

FAQs

The company

Q1: Who is Solar Systems?

A1: Solar Systems is a Melbourne-based private company that has developed an innovative solar electricity generation system with the potential to cost-efficiently generate electricity on a large scale with zero greenhouse gas emissions.

The company is backed by a group of private investors who have invested more than \$50 million to advance the technology to its current form.

Solar Systems has over 50 staff with significant, specialised expertise in commercial and technical fields, including control, optical and power systems. The company's research and development, manufacturing and corporate facilities are located in Hawthorn, Victoria.

The business was founded in 1990 to develop the discoveries that Technical Director, John Lasich, had made while researching solar photovoltaic (PV) power systems in the 1970s. Photovoltaic literally means 'electricity-from-light'.

Solar Systems has been developing solar concentrator PV technology for 16 years. The company achieved a world record in solar power performance in 2006.

The company owns intellectual property including 10 patents granted and pending registered around the world, covering innovations in:

- PV modules and receivers
- Optics
- Controls
- Cooling
- Hydrogen production

Solar Systems won the 2005 Engineers Australia Engineering Excellence Award for the \$7 million Indigenous solar power station project at Hermannsburg, Yuendumu and Lajamanu. It comprises 30 solar concentrator photovoltaic dishes that produce electricity for the communities.

The company has developed collaborative relationships, particularly with Boeing subsidiary Spectrolab, the US Department of Energy's National Renewable Energy Laboratory and Australian based company, Able Engineering.

The new \$420 million large scale solar power station planned for northwest Victoria will consist substantially of technology developed by Solar Systems. The project will enable gear up to deliver roll out over 5GW of the technology by 2030 across Australia and additional exports.

The technology

Q2: Is solar concentrator technology used to generate power on a large scale anywhere in the world?

A2: The Victorian solar power station will be the largest and most efficient solar photovoltaic power plant in the world.

Multi-megawatt scale solar concentrator thermal technology plants have been constructed in the US, Spain and Israel. These plants use only the heat from concentrated sunlight for electricity generation. Heliostat technology is well proven in these countries. Demonstration and research heliostat systems for thermal use are also under development in NSW.

Large Scale Solar Power

Solar Systems will incorporate its high performance solar photovoltaic modules with heliostat solar concentrator technology to triple plant efficiency and significantly increase output.

The essential components of the new Victorian power plant are already well proven in Solar Systems' solar concentrator photovoltaic power plants in central Australia.

Q3: What is special about Solar Systems' technology?

A3:

- Solar Systems can generate clean energy from the sun with no greenhouse gas emissions on a large scale
- Solar Systems uses ultra high performance solar cells developed for power generation in space
- Solar Systems' technology has the potential to supply the whole world's power needs with less than 1% of the world's arid land area
- Solar Systems' technology concentrates sunlight 500 times to directly convert sunlight into power. 500 times sunlight is intense enough to melt steel
- Solar Systems Technical Director John Lasich came up with a set of 'big picture' design criteria for supplying electricity. This technology has been developed towards those criteria, that the technology be clean, available on a large scale and cost effective. Solar concentrator PV power is a combination of the best electricity generation technology to achieve this goal.
- Most of the solar concentrator photovoltaic power station is built from standard building materials to keep the power station costs down
- Solar Systems work with a subsidiary of Boeing, Spectrolab, and the US Department of Energy to develop space technology for power generation on Earth
- The solar resource is widespread, so the power station can be located appropriately
- Solar Systems can repeat a unit of the power station over and over to make a large scale power station, which reduces risk
- This first large scale power station means that production can be geared up to be cost competitive
- Solar concentrator technology turns the sun's energy directly into electricity

Q4: What are heliostats?

A4: Heliostats are sun-tracking mirrors that can focus light to a point. They can be manufactured at low cost and in high volumes.

The heliostats will be established in fields of approximately 250. They track the sun's movement and concentrate sunlight onto high efficiency PV receivers mounted on a fixed central tower that stands approximately 40 metres high.

Q5: Whose PV technology is it?

A5: Solar Systems developed the control systems, high performance concentrator PV modules and the cooling system in Australia over the past 15 years. It has 10 worldwide patents granted and pending. Solar Systems has collaborated with Spectrolab, a subsidiary of the US company Boeing, to develop triple-junction concentrator PV cells. Solar Systems are joint owners of the new high performance solar cell technology that will be used in this project.

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- The Victorian power station will consist substantially of Australian technology developed by Solar Systems. The vast majority of the power station technology is Australian and approximately 70 per cent of the total project cost is expected to be spent in Victoria, leading to the creation of an entire new industry. Solar Systems has established strategic partnerships with some overseas manufacturers, such as Boeing, to ensure that the best available resources are utilised.

Q6: What is Solar Systems' experience in this area?

A6: Solar Systems' technology is being used in four solar concentrator power PV stations in Central Australia at Hermannsburg, Yuendumu, Lajamanu and Umuwa.

John Lasich, the current Technical Director, began working on solar concentrator PV systems during the 1970s.

Solar Systems has been developing solar concentrator photovoltaic technology for 16 years.

