BrightSourceEnergy™

LUZ II™
A BrightSource Energy Company

BrightSource Energy, Inc.

An Overview

A Presentation To The:

Air & Waste Management Association
Mother Lode Chapter

The Role of Solar Thermal Power in California's Energy Future

BrightSourceEnergy™

March 5, 2009

The Role of Solar Thermal Power in California's Energy Future

Well, to be honest, we really don't have a clue…

So instead, we'll discuss BrightSource Energy, the LPT solar-thermal technology, its relative market position to other technologies, environmental challenges, and stuff like that.

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Topics:

- BrightSource Energy
  - An Overview
- Market Background
- Technology Overview
- Ivanpah SEGS Development Overview
- Pilot Plant

BrightSource Energy – An Overview:

- Mission: Become the world's leading builder, developer, operator and owner of solar energy projects.
- Business: Develop large-scale solar power generation projects based on power purchase agreements (PPAs) with electric utilities and large industrial / commercial consumers of electricity.
  - Solar-Thermal LPT: Superior technology; lower cost – higher efficiency, utility-class system design.
  - Experienced, Accomplished Management Team: Subsidiary Luz II, engineer / developer of 350MW of California solar-thermal energy plants (1980's and 90's).
  - Backed by Premier Venture Capital Firms: VantagePoint, Morgan Stanley, Draper Fisher Jurvetson, JP Morgan, Babcock & Brown and Chevron Technology Ventures.
  - Headquartered in Oakland, California. Luz II (BSI) subsidiary located in Jerusalem, Israel

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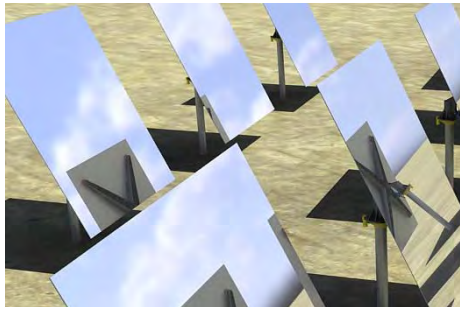

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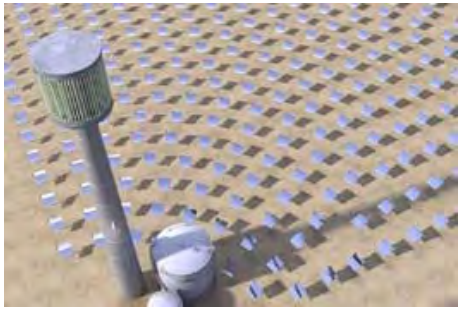

Market Background

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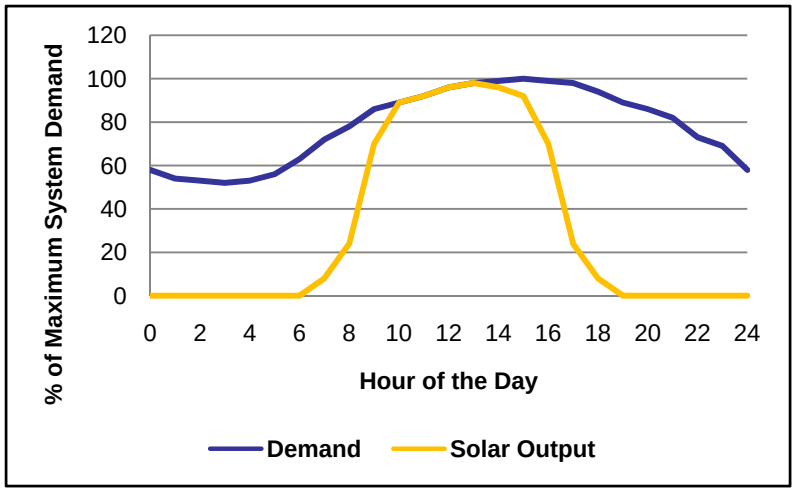
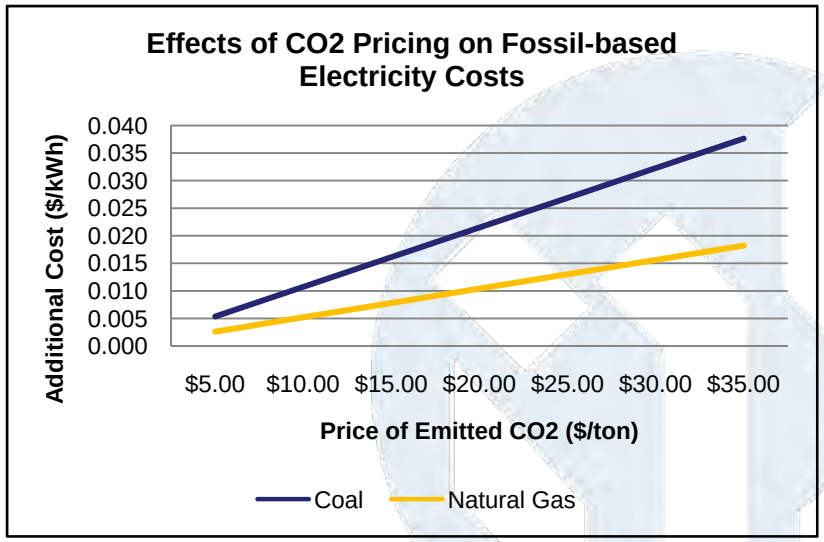
Solar Power Market Dynamics

