nova economics

# An assessment of funding models to enable rooftop Solar PV investment in South Africa

## Part II – evaluation of the options and recommendations

Final report prepared for the Climate Neutrality Foundation

13 November 2024

Climate Neutrality Foundation

# Contact Information


**Authors**

Kay Walsh,[1], Jessica Kiln, Jaco Nel and Peter Meihuizen[2]



**Acknowledgements**

We would also like to acknowledge Heather Jackson and Pieter Botes of RBN Fund Managers for their technical input and contribution to this report.



**Nova Economics (Pty) Ltd.**

Data Voice House, 16 Elektron Road, Technopark, Stellenbosch, 7600.

www.novaeconomics.co.za


[1] In her capacity as Managing Director of Nova Economics (Pty) Ltd.

[2] In their capacities as consultants and analysts at Nova Economics (Pty) Ltd

# Table of Contents

# List of Figures

# List of tables

# List of abbreviations

| Abbreviation | Description |
|---|---|
| AF | Additional Financing |
| AfDB | African Development Bank |
| APRA | Australian Prudential Regulation Authority |
| BBBEE | Broad-Based Black Economic Empowerment |
| BESS | Battery Energy Storage Systems |
| C&I | Commercial and Industrial |
| CAPEX | Capital Expenditure |
| CEFC | Clean Energy Finance Corporation |
| CFF | Climate Finance Facility |
| CIPC | Company and Intellectual Property Commission |
| CPI | Consumer Price Index |
| CTF | Clean Technology Fund |
| DBSA | Development Bank of Southern Africa |
| DEG | Deutsche Investitions- und Entwicklungsgesellschaft |
| DERs | Distributed Energy Resources |
| DFI | Development Finance Institution |
| DISCOMs | Power distribution companies |
| DISCOs | Distribution service companies |
| DLIs | Disbursement-Linked Indicators |
| DLRs | Disbursement-Linked Results |
| DMRE | Department of Mineral Resources and Energy |
| DSPV | Distributed Solar Photovoltaic |
| Dx | Distribution (Division of Eskom SOC Ltd.) |
| EAP | Energy Action Plan |
| EBBS | Energy Bounce-Back Scheme |
| ECARES | Europe and Central Asia Renewable Energy Scale-Up Program |
| EE | Energy Efficiency |
| EMRA | Energy Market Regulatory Authority |
| EMS | Energy Management System |
| ESCos | Energy Service Companies |
| ESMAP | Energy Sector Management Assistance Programme |
| EURIBOR | Euro Interbank Offered Rate |
| FICA | Financial Intelligence Centre Act |
| FIG | Financial Institutions Group |
| GCF | Green Climate Fund |
| GEF | Global Environment Facility |
| GoT | Government of Türkiye |
| GPG | Fund for Innovative Global Public Good Solutions |
| GW | Gigawatt |
| HEUF | Household Energy Upgrades Fund |
| HVAC | Heating, Ventilation and Air Conditioning |
| IBRD | International Bank of Reconstruction and Development |
| IDA | International Development Association |