The company initially installed its solar concentrator photovoltaic technology at White Cliffs solar dish power station in NSW in 1997, where the station operated at record solar power output for several years. Solar Systems then achieved 500 times sun concentration at two dishes in Fosterville, Victoria.

Solar Systems has over 50 staff with specialised expertise in technical fields, such as photo-electronics, materials, chemistry, mechanics, control, optical and power systems. In addition, Solar Systems recently employed a recognised expert in heliostat technology from the US.

Solar Systems' technology is recognised internationally as the leader in the field.

The new solar power station

Q7: What is the capacity of the new solar concentrator power station?

A7: The 154MW solar concentrator power station to be built in north-west Victoria will be the largest, most efficient solar photovoltaic power station in the world. It will generate 270,000 MWh per annum – sufficient to meet the annual power needs of 45,000 homes – with zero greenhouse gas emissions.

Q8: Who will own the power station?

A8: The power station will be owned and operated by a major infrastructure specialist, yet to be determined.

Q9: When will construction start and how long before the station starts generating electricity?

A9: The station will be constructed and commissioned over a six-and-half-year period to 2013. This comprises a technology optimisation stage and commercial rollout stages.

Q10: Who is paying for the new power station?

A10: \$125 million in grant funds from Federal and Victorian governments will assist in building this large-scale solar power station.

The Federal Government has provided a \$75 million grant under its Low Emissions Technology Demonstration Fund (LETDF) and the Victorian Government has provided \$50 million.

The remaining \$295 million will be private sector funding.

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Government support is critical for the development of a station of sufficient scale to enable commercialisation of the technology. In addition, it will ensure that the ultra high-efficiency solar technology and the company remains Australian-owned.

Q11: Are there plans for any more power stations?

A11: Solar Systems has a strategic plan to roll out large scale projects across Australia and for export. The new Victorian power station will be the catalyst for the delivery of more than 5GW across Australia by 2030. Solar Systems is currently holding discussions regarding further solar concentrator plants in other Australian states and internationally.

Siting of the station

Q12: Where in north-west Victoria are you planning to build the power station?

A12: An exact location has not yet been determined but we have identified a range of possible sites in north-west Victoria around Mildura and Swan Hill - an area with an abundant solar resource and land that fits the criteria for a solar power station. One of the benefits of the Solar Systems technology is that it does not require a single site but can be broken up across a number of locations.

An important feature of the technology is that it is suited to low lying sites, including salinity-affected areas. We can draw high salinity water from ground water supplies for use in the station's heat exchange system, lowering the water table and assisting in the reparation of salt-damaged land.

Q13: How do you choose the location for a station?

A13: There are several key criteria in selecting the appropriate location, including:

- Availability of an abundant solar resource
- Access to connect to the electricity grid
- Availability of appropriate land
- Guidance of the local government authority
- Suitability in terms of the interests of other stakeholders and the environment.

Like any major project, the solar power station developer will have to navigate the relevant planning and regulatory processes.

Job and manufacturing opportunities

Q14: How many jobs will the project create?

A14: Jobs will peak at about 950 during the construction period and create about 44 new direct full time jobs created for ongoing operation and maintenance.

Q15: Will there be any new manufacturing opportunities?

A15: The project provides ongoing opportunities for Victorian manufacturing to support the commercialisation plan rollout. Approximately 70 per cent of the total project cost is expected be invested in Victoria; the vast majority of the power plant will be Australian.

Two new manufacturing facilities will be constructed – one is expected to be situated near the power station for assembly of plant components and one facility in Melbourne for manufacture of Solar Systems' proprietary solar concentrator components.

The new Melbourne facility, which will be established over the next several years, will be the highest capacity PV module facility in the Southern Hemisphere.

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Expansion of supplier's manufacturing facilities is also expected to meet the demand.

This technology will create a new international industry for Australia.

Environmental and visual impact

Q16: What are the environmental benefits of the station?

A16: The solar power station will generate clean electricity with zero greenhouse gas emissions – a reduction of 396,000 tonnes of emissions a year, according to the Australian Greenhouse Office factors for Victorian electricity supply for Victoria. Allowing for losses from transmission of power to north-west Victoria (15%), the power plant will reduce greenhouse gas emissions at fossil fuel power stations by well over 400,000 tonnes a year.

A major LETDF criterion was a credible commercialisation plan that would reduce Australian greenhouse gas emissions by 2% by 2030. Solar Systems plans to roll out a total of over 5GW of generation capacity from solar power stations across Australia by 2030. This will reduce greenhouse emissions by approximately 10 million tonnes a year to exceed the LETDF requirement.

In addition, Solar Systems is considering locating the power station in an area of low value land that is affected by salinity. It could use salt-affected water from ground water supplies in the station's heat exchange system, lowering the water table and assisting in the reparation of salt-damaged land.

Q17: What will be the visual impact of the power station?

A17: The heliostats and the towers housing the receivers are all low profile and will not be established in high value, high visibility areas. They will be located in fairly isolated, low level land use areas and will be installed in separate groupings, diminishing their visual impact.

Solar Systems will build the power station across a number of different sites and will consult with local Government and communities about appropriate locations.