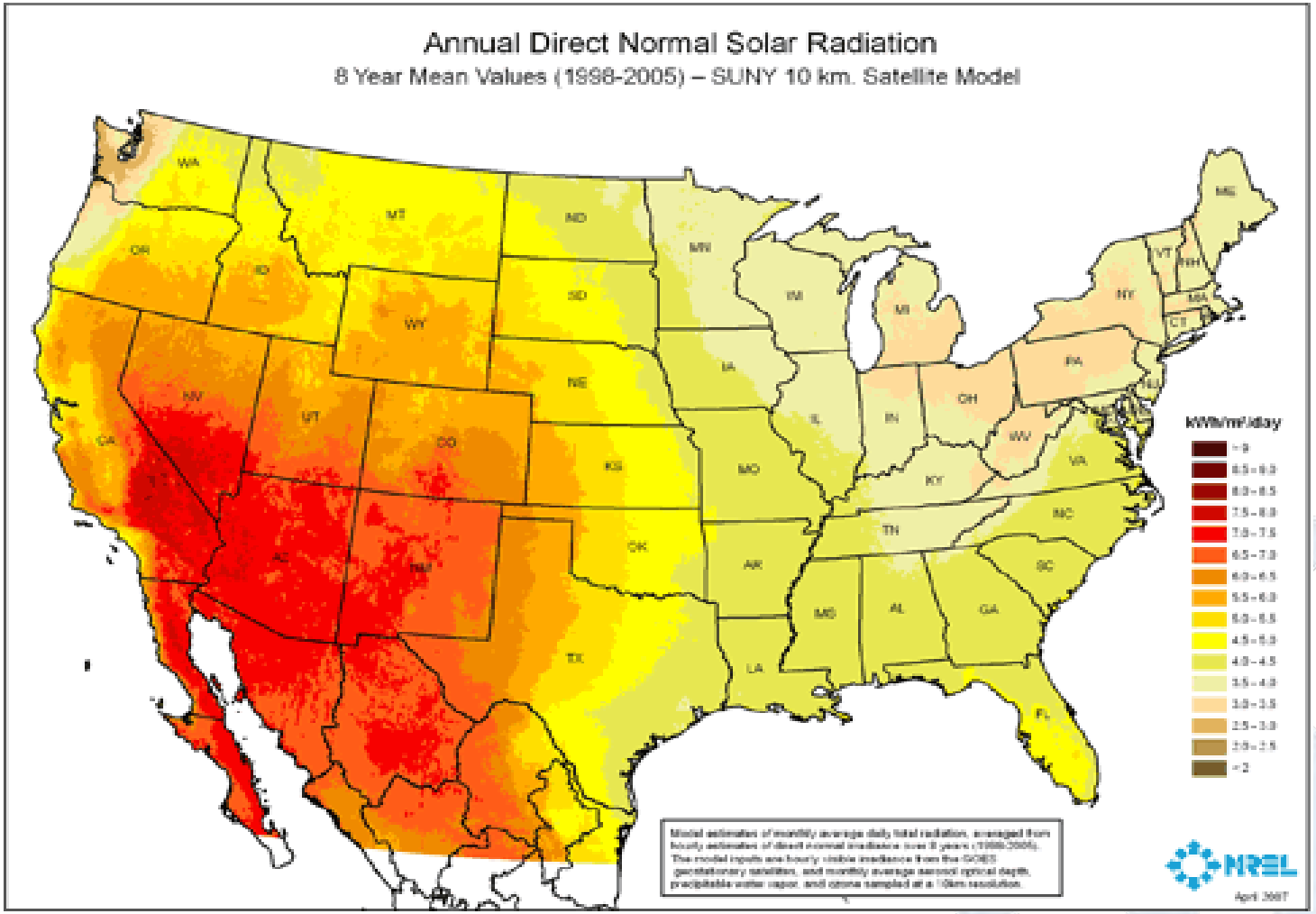


Solar power generation correlates with consumer demand

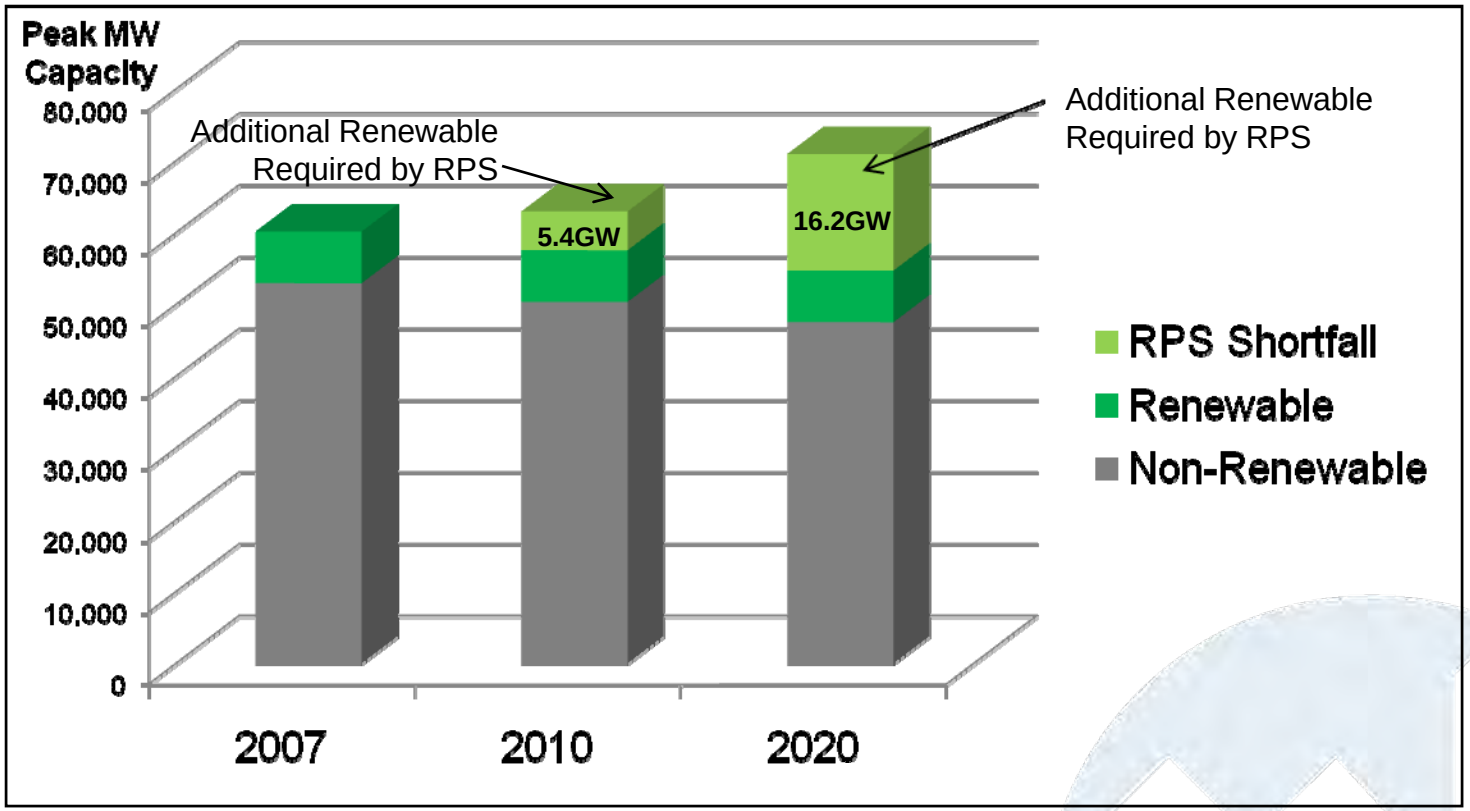
Effect of CO^2 regulations on cost of power



US Solar Radiation Map



California Renewables Market



Sources: California Energy Commission and North American Electric Reliability Council

Notes: Total US renewables market is more than 1½ times the size of the California renewables market.
European renewables market is as big as the US renewables market
Asian renewables market, with focus on India and China, is 2-4 times the US renewables market.
Potential total renewables market: US = 25GW, EU = 25GW, Asia = 75GW, World = 125GW.
Addressable market for central solar power @ $2K/KW: US = $50B, World = $250B.

Principal Solar Thermal Competition

TECHNOLOGY	COMPANY	ADVANTAGES/DISADVANTAGES
Parabolic Troughs	Solel (Israel)	Company manufactures tubes for troughs, proven technology, less efficient, higher capital cost
Parabolic Troughs	Solar Millennium (Germany)	Proven technology but less efficient and more costly, more project development experience
Parabolic Troughs	Acciona / Solargenix (Spain)	Proven technology but less efficient and more costly, new plants in Nevada and Spain, well financed
Parabolic Troughs Power Towers	Abengoa / Solucar (Spain)	Trough technology but less efficient and more costly, new trough plant and new 11MW power tower in Spain, financially strong, power tower design inherently expensive
Power Towers	Rocketdyne (US)	Technology provider, will work with development companies to develop projects
Distributed Power Towers	BrightSource Energy (US)	Proven technology that is more efficient and less costly, strong project development team, solid financing
Stirling Engines	Stirling Energy (US)	Direct power production, must demonstrate scale-up, cost of O&M may be issue
Solar Thermal Start-Ups	Ausra and various other new companies	Various potential issues including technology, project development experience, and financing

Technology Comparison – Solar Trough / LPT:

("LPT" Formerly referred to as "DPT")

