

CASE STUDY: Battery Storage in Perth Business



Introduction:

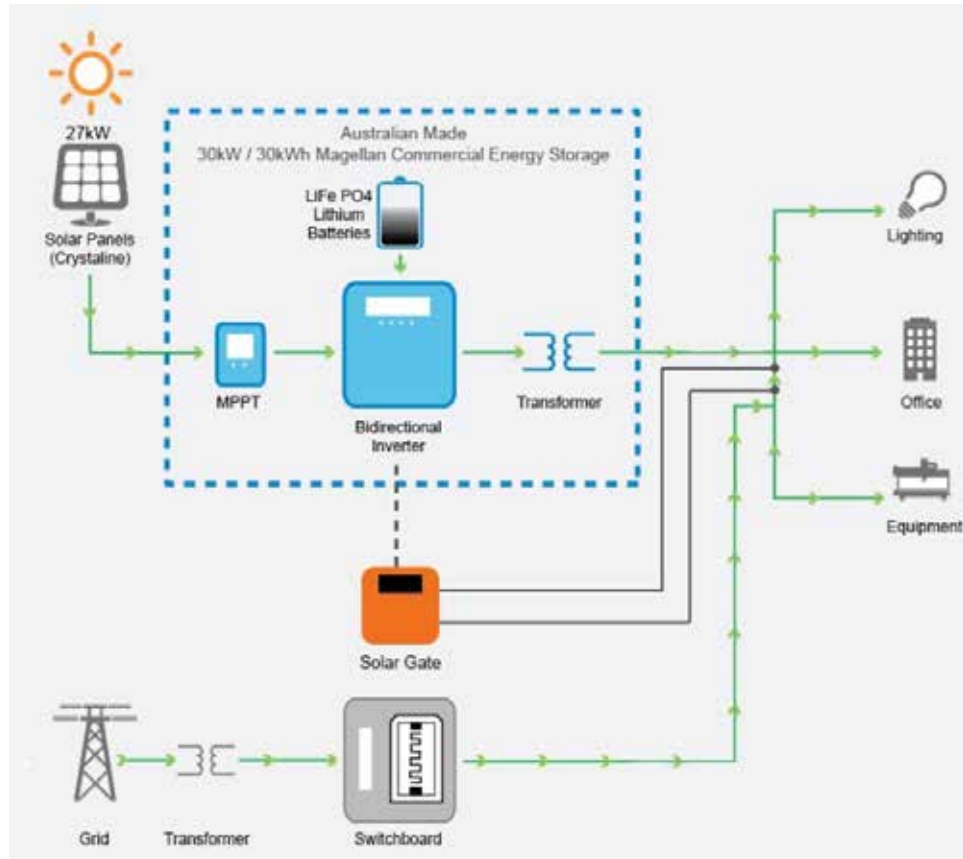
This is a case study on how a Perth business, which operates from an office and warehouse building (of 1,546m²) cut its electricity bills by 68% by installing PV and battery storage. The equipment installed consisted of a 27kW solar array, facing 3° east of north, and 32° inclination, a 30kW/30kWh Australian made Magellan battery storage system with lithium batteries, and an Australian made Magellan Solar Gate zero export control device. The main function of the Solar Gate is to ensure all excess solar energy is diverted into the load and that there is no power export into the grid.

Before installation, the Solar Gate was used to log the total consumption of the office and warehouse - please see load profile below. The solar panels were installed on the roof of the factory and the energy storage system consisting of an MPPT and a grid connected bidirectional inverter was installed inside the building. The total PV power installed was 27kW, consisting of 135, 200W solar panels. Lithium batteries were chosen due their high cycle life and high depth of discharge capability and their high performance under a wide temperature range.



24 hour load profile

System Schematic



Description

The DC power generated by the solar panels is fed into the Bi-directional Inverter via the Maximum Power Point Tracker (MPPT) where it is converted into pure sinewave which is then feeds the loads. All excess solar energy is measured by the Solar Gate and diverted into the battery. The Solar Gate also ensures that no power is fed back into the grid. The Bi-directional Inverter is also used to import low cost grid power at night for storage into the battery for use during the day when the cost is at its highest. The equipment also has a UPS function that can keep the business running in the case of total grid failure.

Payback and Financials:

Two Tariffs were considered. A Synergy constant tariff L1 and a variable tariff R1.

Synergy Tariff - L1	
Supply Charge: Cents Per Day	44.77
Electricity Charge: Cents Per Unit	25.60
Total Annual Cost of Electricity Without Energy Storage and Solar	\$19,208

Installing Energy Storage and Solar				
Total Initial Cost of Installation	PV Size (kW)	BESS Size (kWh)	Savings Per Year	Payback Period (Years)
\$59,770	27	30	\$9,427	6.34

Synergy Tariff - R1	
Supply Charge: Cents Per Day.	183.56
Electricity Charge: Cents Per Unit for Peak Hours.	32.22
Electricity Charge: Cents Per Unit for Off-Peak Hours.	9.93
Total Annual Cost of Electricity Without Energy Storage and Solar	\$21,279

Installing Energy Storage and Solar				
Total Initial Cost of Installation	PV Size (kW)	BESS Size (kWh)	Savings Per Year	Payback Period (Years)
\$59,770	27	30	\$14,445	4.13

Conclusions:

The above case study shows that installing solar power and energy storage equipment in a commercial building is a very effective way of reducing the cost of electricity and provides an excellent return on investment (not including plant depreciation). The Australian made Magellan Commercial Scale Energy Storage System is also an Uninterruptible Power Supply (UPS) and due to its 4 quadrant capabilities can also improve power quality by correcting the load power factor which can also reduce cost of electricity cost.



Magellan Solar Gate



Magellan Commercial Energy Storage

Magellan has been supplying high quality AC and DC back-up power systems to Australian industry since 1991. Our expertise is design and manufacture of customised AC and DC power systems, and since 2009 Magellan has been also supplying energy storage systems to utilities and solar projects. Magellan has been in business for 24 years, and many of its original power systems which were manufactured in the 1990's are still in operation at various Australian and international substations, which is a testament to Magellan's reliability.