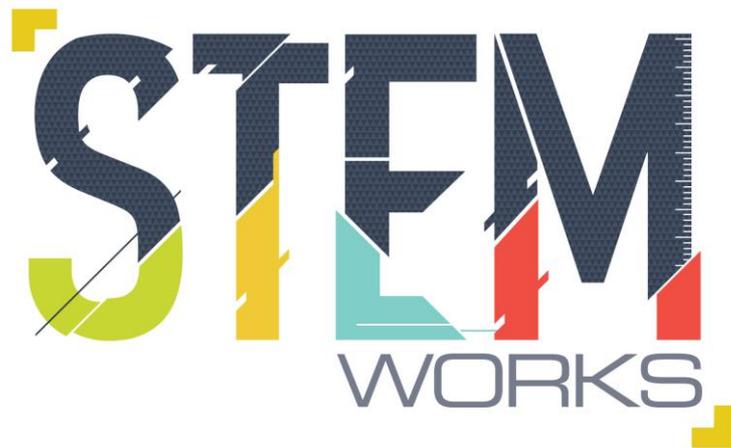


FREQUENTLY ASKED QUESTIONS

SOLAR PHOTOVOLTAIC (PV) SYSTEMS



FREQUENTLY ASKED QUESTIONS - SOLAR PV SYSTEMS

The STEM Works program provides an opportunity for renewable energy and solar PV systems to be integrated into the school curriculum to demonstrate the benefits of renewables while also working towards a low carbon emissions future. With renewables accounting for approximately half of new power generation worldwide in 2014 and prices for renewables continuing to decrease¹, solar PV systems will remain a driving technology for Australia and will provide children and young people with learning opportunities to understand how low carbon technologies integrate into existing carbon intensive markets.

1. Why are solar PV systems being specified in the STEM Works program?

As part of government policy since July 2010, all new or substantially refurbished SA government owned buildings must have a minimum 5kW capacity solar system installed which applies to the STEM Works program and is part of DPTI's specifications. However, to mitigate the rising cost of electricity, reduce carbon emissions, work towards a low carbon economy and provide curriculum opportunities for renewable energy, the department is recommending the minimum government solar PV size is increased to:

Primary School	Secondary School/R-12/Area School
Increase by 10kW to a maximum 30kW	Increase to 30kW

For example:

- Participating primary schools should increase their current solar PV capacity by 10kW e.g. if a 10kW system is already installed an additional 10kW system will be specified (to a maximum 30kW)
- Participating high schools and area schools should increase their current solar PV capacity to 30kW e.g. if a total of 15kW is already installed a 15kW system will be specified to bring the total to 30kW

Increased solar PV requirements are also being incorporated in to the DECD Design Standards for all new capital works projects and major refurbishments.

2. Assumption - Schools don't receive the benefits of solar power systems. Why would a school install solar as part of the STEM Works program?

All solar power systems installed at DECD schools benefit the school directly by generating electricity onsite and reducing the amount of electricity imported from the electricity grid.

For example a school on the small market contract with AGL Energy will save approximately \$3,200 per annum following the installation of a 10kW solar PV system compared to buying electricity from the grid:

Solar PV System - Calculator	Total
System Size (kW)	10
Estimated Annual Solar PV System Generation (1,382kWh per kW installed)	13,820
Approximate cost per kWh imported from the grid	\$ 0.23
Estimated reduction in electricity costs per annum	\$3,242.28

Although there may be a perception that solar PV has not benefitted schools and that the department takes any savings or credits (feed-in tariffs), schools receive the full benefits through their electricity bill and the department does not (and could not) withhold any of the savings (refer to question three regarding feed-in tariffs).

¹ International Energy Agency – World Energy Outlook 2015

Solar PV systems also provide a range of educational benefits and promote pro-environmental behaviours within the school by providing access to solar generation reports, tables, charts and graphs in mathematics, science and technology studies to further develop an understanding of:

- What electricity is
- What electricity costs
- How electricity is generated
- Emissions caused by grid power generation
- Money saved by renewable power generation
- CO₂ emissions saved by renewable power generation.

3. Do schools receive a feed-in credit for electricity exported to the grid?

Solar PV systems are monitored through an import/export meter which tracks the total amount of electricity consumed by the school and any electricity which has been exported to the grid. Electricity that is imported from the grid is charged by the retailer (in the above example the retailer is AGL) through contracted rates and total electricity consumption is displayed on the schools electricity account. The total electricity consumption shown on the retailer account will be the amount of electricity the school has used on top of the electricity generated by the solar PV system. Therefore, the bill will only mention solar power if there is a credit for electricity exported to the grid. The department cannot edit the bill prior to the bill being issued and bank any savings from solar PV.

