

# Project finance for large scale geothermal development

Geothermal Innovation & Investment Conference, San Francisco

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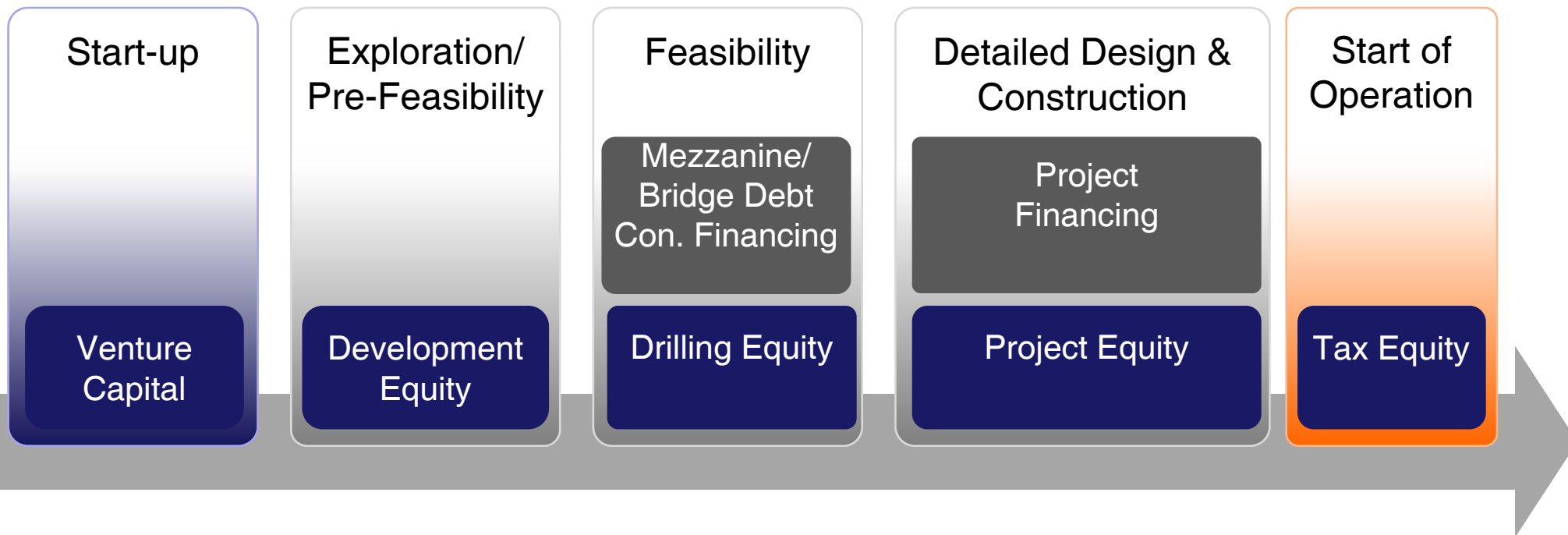


Roy Piskadlo  
Ric Abel, Prudential Capital Group  
Alexander Richter, Islandsbanki/ [ThinkGeoEnergy.com](http://ThinkGeoEnergy.com)