		DPT 550			DPT 650		
	NEW TROUGH	DPT 550	Delta to NEW TROUGH	Percentage Delta	DPT 650	Delta to NEW TROUGH	Percentage Delta
Performance Data							
Assumed Direct Normal Radiation on Site (MBTU/m^2/y)	9.4	9.4			9.4		
Solar Field							
Thermal Output (MBTU/m^2/y)	4.1	4.6	0.5		5	0.9	
Temperature Deg F	750	1020	270		1110	360	
Pressure PSI	1800	2350	550		3900	2100	
Power Block							
Gross Heat Rate (BTU/kWh)@100% load	8500	8100	-400	-4.71%	7300	-1200	-14.12%
Gross Electrical Output (kWh/m^2/y)	458	540	81	17.74%	651	192	42.00%
Solar Field Parasitics (kWh/m^2/y)	37	0	-37	-100.00%	0	-37	-100.00%
Power Block Parasitics (kWh/m^2/y)	23	32	9	41.28%	39	16	70.40%
Net Electrical Output (kWh/m^2/y)	399	507	108	27.21%	612	213	53.42%
Relative Capital Costs							
Total System							
Solar Field $/m^2	100%	70%			60%		
Power Block $/Kw	100%	100%			100%		
Capacity Factor	24%	28%			32%		
Relative Energy Costs	100%	70%			60%		

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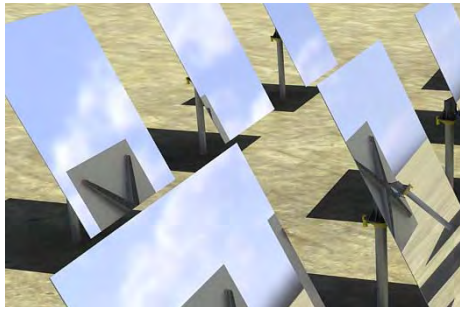

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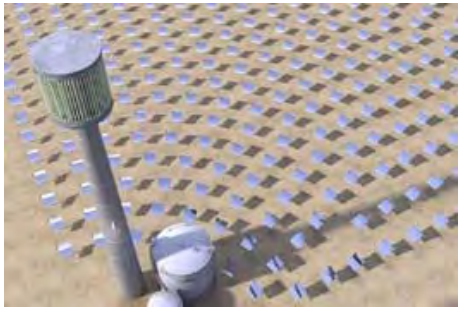

Technology Overview

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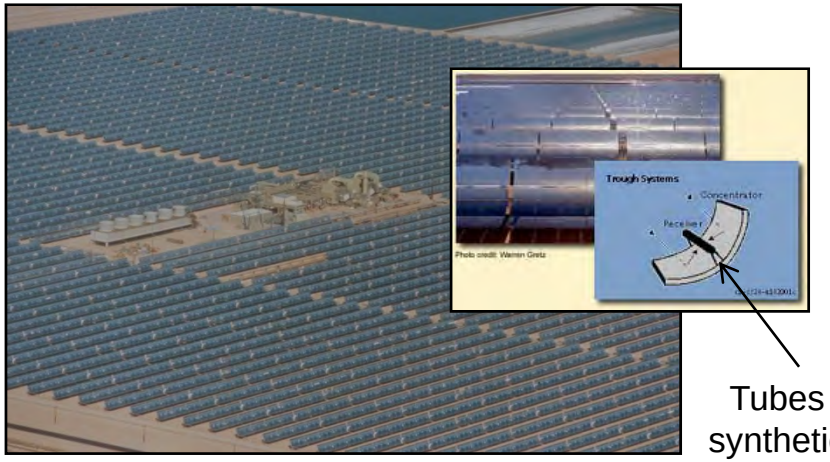
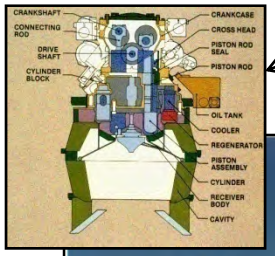
Principal Solar Thermal Technologies

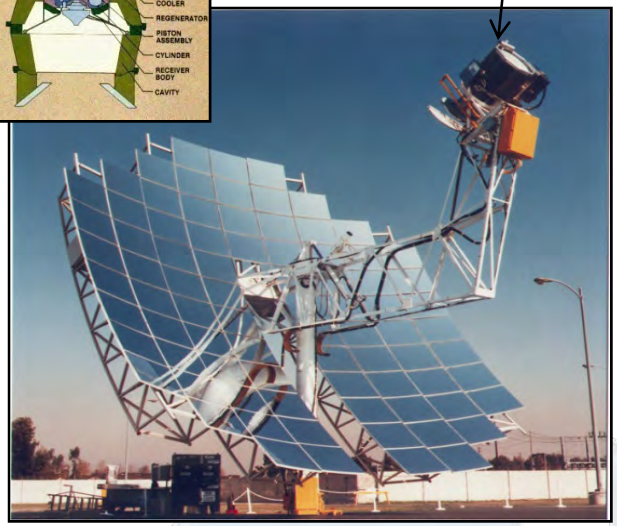


Tubes w/ synthetic oil

Solar Parabolic Trough



Stirling engine



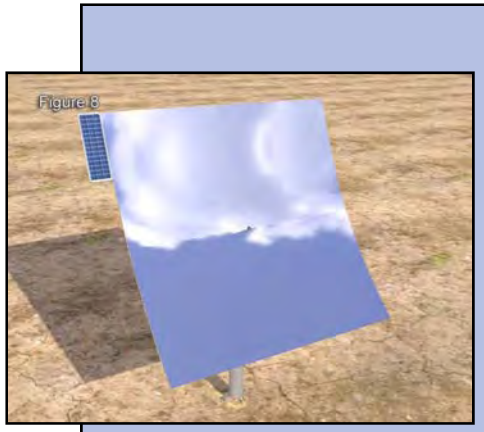
Stirling Solar Dish

120m² heliostats

115m tall tower

11MW Conventional Power Tower

Distributed Power Towers (LPT 550)



