Presentation Outline

- Corporate Overview
- Technology (R&D)
- Development
- Ivanpah
- Environment
BrightSource Energy Snapshot

Mission: BrightSource Energy’s mission is to make solar energy cost competitive with fossil fuels by developing, building, owning and operating the world’s most cost-effective and reliable large-scale solar energy projects.

➢ Business:
   ▪ Develop and build large-scale solar power generation plants for utilities at prices that compete with fossil-fuel plants, using proprietary technology
   ▪ Develop and build solar-to-steam plants for industrial applications

➢ Financial Strength:
   ▪ Over $160M in corporate financing from key strategic investors including: VantagePoint Venture Partners, Morgan Stanley, Google.org, BP Alternative Energy, StatoilHydro Ventures, Chevron Technology Ventures, Black River, Draper Fisher Jurvetson, and DBL Investors (a spin-off from JP Morgan), and others

➢ Team:
   ▪ Includes all of the key senior managers of Luz International, which designed and built more than 350 MW of solar thermal plants built in the 1980’s
   ▪ World class project development team with over 20GW of power projects developed, constructed, and managed

➢ Locations:
   ▪ Headquarters in Oakland, California, 52 full-time employees
   ▪ Subsidiary BrightSource Industries (Israel) located in Jerusalem, 115 full-time employees

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BrightSource Energy Highlights

Proven Technology:
- SEDC generating highest temperature and pressure solar steam in the world
- 14 months of operations and independent engineering firm evaluations

Projects Under Development:
- Chevron Solar to Steam for EOR
- Ivanpah 400MW Electric for PG&E and SCE
  - Bechtel as EPC and Investor
  - Siemens as Turbine Supplier
  - DOE loan guarantee
  - ITC cash grant eligible

Largest Development Pipeline in Industry:
- 2.6GWs of signed PPAs with PG&E, SCE
- Shortlisted for projects in Israel and Australia
20 Years Ago Luz Int’l Revolutionized the Solar Energy…

354 MW of Solar Thermal – Built in ‘80s and ‘90s & Operating Today

1990s Policy Failures Stalled Progress for Decades
Concentrated Solar Power Advantages

- Produces power when needed the most, at peak
- Provides firm dispatchable output, avoiding volatility associated with other intermittent resources
- Uses less land than other large-scale renewable resources
- Storage- and hybrid- capable, to smooth output and reduce need for conventional unit commitment and dispatch
- Enhances integration; provides reliability services of turbine-generated power and power qualities familiar to utilities & grid operators
- Stable, known and decreasing costs
A Technology Evolution: Luz Power Towers (LPT 550)

Solar Field  Tower

7m² Heliostat

550°C Steam

Solar Boiler

Power Block (Air cooled)
BrightSource Solution – LPT 550

- Proven Technology
- Direct Solar-to-Steam
- Higher Temp. – 550°C
- Low Parasitic Load
- Higher Operating Efficiency
- Lower Capital Cost
- Uses Commodity Materials:
  - Flat Glass
  - Minimum Concrete
  - Minimum Steel
- Air-Cooled Power Block & Closed-Loop Water Recycling
- Zero Liquid Discharge
Project Scale - Up

Solar Energy Development Center
2Q/2008
(6 MWth)

Solar Thermal Chevron EOR Demo Plant
4Q/2010
(29 MWth)

Ivanpah Solar Power Complex
1Q/2012
(400 MWe)
### Projects: Solar Energy Development Center

#### Key Design Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>6 MWth production capacity</td>
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<tr>
<td>60 meter receiver tower</td>
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<tr>
<td>1,640 heliostats</td>
<td></td>
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<tr>
<td>12,000 meters of reflecting area</td>
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<tr>
<td>Commissioned: June 2008</td>
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#### Key Demonstration Accomplishments

- World’s highest temperature and pressure solar thermal steam production known to be achieved
- Independent verification by RW Beck
- 18 months of operations; excellent performance
- Optimization of mirror synchronization
Chevron EOR Demonstration Plant

- 29 MWth
- Construction started June 2009
- Heat exchanger for injection water
- 3,750 LH-2 Heliostats (14 m²)
  - Lower temperature
  - Lower Pressure
  - Closed loop boiler water feed
# Ivanpah Solar Energy Generating System

