

**U.S. House of Representatives**  
**COMMITTEE ON SCIENCE AND TECHNOLOGY**  
**Subcommittee on Energy and Environment**

"Technology Research and Development Efforts Related to the Energy and Water Linkage"

Testimony of Terry Murphy, President and Founder of SolarReserve: July 9<sup>th</sup>, 2009

Good Morning Chairman Gordon and members of the Committee.

Thank you for this opportunity to appear before you this morning to discuss the linkage between Energy and Water. My name is Terry Murphy and I'm the President and Founder of SolarReserve.

I co-founded SolarReserve, along with US Renewables Group, after a twenty-seven year career at Rocketdyne, where I was the Director of Advanced Programs. My executive responsibilities at Rocketdyne covered a wide range of advanced power systems for both space and terrestrial applications. My business unit generated over 40 patents which leveraged aerospace technologies into clean and renewable terrestrial energy projects, so I appreciate the opportunity to offer my perspective on water usage in the generation of electricity.

Solar Reserve is a US company, based in Santa Monica, California, which is leveraging US technology, DOE investments and local manufacturing to address our energy security and energy related environmental concerns. SolarReserve has the exclusive worldwide rights to the United Technologies, Pratt & Whitney Rocketdyne molten salt power tower technology that was thoroughly validated by the Department of Energy at the Solar Two pilot plant in Barstow, California from 1995 to 1999.

United Technologies, a Fortune 30 company, is standing behind this technology by guaranteeing the performance of the system, which is key enabler to successful project finance.

The critical components in this facility are engineered by the same team at Pratt & Whitney Rocketdyne that designed and built the International Space Station solar power systems, the Space Shuttle Main Engines, and the Apollo moon rocket propulsion systems. This is world-class American technology generating American jobs, erecting critical, desperately needed infrastructure and establishing a foothold to our permanent energy independence.

Our unique, molten salt, solar power technology solves a key fundamental challenge of renewable energy: **storage**. Wind only has a 2% correlation with electrical energy demand in California, so while building a wind farm may satisfy the Renewable Portfolio Standards (RPS), it does very little to satisfy customer requirements.

Conventional solar, the rooftop photovoltaic (PV) that we are all familiar with is more coincident with demand, but intermittent cloud cover can cause it to drop off in milliseconds; and what's worse, turn right back on just as quickly. While these systems have minimal water use and are great for distributed rooftops, Utility scale deployment of PV could introduce problems with grid stability and reliability due to a rapid and unpredictable intermittent generation profile.

Conversely, a SolarReserve power plant generates electricity from the sun's heat; this type of solar energy is known as Concentrated Solar Power (CSP). These power plants capture the sun's thermal energy by focusing thousands of heliostats (or mirrors) on to a central receiver, converting and storing that energy in molten salt and then transforming that energy into steam, which in turn drives turbines. Unlike a photovoltaic power system, however, the molten salt CSP technology allows electricity to be generated on demand and controlled like any conventional power generator. These load following power plants operate on a highly predictable and dependable fuel supply, the sun! They have zero price volatility, zero fuel costs, and can provide reasonably-priced renewable electricity for generations to come. The technology does not require toxic operational fluids and last, but not least, SolarReserve technology does not require natural gas or other fossil fuels.

Like any power plant technology using a conventional steam turbine, our system can be Air-Cooled, reducing overall plant water consumption significantly relative to any water-cooled plant, particularly older plants which use less efficient technologies or water-saving designs. We believe, however, that we need appropriate public policy and economic incentives to realize this opportunity in the competitive marketplace since, relative to conventionally water-cooled generators, air-cooled technologies have a significant impact on electricity production efficiency and cost of electricity. In addition, SolarReserve encourages collaborative research with the Department of Energy into technologies that could further reduce our water consumption and increase our plant performance, thereby putting us on track to build the "Ideal Power Plant".

SolarReserve Power Towers can't solve all of our energy problems, but I believe that they do represent the best utility scale renewable energy system for the American Southwest. Because SolarReserve Power Towers operate on demand, they are perfectly suited to replace the aging coal-fired power plants that are currently operating in the Southwest. SolarReserve already has fifteen projects in various stages of development, with the first project in the United States slated for Tonopah, Nevada. This system will provide 500,000,000 kW-hr per year of clean, emission free, renewable energy and would abate over 500,000 tons of CO<sub>2</sub> when compared to a coal fired power plant over its operating life.

Our \$700 million dollar Tonopah facility is scheduled to begin construction in 2010. Solar Reserve hopes that this committee will support our efforts to expedite the federal review and approval process by working directly with the Department of Defense, the Federal Aviation Administration and the Bureau of Land Management, so that this project can avoid further costly delays. SolarReserve will employ nearly 500 people during the two year construction period and will operate with 50 permanent positions. In addition to Tonopah, SolarReserve has significant development activities in California, Arizona, New Mexico, Colorado, Utah, and several international efforts, including two projects is in Spain.

I look forward to answering your questions this morning and hope that our brief exchange of ideas, along with my written testimony will provide you with a more comprehensive analysis and awareness of water usage in power plants and the true potential of Concentrated Solar Power technologies.