7m^2 Heliostat

Solar Boiler

Calibration Target

550^0 C Steam

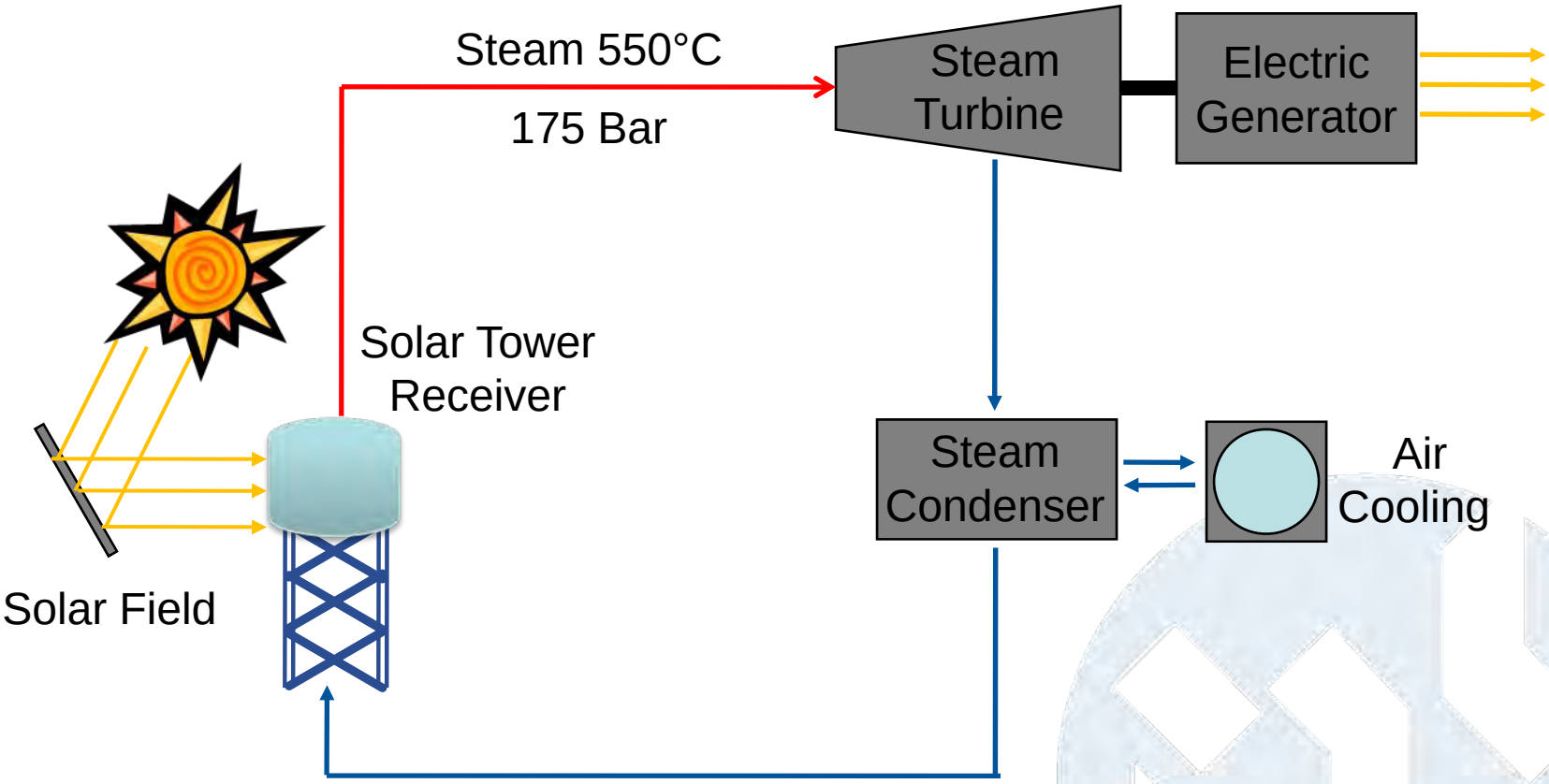
Power Block *

Heliostats

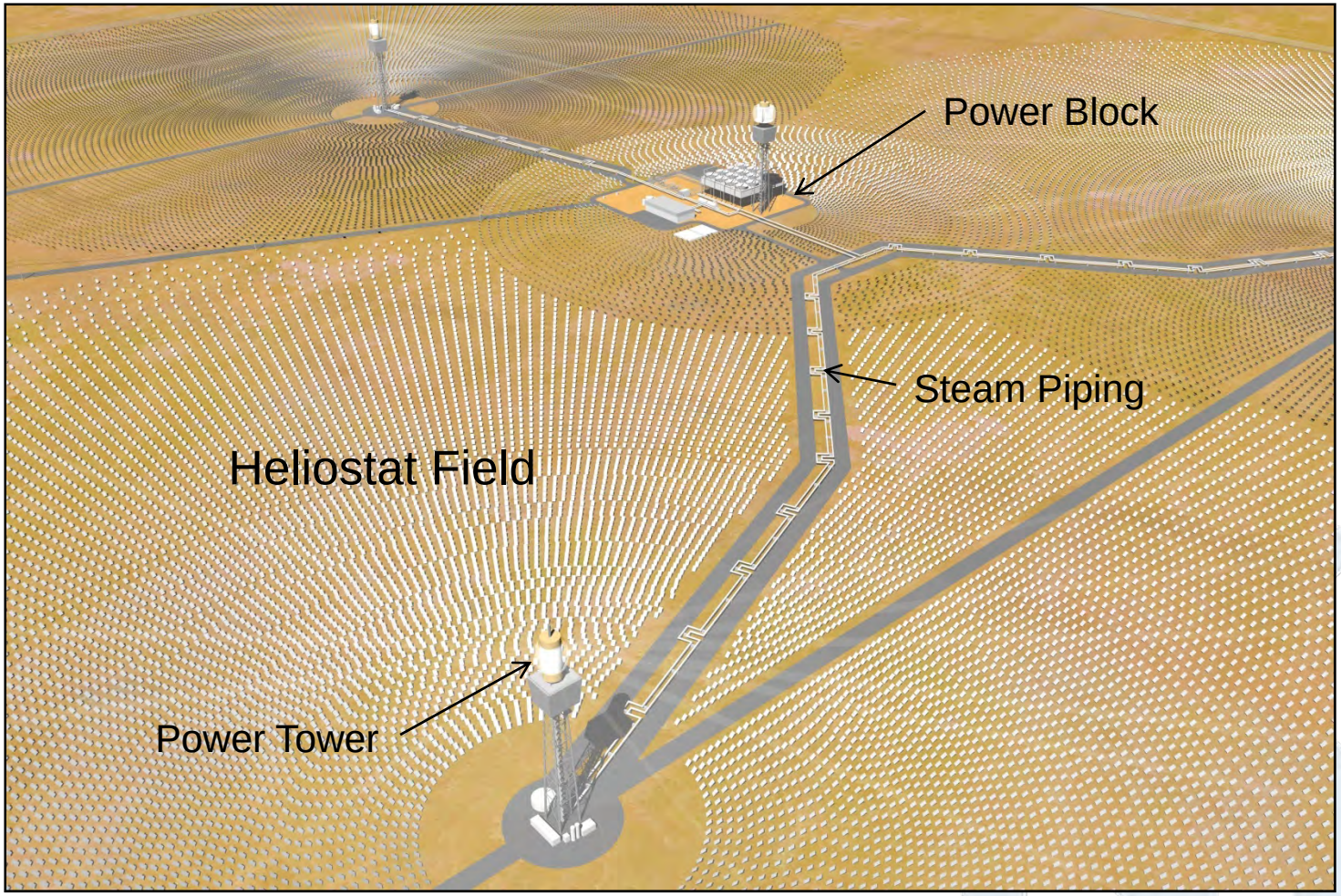
Tower

** Air cooled*

LPT – Technology Schematic



LPT 550 Solar Power Field



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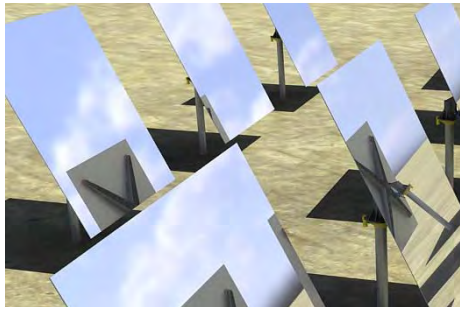

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Ivanpah SEGS Development Overview

