

CRESCENT DUNES PROJECT OVERVIEW

Andrew Wang
Director of Development

April 24, 2014

SOLARRESERVE OVERVIEW

- **Leading global developer** of large-scale solar power projects and advanced solar thermal technology
- **More than \$1.8 billion of projects in construction** around the world – both Concentrated Solar Power projects (CSP) and Photovoltaic (PV) projects
- **Development pipeline of more than 5,000 MW** in Europe, Asia, the Middle East, Africa and Latin America
- Commercialized **world's leading solar thermal technology (CSP) with integrated energy storage** – providing reliable and non-intermittent electricity, day or night
- Experienced and **proven management team** – previously built more than 15,000 MW and financed more than \$15 billion in energy projects in more than fifteen countries
- US Headquarters in Santa Monica, California with international offices in Dubai, Istanbul, Johannesburg, London, Madrid, Perth and Santiago

CSP AND PV SOLAR PROJECTS

Geographically diverse portfolio of more than 3,000 MW of Concentrated Solar Power Projects

- Lead 110 MW project in construction - Crescent Dunes Solar Energy in Tonopah, Nevada
- Late-stage projects represent more than 600 MW of fully permitted projects in US and overseas
- 10 sites and more than 150,000 acres under control

Expanded into Photovoltaic activities in early 2009

- Three projects totaling 246 MW in construction in South Africa with capital costs of \$820 million
- Development pipeline in the US and international of more than 2,000 MW

Developing combined CSP and PV solutions that can provide competitive 24-hour solar energy



DIFFERENTIATED TECHNOLOGY

The Solution for solar energy to operate day and night and the ability to replace coal, oil, natural gas, diesel and nuclear

THE CASE FOR SOLAR THERMAL WITH INTEGRATED STORAGE

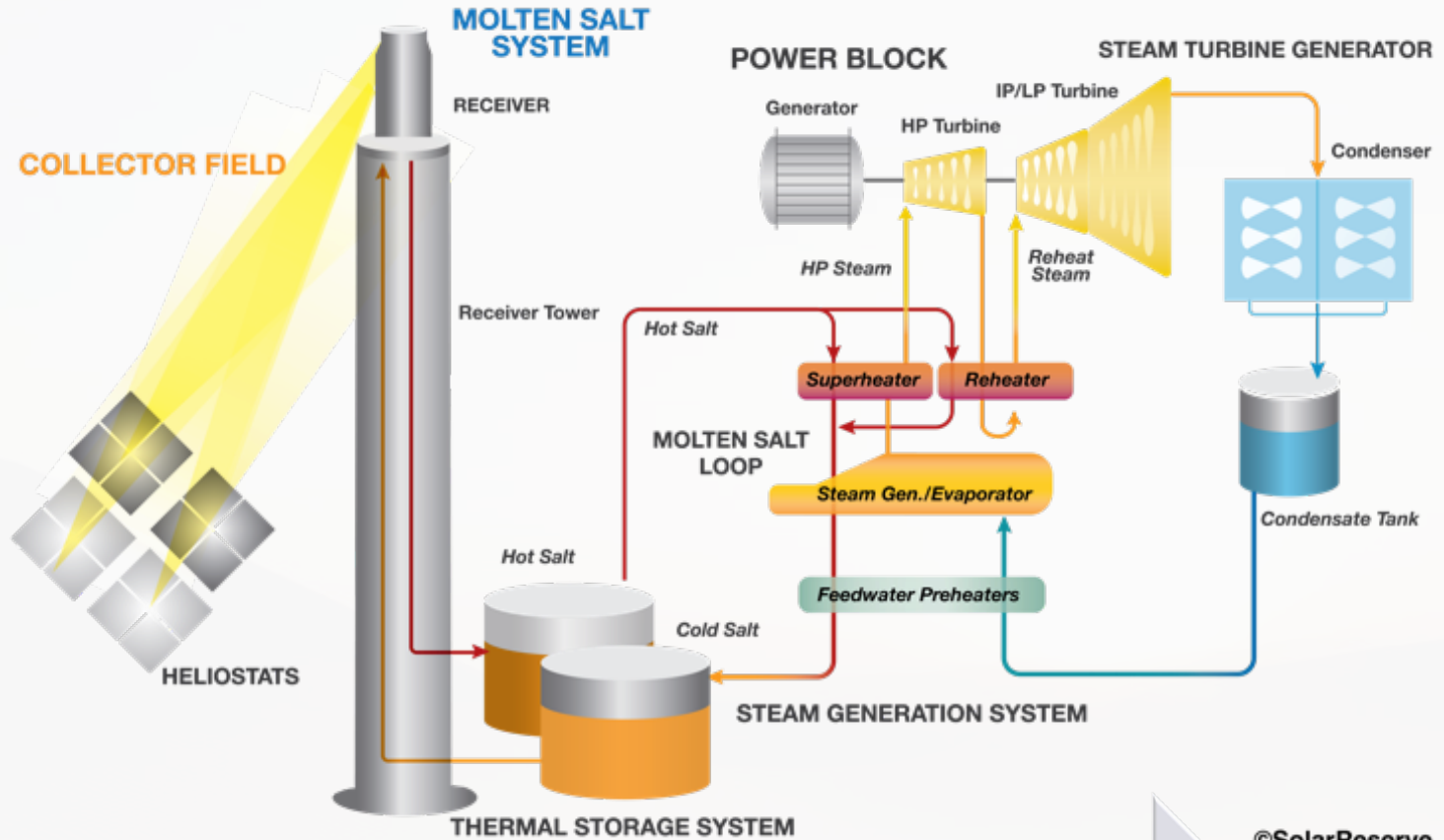
- Energy storage allows the generator to control a plant's output, matching supply with demand and dispatching when electricity is most valuable
- Solar thermal with storage power plants can operate like conventional generation, dramatically reducing GHG emissions
- Storage allows the facility to produce more than twice as much net annual output (MWh) than any other solar technology
- Firm output ensures a more stable and secure transmission system (wind and PV challenges)



