

SOLARRESERVE

CSP Towers with Integrated Storage

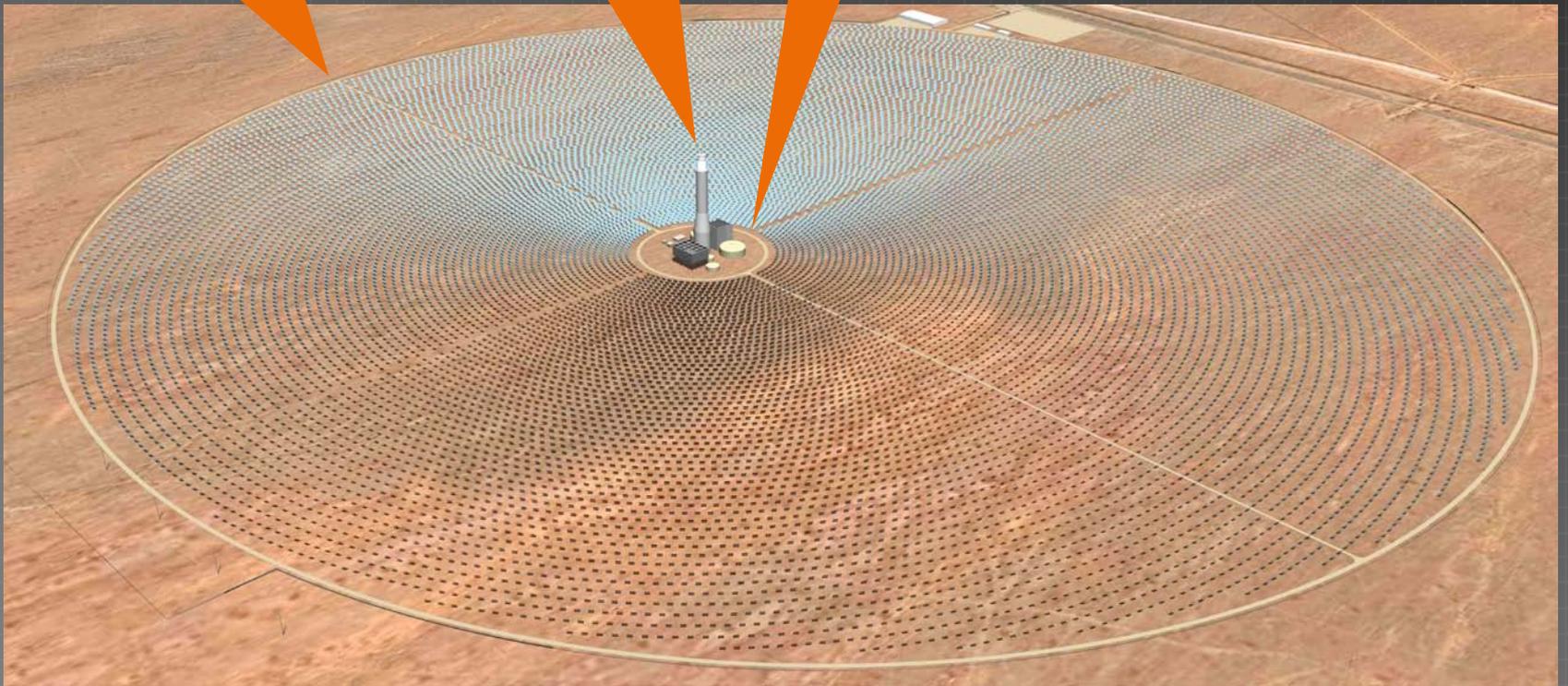
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The SolarReserve Technology