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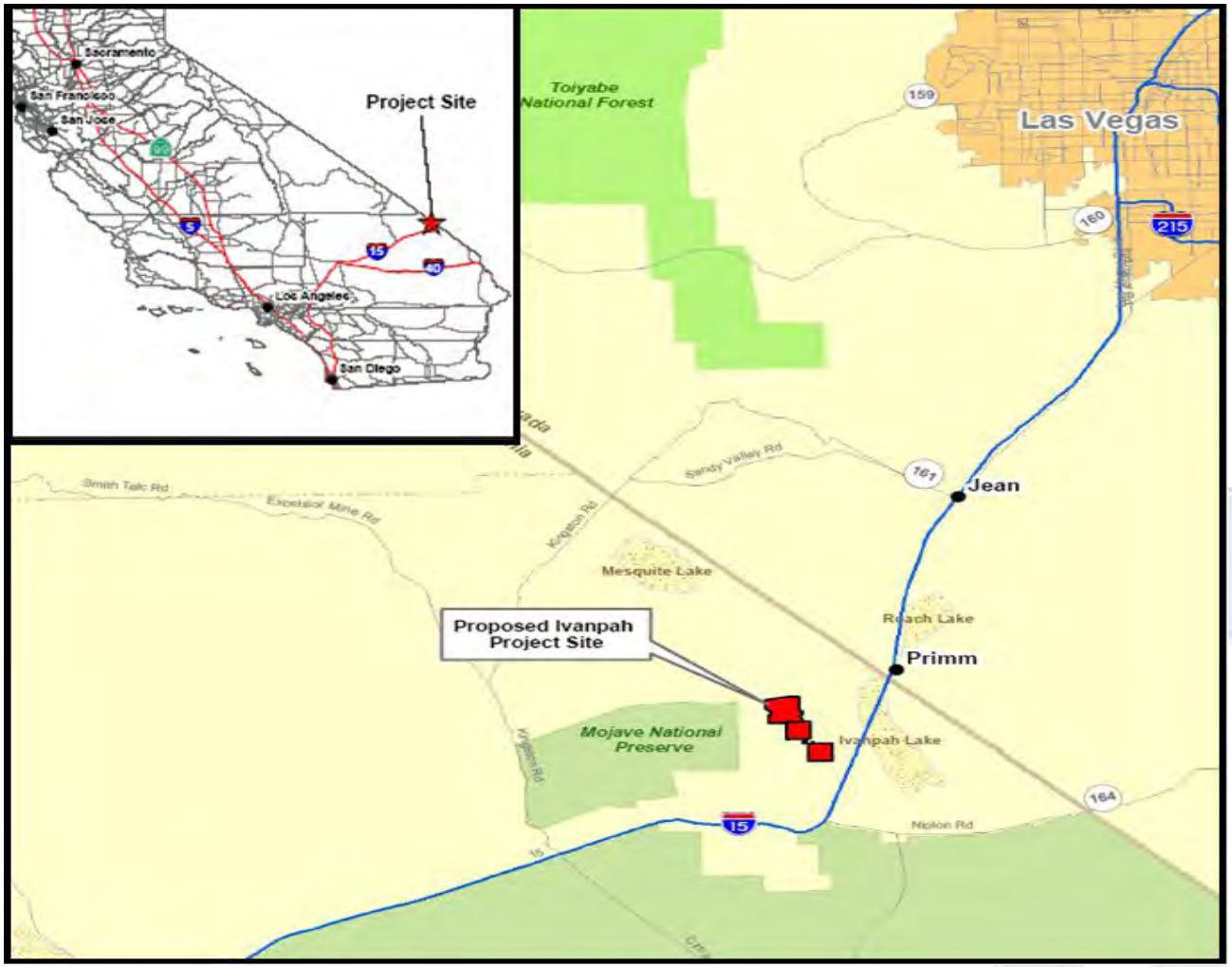
Project Characteristics – Ivanpah SEGS

- 400MW Utility Class, Solar-Thermal Complex
- Ivanpah Solar Electric Generating System ("SEGS")
  Three discrete plants:
  - Ivanpah 1 – 110MW (PG&E)
  - Ivanpah 2 – 110MW
  - Ivanpah 3 – 220MW (PG&E)
- COD: For Discussion
- "Dry Cooling" Technology: Reduces plant water demand to a minimum level.

Location – Ivanpah Dry Lake



Project Status –

- CEC / BLM Joint Process – CEQA, NEPA;
  AFC process - CEC taking lead on environmental analysis

• CEC "Data Adequate":	October 2007
• CEC / BLM Workshops/data analysis:	In process
• Preliminary Staff Assessment (PSA):	August 08
• Final Staff Assessment / Draft EIS:	June 09
• EPC Contractor Pre-quals:	In process
• Turbine Order Placement	2Q08
• Interconnect Requests	In process

Illustration of Ivanpah SEGS (1 of 3)

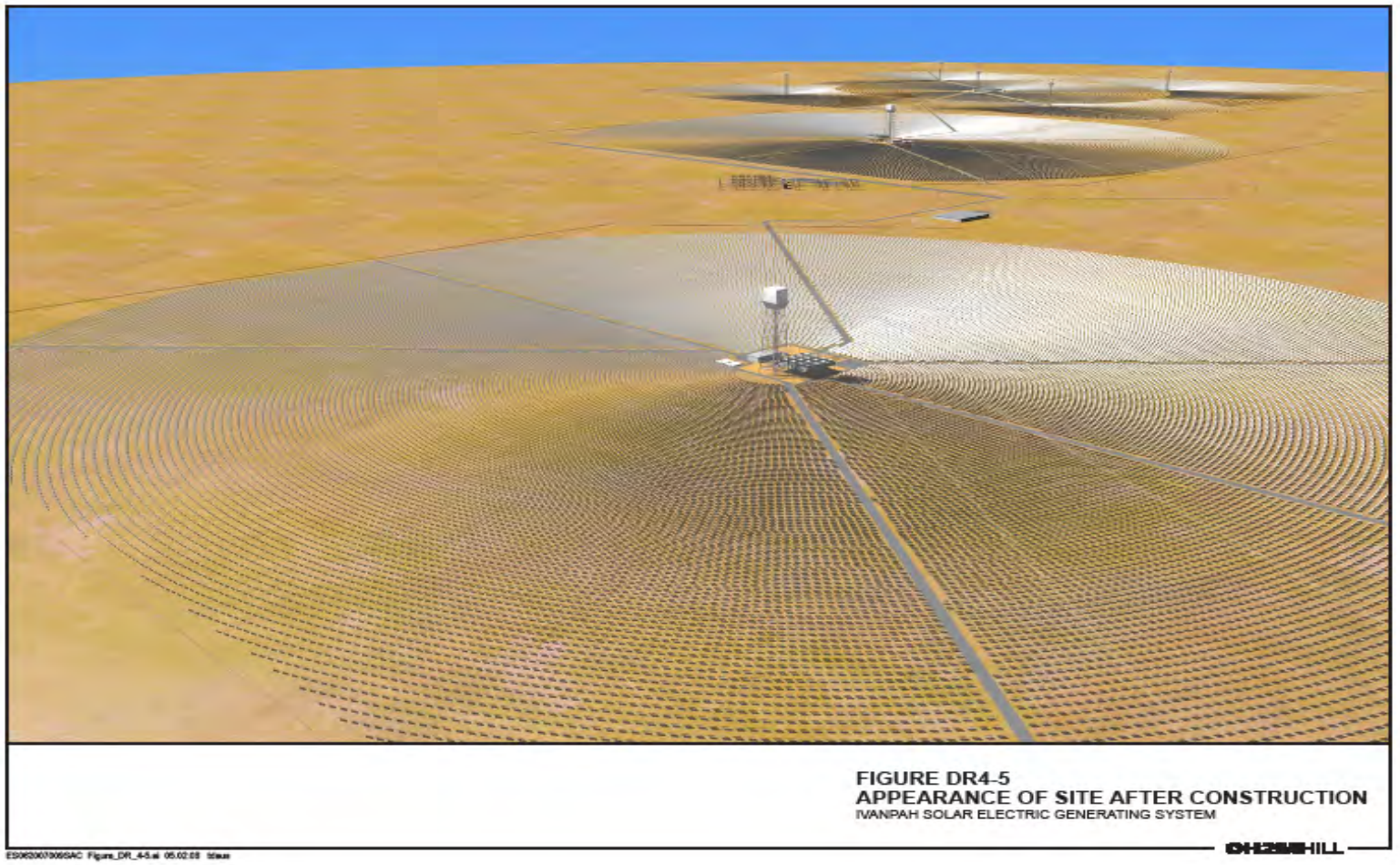


FIGURE DR4-5
APPEARANCE OF SITE AFTER CONSTRUCTION
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

Illustration of Ivanpah SEGS (2 of 3)

