



Leveraging infrastructure investment to create a sustainable special economic zone (SEZ): **A case study of Stripform Packaging**

Atlantis SEZ pilot project for energy security: An innovative approach to owning a revenue-generating asset with a shared risk and revenue model.



STRIPFORM PACKAGING, CAPE TOWN

Produced by GreenCape In partnership with Climateworks Foundation and Bloomberg Philanthropies



List of abbreviations

dtic	Department of Trade, Industry and Competition
.....
EPC	Engineering, Procurement and Construction
.....
ESCO	Energy Service Company
.....
GDP	Gross Domestic Product
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ha	Hectares
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kW	Kilowatt
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kWp	Kilowatt Peak
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MW	Megawatt
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PPA	Power purchase agreement
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PV	Photovoltaic
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SEZ	Special Economic Zone
.....



1 Key insights

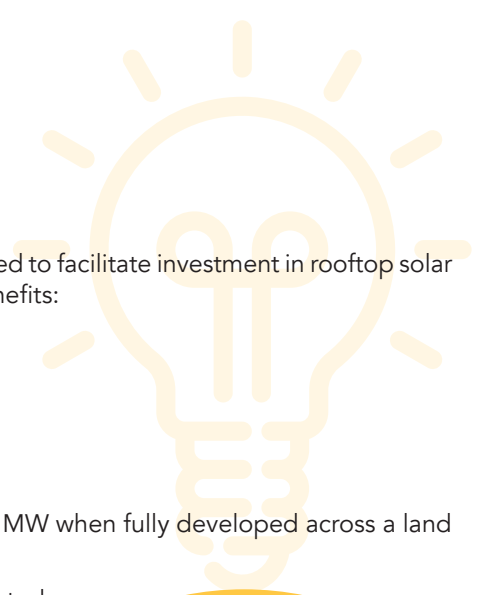
- An innovative shared ownership Power Purchase Agreement (PPA) model can be used to facilitate investment in rooftop solar PV for tenants of SEZs and industrial parks, with the following multistakeholder benefits:
 - > A reduction in the carbon intensity of manufacturing processes
 - > Energy savings for industrial tenants
 - > A shared revenue model reinforcing performance guarantees.
 - > Energy security and a revenue model for SEZs and industrial parks
- The total addressable energy market size for the Atlantis SEZ is approximately 25 MW when fully developed across a land area of 95 ha.
- There are currently ten other South African SEZs, where this model could be replicated.

2 Purpose

This case study describes the successful implementation of An innovative approach to owning a revenue-generating asset (i.e. solar PV) with a shared revenue and risk model. GreenCape has used in the Atlantis SEZ to facilitate investment in rooftop solar PV. This model can create alternative revenue streams for an SEZs by leveraging blended finance grants to supply cleaner, cheaper and potentially secure energy to SEZ tenants, adding to the attractive offerings SEZs give their tenants.

This case study is written for:

SEZs and industrial parks in South Africa looking to reduce their carbon footprint, promote energy security and reduce the cost of electricity for their tenants while creating alternative revenue streams for the long-term sustainability of an SEZ.



Blended finance:

Blended finance is the strategic use of development finance for the mobilisation of additional finance (i.e. private finance) towards sustainable impact.



3 Background

According to the World Bank, the manufacturing sector contributed 12.04% of South Africa's GDP in 2022¹. The percentage share of manufacturing in South Africa's GDP has steadily declined due to several factors, including the perception of energy insecurity due to loadshedding. South Africa has had more loadshedding in 2023, than in 2022, placing increased strain on manufacturing productivity and competitiveness. Industrial parks and SEZs in South

Africa require innovative mechanisms to increase their service offering to attract investment while creating a more sustainable business model. The Atlantis SEZ is projected to have a total energy demand of around 25 MW when fully developed across a land area of 95 ha. The South African Energy Sector Report (2021) shows that the industrial sector in South Africa contributes towards ~51% of South Africa's total energy demand².



4 Challenge

Outright capital purchase of renewable energy poses a series of risks; primarily, the installer receives the full payment for the system at handover, but the asset is required to operate for 15-25 years, and the performance risk is transferred to the owner. The non-performance of renewable energy assets could greatly impact the return on investment. SEZs have additional challenges creating a barrier of entry:

- Subsidised electricity prices in the Atlantis SEZ make it difficult to design a revenue-positive power purchase agreement (PPA) for solar PV projects.
- Blended finance is difficult for small projects. Building finance mechanisms to use concessional or grant funding to fund PPA projects is difficult and takes time to manage.

