

Solar 65kWh Grid Connect & MultiGen 65kW Grid Connect or Standalone - Compared

As shown in the images below it takes a very large industrial roof to make the same amount of electricity, 65kW, as it does with using a MultiGen system. Solar needs 468m² of space while MultiGen needs less than 20m².



A Solar electric system comprising of 372 photovoltaic panels rated at 175 watts each produces 65kW of electricity and no thermal output. The panel cost is \$608,000 with 1 x 75kW inverter at \$40,000 makes the total capital cost of \$648,000. This is for a grid-connect system. A battery bank would need to be added, at great expense, in order to have power available at night or when there is insufficient sunlight. Although solar modules are often warranted for 20 years or more, the warranty on the overall solar energy system, inclusive of the other components, in some cases may only be 5 years or less.



A MultiGen65 comprises of one 65kW micro-turbine, with a chiller and water maker that generate an electrical output of 65kW and a thermal output of 115kW. They are powered by natural gas or liquid fuels and can operate 24/7 either grid connected or standalone. The systems not only produce electricity but also air conditioning, water from the air and heated water. Warranty is for 5 or 9 years. The capital cost of the equipment is \$375,000 - MultiGen65(e) The table below compares Solar and MultiGen.

More information is available at: www.multigen.com.au

System	Solar PV (Grid Connect)	MultiGen65
Daily Hours Available	4.5	24
Days Per Year	365	365
kW	65	65
kWh/Year	106,763	569,400
Capital Cost	\$648,000	\$375,000
Footprint (sq. metres)	468	20

* Electricity is generated for an average daily sun hours of 4.5 in Victoria

The above table shows that an equivalent solar system cost \$273,000 more than MultiGen and produces almost 19% of the electricity that MultiGen produces per year. While the Solar system only produces electricity MultiGen also produces electricity, air conditioning, water from the air and heated water.

Item	Solar PV (Grid Connect)	MultiGen65
Estimated Maintenance	\$40,000	\$120,000
Power Produced 20yrs	2,135,250	11,388,000
Revenue at \$0.15/kWh	\$320,288	\$1,708,200
Water Heating Savings	\$0	\$501,940
RECs / CO2 Credits	\$81,140	\$148,400
Gas Cost to Operate	\$0	\$847,968
Total	\$401,427	\$1,510,572
Year to ROI	>20years	<5 years

* RECs are based on a value of \$38 and CO2 credits are based on a value of \$10 per tonne

* Grid feed over 10kW generated by an embed system is by negotiation

* Gas price is based on \$6/GJ

The table above shows that electricity produced and sold at a price of \$0.15/kWh a MultiGen system would be paid off within 5 years whereas a Solar system would take more than 20 years. Estimated maintenance includes replacement of the solar inverter after 10 years and replacement of MultiGen turbine shaft every 5 years. The above table doesn't not take into account additional savings associated with water (200,000 litres p.a) and air conditioning (22,995 kWh p.a) produced by the MultiGen system at very little cost.

Energy Products	Solar	MultiGen
Equipment Footprint	468m ₂	20m ₂
Electricity kW	65kW	65kW
Water from the Air	0	200,000lts
Heated Water	0	2,628KL
Air Con	0	72kW _{th}
CO2 Savings p.a	383 tonnes	742 tonnes
Electrical Efficiency	<15%	<29%
Overall Efficiency	<15%	>85%

* CO2 savings are based on the emission factor rate for Victoria of 1.22 CO₂-e/kWh

* Emission Factor - Natural Gas Consumption is 51.2kg CO₂-e/GJ

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