

Geothermal Industry Interim US Market Update

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The GEA expects geothermal industry growth to continue for the foreseeable future. Although the amount of geothermal capacity coming online in 2010 is not expected to reach 2009 levels (176 MW), geothermal projects in advanced phases of development abound. GEA estimates that 500 to 700 MW of geothermal projects will enter advanced phases of construction between the end of 2010 and through 2011. An increasing number of these projects are located in California and especially Nevada, where strong state policies and a geothermal friendly regulatory structure support strong industry growth. Overall, strong state renewable portfolio standards, federal tax incentives, and stimulus funding continue to drive growth in the geothermal industry. With 95% of geothermal projects receiving American Recovery and Reinvestment Act (ARRA) funding still being less than 50% complete, GEA anticipates that stimulus funding will continue to be a significant driver behind geothermal development through 2011.

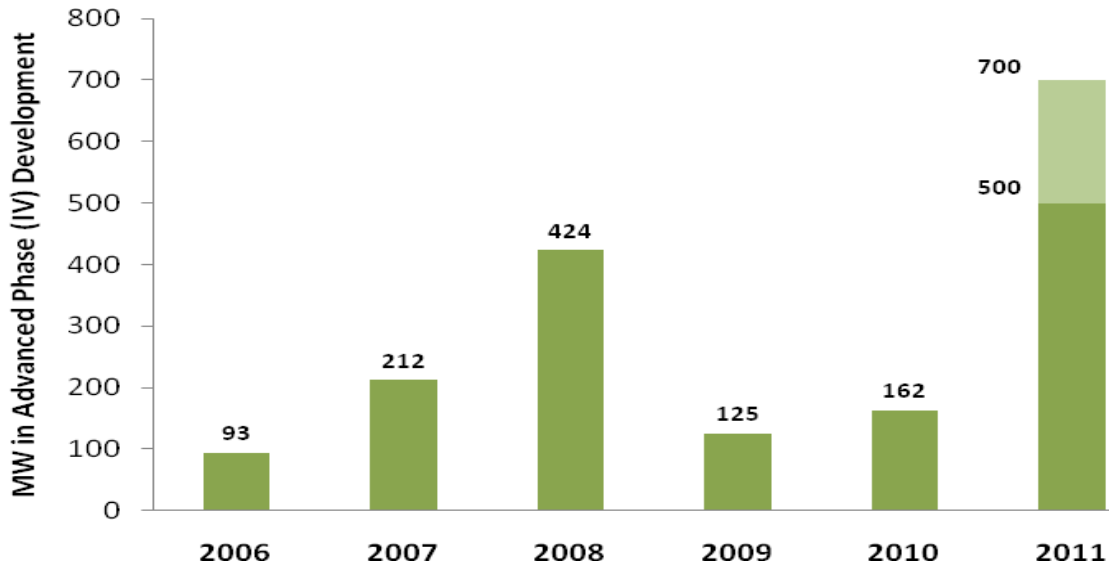
Industry Growth Trends and Future Development

The US geothermal power industry continued to grow in 2010, with the overall number of new projects under development continuing to increase. While developing projects in final stages of construction and completion is expected to be down from 2009 levels, GEA anticipates the number of advanced stage projects to rebound to new highs in 2011.

Developers report that the economic downturn has made investors extremely risk-averse, thereby dampening geothermal industry growth in 2010, particularly for projects that were approaching the final construction state. However, if the economy continues to recover and federal and state policies providing incentives to investors remain in effect, a significant rebound is expected in 2011.

GEA expects the amount of geothermal capacity under construction to reach significantly high levels in 2011. GEA estimates that 500 to 700 MW of power projects will enter final phases of construction in 2011, and these projects will create 3,000 jobs primarily in Nevada and California. Figure 1 below shows the capacity identified by GEA as being in the final phase of development (Phase IV) over the past five years as well as GEA's estimate for 2011.