SEZs have access to funding for capital infrastructure but need to build a self-sustainable model where they can get additional income and do not entirely rely on government funding.

5 Solution

A pilot project was designed by GreenCape, in which patient capital was used to de-risk longer-term debt for energy generation installations on privately owned commercial and industrial property within the Atlantis SEZ. Grant funding for the pilot(s) was obtained from the dtic during the SEZ feasibility stage of the Atlantis SEZ.

The Atlantis SEZ ESCO project consisted of a 20% capital participation of a private service provider (the company installing and maintaining the solar PV system), with the remaining 80% of the capital provided by the Atlantis SEZ.

This model allowed for an innovative approach to owning a revenue-generating asset with shared revenue rather than a performance guarantee.

¹ Source: – <https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=ZA>

² Source: – <https://www.energy.gov.za/files/media/explained/2021-South-African-Energy-Sector-Report.pdf>



5.1 Pilot specifications

Stripform Packaging was chosen as the pilot site for the Atlantis SEZ ESCO project. The roof at the Stripform facility was made of asbestos, which was not the ideal material for a solar PV system to be built on. Therefore, a ground-mounted 10 kWp solar PV carport system was developed instead. Stripform Packaging requested a solar PV system with a larger capacity than the planned 10 kWp.

The concluding agreement was that a 20 kWp solar PV system was to be installed, where GreenCape and the winning RFP bidder would pay for half of the PV system (10 kWp) to illustrate the model, and Stripform Packaging would cover the remaining engineering, procurement & construction (EPC) costs for the additional 10 kWp system.

- A 10 kWp solar PV rooftop system was used to demonstrate the potential of the SEZ ESCO.
- During the initial five years of the project's lifespan, the 20% investment by the installer was paid back by the revenue generated by the solar PV rooftop system.
- The electricity tariff was set at a 10% lower rate than that of the City of Cape Town at the time.
- From year six to year 25, the installer will continue to generate revenue from the generated electricity, however, at a reduced rate compared to years one to five.
- A 20% participation was financed by the installer at a loan rate of 14% for five years. After which, the installer will receive a portion of the energy sales for the remaining lifespan of the project.
- For the pilot project, 80% of grant funding was supplied through GreenCape's Project Management Unit (acting as a proxy for the Atlantis SEZ Operator in the proposed model).
- A revenue-sharing model was implemented between the installer and the Atlantis SEZ operator that would be arranged in phases over the lifetime of the offtake agreement.



5.2 Financial model

The pilot demonstrated that with a 20% capital investment of the total EPC cost by the installer and the remaining 80% provided by patient capital, the risk and reward of the project are appropriately allocated.