| | |
|---|---|
| IDC | Industrial Development Corporation of South Africa |
| IFC | International Finance Corporation |
| IRP | Integrated Resource Plan |
| ISAs | Instalment Sales Agreements |
| IVA | Independent Verification Agent |
| JET-P | Just Energy Transition Partnership |
| JIBAR | Johannesburg Interbank Average Rate |
| JNNSM | Jawaharlal Nehru National Solar Mission |
| KfW | Kreditanstalt für Wiederaufbau |
| kW | Kilowatt |
| kWh | Kilowatt-hour |
| kWp | Kilowatt-peak |
| LED | Light-emitting diode |
| LGD | Loss Given Default |
| MDU | Multi-Dwelling Unit |
| MIGA | Multilateral Investment Guarantee Agency |
| MPA | Multi-Phase Programmatic Approach |
| MW | Megawatt |
| MWh | Megawatt hour |
| MYPD | Multi-Year Price Determination |
| NBFIs | Non-bank Financial Institutions |
| NECOM | National Energy Crisis Committee |
| NERSA | National Energy Regulator of South Africa |
| NSB | National Small Business Amendment |
| NTCSA | National Transmission Company South Africa |
| PA | Prudential Authority |
| PD | Probability of Default |
| PforR | Program-for-Results |
| PLA | Power Lease Agreement |
| PPA | Power Purchase Agreement |
| PV | Photovoltaic |
| R/kWh | Rand per Kilowatt hour |
| RE | Renewable Energy |
| RSPV | Rooftop Solar Photovoltaic |
| RTN | Rewiring the Nation |
| SADC | Southern African Development Community |
| SAFGG | South African Facility for Green Growth |
| SARB | South African Reserve Bank |
| SARS | South African Revenue Service |
| SBC | Small Business Corporation |
| SBI | State Bank of India |
| SDU | Single-Dwelling Unit |
| SIPs | Strategic Implementing Partners |
| SMEs | Small and Medium Enterprises |
| SMMEs | Small, Medium and Micro Enterprises |
| SOFR | Secured Overnight Financing Rate |

| | |
|---|---|
| SPV | Special Purpose Vehicle |
| SSEG | Small-Scale Embedded Generation |
| TKYB | Türkiye Kalkınma ve Yatırım Bankası |
| ToU | Time of Use |
| TSKB | Türkiye Sınai Kalkınma Bankası |
| USD | United States Dollar |
| VSD | Variable Speed Drive |
| WB | World Bank |
| ZAR | South African Rand |

# 1. Introduction

This report is the second in a two-part series that the Climate Neutrality Foundation, in close collaboration with KfW and GIZ, commissioned to assess funding models to enable investment in distributed (e.g., rooftop) Solar PV among households and small businesses in South Africa. The aim was to identify practical solutions that can be implemented within a one-year timeframe and can be built on the progress and achievements already made.

In Part I of this series, we provided insight into the market for distributed Solar PV and energy storage systems in South Africa with a focus on the household and small business segments.[3]

In this report (Part II), we provide recommendations on the potential financing and other support mechanisms that DFIs could employ to sustain the adoption of grid-connected Solar PV by households and small businesses in South Africa and to broaden access.

These recommendations were informed by:

- The findings of the market and gap analysis which are summarised in Section 2.
- A review of the existing programmes that have been implemented by local development finance institutions. These are presented in Section 3.
- Insights from international case studies to provide examples of the mechanisms governments and DFIs employ to encourage the adoption of distributed Solar PV in other jurisdictions - presented in Section 4.
- And insights gathered from additional interviews with representatives from a selection of local and international DFIs and ESCOs that are active within climate-finance in South Africa (see Appendix A for a list of stakeholders interviewed).

We have been mindful of the fact that this study aimed to identify practical solutions that can be implemented within a one-year timeframe, and, where possible, should build on the progress and achievements already made.

- Interviewed ESCos to get their feedback from their perspective on the attractiveness and drawbacks of each of the programmes, and (if applicable) their experience in accessing them.

## 1.1 Structure of this report

This report comprises seven further sections:

- **Section 2. Key insights from the market and gap analysis.**[4] This section presents key insights from the market and gap analysis outlined in Part I of this research. We begin with an overview of recent demand trends in the adoption of distributed Solar PV capacity and battery energy storage systems (collectively referred to as "Solar PV systems" throughout this report), including the barriers to adoption. Next, we provide an estimate of the size of the addressable market in the residential and small business segments. We then discuss the market outlook, highlighting key opportunities and risks, followed by a brief overview of banks and ESCos currently serving the market, along with a comparison of the relative advantages of ESCo-led versus bank-led models. We also summarise stakeholder feedback on the types of support

[3] Kay Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*, Nova Economics (2024).

[4] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

needed. The section concludes by setting targets for future residential PV adoption and estimating the investment required to meet these targets.