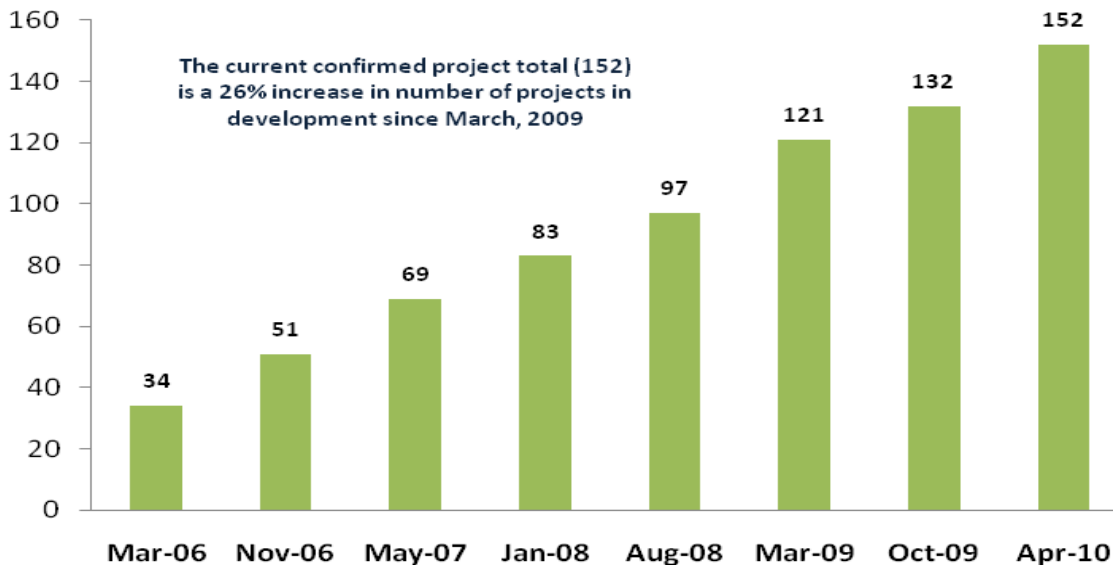
Figure 1: Advanced Phase Project Development 2006 – 2011



Source: GEA

In its April 2010 *US Geothermal Power Production and Development Update* GEA identified 188 projects in different stages of development in fifteen states which could produce as much as 7,875 MW of new electric power. This increase in the number of projects in development represents a 25% growth in the number of new projects under development in the United States between May 2009 and April 2010. Despite a slow-down in projects reaching the final construction phase, the long-term growth trend for new geothermal projects continues. Figure 2 highlights the growth in geothermal projects identified by GEA between 2006 and 2010.

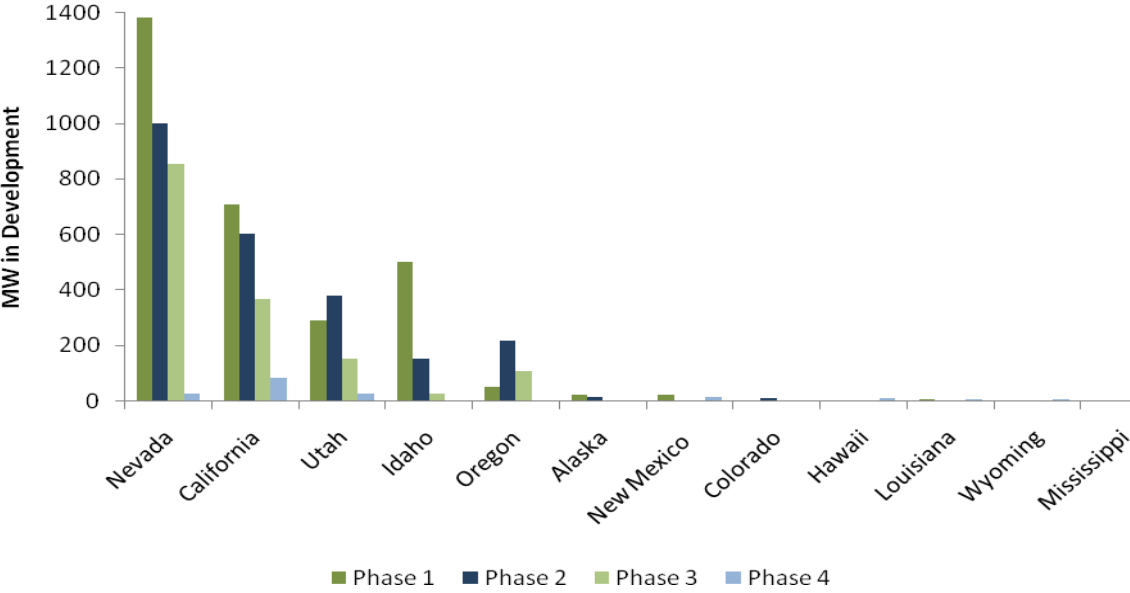
Figure 2: Total Confirmed Projects 2006-2010



Source: GEA

New geothermal power projects are in progress in fifteen states from the Pacific to the Gulf Coast. GEA identified new projects, in various stages of development (see figure 3), in Alaska, Arizona, California, Colorado, Hawaii, Idaho, Louisiana, Mississippi, Nevada, New Mexico, Oregon, Texas, Utah, Washington and Wyoming. In addition to large utility scale power projects, the survey also demonstrated expanding interest in small power systems (under 1MW) with projects in Mississippi, Louisiana, Texas, Oregon and Wyoming.