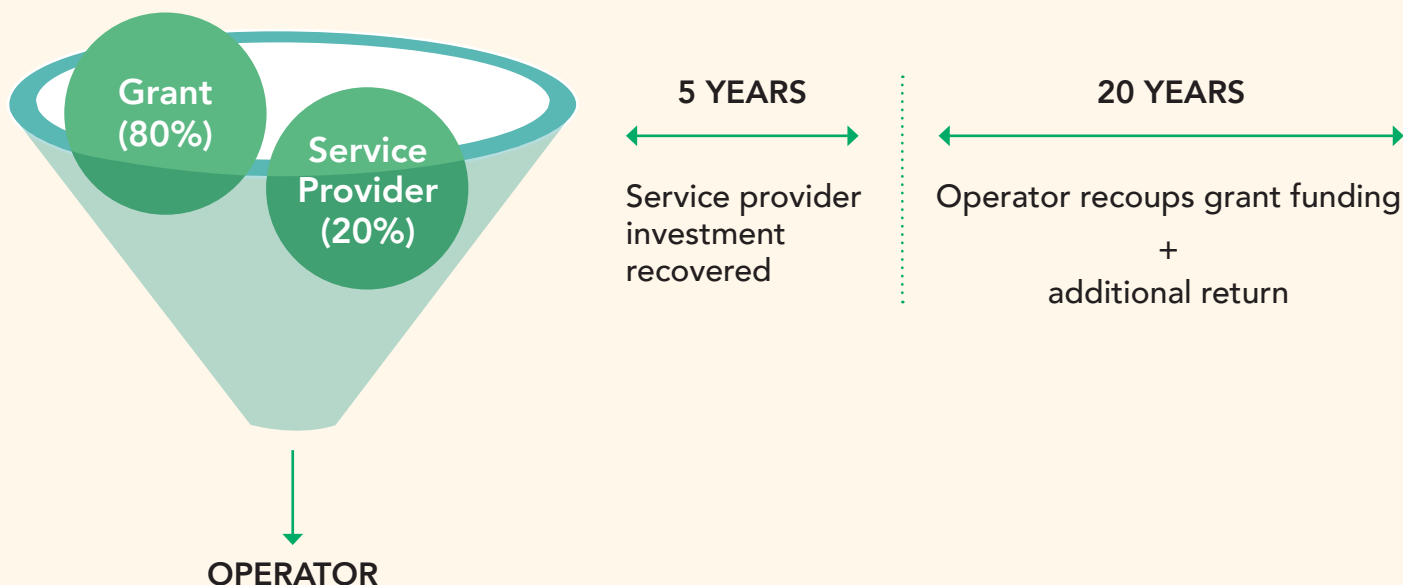


Figure 2: Concessional debt finance model

- For the project's lifespan, the tenant purchases the generated energy at a rate 10% less than that of the City of Cape Town.
- From year one to five, the SEZ operator receives 54% of the energy sales revenue, and the installer receives 46%.
- From year six to 25, the SEZ operator receives 86% of the energy sales revenue while the installer receives 14%.

YEAR 1 EXAMPLE:	
City of Cape Town tariff	R 1.29/kWh
Tenant tariff	R 1.16/kWh (10% discount)
Operator portion	R 0.63/kWh (54%)
Service provider portion	R 0.53/kWh (46%)
Annual increase	8%
YEAR 6 EXAMPLE:	
City of Cape Town tariff	R 2.123/kWh
Tenant tariff	R 1.93/kWh (10% discount)
Operator portion	R 1.67/kWh (86%)
Service provider portion	R 0.26/kWh (14%)
Annual increase	6%

5.3 Power Purchase Agreement

Figure 3 below shows the PPA between the stakeholders involved in the Stripform pilot project. The tenant has a normal lease agreement with the SEZ entity; this would include utility costs at the rate that is stipulated in the PPA. The SEZ entity has two PPAs, one with the SEZ operator (SEZ ESCO) and one with the service provider (the EPC installer, that will continue to operate and maintain the asset).