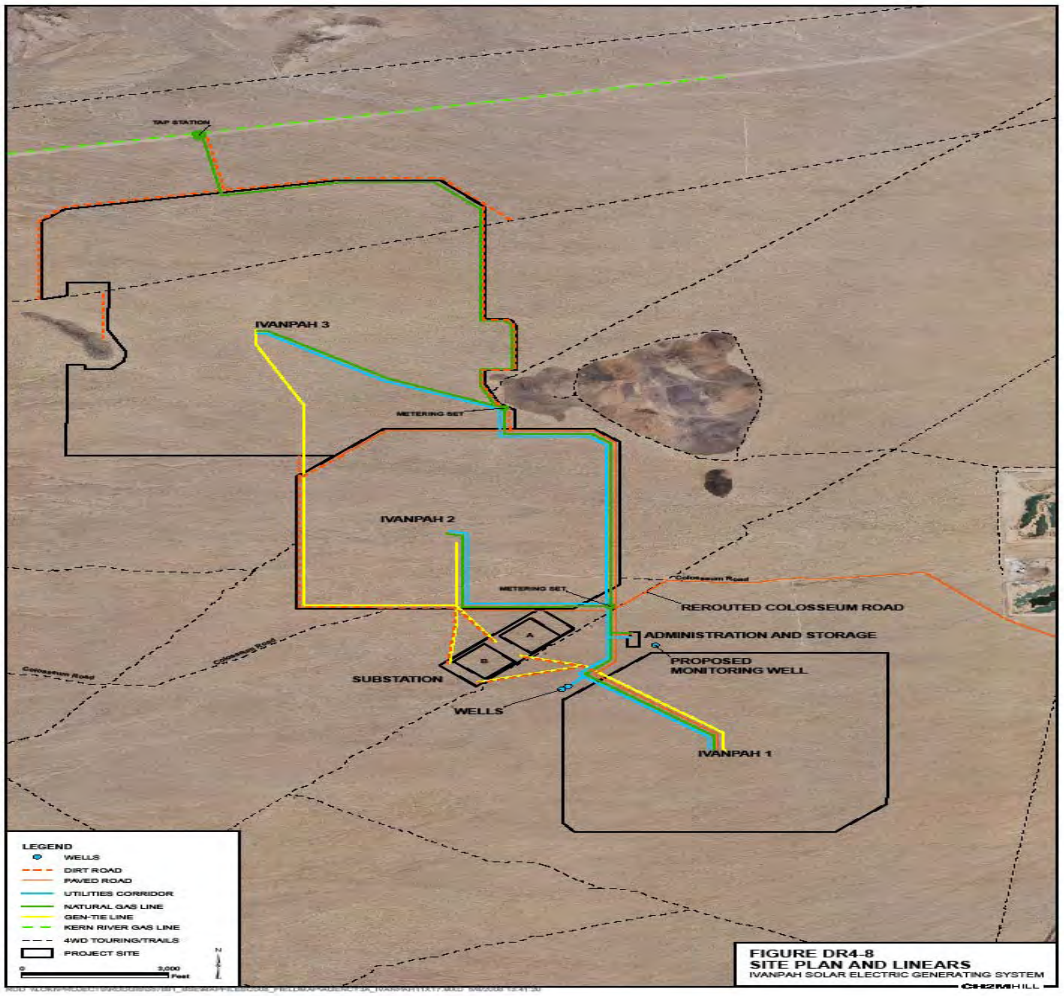
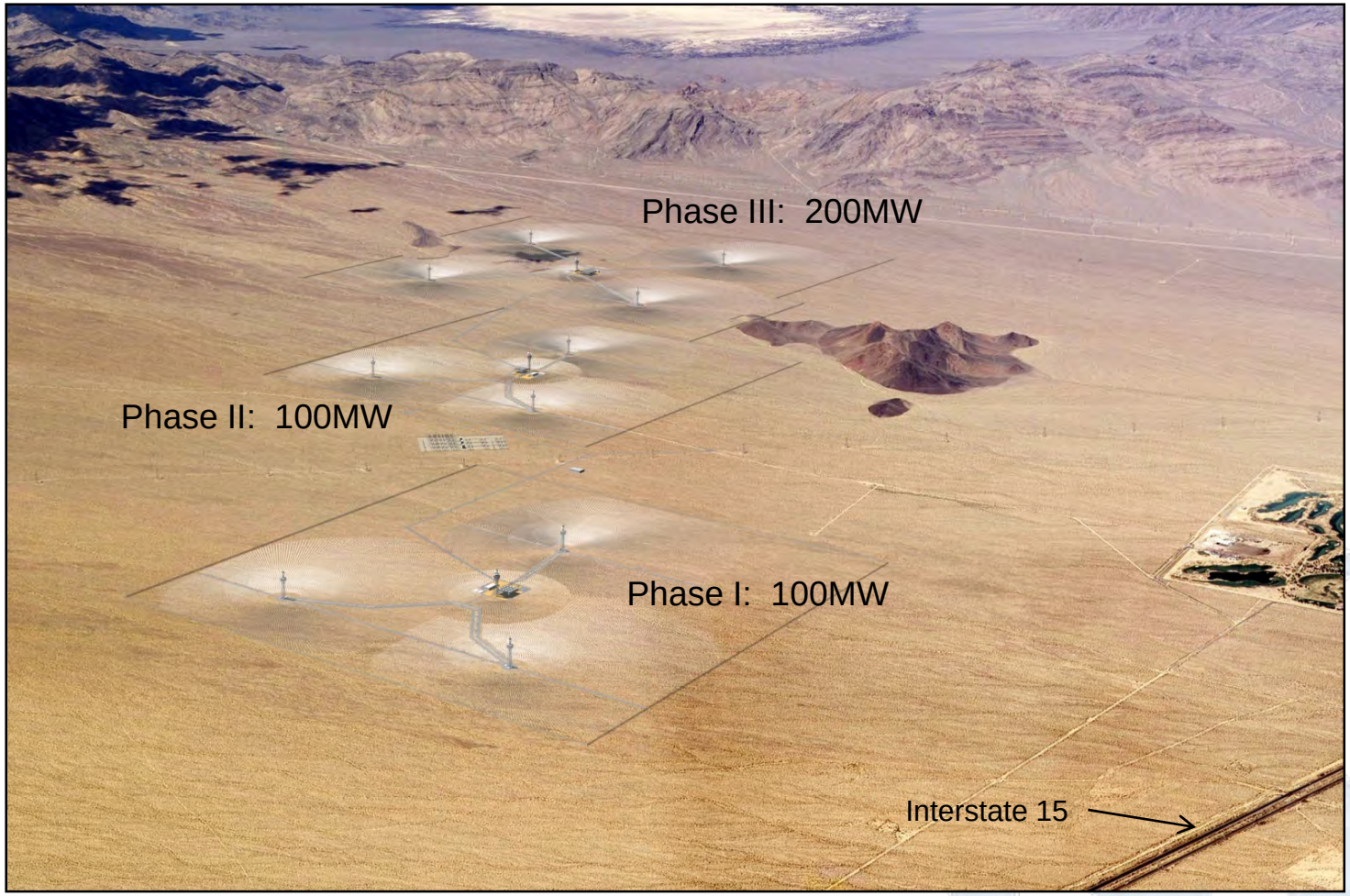


