Solar Energy Technologies Program

DOE CSP R&D:
Component Award Overview

DOE HQ | April 28, 2010

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DOE CSP R&D: Industry/University Awards

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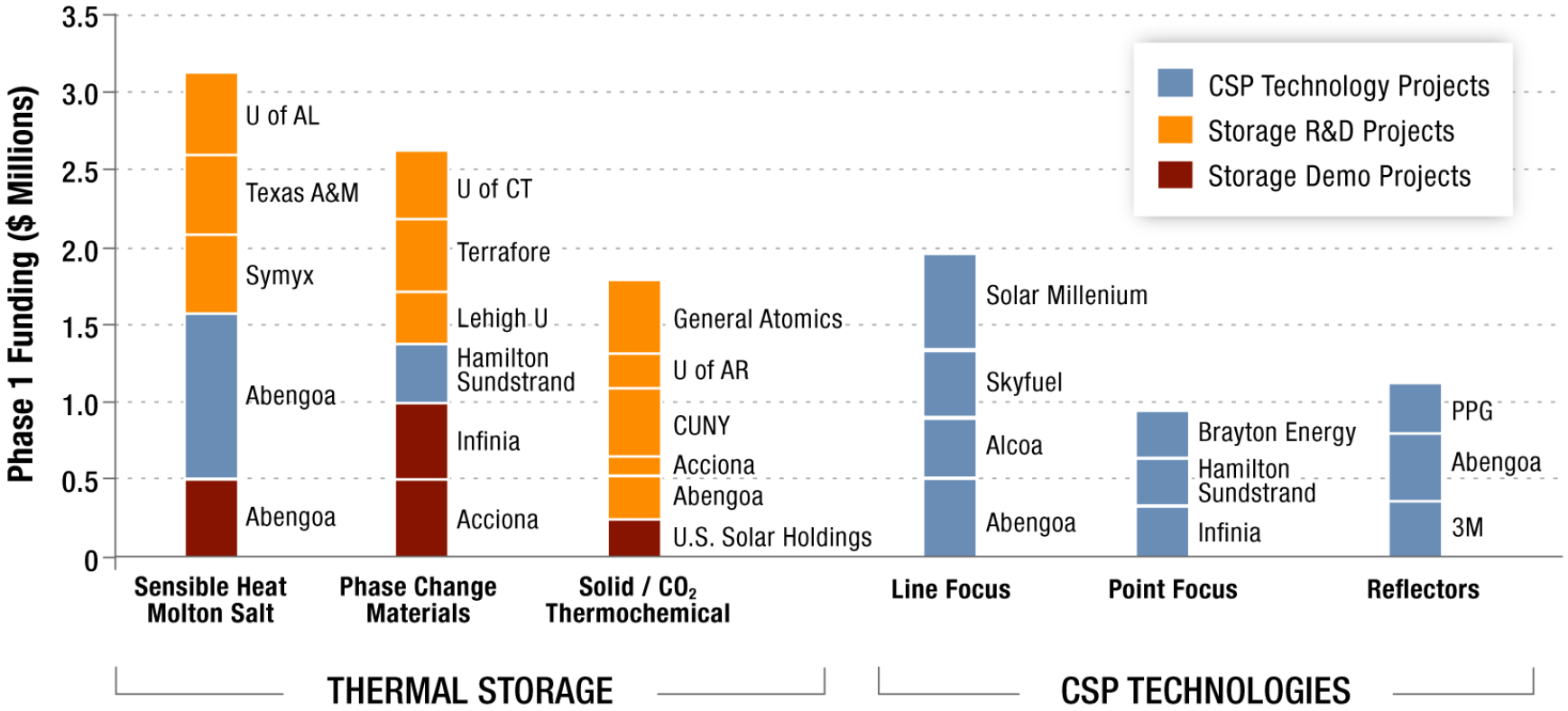

Component Breakdown

- Collectors
  - Abengoa – Development of a next-generation parabolic trough collector
  - Alcoa – Parabolic trough system design
  - SkyFuel – Commercial development of an advanced linear Fresnel
  - Solar Millennium – Advanced high-temperature trough collector development
- Reflectors
  - 3M – Cleanable and hardcoat coatings for silvered polymeric mirrors
  - Abengoa – Development of an advanced polymeric reflector
  - PPG Industries – High performance reflector panels
- Engines
  - Brayton – Brayton solar power conversion system
  - Infinia – 30-kW maintenance-free Stirling engine
- Receivers
  - PWR – Solar power tower receiver development

Abengoa Solar

Development of a next-generation parabolic trough collector

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Description

- The project aims to reduce the cost of collector technologies that could be deployed in the US in the 2010-2013 time frame (short-term), and employ innovative approaches to developing the next generation of lower-cost parabolic trough technologies (mid-term).