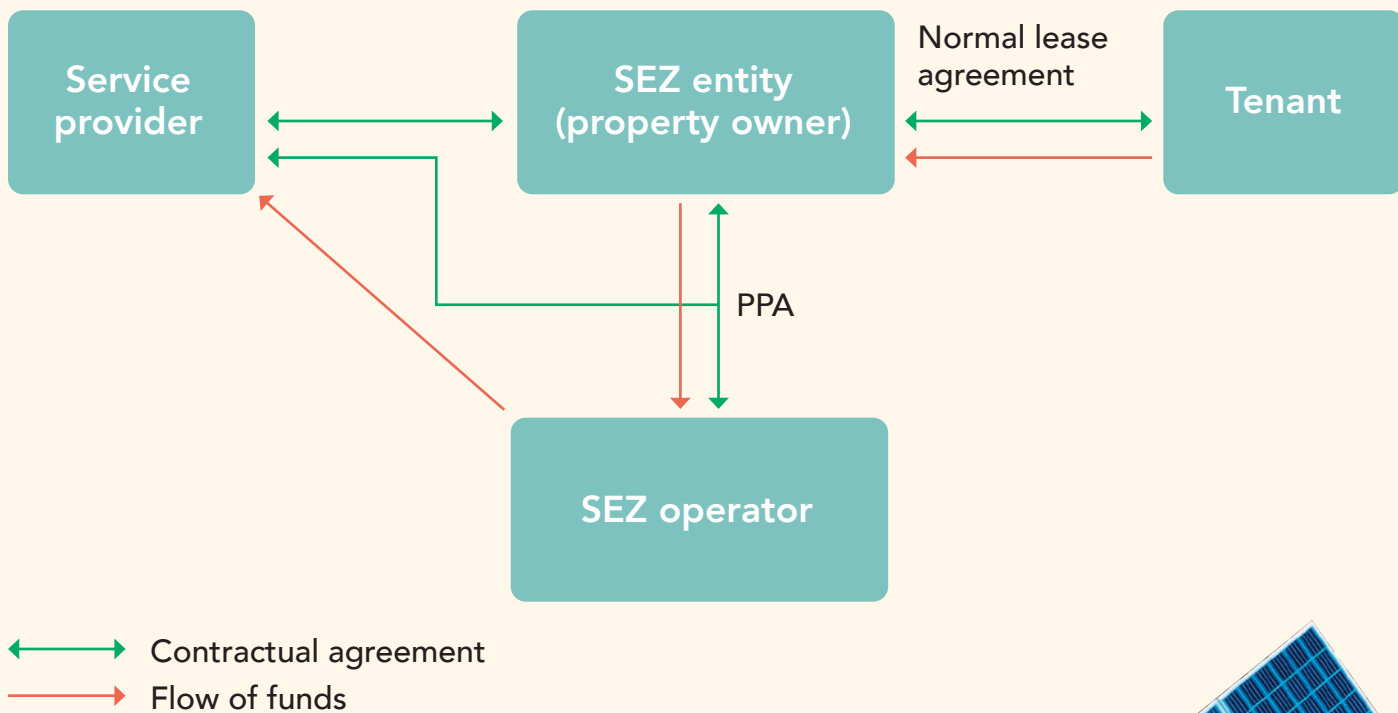