Illustration of Ivanpah SEGS (3 of 3)

400MW Ivanpah Solar Power Complex



Complex will provide enough power for 250,000 homes, and reduce CO^2 by >500,000 TPY

LPT Technical Description – Ivanpah 2

- Solar Technology: LPT 550
  - Steam Generated at: 175 bar, 395^{0}C
  - Steam Superheat: 543^{0}C
  - Steam Reheat: 483^{0}C
- Size : 110 MW nominal
  - Reheat Condensing Steam Turbine Generator
  - Dry Cooling
  - Makeup Water Demand: 20 acre-ft/yr
  - Heliostats: 55k (approx)
- Proposed Interconnect: SCE
  - Mountain Pass – Eldorado Line – 115kV (230kV)

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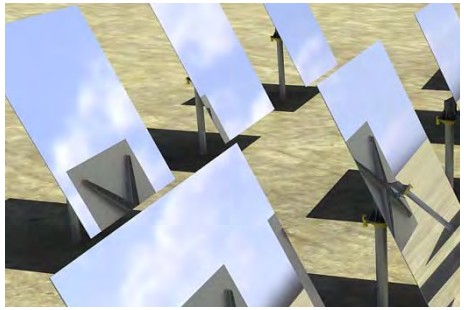

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PILOT PLANT

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PILOT Plant Objectives

- Demonstrate, on a reduced scale, LPT-550 technology performance
- Provide a facility to run a complete test program for system evaluation and improvements.
- Principal Objective: To produce superheated steam at same temperature and pressure as for the full scale 110 MW Power Plant (540 deg.C ; 1750 Bar).

PILOT Project Overview

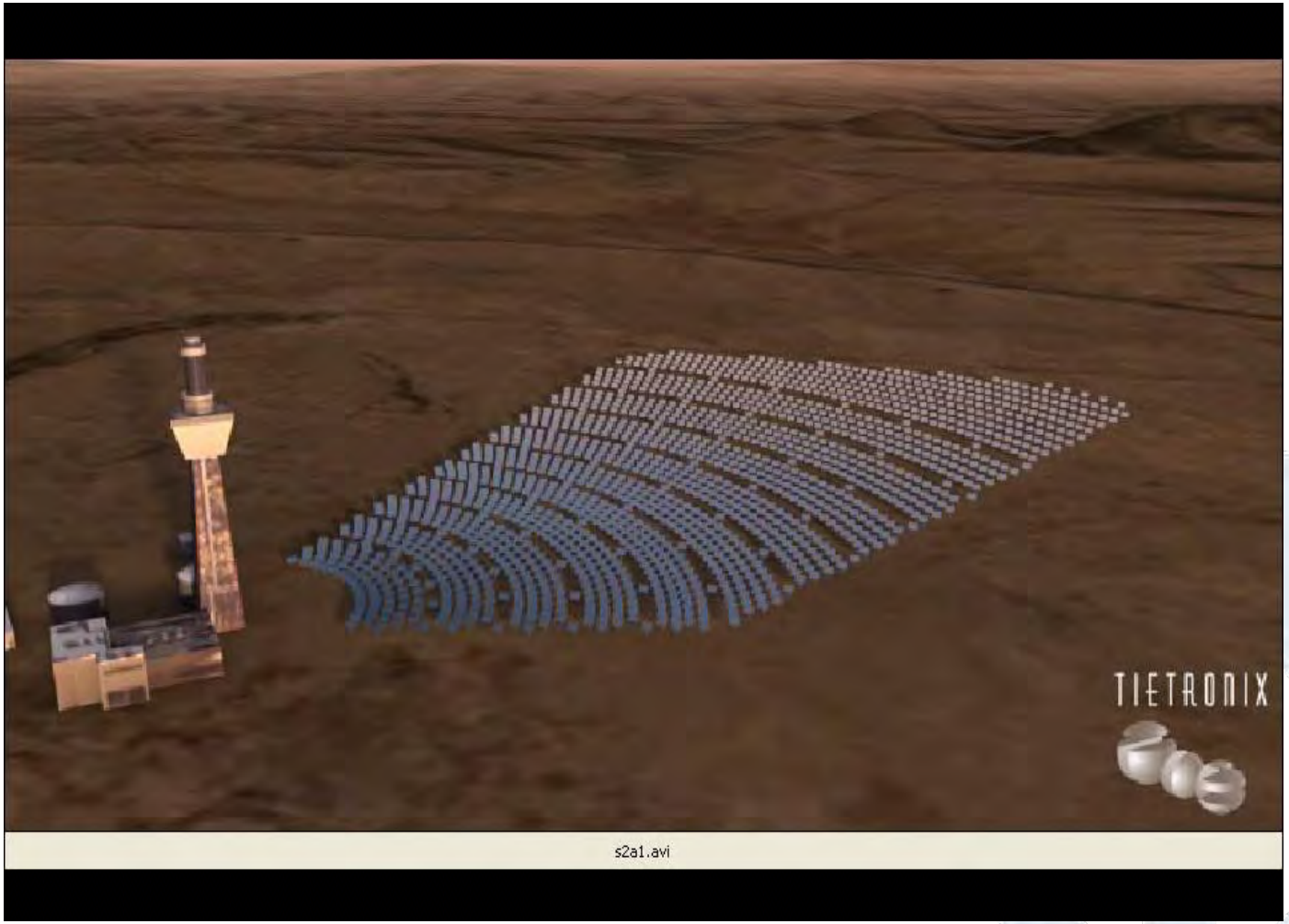
- **Three Main sub-systems**
  - Boiler
  - Water/Steam cycle
  - Solar Field (Heliostat Array)

- **Disciplines involved:**
  - Site Development / Access
  - Civil / Structural (Tower 60 m)
  - Electrical (Solar Field Controls – Balance of Plant)
  - Piping (primarily at the tower facility)
  - System Controls

PILOT Plant Technical Data

- Heliostats Reflecting Area: ~ 12,000 m2
- Number of Heliostats: 1641
- Heliostat Dimensions: 2.25m x 3.21m
- Reflecting area per Heliostat: 7.2 m2
- Distance between rows of Heliostats: 4.2 m – 10 m
- Tower Height: 60 m (+ 15m Receiver)
- Thermal Energy on receiver: 4.5 /6 MWth