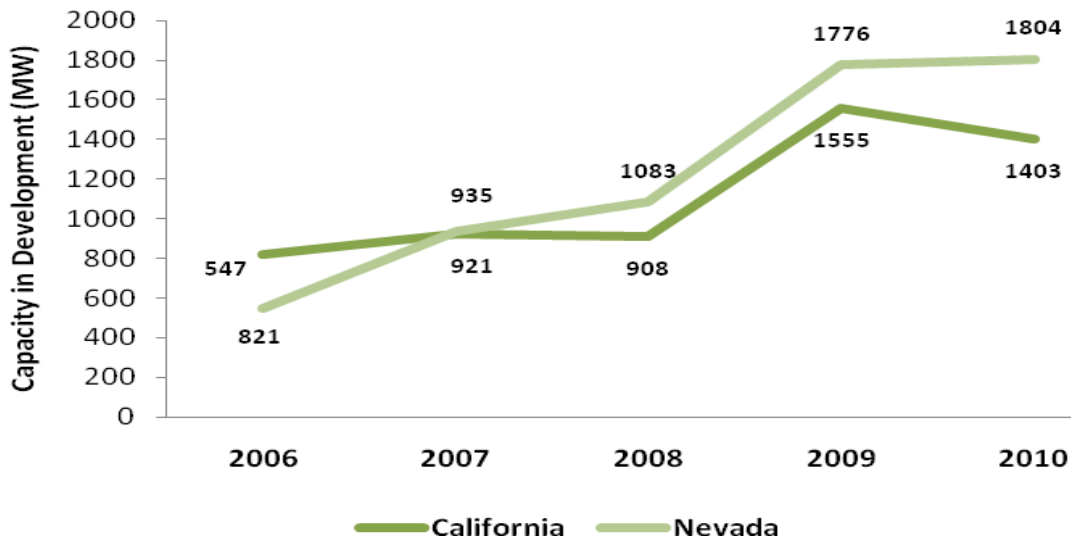
Figure 3: Developing Projects by State and Phase



Source: GEA

As indicated in Figure 3, Nevada and California are clear leaders in geothermal power development. However, in the past few years, Nevada has overtaken California in the number and capacity (MW) of geothermal power projects under development. Nevada's strong state policies supporting new geothermal growth, as well as its limited bureaucratic requirements and delays, have provided impetus to geothermal exploration and general industry growth. Figure 4 shows the growth in projects under development in California and Nevada from 2006 to 2010.

Figure 4: CA and NV Capacity in Development 2006-2010



Source: GEA

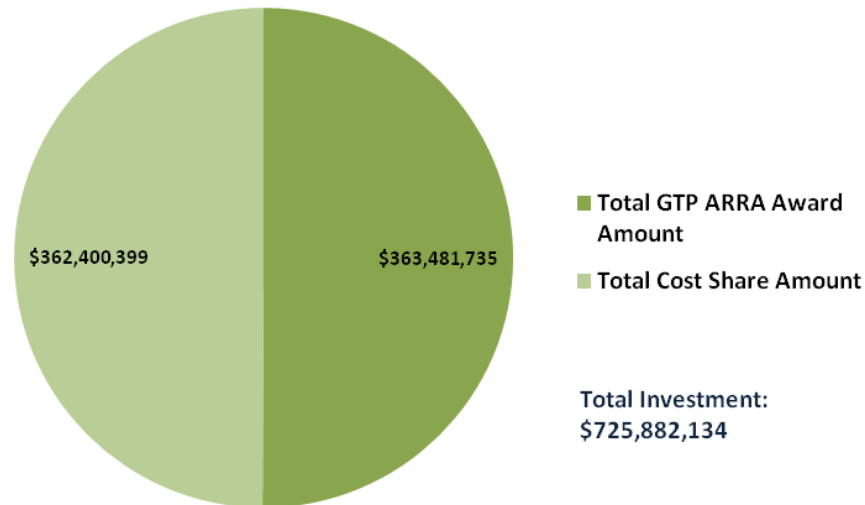
Drivers of Geothermal Development

The federal stimulus, tax incentives, and strong state renewable standards continue to fuel the growth in geothermal power. Every geothermal project coming online in 2009 has taken advantage of the tax grant provisions of the stimulus bill, which has helped to maintain the momentum for new projects. Many geothermal developers are building several projects in the US, and the cash grant provides them an effective incentive that quickly reduces their debt -- an important factor in the present economic recession.

