SOLARRESERVE®

Attention: The Senate
Australian Government
Environment and Communications Reference Committee

25 October 2016

INQUIRY INTO THE RETIREMENT OF COAL-FIRED POWER STATIONS

Dear Sir or Madam

Thank you for the opportunity to provide feedback to the Australian Government's Senate Inquiry into the retirement of coal-fired power stations. It is with pleasure that we can provide the following information to assist your inquiry.

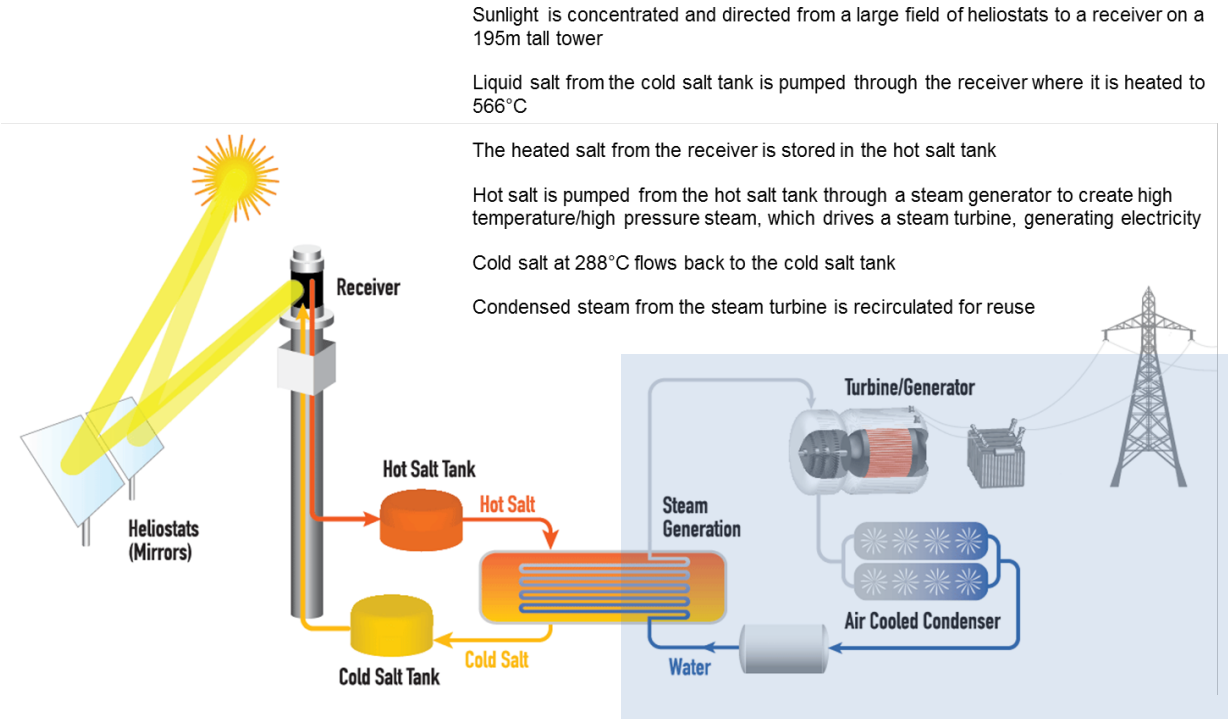
Introduction
SolarReserve is a leading developer of concentrated solar power (CSP) and photovoltaic (PV) solutions, combining our proprietary power tower molten salt storage technology with project development, financing, and operating expertise. Our technology can provide firm, fully dispatchable, non-intermittent renewable energy, day or night. The power generation technology is nearly identical to that which is found in a coal-fired power station

SolarReserve has successfully financed and constructed more than US$1.8 billion of large scale solar projects worldwide. These include the 110 MW Crescent Dunes CSP project in Nevada, now in its commercial operations phase; the 75 MW_{DC} Letsatsi and Lesedi Solar PV Projects; and the 96 MW_{DC} Jasper Solar PV Project in South Africa, now fully operational. Construction is due to commence shortly on the 100MW Redstone CSP project in South Africa.