- **Section 3. Overview of existing programmes offered by local DFIs in South Africa.** In this section, we provide an overview of two existing programmes offered by local development finance institutions - the IDC and DBSA – to promote the uptake of solar PV, energy efficiency, and storage solutions among households and businesses in South Africa. We examine the amount, nature and sources of funding for each programme, as well as their institutional structures and financing mechanisms. Finally, we assess the strengths and limitations of each programme, identifying potential improvements to address market barriers more effectively and to support ESCos with more affordable financing options or more favourable loan terms.
- **Section 4. International case studies.** This section provides an overview of three existing programmes offered by international development finance institutions aimed at improving access to credit and reducing financing costs for households seeking to install grid-connected solar PV systems and other distributed energy resources (DERs). These include (i) the World Bank-funded Türkiye Market Transition for Distributed Energy Program-for-Results, (ii) the Rooftop Solar Programme for the Residential Sector in India and (iii) the Clean Energy Finance Corporation Household Energy Upgrades Fund (HEUF) in Australia.

  For each case study, we provide (i) a description of the programme and its key objectives, (ii) an overview of the funding (including the source, amount, and nature), (iii) the programme's approach to promoting the adoption of DERs, (iv) a summary of the institutional arrangements and financing mechanism, and finally, (v) the insights applicable to the design of a similar programme in South Africa.
- **Section 5. The case for support: identifying the key levers DFIs can use to encourage Solar PV adoption by households and small businesses.** This section presents our summary of the overall motivation for providing support for the adoption of Solar PV systems by households and small businesses in South Africa and introduces the three strategic levers we recommend DFIs employ.
- **Sections 6, 7 and 8** provide a detailed rationale for the use of each of these three levers, outline the challenges they seek to address and provide recommendations on the potential support mechanisms that can be provided by DFIs with reference to existing programmes and international examples.

# 2. Key insights from the market and gap analysis

## 2.1 Introduction

This section presents key insights from the market and gap analysis outlined in Part I of this part, as these (along with case studies presented in Sections 3 and 4) have informed our recommendations on potential financial and other support mechanisms that can be used to promote the adoption of distributed Solar PV in South Africa.[5]

We begin with an overview of demand trends for Solar PV systems among households and small businesses, as well as the barriers to adoption. Next, we provide estimates of the size of the addressable market. We then discuss the market outlook, highlighting key opportunities and risks, followed by a brief overview of banks and ESCos currently serving the market, along with a comparison of the relative advantages of ESCo-led versus bank-led models. We also summarise stakeholder feedback on the types of support needed. The section concludes by setting targets for future residential Solar PV adoption and estimating the investment required to meet these targets.

## 2.2 Recent trends in demand for Solar PV systems, market size, penetration rates, and barriers to uptake

### 2.2.1 Recent trends in the demand for Solar PV systems among households and small businesses

As discussed in Part I of this report, estimates from the NTCSA system operator suggest that the private sector had procured and installed ~5 953 MW of Solar PV capacity by the end of July 2024.[6] This accounts for approximately 73% of the total 8 239 MW Solar PV capacity that had been installed in South Africa.[7] Of the 5 953 MW of capacity procured and installed by the private sector, it is estimated that 10.4%, or 621 MW, has been installed by households and small businesses (comprising distributed Solar PV systems with a capacity of between 1 and 30kWp).[8, 9]

Industry representatives confirmed that the key driver of demand for Solar PV systems in the residential and small business segment over the past 12 months was load shedding. As a result, the suspension of load shedding in March 2024 has coincided with a notable slowdown in demand. While some ESCos reported that they were still managing to achieve relatively strong growth in residential installations, others have responded by shifting their focus to the commercial and industrial segment (where demand remains robust).[10]

ESCos and banks financing Solar PV systems in the household and small business segment noted that while the risk of load shedding has subsided, there is still a clear financial incentive for households and small businesses that have relatively high electricity consumption (i.e., are consuming >1 000kWh) to install distributed Solar PV and storage.

---

[5] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

[6] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

[7] National Transmission Company of South Africa, *Weekly System Status 2024 Week 34* (2024), https://www.ntcsa.co.za/wp-content/uploads/2024/08/Weekly_System_Status_Report_2024_w34.pptx.