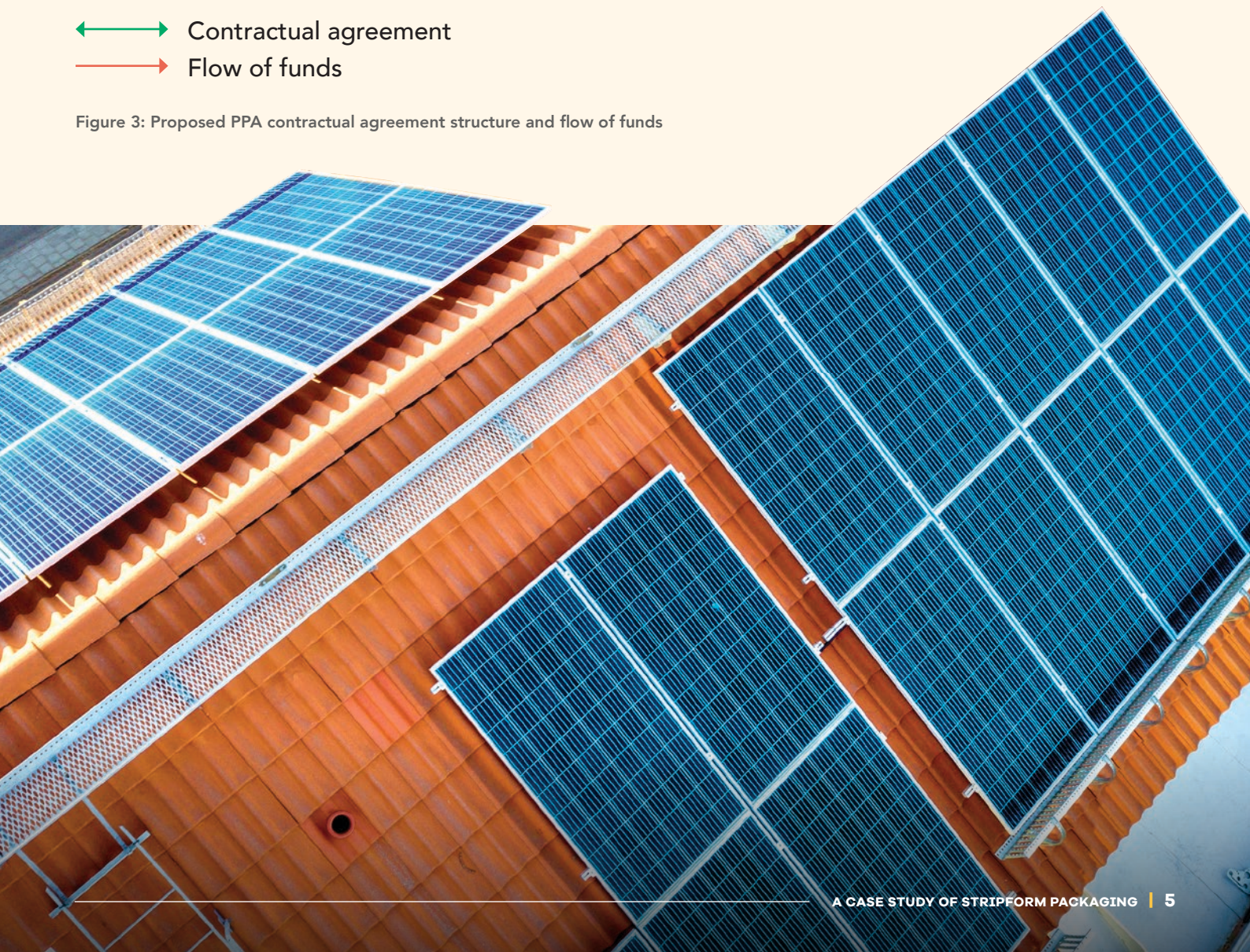


