawley (50 MW), for a total installed capacity of 625 MW. This is more than a third of the installed capacity in all of California.

The Imperial Valley is on the forefront of geothermal energy development and will play an increasing role in the future. A minimum of ~1,900 MW, and a likely ~2,500 MW of additional geothermal development is expected in the region, which is about half of that in all of California (GeothermEx Report, 2004). Thirteen geothermal prospects have been documented in the Imperial Valley (GeothermEx Report, 2007; Aerospace Report to IID, 2011): Salton Sea (1750 MW likely capacity); Niland (776 MW), Westmoreland (50 MW), Glamis (6 MW), East Mesa (148 MW), Heber (142 MW), Dunes (11 MW), Superstition Mountain (10 MW), North Brawley (135 MW), East Brawley (129 MW),

Mesquite/South Brawley (62 MW), Mount Signal (19 MW), and Truckhaven (25 MW), for a total of 3,263 MW geothermal capacity. (GeothermEx Report, 2004).

The estimated total geothermal capacity in Imperial Valley (3,263 MW) is about 20% of the estimated 16,000 MW potential of all renewable energy (solar, wind, geothermal and biomass) for the region. In anticipation of increased power supply from the renewable resources in Imperial County, the San Diego Gas & Electric has already started construction of a high voltage transmission line (Sunrise Powerlink) running through Imperial Valley and to San Diego, over a ~190 km distance. This transmission line is expected to bring ~1000 MW of renewable energy to San Diego County.

The economy of the region stands to greatly benefit from geothermal development. The proposed project will contribute to the local community by significantly helping the geothermal developers and operators to assess resources and to mitigate any possible environmental impacts. Creating a surface deformation baseline at sites of interest in Imperial Valley will benefit not only the geothermal companies, but also the Imperial Irrigation District and Imperial County. Ongoing tectonic movements will be better understood by regional planning agencies to better plan for future environmental mitigation measures and regulatory activities.

Geothermal developers stand to benefit from project results, in terms of comprehensive knowledge of the tectonic surface deformation at their intended sites of development, and assist in their planning and resource assessment activities and may even help with pinpointing drilling targets.

## **Proposed Work**

The objective of the proposed work is to create a baseline data base of surface deformations at current and planned geothermal plants in the Imperial Valley, using remote sensing data from satellites and advanced interferometric synthetic aperture radar (InSAR) techniques. The proposed project will reveal in greater detail surface deformation over a large area in the geothermal production zones, than what is possible with localized leveling surveys and the regional GPS network. This will assist geothermal developers in their resource assessments, planning and exploration activities by: (1) providing unprecedented tectonic deformation at prospective geothermal sites; (2) pointing possible hidden faults; and (3) supplying estimates of tectonic strain that may assist in identifying drilling targets, (4) If there are indications for surface deformation associated with the existing geothermal production, geothermal operators can be greatly aided in their mitigation efforts to reduce any possible environmental impact. This work will build on a previous GRDA project and will provide further detail to help geothermal energy developers locate resources.

## **Justification and Goals**

This project "[will develop, and help bring to market] advanced electricity generation technologies that exceed applicable standards to increase reductions in greenhouse gas emissions from electricity generation, and that benefit electric utility customers" (Public Resources Code 25620.1.(b)(3)), (Chapter 512, Statutes of 2006)).

This will be accomplished by:

- The proposed project will assist geothermal developers in their resource assessments, planning and exploration activities by: (1) providing unprecedented tectonic deformation at prospective

geothermal sites; (2) pointing possible hidden faults; and (3) supplying estimates of tectonic strain that may assist in identifying drilling targets, (4) If there are indications for surface deformation associated with the existing geothermal production, geothermal operators can be greatly aided in their mitigation efforts to reduce any possible environmental impact.