Pilot Plant – Artists Concept



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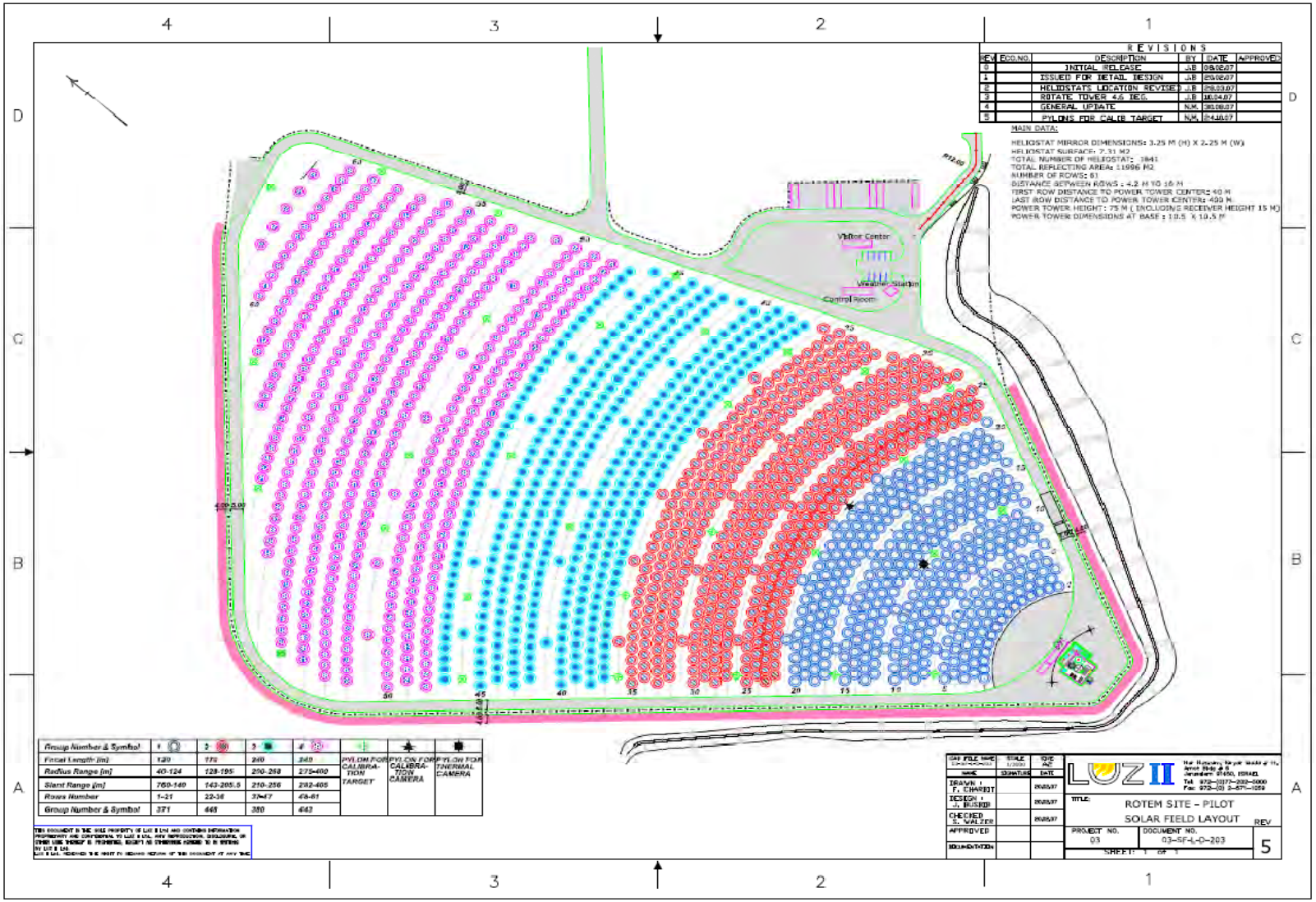
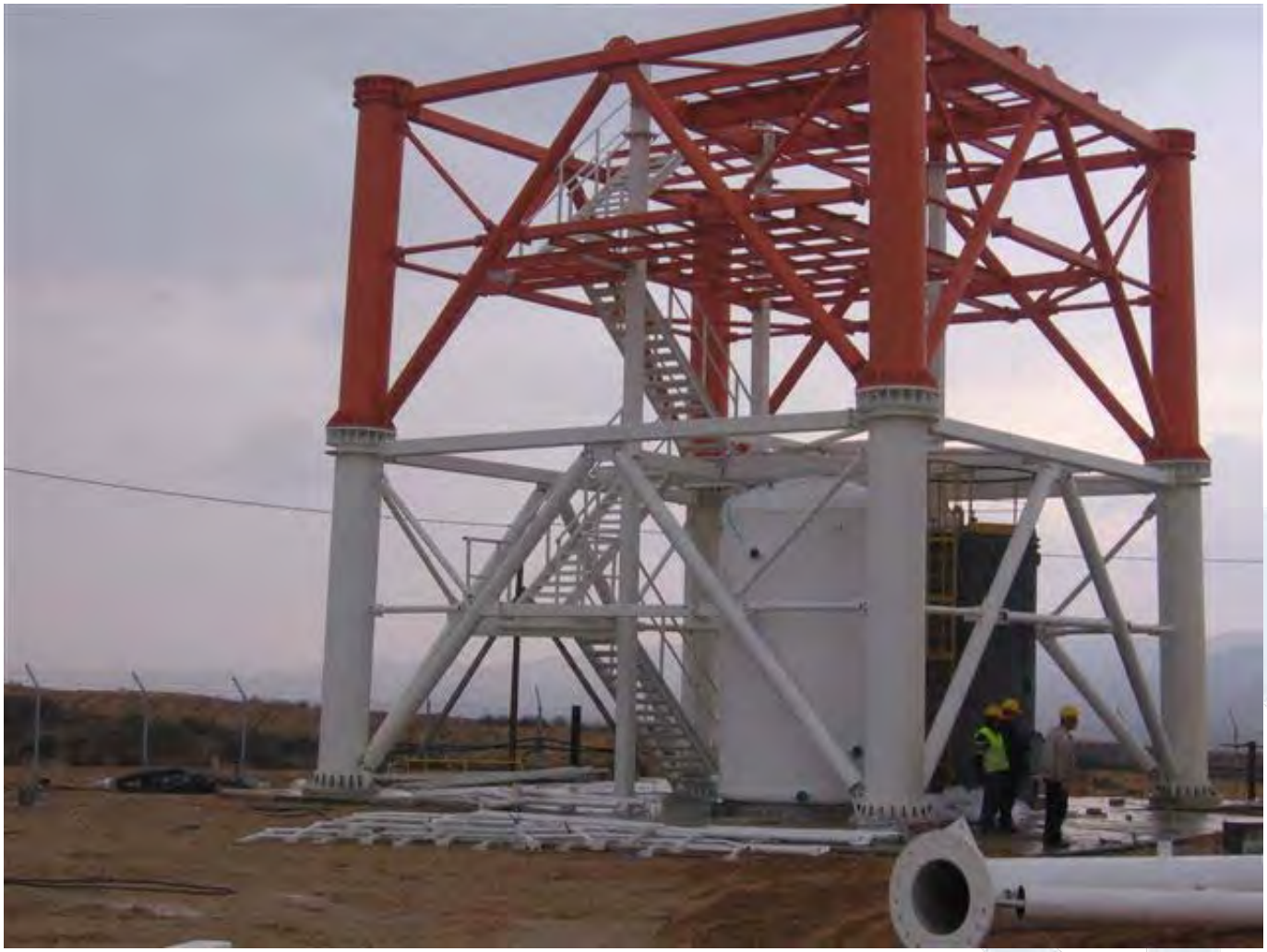
PILOT Layout: Rotem Industrial Park



Solar Tower Foundation and First Segments (01/2008)



First Mast Installation (09/18/2007)

Heliostat Assembly Workshop (09/2007)

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