In addition, four of the top five states with geothermal power under development have substantial renewable standards. Those states in order of geothermal development and their state renewable requirement are: 1) Nevada (25%), 2) California (33%), 3) Utah (20%), 4) Idaho (none), and 5) Oregon (25%).

DOE federal stimulus legislation funding (ARRA) is also having an important influence on the US geothermal market. In October 2009, the Department of Energy announced the results of its competitive solicitation under ARRA for geothermal technology projects. DOE announced awards that could result in up to \$338 million in ARRA funding to geothermal research and development, and would require an additional \$280 million in recipient cost-share. As of June 2010, ARRA awards administered through the DOE Geothermal Technologies Program (GTP) totaled nearly \$363.5 million. Total cost share contributes an additional \$362.4M, bringing the combined ARRA/cost share geothermal technology investment to more than \$725.88M. The vast majority of projects that have yet to be completed indicate that much of this total will be spent in the coming year, boosting job growth within the geothermal sector.

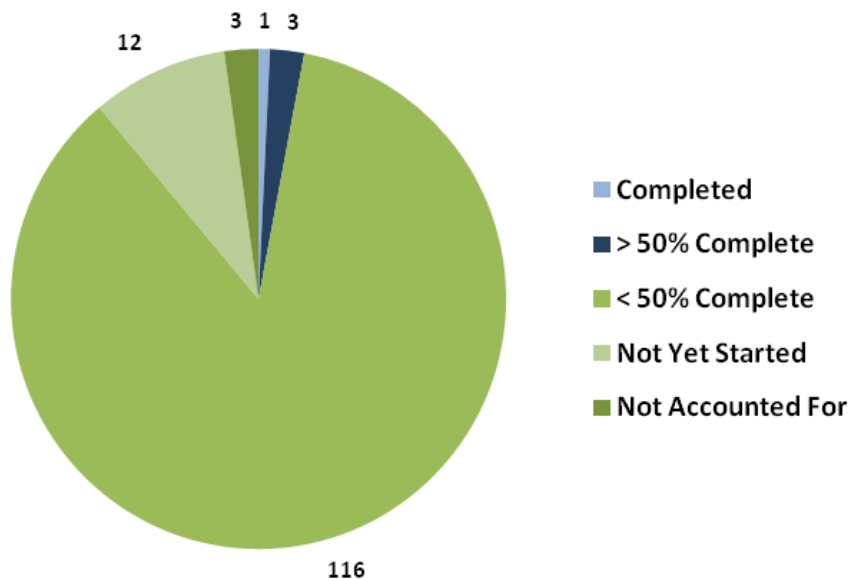
Figure 5: Total DOE GTP ARRA/Cost-Share Geothermal Investment



Source: GEA

A review of GTP ARRA awards reveals that the impact of stimulus funding has not yet peaked for geothermal. At the end of Q2 ending in June, of the 135 projects receiving ARRA funding through the DOE GTP: 1 has been completed, 3 are more than 50% complete, 116 are less than 50% complete (85.9%), 12 have not been started (1 of these only had reports for Q1, ending in March), 3 are unaccounted for on Recovery.gov.

Figure 6: ARRA Funded Geothermal Project Progress



Source: GEA

As indicated in Figure 6, about 95% of the projects receiving ARRA funding are either less than 50% complete or have not been started as of June, 2010. With the majority of ARRA funded projects still in early stages of development, GEA anticipates that 2011 will be the high-point of geothermal activity in the US under the stimulus legislation.

Funding for geothermal projects via ARRA has reached a large number of states but remains concentrated in those regions with significant geothermal development. While 38 states, including the District of Columbia, received geothermal stimulus awards, California and Nevada together account for almost 25% of the awards.