# Geothermal energy has a number of significant funding challenges

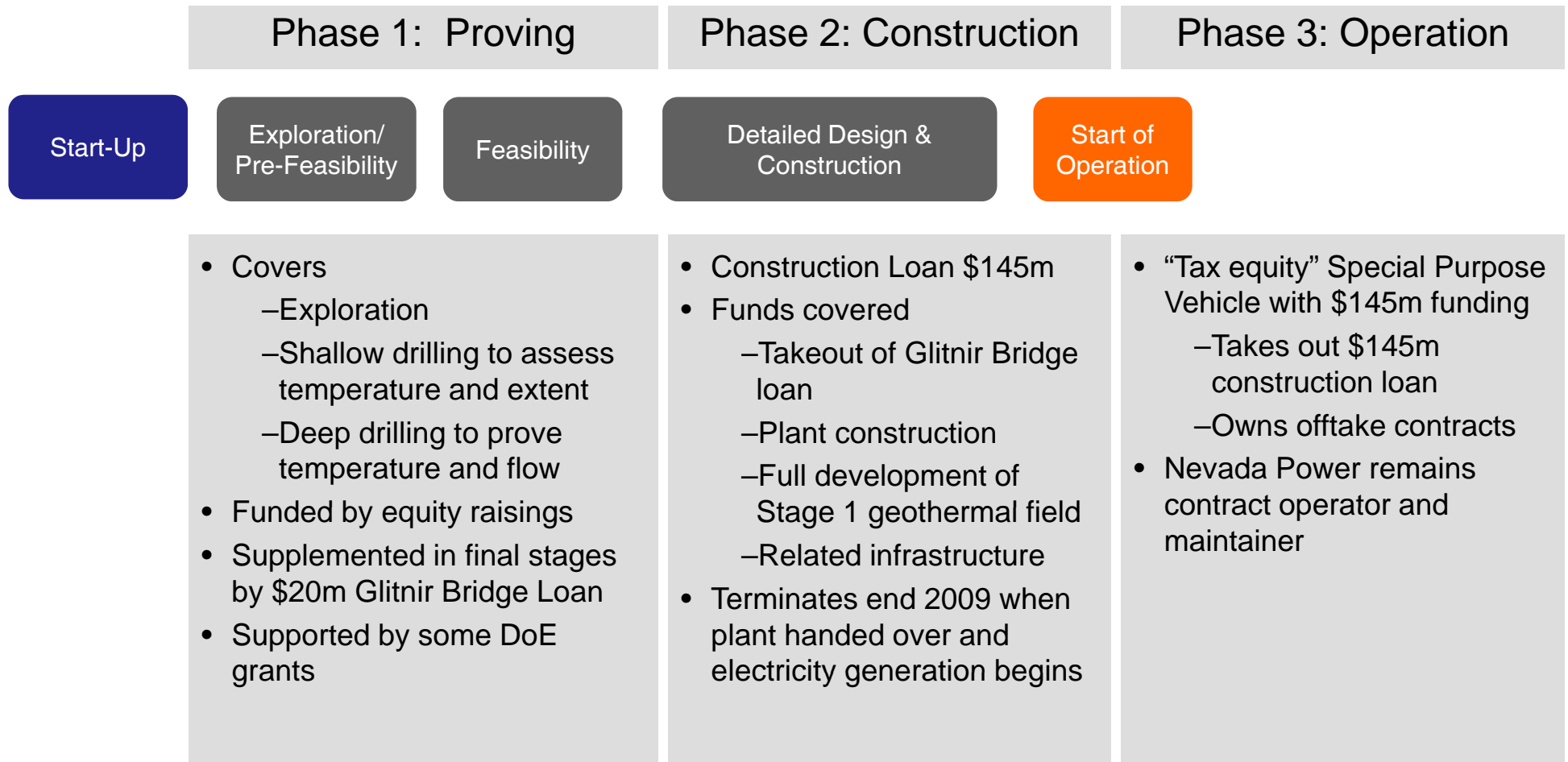
Special features of developments	Implied financing challenge	Potential mitigation strategies
Proving the viability of heat resource	Funding exploration, deep drills (2+), frac and circulation test	<ul style="list-style-type: none"> <li>• Farm-in utility/customer requiring renewable energy, to share development costs and contract offtake</li> </ul>
One third (or up to half) of capex is associated with drilling	How do you fund drilling given the risks?	<ul style="list-style-type: none"> <li>• Drilling company as equity player</li> <li>• Drillers guarantee certain performance</li> <li>• Payment by well vs. hourly</li> </ul>
Highly capital intensive	Low cost-of-capital essential <ul style="list-style-type: none"> <li>• tax-efficient structures</li> <li>• low-risk long term debt</li> </ul>	<ul style="list-style-type: none"> <li>• Splitting of developer/operator business from long-term ownership vehicle</li> <li>• Modular, staged development programs</li> <li>• Financing structures that monetize benefits of carbon credits, depreciation, tax incentives etc</li> </ul>