Other than CSP with storage, no other solar resource can operate like a conventional power plant. Solar PV, trough, and direct steam have the disadvantage of not being able to generate electricity when there is no sunlight, relying on flexible fossil-fueled generation to meet demand.

SolarReserve's solar thermal with storage facility deploys commercially viable technology that can displace fossil fuel generation

SOLARRESERVE'S ENERGY STORAGE TECHNOLOGY



Sunlight heats the molten salt directly

Fewer heat exchange steps, higher temperature

Higher efficiency than other molten salt storage designs

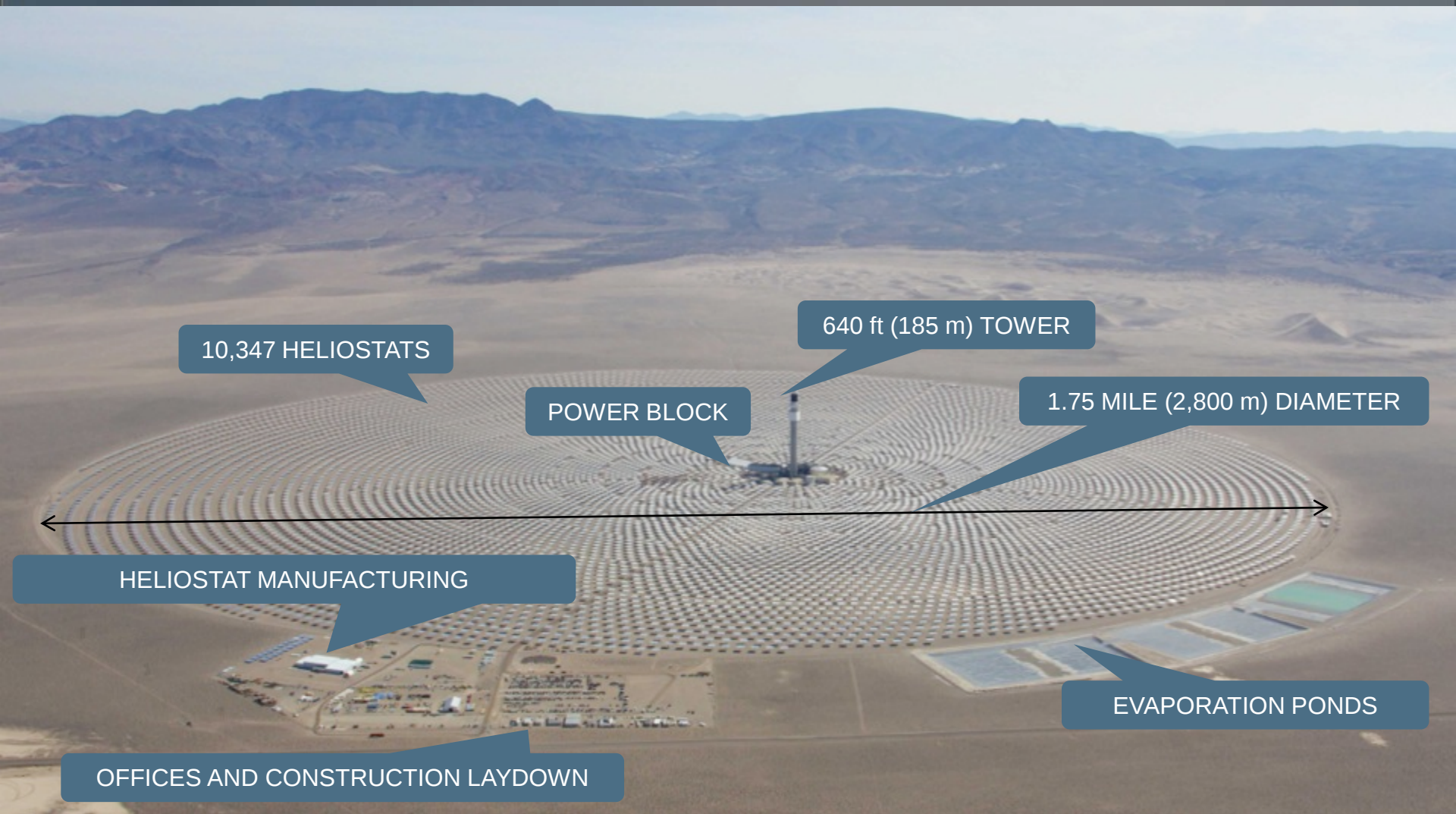
Energy storage with greater flexibility at lower cost

