

Photovoltaic system at the Singapore Sports Hub



Figure 1- Aerial view of Sports Hub. PHOTO: Phoenix Solar Pte Ltd

Rated system power	707kWp
Expected energy yield	At least 884'000kWh/year.
CO₂ savings	At least 442'000kg/year
Area covered	Approximately 7'000m ²
PV modules	REC Solar Peak Energy Series Each panel is rated at 260Wp, under standard test conditions (STC).
Inverter	SMA Sunny Tripower
Construction type	HDG steel structure on concrete roofs

FAQ

a) What is solar PV?

PV stands for Photovoltaics, or the conversion of sunlight to electricity. Sports Hub's PV system is made of arrays of polycrystalline silicon PV panels. The panels were manufactured at REC's factory in Singapore.

As well as producing solar electricity, the PV array acts as a sunshade for the roof, and reduces the heat conducted to the building.

PV has a negligible environmental footprint, it is easy to install and has low maintenance requirements; it can be deployed almost anywhere and at any scale. PV systems can be mounted on roofs (rooftop installations) and on the ground (solar farms). Singapore is a land scarce country so most of the PV systems, including the Sports Hub system, are rooftop installations.

b) How does it work? Where are the batteries?

This is a grid-connected system, so there is no battery storage. The PV arrays generate DC electricity whenever they are exposed to sunlight. Each array is connected with special solar cables to a three-phase inverter, which converts DC to AC so it can feed the building's Main Switch Board (MSB) located in the main switch room. This offsets what the building would otherwise draw from SP Services.

The inverter will also synchronise with the public grid and will ensure preference goes to the solar electricity to feed the Sports Hub. If the PV system produces more power than that part of the building needs, then the excess of power automatically flows to the rest of the Sports Hub campus.

c) Where is the system installed

Over 2'700 REC solar modules are installed on the rim of the circular Stadium, above the office and the main car park. Besides generating clean electricity, the PV arrays reduce heat gain through these roofs by shading them from direct sunshine.

d) How much electricity does it generate?

The Sports Hub PV system was designed to generate at least 884'000kWh/year. This is well in excess of the 610'000kWh/year needed to offset energy demand of the bowl cooling system at the new 55'000-capacity National Stadium and make it carbon neutral. The system was commissioned in April 2014 and the energy yield (YTD) is already well above expectations with an annualised production for the first 3 months of 961'637kWh/yr.

e) How long will this system last?

The panels have a 25-year power output warranty. The inverters, as electrical devices, have a warranty period of 5 years. If properly maintained, the PV system can last well beyond 30 years.

f) Is there something special and noteworthy about the installation?

The Sports Hub PV system is an example of aesthetic integration of solar energy solutions into urban environments. The PV system combines a sound technical solution with a design that harmonises with the overall architectural design of the Sports Hub.

g) How was the project financed?

SportsHub Pte Ltd and Phoenix Solar have signed a 21 year solar power purchase agreement whereby Phoenix Solar will install the PV system at the Sports Hub. Phoenix Solar will own and operate the PV system and SportsHub will obtain electricity at a discounted price compared with the existing retail price from the local utility. This gives SportsHub stable electricity prices for the next 21 years, with no up-front investment.

h) Who installed the system?

Phoenix Solar Pte Ltd is the Asia headquarters of Phoenix Solar AG. Located in Singapore, Phoenix Solar designs and builds investment-grade PV systems. We offer full turn-key service including design, engineering, supply, installation and maintenance of PV systems. We are a pioneer in Asia Pacific with over 80'000kWp of PV projects, making us one of the best qualified PV system installers in the region.

For more information, please refer to: <http://www.phoenixsolar.sg>