- 15 projects are listed in California, all of which are less than 50% complete (11% of total projects)
- 16 projects are listed in Nevada, two of which have not been started, the 14 others are all less than 50% complete

ARRA also appears to have drawn a diverse group of actors into the geothermal sector. Almost half of the GTP awards went to non-industry entities: colleges and universities, cities, counties, or other state and local institutions, tribal entities, and DOE's National Labs. Of the 132 GTP awards for which GEA obtained Recipient Reports, 40 went to colleges and universities, 7 went to cities, counties, or local school districts, 10 went to DOE National Labs, 5 went to state departments or entities, and 2 went to tribal entities.

An examination of the recovery act data also shows ARRA awards were distributed to geothermal projects by a number of other federal agencies, many of these heat-pump related. Other funding agencies include the Departments of Agriculture, Commerce, Defense, Health and Human Services, Homeland Security, Housing and Urban Development, the Interior, Labor, Transportation, and Veteran's Affairs, the General Services Administration and the National Science Foundation.

Appendices:

- Appendix A: California Geothermal Projects Under Development (from April 2010 US Geothermal Power Production and Development Update)
- Appendix B: Nevada Geothermal Projects Under Development (from the GEA April 2010 US Geothermal Power Production and Development Update)
- Appendix C: California DOE-GTP ARRA Awards – Q2 Data (April-June 2010)
- Appendix D: Nevada DOE-GTP ARRA Awards – Q2 Data (April-June 2010)

Appendix A: California Projects Under Development

Phase	Project Name	Developer	Capacity (MW)	DOE Funding
Phase 1				
	Unnamed Glass Mountain	Calpine	320	
	Unnamed North Geysers	Calpine	100	
	Surprise Valley	Enel NA	20	
	NAWS China Lake So Range	Navy Geothermal Program	5-15	
	MCAS Yuma Chocolate Mountains	Navy Geothermal Program	12-30	
	NAF El Centro/Superstition Hills	Navy Geothermal Program	5-25	
	Orita 3	Ram Power	40-100	
	New River	Ram Power	40-50	ARRA Recipient
	Mesquite Lake	Ram Power	49.9	
Phase 2				
	Fourmile Hill-Glass Mountain	Calpine	50	
	Telephone Flat-Glass Mountain	Calpine	50	
	NAF El Centro/Superstition Mts.	Navy Geothermal Program	12-35	
	Marine Corps, Twenty-nine Palms	Navy Geothermal Program	5-12	
	Mammoth Phase II	Ormat	25	
	Wister	Ormat	30	ARRA Recipient
	Project CA	Oski Energy	TBD	
	KS	Oski Energy	75-100	
	HV	Oski Energy	75-100	
	KN	Oski Energy	75-100	
	Orita 2	Ram Power	40-100	

Phase	Project Name	Developer	Capacity (MW)	DOE Funding
Phase 3				
	Buckeye-North Geysers	Calpine	30	
	Wildhorse-North Geysers	Calpine	30-50	
	East Brawley	Ormat	30	
	Orita 1	Ram Power	40-100	
	Black Rock 1	CalEnergy	53	
	Black Rock 2	CalEnergy	53	
	Black Rock 3	CalEnergy	53	
Phase 4				
	Geysers Field	Ram Power	35	
	Hudson Ranch 1	CHAR	49.9	
Unconfirmed				
	San Felipe	Esmeralda Energy	20-25	
	Bautista	Esmeralda Energy	49.9	
	Truckhaven I	Iceland America Energy	49	
	Salton Sea	Sierra Geothermal Power	18-38	
	Surprise Valley	Gradient Resources Inc.	20	
	El Centro*		50	