# Each stage of development cycle with different risk profiles



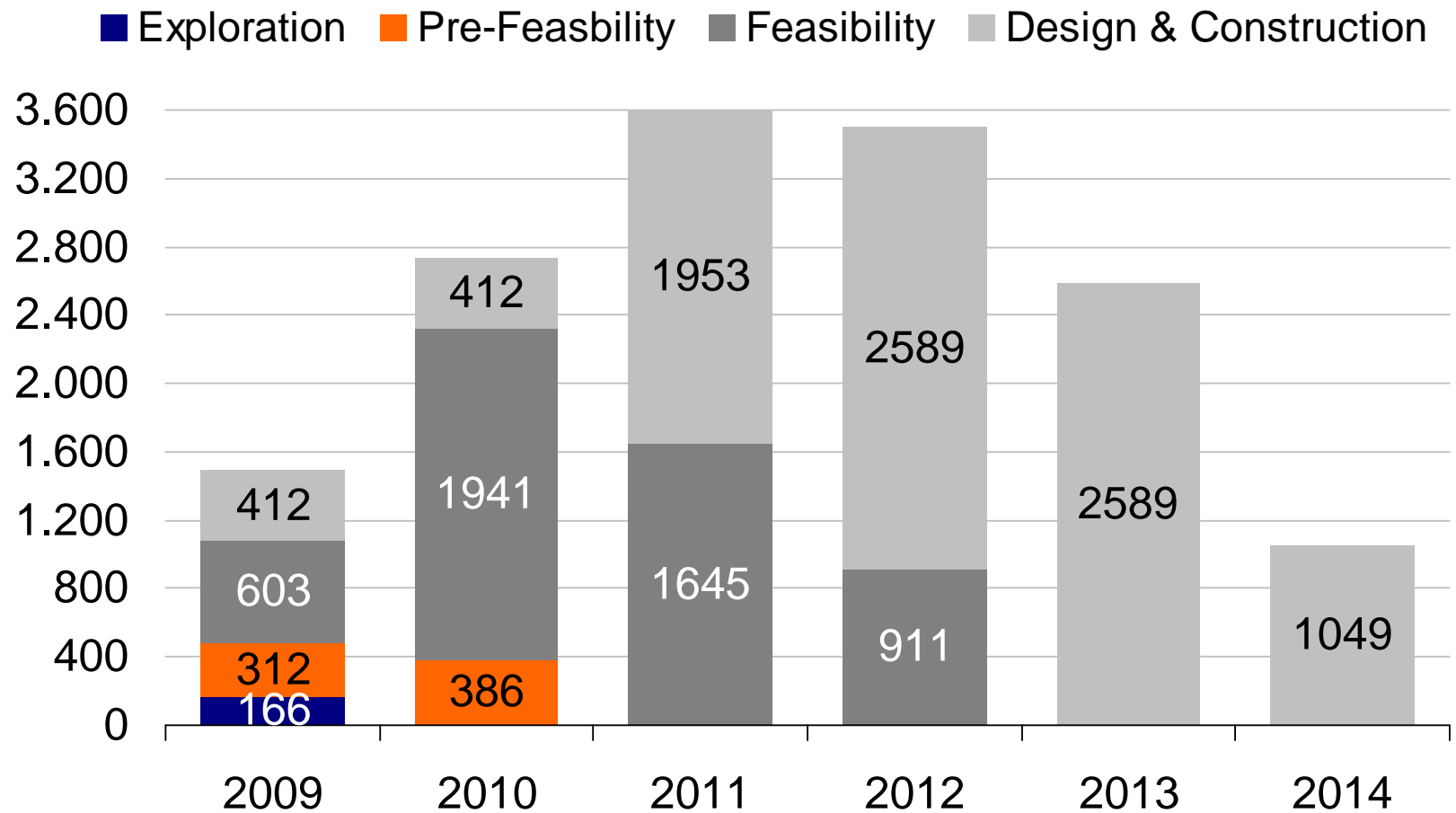
# Nevada Geothermal Blue Mountain Project