THE CRESCENT DUNES SOLAR ENERGY PLANT

- Location: Tonopah, Nevada
- Technology: CSP with Molten Salt Thermal Energy Storage
- Size: 110 MW facility output
- Storage: 10 hours full load storage
- Electricity Production: more than 500,000 MW-hours annually
- Power Purchaser: NV Energy (25-year contract)
- EPC Contractor: Cobra Thermasolar, Inc. (NV)



CRESCENT DUNES - PROJECT ARRANGEMENT



CRESCENT DUNES – POWER BLOCK

HOT SALT TANK

Molten salt (566°C) in stainless steel storage tank provides 10 hours storage at nameplate capacity.



AIR COOLED CONDENSER

Dry-cooled steam cycle saves millions of gallons of water.



STEAM TURBINE & GENERATOR

Hot salt generates high-quality superheated steam to drive a standard steam turbine at max efficiency.

CONTROL & OPERATION BUILDING

Operations center provides permanent local jobs + operational data for R&D.

RECEIVER

Captures the concentrated sunlight. SolarReserve holds exclusive worldwide license to patented receiver technology.

STEAM GENERATION SYSTEM

Hot salt is sent to a heat exchanger to produce steam, which drives a conventional steam turbine generator.

COLD SALT TANK

Molten salt (260°C) flows from carbon steel storage tank, up piping within the tower, into the receiver.

OVER 10,000 HELIOSTATS

Highly accurate GPS measurement + sophisticated control software precisely centers beam on receiver. Tremendous opportunity for local content and on-site manufacturing.



CRESCENT DUNES CONSTRUCTION – POWER BLOCK



Able to provide **peak or baseload power – day and night**



Molten salt (1,050°F) in **hot storage tank** provides 10 hours storage at nameplate capacity



Air cooled condenser for hybrid cooling system saves millions of gallons of water



Hot salt is sent to a heat exchanger to produce steam which drives a **conventional steam turbine generator**

CRESCENT DUNES CONSTRUCTION – 10,347 HELIOSTATS



On-site heliostat assembly and installation



Heliostat Control Unit (HCU) for **individual control**



Dual axis tracking for optimal electricity production



Highly accurate GSP measurement + **sophisticated control software** precisely centers beam on target