* Pending Action of Volume II of PEIS

Appendix B: Nevada Projects in Development

Phase	Project Name	Developer	Capacity (MW)	DOE Funding
Phase 1				
	Beowawe	Magma	TBD	
	Columbus Marsh	Magma	TBD	
	Baltazor Hot Springs	Magma	TBD	
	NAS Test Ranges-Fallon	Navy Geothermal Program	10-30	
	Hawthorne Army Depot	Navy Geothermal Program	10-30	
	Black Warrior	Nevada Geothermal	55	ARRA Recipient
	Desert Peak EGS	Ormat	TBD	
	Brady EGS	Ormat	TBD	FY 08 Recipient
	Dixie Meadows	Ormat	TBD	
	Leach Hot Springs	Ormat	TBD	
	Smith Creek	Ormat	TBD	
	Hawthorne	Oski Energy	25-50	
	Hot Pot Geo	Oski Energy	30-50	ARRA Recipient
	Alligator Geo	Oski Energy	20-40	
	Clayton Valley	Ram Power	120-200	
	Delcer Butte	Ram Power	30	
	Gerlach	Sierra Geothermal Power	7-15	
	Salt Wells	Sierra Geothermal Power	35-76	
	Howard	Sierra Geothermal Power	19-38	
	Sulphur	Sierra Geothermal Power	12-27	
	Wells	Sierra Geothermal Power	15-32	
	Pearl Hot Springs	Sierra Geothermal Power	22-45	
	Dixey Valley	Sierra Geothermal Power	14-31	
	Dixey Valley North	Sierra Geothermal Power	40-90	
	Hawthorne	Sierra Geothermal Power	10-22	
	North Salt Wells	Sierra Geothermal Power	48-101	
	Spencer	Sierra Geothermal Power	9-19	
	Granite Creek	US Geothermal	TBD	
	Lee Allen	Gradient Resources Inc.	48-115	
	New York Canyon	Gradient Resources Inc.	27-54	

Phase	Project Name	Developer	Capacity (MW)	DOE Funding
	Colado	Gradient Resources Inc.	121-232	
Phase 2				
	Lee Hot Springs	Earth Power Resources	32	
	Fireball	Earth Power Resources	32	
	McCoy	Magma	80	ARRA Recipient
	Panther	Magma	34	
	Desert Queen	Magma	36	
	Dixie Valley	Magma	TBD	
	Granite Springs	Magma	TBD	
	North Valley	Magma	TBD	
	Hawthorne Army Depot SW	Navy Geothermal Program	12-25	
	Gabbs Valley	Ormat	TBD	
	Dead Horse	Ormat	TBD	
	Silver State Geo.	Oski Energy	25-50	
	Pyramid Lake	Pyramid Lake Paiute Tribe	TBD	ARRA Recipient
	San Emidio	US Geothermal	20-25	ARRA Recipient
	Gerlach	US Geothermal	15-30	
	Sou Hills	Montara Energy Ventures	TBD	
	Truckee	Raser Technologies	20	
	Trail Canyon	Raser Technologies	20	
	Alum	Sierra Geothermal Power	33-68	ARRA Recipient
	Silver Peak	Sierra Geothermal Power	15-42	ARRA Recipient
	Reese River	Sierra Geothermal Power	26-58	
	Barren Hills	Sierra Geothermal Power	46-99	
	Aurora/Green Hills	Gradient Resources Inc.	132-350	
Phase 3				
	Darrough Ranch	Great American Energy	21	
	NAS, Fallon-Mainside	Navy Geothermal Program	30	
	Blue Mountain	Nevada Geothermal	20-30	
	Pumpnickel	Nevada Geothermal	15-33	
	Carson Lake	Ormat	20	
	McGinness Hills	Ormat	30	

Phase	Project Name	Developer	Capacity (MW)	DOE Funding
	Tuscarora	Ormat	16-40	
	San Emidio Repower	US Geothermal	8.4	
	Devil's Canyon	Raser Technologies	20	
	Salt Wells	Gradient Resources Inc.	117-245	
	Patua Hot Springs	Gradient Resources Inc.	175-378	
Phase 4				
	NV Co-production Project	ElectraTherm	.03	
	Jersey Valley	Ormat	15	
	Soda Lake Upgrade and Expansion	Magma	12	ARRA Recipient
Unconfirmed				
	Fish Lake Valley	Esmeralda Energy	25	
	Fish Lake II	Esmeralda Energy	25-75	
	Emigrant	Esmeralda Energy	50	
	Gabbs Valley	GeoGlobal	5-60	ARRA Recipient
	Humboldt-Toayaibe*	Great American Energy	12	
	Rye Patch	Presco Energy	13	ARRA Recipient
	Marys River	Standard Steam Trust	Unspecified	
	Marys River SW	Standard Steam Trust	Unspecified	
	Edwards Creek	Standard Steam Trust	Unspecified	
	Edwards Creek SW	Standard Steam Trust	Unspecified	
	Coyote Canyon	Terra-Gen	62	
	Dixie Meadows	Terra-Gen	62	
	New York Canyon	Terra-Gen	62	
	Buffalo Valley	Magma	TBD	
	Moping Hills	Magma	TBD	
	Quartz Mountain	Magma	TBD	
	Soda Lake East	Magma	TBD	
	Upsal Hogback	Magma	TBD	