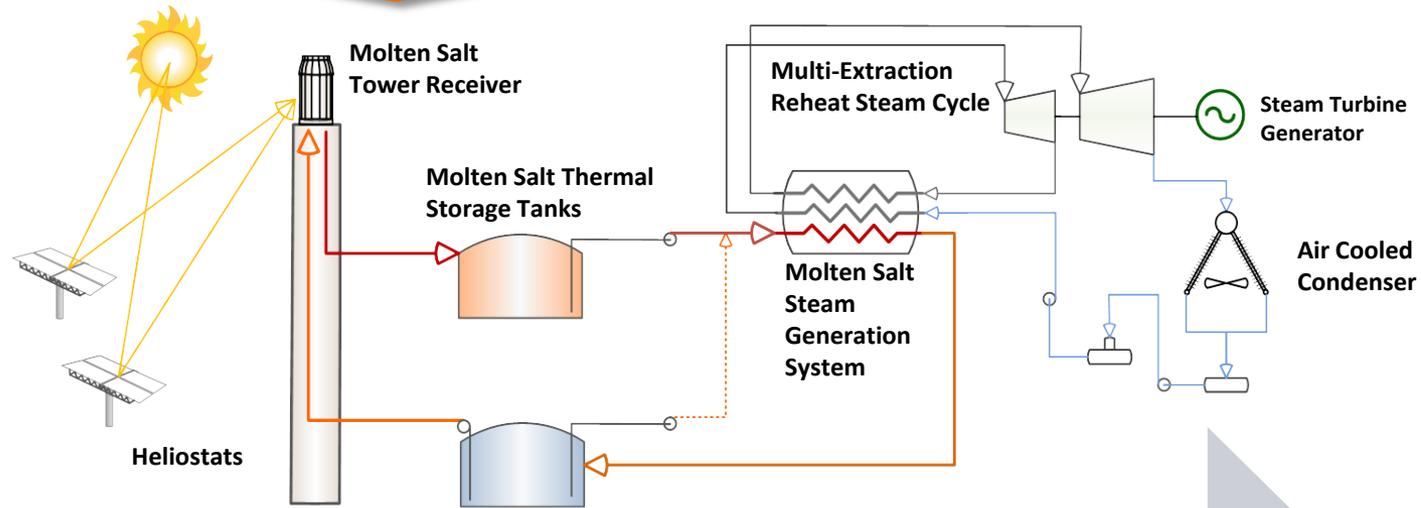
Thousands of sun-tracking mirrors

Central tower over 650 feet tall

Molten salt energy storage and steam power plant generate electricity on demand



Unique Advantage: Integrated Storage



Sunlight heats the molten salts directly

Fewer heat exchange steps, higher temperature

Higher efficiency than other molten salt storage designs

Storage with greater flexibility at lower cost

Crescent Dunes Solar Energy Project

- **Location:** Tonopah, Nevada
- **Technology:** CSP with Thermal Energy Storage (10 hours full load storage)
- **Size:** 110 MW
- **Energy production:** more than 500,000 MW-hours annually
- **Capacity factor:** 52%
- **Power contract:** NV Energy – 25 years
- **EPC Contractor:** Cobra Thermosolar Plants, Inc. with full EPC “wrap”
- **Technology Supplier:** SolarReserve under a subcontract to Cobra
- **Investors:**
 - SolarReserve (managing investor)
 - Cobra
 - Santander



Construction On Schedule - Completion in 2013



CSP with Storage – Major Sources of Value

Providing Energy Products

- Green MWhs (RECs)
- Energy (during high value times)
- Capacity value
- Ancillary services

Avoiding Intermittency Costs (vs. PV or Wind)

- Conventional cycling and fuel costs (and associated GHGs)
- Forecast error
- Additional reserves or other ancillary services
- Curtailment (i.e., of PV) due to ramping constraints

Combining and quantifying all of the benefits is extremely difficult.

Other Sources of Value From Storage

- CSP with molten salt storage contributes value in ways that are unrecognized in most renewable procurement processes

High capacity factor leads to higher utilization of transmission lines	Less environmental impact and societal infrastructure cost
Known cost of energy and ancillary services	Hedge vs. price volatility in energy and ancillaries
Tolerant to curtailment	Protects the ratepayer from transmission congestion or outage costs
Dispatch flexibility	Can change delivery profile mid-life to adjust to new market conditions
Jobs	More long-term operational jobs than PV or wind, and significant construction labor requirements
Uncompensated benefits of a steam turbine	Provides VARs, inertia, governor response, etc.
Requires no fossil fuel backup due to high capacity value and reliability	Avoids long-term dependency on fossil fuels and related emissions
Can make real-time dispatch decisions	More responsive to the grid's price signals, delivering greater value to the ratepayer
Supports greater penetration of other intermittent renewables like wind and PV	Contributes to the lowest-cost overall portfolio and enables higher renewable penetration

Contact Information

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