## Funding in 3 distinct phases



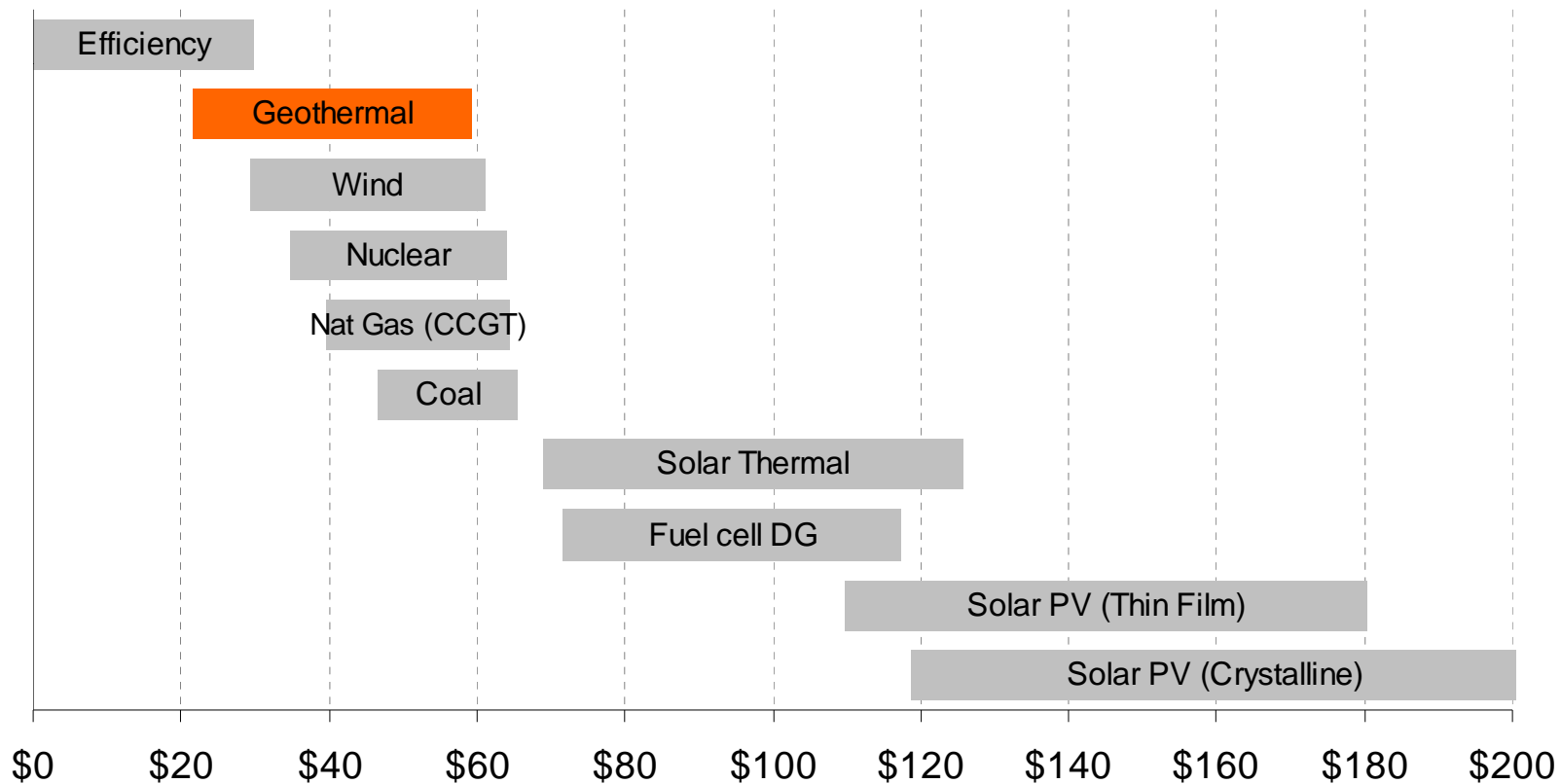
# U.S. Investment needs for current projects only

Projects of max 3,900 MW, investment in million \$



# Credit Suisse, Alternative Energy Report, January '09

“Geothermal plants, while limited in scalability and geography, are the least expensive form of power.” Credit Suisse



# Project finance basic requirements

Proven Resource

Fuel Supply Contract

Contract-based Financing

Trust Account with Waterfall

Traditional EPC

Full Insurance Package

PPA Offtake

Restricted Payment Test

# Sensitivity

## NPV of a 10 MW Single Plant – Sensitivity Analysis (US\$/ KW)

	Discount Rate					MW/ Well	Well Field Cost	Con-struction Cost	Total Capex	Cost/ KW
Wells	10.0%	12.5%	15.0%	17.5%	20.0%	MW	\$MM	\$MM	\$MM	\$
3	2,863	2,214	1,822	1,575	1,431	3.3	7.5	41.5	49.0	4,900
4	2,678	2,030	1,639	1,393	1,231	2.5	10.0	41.5	51.5	5,150
5	2,494	1,846	1,456	1,210	1,049	2.0	12.5	41.5	54.0	5,400
6	2,309	1,663	1,273	1,028	868	1.7	15.0	41.5	56.5	5,650
7	2,124	1,479	1,090	846	686	1.4	17.5	41.5	59.0	5,900
8	1,940	1,295	907	663	504	1.3	20.0	41.5	61.5	6,150
9	1,755	1,111	723	481	322	1.1	22.5	41.5	64.0	6,400
10	1,571	927	540	298	141	1.0	25.0	41.5	66.5	6,650