## Ivanpah Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG&amp;E and SCE PPAs in place</td>
<td></td>
</tr>
<tr>
<td>Negotiating final terms for US DOE Loan Guarantee</td>
<td></td>
</tr>
<tr>
<td>Bechtel Selected as EPC contractor; equity owner in all three projects</td>
<td></td>
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<tr>
<td>123MW Siemens turbine purchased</td>
<td></td>
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<tr>
<td>CEC and BLM permitting anticipated mid-2010</td>
<td></td>
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<tr>
<td>1st Plant COD scheduled mid-2012</td>
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<tr>
<td>Existing Transmission Corridor Bisects Site, Providing Access</td>
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</table>

## World-class Partners

- **Bechtel**
- **Siemens**
- **PG&E**
- **Southern California Edison**
## Ivanpah Economic Benefits

<table>
<thead>
<tr>
<th>Economic Benefits</th>
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</thead>
<tbody>
<tr>
<td>State and Local Tax Revenues: $400 million*</td>
</tr>
<tr>
<td>1,000 construction jobs at peak; four million work hours</td>
</tr>
<tr>
<td>86 permanent jobs</td>
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<tr>
<td>Total employee earnings: $650 million*</td>
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*30 year plant life-cycle
## Ivanpah Environmental Benefits

<table>
<thead>
<tr>
<th>Environmental Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ Emissions avoided: 13.5 million tons total over lifecycle; 450,000 tons per year</td>
</tr>
<tr>
<td>Water use: 100 acre feet per year – 25 times less than competing technologies</td>
</tr>
<tr>
<td>Air Pollutants Reductions: 85% less than natural-gas fired plants</td>
</tr>
<tr>
<td>Low impact design requires less grading; no extensive concrete pads in solar field</td>
</tr>
<tr>
<td>Zero Liquids Discharge</td>
</tr>
</tbody>
</table>
BrightSource’s Environmental Commitment

Site Selection:

- The site does not contain any Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs) or other designated Critical Habitat
- It is bisected by a major high-voltage transmission corridor, and is currently used for cattle grazing, off-road vehicle use, and other activities
- The site is adjacent to a 36-hole golf course and a second major high-voltage and natural gas transmission corridor, near a major interstate highway and less than five miles from casinos and outlet centers
- There are no state or federal endangered species on the site; there is a low density of a single threatened species, the desert tortoise
- The site is ranked by BLM as the lowest management category for desert tortoise, Category 3, considered “least important” for recovery of the species
- BLM requires site restoration at closure; mitigation should contribute to overall recovery of species in the face of climate change
BrightSource’s Environmental Commitment

- **Plant Design:**
  - Maximizes retention of existing vegetation, land contours & natural features
  - Solar field does not require leveling or large quantities of concrete
    - Mirrors placed individually on pylons, without need for foundations
    - Vegetation in the solar field heliostat zones trimmed to allow mirrors to track the sun, but otherwise left in place
    - Soils and vegetation disturbed during construction to be restored
BrightSource’s Environmental Commitment

- Water Use: Dry-cooling, Conservation & Closed-loop recycling
  - Uses air instead of water to condense steam
  - 90% reduction in water use for this project
  - 100 acre feet per year – equal to 300 homes worth of water
  - Closed-loop recycling & conservation measures further reduce usage
  - Efficiency trade-off; additional costs
  - Ivanpah will use 25 times less water than competing technologies
Wet CSP/Conventional Cooling vs. Dry CSP Cooling

Gallons/KWh

<table>
<thead>
<tr>
<th></th>
<th>Gallons/KWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSP Wet Cooling</td>
<td>0.85</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0.72</td>
</tr>
<tr>
<td>Coal</td>
<td>0.50</td>
</tr>
<tr>
<td>Combined Cycle Gas</td>
<td>0.19</td>
</tr>
<tr>
<td>CSP Dry Cooling</td>
<td>0.03</td>
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*Source: California Energy Commission

**BrightSource Ivanpah Solar Energy Complex**

- Proven, high-performance and high-efficiency technology
- Promotes California’s RPS and AB32 with both PG&E and SCE PPAs
- Promotes 2005 Energy Policy Act, Executive & Secretarial Orders
- Promotes ARRA & DOE Stimulus and Innovative Technology goals
- Avoids 450,000 tons of CO$_2$ annually; 13.5 million tons total over lifecycle
- Dry-cooling and other measures keeps water usage to 100 acre-ft/yr
- Provides 1000 jobs at peak; 4 million work hours overall

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### Ivanpah Facility Schematic

- PG&E 1 110 MW
- SCE 1 110 MW
- PG&E 2 220 MW
- Las Vegas 45 miles