

Solar PV on packhouses



Main insight

The installation of solar photovoltaic (PV) systems on packhouses presents a unique opportunity to packhouse owners, with demonstrated savings of 15% of electricity costs.

This industry brief highlights:

- Where it is possible for packhouses to install solar PV and feed electricity into the grid.
- Its profitability, for both a modelled packhouse and in four different case studies.

When and where can you feed in?

One of the key factors when considering installing solar PV is whether the excess electricity generated can be sold, or fed in. It is currently not possible to connect and feed in to the grid everywhere. Figure 1 and Table 1 below highlight when and where feed-in is an option in the Western Cape.

Figure 1:
Potential for feed-in

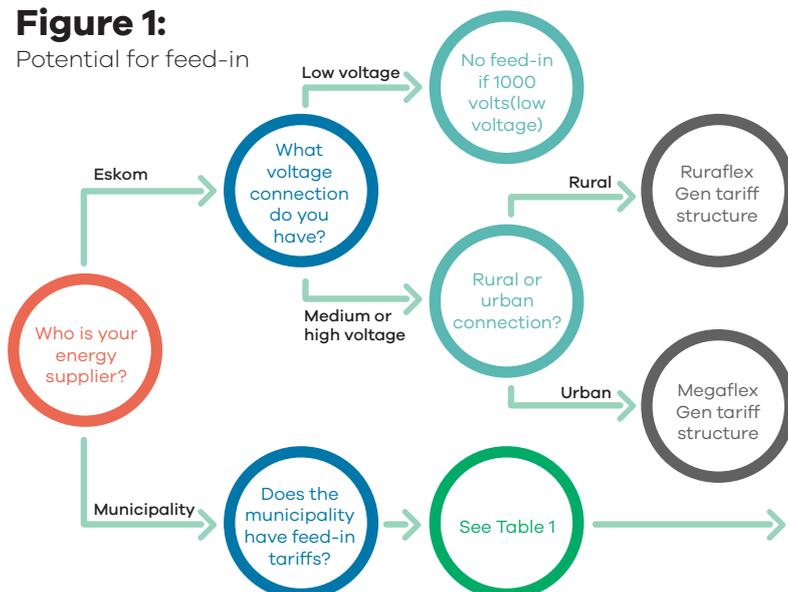


Table 1:
Municipalities that allow solar PV*

Municipality	SSEG tariffs	Rules, regs & by-laws
Beaufort West	Yes	In progress
Bergrivier	No	In progress
City of Cape Town	Yes	Yes
Drakenstein	Yes	Yes
George	Yes	Yes
Mossel Bay	Yes	Yes
Oudtshoorn	In progress	In progress
Overstrand	Yes	In progress
Saldanha Bay	No	In progress
Stellenbosch	Yes	Yes
Swartland	Yes	Yes
Theewaterskloof	In progress	In progress

* For updates, contact the GreenCape Energy team: re@greencape.co.za

Why solar PV on packhouses makes sense

The value of solar PV is mostly derived from replacing relatively expensive electricity with 'free' electricity, rather than making money from selling excess electricity to the grid.

For this reason, solar PV installations on packhouses make sense — they have significant cooling and other intensive energy needs during the day, when solar PV generates electricity.

This is further supported by solar PV acting as an insulator, absorbing heat thus reducing the need for cooling. For instance, some solar PV installations providing electricity for cooling have reported reductions of up to 80% in monthly electricity costs.

case study

01

Ceres Fruit Growers

986 kWp system installed by SolarWorld Africa and African Technical Innovations (ATI) in Ceres



Technology

- 4 060 SW250 SolarWorld polycrystalline panels
- 58 x 17 kW three-phase Sunny Tripower inverters



Return on investment

- Generating 1 690 MWh per year
- 6% reduction in annual electricity consumption
- 1 622 tonnes CO₂e avoided per annum

case study

02

Ceres Koelkamers

908 kWp system installed by SolarWorld Africa and African Technical Innovations (ATI) in Ceres



Technology

- 2117 SW240 polycrystalline PV panels
- 3 800 m² surface area



Return on investment

- Generating 848 MWh per year
- 11% reduction in annual electricity costs
- 839 tonnes of CO₂e avoided per annum

Illustrating financial feasibility: A modelled packhouse

The financial feasibility of solar PV on an apple packhouse was shown by a model based on industry averages. The full report is available from GreenCape. The feasibility is examined under a number of scenarios:

- Two solar PV installation sizes:
 - 500 kWp
 - 10 kWp.
- Two tariff structures:
 - George Municipality
 - Eskom Ruraflex.
- Two per-annum tariff increase scenarios:
 - 13% for five years, then 8%
 - 10% increase.
- Different financing solutions:
 - self-funded (full cost borne in first year)
 - 80% financed by 10-year loan at 10%
 - 80% financed by 10-year loan at 18%.

The financial feasibility of the solar PV installations was considered by using three measures:

- simple payback
- net present value
- internal rate of return.



Key insights from the modelling

The economies of scale are significant

Large (500 kWp) systems were financially viable in all scenarios considered:

- 8–13 years of 'free energy' once the system is paid off, based on simple payback;
- net present value of R0.5–R4.1 million on R8.1 million system;
- internal rate of return greater than 18% in all scenarios.

Financing is key to unlocking full potential of solar PV:

Even small systems (≤10 kWp) are financially viable under the right financing conditions:

- 5–10 years of 'free energy' once the system is paid off on simple payback;
- positive net present value only under favourable (10%) loan terms;
- internal rate of return range: 11–21% thus profitable when lower IRR accepted.

Financing

As traditional financing institutions come to understand the solar PV opportunity and are able to offer better loan terms, financing will become more readily available.

Alternatively, capital cost constraints can be overcome through energy service companies (ESCOs), which can provide innovative performance-based contracts that remove the need for upfront capital when financing solar PV projects. However, performance-based contracts still have inherent risks that need to be considered, such as changes in Eskom's tariffs, oversupply of energy and underperforming contracts.

There is a strong case for solar PV on packhouses which is highly dependent on the size and energy needs of the packhouse. Their potential for success is illustrated in our modelling and in the case studies presented.

case study

03

Stellenpak Fruit Packers

420 kWp system Installed by Energyworx in Paarl



Technology

- 1680 SolarWorld SW250 polycrystalline modules
- 2 744 m² surface area
- 21 Steca 20 000 TL3 grid-tied inverters



Return on investment

- Generating 600 MWh per year
- 15% reduction in electricity costs
- 25-year guaranteed lifespan of the system

case study

04

ArbeidsVreugd Fruit Packers

450 kWp system installed by Renewable Energy Design Engineering in Villiersdorp



Technology

- 1876 x 240 Wp Trina Solar modules
- 26 SMA Tripower 17000 three-phase inverters
- Online data of power production



Return on investment

- Generating 743 MWh per year
- R38 million savings over 25 years
- 733 tonnes CO₂e avoided per annum
- Estimated payback of six years

For the full report or further information, contact GreenCape at info@greencape.co.za



GreenCape



GreenCape is a non-profit organisation that supports and promotes the green economy - low carbon, resource efficient and socially inclusive - in the Western Cape, South Africa.

We assist businesses and investors focusing on green technologies and services to remove barriers to their establishment and growth. Our goals are twofold: 1) To increase investment and job creation in the green economy, and 2) to position the City of Cape Town and Western Cape Province as the green economic hub of Africa.

GreenCape's Industry Briefs are aimed at businesses, investors, government stakeholders and others in specific sectors of the green economy. The briefs communicate key market and other insights from our work and research in this space. They supplement our flagship Market Intelligence Reports that are published annually.

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