[8] SAPVIA, "SAPVIA solar PV installed capacity data dashboard," SAPVIA, 2024, http://sapvia.co.za/dataportal.

[9] An alternative estimation method, which assumes that the ratio of installed capacity across different system sizes remains constant (e.g., systems sized 0-30 kWp consistently account for 18.4% of the total privately installed solar PV), suggests it would be reasonable to estimate that the household and small business segment had installed over 1,000 MW by July 2024.

[10] Vincent Maposa (Wetility), interview by authors, 15 July 2024.

For example, Wetility, an ESCo serving the residential market provides an online calculator illustrating that at current electricity tariffs, a household living in Cape Town that spends R4 600 a month on electricity would be able to enter a three-year subscription for an integrated Solar PV + EE + BESS system that will cost them R2 999 per month to install and maintain but will reduce their electricity bill by almost the equivalent amount (R2 980 a month). For the first three years, the subscription to the Solar PV system will be bill-neutral – that is, the household will be spending a total of R4 600 a month on electricity (including subscription fees) before and after installation.

But at the end of the initial three-year period, when the household renews its subscription (at a reduced monthly fee) or elects to purchase the assets at the predetermined residual value, the household will be able to realise substantial electricity cost savings.

### 2.2.2 Size of the addressable market for residential Solar PV systems

To identify the addressable market for residential Solar PV systems, we segmented the ~14.5 million South African households that have access to and pay for grid-supplied power, by:

(i) **Dwelling type** – distinguishing between (i) single or multi-dwelling homes, and (ii) dwelling structures (roof and walls) that are compatible or incompatible with the installation of a Solar PV system.

(ii) **Ability to pay** – using average monthly household expenditure to assess the ability to pay for or finance the purchase of a Solar PV system.

Firstly, we segmented households (the ~14.5 million that are grid-connected and currently pay for electricity) based on the type of dwelling they currently occupy, distinguishing between:

- **Single dwelling units (SDUs)** include freestanding homes or cluster homes acquired with freehold ownership (where the buyer enjoys outright ownership of the land, buildings, and rooftops).
- **Multi-dwelling units (MDUs)** – flats, apartments, and townhouses acquired with sectional title ownership. Under sectional title ownership, common areas such as rooftops, gardens, parking lots, and other shared amenities are co-owned by all the unit owners, and the body corporate or homeowners' association (HOA) must approve any changes or improvements to or on common property, such as the installation of a Solar PV system.
- **Dwellings that cannot accommodate a standard rooftop Solar PV installation** – these include traditional dwellings, informal dwellings, and other dwellings that are structurally unsuitable and have walls/roof types that would not be able to accommodate a rooftop Solar PV system (e.g., have mud walls or thatched roofs).

Of the 14.1 million grid-connected households that pay for electricity, 10.6 million live in dwellings suitable for the installation of a distributed Solar PV system, and the vast majority of these (92.6% or 9.9 million) live in single-dwelling units. The remaining 7.4% or 0.79 million households live in multi-dwelling units.

In terms of "ability to pay", representatives of banks and ESCos noted that for standalone installations, they currently target households and small businesses who spend a minimum of R1 500 per month on electricity, on average, at a retail tariff of ~R3.50/kWh amounts to ~430kWh per month. They noted that households that consume less than 430kWh of power a month are unlikely to be able to afford (or be willing to pay for) even their entry-level leasing and/or subscription financing arrangements, which for the smallest Solar PV+BESS system start at ~R1 399 per month.[11][12] The total cost of installing a typical standalone Solar PV system for households starts at a minimum of

[11] Ross Main-Sheard (Versofy), interview by authors, 16 July 2024.

[12] Vincent Maposa (Wetility), interview by authors, 15 July 2024.

R80 000 and, as such, very few households with a monthly expenditure of less than R10 000 a month would be able to finance a system like this, let alone purchase it outright.

As such, the "addressable market for Solar PV" can consist mainly of the 4.07 million households that spend more than R10 000 per month and live in single-dwelling units. These are split into two further segments defined as follows:[13]

i. **"Lower-middle income households"** who spend a monthly average of more than R10 000.

ii. **"Middle-to-high income households"** spend a monthly average of more than R30 000.