Crescent Dunes Solar Energy Project, Nevada, USA. 110MW with 10 hours of full load storage (1,100MWh)

The Technology

SolarReserve's CSP with storage technology utilises molten salt to collect and store heat from sunlight during the day and then power a conventional steam turbine system whenever electricity is needed. Low-cost thermal storage allows the facility to deliver energy at full output 24 hours a day, or whenever it is needed by the grid, rather than being subject to the moment-by-moment variability of sunshine. CSP with molten salt storage can be configured to a variety of load profiles, including baseload operations like a conventional coal-fired power station.



Schematic of SolarReserve's CSP with storage technology

The power block within the facility, as presented in the blue shaded area above, is nearly identical to that found in a coal-fired power station. The key difference with SolarReserve's CSP technology to a coal-fired power station is the absence of fossil fuel and a steam generating boiler from the plant, with our technology relying instead on the energy collected from the sun which is stored in molten salt and converted to steam through a heat exchanger.

Transition from Coal to Renewables

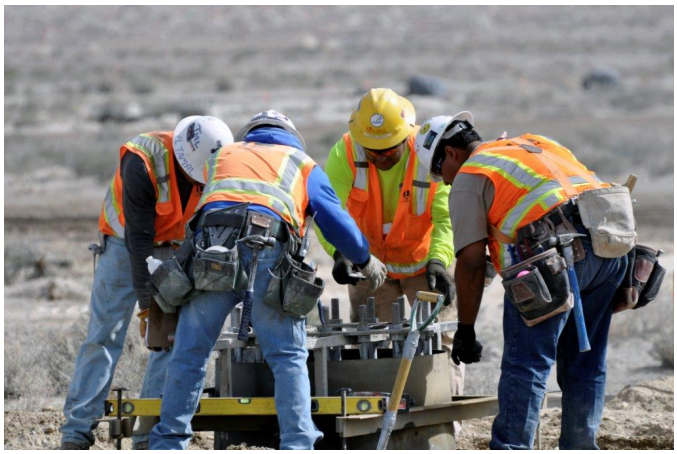
CSP with molten salt energy storage is an enabler for transiting from fossil fuel based generation technology to higher penetrations of renewable generation. The storage element of the technology enables CSP to provide nearly identical dispatchability, energy security and wholesale price stability to that which traditional coal-fired power stations provide, but without the fossil fuel or harmful emissions.

Australia's commitment to the 2016 Paris Agreement will require Australia to decarbonize its electricity generation before 2050, requiring a profound change to the portfolio of the National Electricity Market. Intermittent renewable generation can help in this decarbonisation, but as higher levels of renewable energy penetration are achieved it will require other low carbon generation technologies in the system to provide dispatchable electricity and the ancillary services essential for maintaining a high quality, reliable and secure energy system. This dispatchability is currently provided by coal-fired power stations and gas turbines which will increasingly be required to exit the market. As the market dynamics change and traditional fossil fueled generation technologies exit, CSP can fill the gap left behind to provide both dispatchability and ancillary services.

An orderly transition from fossil fuel based electricity generation to renewable generation is essential to minimise the economic, social and community costs on the closure of these plants. The closure of these fossil fueled plants, which have in a lot of cases been the main employer in the local area for decades, disrupt the social fabric of the community. Loss of employment and income within the community can result in the town transitioning from being vibrant to a town struggling to survive. In Tonopah, Nevada, the town almost faded out of existence when the local silver mine closed in the 1920's, but the development of SolarReserve's Crescent Dunes project nearby has seen the town experience a renaissance due to the influx of investment and sustained jobs into the area. In Port Augusta in South Australia, the coal-fired Northern Power Station closed in 2016 and has resulted in a loss of more than 150 jobs in the town of 13,500 people. When it is considered in the context of the families affected, this is likely to represent more than 600 people within the community, or 5% of the community directly affected with many more indirectly affected. SolarReserve is looking to develop a utility scale CSP project in the town called Aurora.

CSP projects have a greater gestation period from inception to operation than traditional renewable projects like wind or solar PV. Development of a utility scale CSP facility can take 18 months, and construction is typically around 30 months in duration. Retiring coal-fired power stations have historically been closed quickly and with little notice, Northern Power Station for instance was closed in 2016, less than 12 months after the announcement was made by Alinta Energy. For CSP to have a meaningful role in replacing the generation of coal-fired power stations, it requires projects to be progressed in advance of the likely closure date or other transitionary arrangements to be put in place. For projects to progress, the necessary investment signals have to exist, either through Government policy or customer demand.