Figure 3: Proposed PPA contractual agreement structure and flow of funds



5.4 Energy sales revenue model

During the 25 year lifespan of the project, the proposed cash flow for the installer and the SEZ operator is illustrated in **Figure 4** below. **Figure 4** also forecasts the annual revenue module after the initial upfront capital costs in year 1. Indicating the upfront capital contributed by the operator (SEZ ESCO) and the service provider (EPC contractor), details of the finance model can be seen in Section 5.2. From year six the SEZ operator's revenue increases while the service provider's revenue decreases.



Figure 4: Annual cumulative payback model of the solar PV system from energy sales at a breakeven point of 10 years

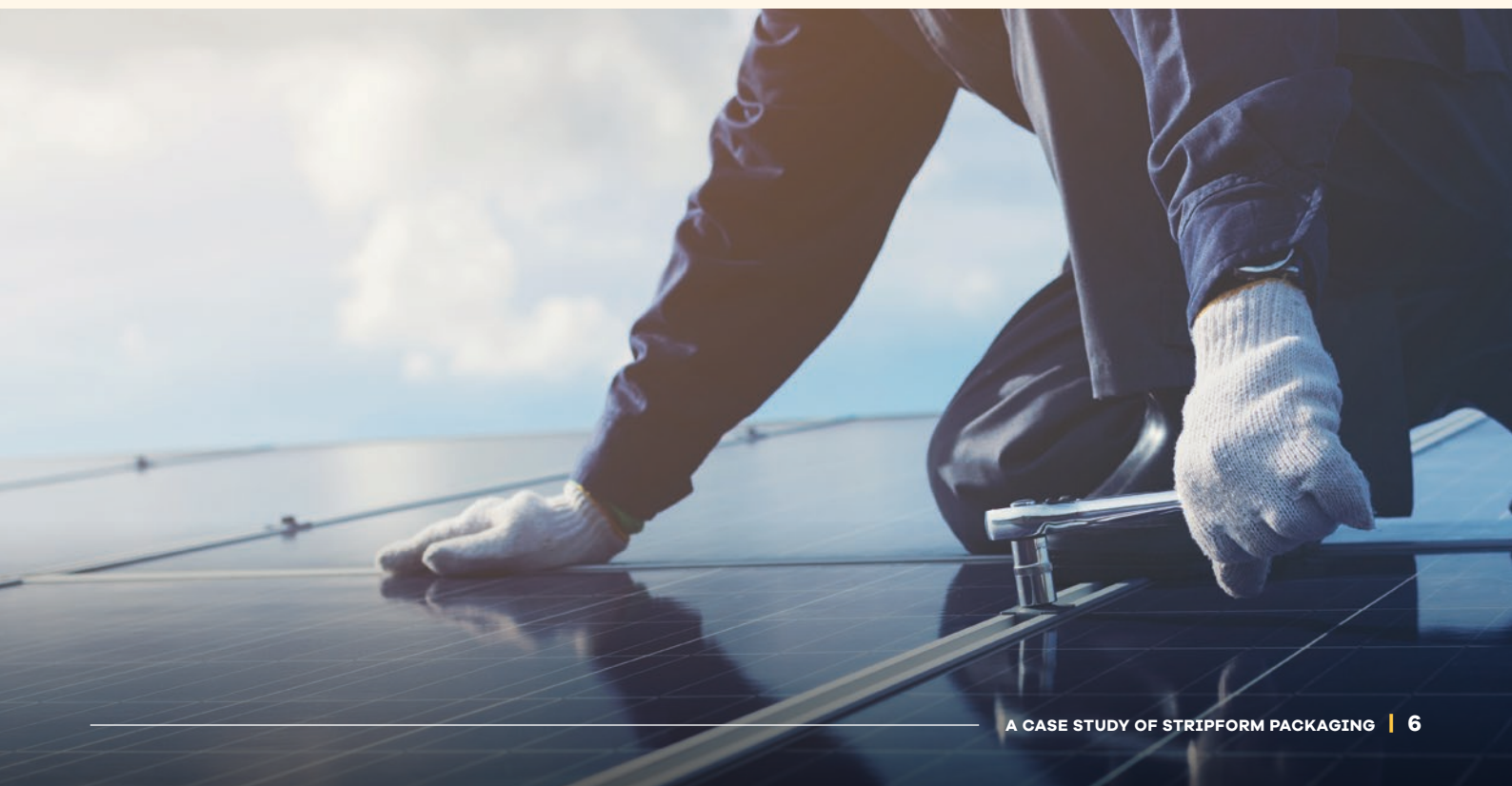


Figure 5 below illustrates the cumulative cash flow of the initial grant funding return over 25 years. It can be seen that the model will start generating revenue from year 10; in 2018 when the project was initiated, the cost of solar PV was much higher than it is currently, and with the current pricing points it is expected that a return could be realised from year five.