Innovative features

- The Phoenix parabolic trough near-term advanced design
  - Aluminum space frame design
  - Larger aperture width
  - Fewer parts, improved manufacturing, quicker assembly and installation
- Lower cost structure designs
  - Steel space frame or torque tube
  - Blue sky concepts
  - Reflective films

Progress

- The Phoenix Gen2 has been integrated into Xcel Cameo Power Plant (Palisade, CO)
  - Eight collectors, each 150 meters long
  - The first CSP/coal integrated plant (would offset ~900 tons of coal/year)
- The Phoenix Gen3 will be used in Abengoa's Solana project (Gila Bend, AZ)
  - 280MW CSP power plant (will be the largest solar power plant in the world)
  - Set to break ground in 2011

Resources

- Total Project: $14.0M
  - DOE Funds: $7.2M
  - Cost Share: $6.8M

Solar Millennium

Advanced high-temperature trough collector development

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Description

•The project aims to develop an advanced geometry parabolic trough collector, the HelioTrough. The HelioTrough has three primary goals: higher performance, lower cost, and the potential to operate with a molten salt heat transfer fluid.

Innovative features

•Heliotrough parabolic trough development
- •Torque tube design
- •Counterweights (making the torque tube the center of gravity)
- •Larger aperture, receiver diameter, SCE length
- •Fewer drives, foundations, wiring, etc.

Progress

•A HelioTrough Demonstration Loop has been built at SEGS V (Kramer Junction, CA)
- •Four collectors, each 190 meters long
- •Included alignment jigs
- •Commissioned in December 2009
- •Will incorporate molten salt into test loop

•The HelioTrough will be used in Solar Millennium's upcoming US projects
- •Amargosa 1 & 2: combined 484MW; Nye County, NV; 2011
- •Blythe Solar Project: combined 1GW; Blythe, CA; 2013
- •Ridgecrest Solar Project: 250MW; Ridgecrest, CA; 2013
- •Palen Solar Project: combined 500MW; Desert Center, CA; 2013

Resources

•Total Project: $5.9M
- •DOE Funds: $3.3M
- •Cost Share: $2.6M

PPG Industries

High performance reflector panels

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Description

- The project aims to develop and commercialize large-area second-surface mirrors that are superior in value, in terms of cost and performance, to existing mirrors available on the market.

Innovative features

- Low iron glass substrate
- Thick silver layer reflective coating
- Encapsulation layers
  - Organic (for mechanical protection)
  - Inorganic (for chemical protection)
- Low-cost fabrication process

Progress

- Production run of solar mirror glass in April 2010
  - 1,320 pieces, totaling ~133,500 ft^2
  - Produced for Compact Linear Fresnel Reflector (CLFR) solar system

Resources

- Total Project: $3.6M
  - DOE Funds: $2.2M
  - Cost Share: $1.4M

Pratt & Whitney Rocketdyne

Solar power tower receiver development

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Description

•The project aims to develop a molten salt central receiver through the design, fabrication, and testing of a sub-scale large receiver. Manufacturability of large-scale receivers and cost effectiveness will be validated.

Innovative features

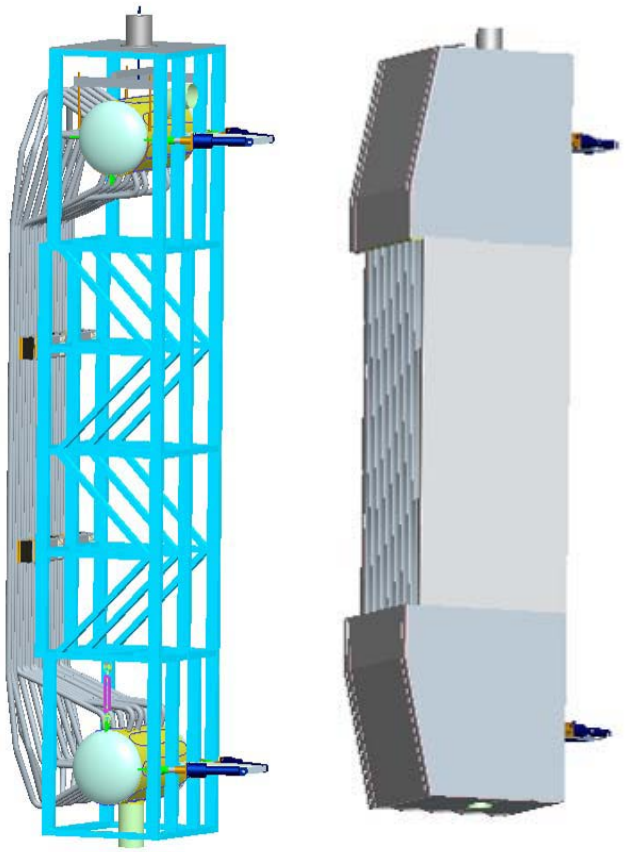
•Advanced, high-temperature tube materials
•New tube-to-structure clip system
•Higher performance insulation system
•More efficient manufacturing and assembly processes

Progress

•In the process of finalizing design details, analysis, and drawing creation
•In the process of requesting and receiving quotes from vendors
•Prototype receiver will be tested at Sandia facility
•Central receiver will be incorporated into future Solar Reserve tower designs

Resources

•Total Project: $2.9M
  •DOE Funds: $1.9M
  •Cost Share: $1.0M



Thank You

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