Job Creation



CSP technology is a major contributor to developing and growing the economy through the creation of jobs, both during construction and in operations. Skilled workers on SolarReserve's Crescent Dunes CSP facility numbered more than 1,000 at the peak of construction and averaged around 650 during the 30-month construction schedule. During operations, the facility employs 50 people and will continue to do so for the projects 30+ year life. The majority of jobs created for the operations phase of the project are jobs typically found in a conventional coal-fired power station. Collectively, over 4,000 direct, indirect and induced jobs are created by building one of our power plants. These jobs range from direct construction and operations jobs to manufacturing, transport and logistics to hospitality and real estate. The majority of these jobs were locally created, providing a much needed stimulus to the region.

It is recognised that the location of some of the existing coal-fired power stations that will close are not in the ideal location for a CSP facility, which require a high quality solar resource. Notwithstanding, where such a transition can occur in an incremental and planned manner, the skills required in operated a coal-fired power station are transferable to a CSP facility even if this is in a new location. The deployment of this technology will provide options for former coal-fired power station workers to continue working in their field of experience and grow skills in a new technology. An orderly but planned exit from coal to CSP will provide greatest opportunity for affected communities to secure like employment in this new industry.

CSP is an enabler for creating new industries including manufacturing, which has seen a

precipitous decline in Australia. The bulk of the components of SolarReserve's technology are materials that can be sourced locally, and in the case of assemblies such as the heliostats that can be manufactured and assembled locally. The 10,347 heliostats deployed at Crescent Dunes are each 115m^2 in size, comprised of 3mm silver-backed glass. These mirrors were manufactured in a nearby city and shipped to site. On site, an assembly plant was constructed which converted the individual mirrors into an array of mirrors which make up a heliostat. Depending on the size of the heliostats ultimately selected for Australia projects, opportunities may exist for either on-site or off-site manufacture and assembly.

SolarReserve's Aurora Solar Energy Project

Aurora is located 30km north of Port Augusta, South Australia, where a grassroots campaign for a solar thermal plant has been underway for many years. SolarReserve recognised the importance of Port Augusta for CSP due to the confluence of its exceptional solar resource, availability of skilled workers from the nearby Northern Power Station, available land and grid connectivity. Aurora will be nearly identical to SolarReserve's Crescent Dunes facility in Nevada, now fully operational and delivering clean, fully dispatchable energy to the grid. Aurora will be a vital first step for large-scale CSP in Australia. Fundamentally, this will propel CSP as a low-cost, carbon-free replacement for fossil fuel fired generation.

The Federal Government can play an important role in providing the pathway from coal-fired generation into CSP, which in turn will support the development of a greater penetration of renewable electricity in the overall market. In meeting the Federal Government's renewable energy target, retailers and large industrial customers that are seeking to meet their liability under the RET are currently choosing to do so using the lowest cost option available, typically through wind and PV projects. These projects rarely account for the system wide cost of intermittent generation which are socialised amongst all electricity consumers. CSP is yet to establish a foothold in Australia due to its higher cost, although CSP projects provide much greater value to the broader electricity market. Dispatchability and the social benefits that CSP deliver are not currently valued, although are increasingly important in a rapidly changing energy market. Mechanisms such as prescribed energy storage targets, time of day renewable energy certificate pricing and prescribed local content requirements can all assist in creating an opportunity for CSP to become more mainstream in Australia's portfolio of electricity generation.

SolarReserve believes that a planned and orderly transition from fossil fueled generation to renewable energy can be supported through the development of large scale CSP projects. These projects are able to minimise the impact on workers and communities following the closures of coal-fired power stations through creating new equivalent jobs, manufacturing opportunities and local investment at levels greater than intermittent wind and PV projects. We thank you for the opportunity to contribute to your inquiry. Please feel free to contact me [redacted] should you wish to discuss any of the above further.

Yours sincerely,

[redacted]

Daniel Thompson
Director of Development
SolarReserve Australia