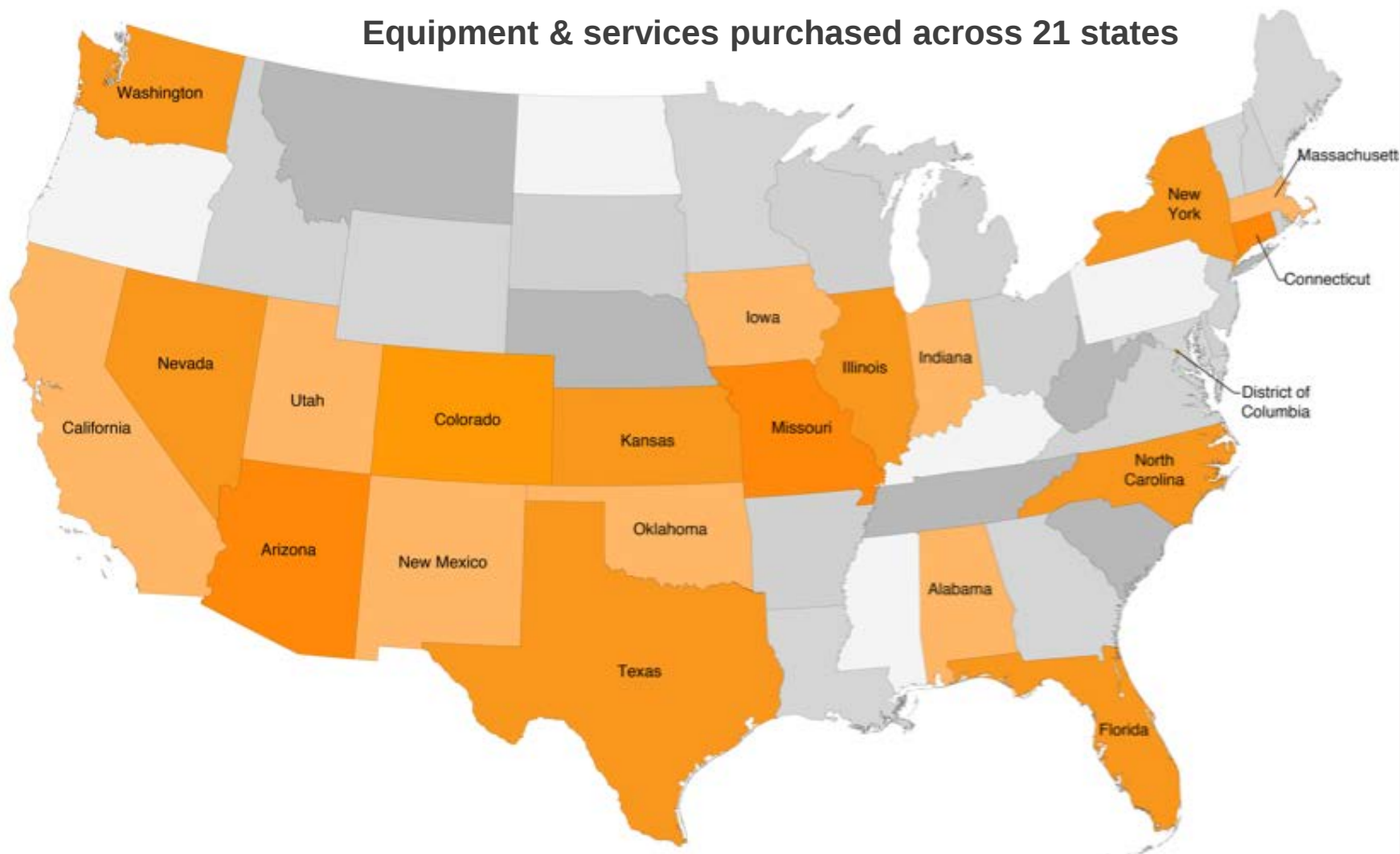
CRESCENT DUNES - DOMESTIC BENEFITS

- **Job Creation:**
 - Over 900 workers currently on site
 - 4,300 direct, indirect and induced jobs created
 - Equipment and services purchased across 21 states
 - 45% of craft workers are Nevada residents
- **Tax Revenues:** Project forecasted to generate more than \$73 million in local and state tax revenues over first 20 years of operation
- **Operating Expenses:** During the 30+ year operating life, the project will expend more than \$10 million per year in salaries and operating costs, much of this spent in the region
- **Capital Investment:** Project will generate in excess of \$750 million private capital cost investment in Nevada



CRESCENT DUNES - CREATING U.S. JOBS

Equipment & services purchased across 21 states



CONTACT INFORMATION



www.SolarReserve.com

info@SolarReserve.com

Corporate Headquarters (US):

2425 Olympic Blvd.

Suite 500 East

Santa Monica, CA 90404

Phone: (310) 315-2200

Toll -Free: (866) 622-2778

Fax: (310) 315-2201