In most cases the amount of electricity generated by the solar PV system is consumed by the school during peak consumption and generation hours while the school is operating, which reduces the amount of electricity imported from the grid. Schools also have a relatively high standby/off-peak electricity consumption average (approximately 30% of total consumption). High standby/off-peak consumption is due to ICT equipment, fridges and freezers and general appliances around the school that are left on at all times. As a result, even when the school is not operating (weekends and school holidays) the majority of electricity generated by solar is consumed by the standby power.

As such, schools rarely generate enough electricity through solar PV systems to export to the grid unless a significant amount of solar is installed.

When schools do export to the grid, the electricity contract a school is on affects the school's eligibility for a feed-in tariff. The South Australian Government has negotiated two contracts for the supply of electricity through which DECD is mandated to purchase electricity. The across government contract includes a range of safeguards to ensure government facilities are not negatively impacted by policies that apply to standard customer contracts. The across government contract also ensures that schools and preschools receive a guaranteed discount from the energy retailers.

The electricity contract is divided into:

- **Large Market connections** that consume greater than 160MWh per year. These are typically high schools and large primary schools and are supplied by Alinta Energy.
- **Small Market connections** that consume less than 160MWh per year. These are typically preschools and small primary schools and are supplied by AGL.

Schools on the Small Market contract for electricity (currently with AGL) receive the minimum feed-in tariff for electricity exported to the grid, however schools on the Large Market Contract (Alinta Energy) are not eligible for the minimum feed-in tariff.

For schools on the Small Market contract, electricity exported to the grid will be shown as a "Solar Buyback" credit on the school's electricity account from AGL.

Due to the size and consumption of schools on the Large Market Contract, it is unlikely solar systems will be large enough to generate sufficient electricity to export to the grid however any electricity generated by the system will reduce electricity consumption from the grid and costs for the school.

4. How much will the solar PV system cost?

The cost of solar PV systems has reduced significantly in the past decade which has resulted in solar PV being a highly viable investment to reduce electricity costs for schools.

Based on a conservative average the cost of solar PV as part of the STEM Works program is estimated to be:

- 10kW: \$20,000
- 30kW: \$50,000

5. Who will pay for the maintenance of the systems?

The maintenance of solar PV systems is mandated on the department's Preventative Maintenance schedule which is a corporately managed and funded program. Schools will not pay for the maintenance of the solar PV systems through site maintenance programs.

6. Can the school install a larger system?

Schools can increase the size of the solar PV system, however it is recommended a total system size of 30kW (including any existing solar PV systems) is not exceeded. If a system larger than 30kW is installed, additional electricity network protections are required by SAPN which will increase the cost of the installation. It is only recommended to go above 30kW when a significant system is being installed (e.g. 100kW) which will justify the additional network costs.

7. How will the school access information on the solar PV system?

Specifications have been developed so that all solar PV systems installed at schools will incorporate a data logging system that can be accessed wirelessly. The data logging system has been designed to export information to an online portal where information and reports can be downloaded and incorporated into the curriculum. An online portal is also being trialled so that both the solar PV data and electricity consumption data can be downloaded by schools through a single portal.

8. How long will the solar PV system last?

The Department of Planning, Transport and Infrastructure (DPTI) and DECD have developed school specific specifications for solar PV systems to ensure the equipment is of a high quality and has appropriate warranties:

- Solar module manufacturer's workmanship warranty: **10 years**
- Manufacturer's power performance warranty: **10 years at 90% power output and 25 years at 80% rated power output** or better
- Mounting system product warranty: **10 years**
- The inverter must have a minimum product warranty of **10 years**.

The above warranties ensure that the solar panels will last for at least 25 years and inverters to last at least 10 years.

9. Can solar PV systems be used as a backup supply when power is lost?

In the event that power is lost to school, solar PV systems are designed to turn off so that no electricity is being generated by the system. The system shutdown removes the possibility of electrical wiring and infrastructure becoming live, both on the school property and in the electricity grid to which the system is connected. This is to ensure that electrical contractors, staff and students do not assume that there is no power on site and attempt to identify the fault or repair any damaged equipment that may be live due to the solar PV system.

General Information

- Solar power systems produce electricity, but do not improve energy efficiency. To obtain the greatest benefit from the installation of a solar power system it is important to also implement energy efficiency improvements. The Energy Efficiency Guideline has been developed by the department to assist schools in understanding energy efficiency opportunities and is available on the DECD Intranet by searching "energy efficiency".
- Although 10kW and 30kW systems are larger than previous solar systems installed at schools, they are not sufficient to generate enough electricity to cover a schools total peak electricity requirement. Schools consume a large amount of electricity with the amount of equipment and appliances in use (ICT equipment, appliances, heating/cooling, lighting). For example, a 30kW system will generate enough electricity to cover approximately 10% of a medium sized high school's annual electricity consumption.