For households living in multi-dwelling units, we include those spending less than R10 000 a month, as feedback from the banks was that with some assistance from DFIs, they could be feasibly served through ESCos and programmes that specifically target developers or landlords who own affordable housing blocks.

As such, we estimate that the total addressable market for distributed Solar PV systems in the residential sector is the ~4.9 million households highlighted in blue in Table 1.

**Table 1. Market penetration rates, % of households that have installed Solar PV systems.**

| Dwelling type | Single-dwelling units | | | Multi-dwelling units | | Total addressable market |
|---|---|---|---|---|---|---|
| Household expenditure group | Low | Lower-middle | Middle-to-high | Low | Lower-middle to high | |
| Average monthly expenditure | <R10 000 | R10 000 to R30 000 | >R30 000 | <R10 000 | >R10 000 | |
| Total no. of households | 6 080 000 | 2 950 000 | 1 120 000 | 180 000 | 626 000 | 4 876 000 |
| Solar PV penetration rates (% of total) | 0.7% | 3.1% | 10.5% | 0.6% | 2.1% | 2.4% |
| Number of households without Solar PV | 6 037 440 | 2 858 550 | 1 002 400 | 178 920 | 613 000 | 4 652 870 |

Note: The cells highlighted in blue indicate the addressable market.

Source: Nova Economics (2024) - An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I – Market and gap analysis.

### 2.2.3 Market penetration rates for residential Solar PV and barriers to uptake

While there is a clear financial incentive for middle-to-high-income households (defined as those who spend more than R30 000 per month) to invest in distributed Solar PV, penetration rates remain relatively low. It is estimated that only 10.5% of the 1.12 million middle-to-high-income households that live in suitable single-dwelling units (SDUs) have installed Solar PV systems (Table 1).[14]

Solar PV penetration rates among lower-middle to middle-income households (defined as those who spend between R10 000 and R30 000 per month) are very low – we estimate that only 3.1% of the ~2.95 million lower-middle to middle-income households have installed Solar PV systems.

[13] Vincent Maposa (Wetility), interview by authors, 15 July 2024.

[14] We estimated based on data form the general household survey hat the penetration rate for the middle-to-high expenditure households (defined as those with monthly expenditure in excess of R30k) and living in single dwelling units/full title ownership suitable for the installation of solar PV was at 10.5%.

The low uptake among households despite the potential to realise electricity cost savings can partly be attributed to limited access to finance on attractive terms – specifically, it appears that:

i. There is a mismatch between the tenor of loan, lease, and subscription agreements available to households and small businesses to finance Solar PV systems and the useful life of the underlying assets. For example, while the typical useful life of solar panels is 20 to 30 years and battery storage assets are expected to last 10 years (when cycled daily), the tenors of loans offered directly by banks or indirectly via ESCos who offer subscriptions are typically much shorter. Banks tend to offer solar loans over 5 to 8 years, while ESCos such as Wetility and Versofy offer subscriptions for a minimum of three years with the ability to extend the contract. GoSolr offers a month-to-month, evergreen contract.

ii. Banks lack a clear understanding of the residual value of Solar PV and battery energy storage assets and frequently default to the assumption that these assets have no residual value, which means they treat loans (both direct and to intermediaries such as ESCos) as unsecured, which increases financing costs.

The net effect of the unfavourable structure and unnecessarily high cost of finance (loan or lease agreements) is that households and small businesses are only able to realise monthly electricity cost savings once they have paid off the assets (or at least several years into their subscription/lease agreements).