*Pending Action of Volume II of the PEIS

Appendix C: California DOE-GTP ARRA Awards – Q2 Data (April-June 2010)

Award Number	Recipient Name	Project Status	Project Location City	Award Amount (dollars)	Cost Share (dollars)
DE-EE0002778	AltaRock Energy, Inc.	Less than 50% completed	Sausalito	1,450,120	11,438,351
EE0002756	Array Information Technology, Inc.	Less than 50% completed	Emeryville	1,164,142	5,400,000
EE0002767	California State University Long Beach Foundation	Less than 50% completed	Long Beach	380,156	95,039
CH11231	Lawrence Berkeley National Laboratory (Regents of the University of California)	Less than 50% completed	Berkeley	1,025,000	0
NA27344	Lawrence Livermore National Laboratory (Lawrence Livermore National Security, LLC)	Less than 50% completed	Livermore	1,025,000	0
DE-EE0002838	Ormat Technologies, Inc.	Less than 50% completed	Wister	4,475,015	1,507,980
EE0002746	Potter Drilling, Inc.	Less than 50% completed	Redwood City	5,000,000	2,479,243
DE-EE0003032	Power Environmental Energy Research Institute	Less than 50% completed	Covina	1,840,000	460,000
DE-EE0002843	Ram Power, Inc.	Less than 50% completed	Brawley	5,000,000	9,339,420
DE-EE0002753	Regents of the University of California, The	Less than 50% completed	Berkeley	1,777,617	456,071
DE-EE0002763	Science Applications International Corporation	Less than 50% completed	San Diego	1,025,953	256,489
DE-EE0002790	Simbol Mining Corp	Less than 50% completed	Pleasanton	3,000,000	4,277,162
DE-EE0003006	Surprise Valley Electrification Corp	Less than 50% completed	Alturas	2,000,000	7,513,522
EE0002765	Symyx Technologies, Inc.	Less than 50% completed	Sunnyvale	3,000,000	1,004,705
EE0002747	University of Southern California	Less than 50% completed	Los Angeles	1,483,189	417,088
Total:				33,646,192	44,645,070

Combined ARRA/Cost-Share Geothermal Technology Investment: \$78,291,262

Appendix D: Nevada DOE-GTP ARRA Awards – Q2 Data (April-June 2010)

Award Number	Recipient Name	Project Status	Project Location City	Award Amount (Dollars)	Cost Share Amount (Dollars)
DE-EE0002856	Beowawe Power, LLC	Less than 50% completed	Beowawe	2,000,000	2,437,365
EE0002829	GeoGlobal Energy LLC	Less than 50% completed	Gabbs	2,820,211	3,302,766
EE0002830	Geothermal Technical Partners Inc.	Less than 50% completed	Denio	1,609,275	1,619,666
DE-EE0002832	Magma Energy (US) Corp.	Less than 50% completed	Reno	5,000,000	9,571,873
DE-EE0002831	Magma Energy (US) Corp.	Less than 50% completed	Reno	4,511,945	6,126,664
DE-EE0002834	Nevada Geothermal Power Company	Less than 50% completed	Nixon	1,597,847	1,597,847
EE0002759	Nevada System of Higher Education	Less than 50% completed	Reno	1,278,070	351,600
EE0002748	Nevada System of Higher Education	Less than 50% completed	Reno	935,505	234,429
EE0002839	Oski Energy, LLC	Less than 50% completed	Reno	4,214,086	3,985,570
EE0002840	Presco Energy, LLC	Less than 50% completed	Imlay	2,277,081	1,934,148
EE0002842	Pyramid Lake Paiute Tribe	Not Started	Nixon	4,845,534	0
EE0002845	Sierra Geothermal Power Inc.	Less than 50% completed	Silver Peak	5,000,000	7,356,546
EE0002844	Sierra Geothermal Power Inc.	Less than 50% completed	Silver Peak	5,000,000	7,356,546
DE-EE0002860	Terra-Gen Sierra Holdings, LLC	Not Started	Fallon	2,000,000	12,148,900
DE-EE0003008	TGP Development Company LLC	Less than 50% completed	Reno	10,406,082	5,668,667
EE0002847	U.S. Geothermal Inc.	Less than 50% completed	Empire	3,772,560	3,451,878
Total:				57,268,196	67,144,465

Combined ARRA/Cost-Share Geothermal Technology Investment: \$124,069,698



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