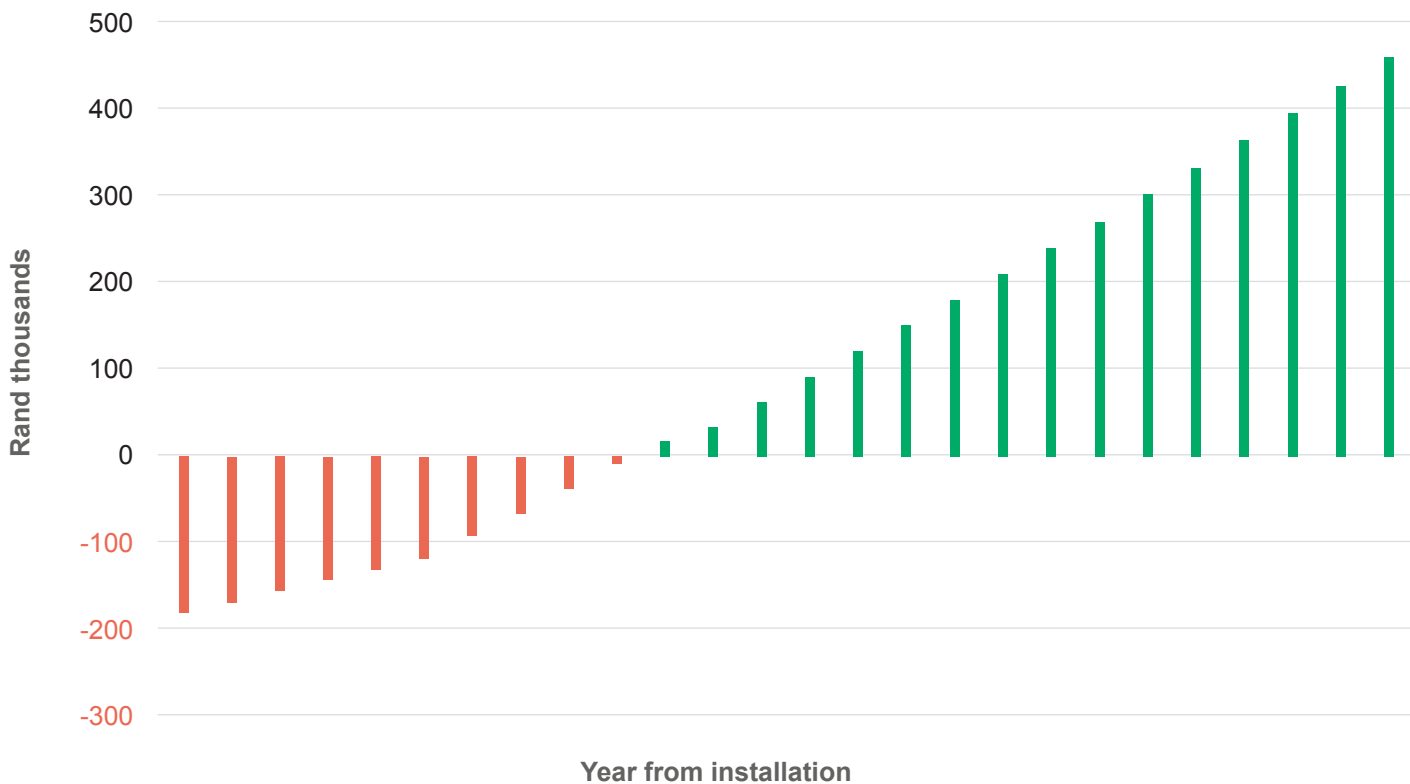


Figure 5: Cumulative cash flow grant funding return

Figure 6 below illustrates the cash flow of the installed solar PV system at Stripform. The upfront payment is R180 000 in year 0, and then in year 11, there is a payment of R20 000 for invert replacement.



Figure 6: Cash flow grant funding return

5.5 Stakeholder benefits

This operating model aims to show that SEZs can leverage their infrastructure investments to create new sustainable revenue streams while benefiting all other participating stakeholders.

The tenant receives cheaper green energy with no capital outlay.

- Fully funded, installed and maintained 10 kWp solar PV system.
- All energy generated by the PV system will be purchased at a rate 10% less than the City of Cape Town (municipal utility) – the tenant is greener and more competitive.

The operator (SEZ) takes the long-term occupancy risk, enabling more installations.

- Ownership of the 10 kWp solar PV system.
- Can leverage patient capital, grants and blended finance across multiple projects.
- Revenue generation from energy sales for the lifetime of the solar PV system.

The service provider takes the installation and system performance risk and is incentivised to ensure long-term performance via the remaining payments.

- Does not need patient capital (can finance relatively easily via commercial working capital facilities).
- Trickle payment to incentivise maintaining high performance.



6 Lesson learned and next steps

The case study of Stripform Packaging has shown a business case for SEZs to leverage their infrastructure funds to invest in rooftop solar PV at existing factories located in SEZs, and create sustainable alternative revenue streams for the SEZ. The pilot demonstrated that with a 20% capital investment of the total EPC cost, by the installer and the remaining 80% provided by patient capital, the risk and reward of the project are appropriately allocated.

Infrastructure grant funding from the dtic is available to SEZs in South Africa, to finance the top structure of new factories, which are then leased to manufacturers. The traditional mandate of SEZs in South Africa is that of an infrastructure-as-a-service business model where the factories are rented out to industrial tenants. Smart factories of the future will consider rooftop solar PV as an additional revenue-generating asset part of the standard factory top structure.





Leveraging cheaper, clean and secure energy as a unique value proposition

Many new technologies are emerging and maturing that could offer an SEZ the opportunity to use the operating model highlighted in this case study to make SEZs attractive for landing industrial tenants. International trends in industrial parks in developed countries have the value proposition of offering close to 100% energy availability for the entire park, even in utility grid failure or force majeure conditions, many industrial operations have this level of energy security as a minimum requirement. Coupled with the increasing need

for low-carbon manufacturing due to the EU Carbon Border Adjustment Mechanism (CBAM), SEZs can position themselves as clean, secure and cheap energy providers for their tenants. Using these outcomes as the building blocks, and creating a shared ownership and operating model can create sustainable and self-sufficient SEZ operating structures. GreenCape has undertaken work to understand the optimal energy mix and operating model to offer this unique value proposition for SEZs, using Atlantis SEZ as the initial case study.



For more information and support contact:
GreenCape: info@greencape.co.za | (021) 811 0250