This creates a significant barrier, particularly for the ~3 million lower-middle to middle-income households (and for small businesses) to invest in distributed energy resources (DERs) because, while many can benefit from energy cost savings over the long term, the potential savings are not immediately apparent as their short-term electricity costs (including loan instalments or subscription fees) are likely to increase significantly (e.g., by 50% as illustrated in Part I of this report).[15]

Aside from a lack of finance on attractive terms, some of the other barriers to the uptake of rooftop Solar PV and storage among households and small businesses include:

1. **Suboptimal tariff design for households and firms that install distributed generation.** Current tariff structures offered by municipal distributors to residential customers are not time-of-use-based and do not provide them with a sufficiently strong financial incentive to use DERs in an economically efficient way. There is little incentive to reduce consumption of grid-supplied power in peak periods, nor to export surplus power to the grid. Tariffs offered to small businesses are often ToU-based but provide very limited incentives to export power to the grid. Owners of distributed generation do currently, however, benefit from the current tariff design whereby the majority of costs are recovered via the volumetric portion of the tariff and fixed costs remain low.
2. **Upfront costs of grid connection & meter replacement.** The majority of residential and small business customers who have installed distributed generation are not exporting power to the grid. This is partly because they are expected to cover the upfront costs of grid connection and registration with the distribution licensee, as well as the replacement of their existing utility-side electricity meters with four-quadrant smart meters and under suboptimal tariff design which provides limited credit for power exported to the grid, are unlikely to be able to recoup the costs in under 5 to 10 years.

[15] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

3. **Limited government incentives.** There are very few government incentives available to residential customers or ESCos serving the residential market. The only direct incentive for households was a tax rebate on the cost of Solar PV panels that expired in March 2024. The government is also providing some indirect support to households via the Energy Bounce-Back Scheme (EBBS), which was set to expire at the end of August 2024 but will be available to customers between February 2025 and May 2025. Under this scheme, the government, through a guarantee administered via the South African Reserve Bank, will assume the first part of any loss (20%) in the event of default, on any loan extended to small and medium enterprises or households for the installation of rooftop Solar PV, batteries, inverters, etc.

   As such, the EBBS was designed primarily to improve access to credit to finance Solar PV and storage by enabling participating commercial banks to increase their capacity to extend credit to existing borrowers and/or extend credit to riskier categories of borrowers (than they would have without the risk mitigation mechanism). The EBBS appears in some instances to reduce the cost of credit provided by banks in response to reduced risk exposure.

   Our understanding is that while the Government is considering extending the scheme, it is likely that they will put greater emphasis on supporting finance for medium and large commercial and industrial enterprises that can generally install distributed Solar PV at a much lower average cost than households (per kWp installed) and have stronger financial incentives to invest (e.g., to reduce energy costs and carbon footprint).[16]

### 2.2.4 Size of the addressable market for Solar PV systems for small businesses

Despite the National Small Business Amendment (NSB) Act 26 of 2003 stipulating how small, medium, and micro enterprises (SMMEs) can be defined (either by annual turnover, number of employees, or gross value of their assets excluding fixed property), these classifications have not been consistently applied, neither by the private, nor public sectors. The NSB Act provides its classification criteria based on the main industry, and as such, a small agricultural firm would not necessarily have the same turnover (or other metrics) as a small wholesale and retail trade firm.

The Company and Intellectual Property Commission (CIPC) had 3.93 million companies registered at the end of March 2023; however, it is unknown how many are actively trading, as the data is not publicly available. However, the South African Revenue Service (SARS) noted that there were 1.057 million firms that submitted tax returns for the 2020/21 tax year – i.e. are registered taxpayers. The vast majority (97% or 1.02 million) generated taxable income (gross profit) of less than R1 million in the 2020/21 fiscal year. Furthermore, SARS notes that 159 307 (~16% of the 1 million) were assessed as Small Business Corporations (SBCs) in the 2020/21 tax year. Companies registered as SBCs have an annual turnover of less than R20 million per year and are registered as either a private company, closed corporation, or co-operative (excludes those small businesses registered as sole proprietorships or partnerships).

Therefore, it is difficult to determine the actual number of SMEs, however, we do know that there were at least 107 000 registered small businesses in South Africa that would be classified as "small" or "very small" in terms of their annual turnover in 2020/21 and that 98% of these enterprises generated a gross profit (taxable income) of less than R1 million in that year. However, there were another 865 000 businesses that were not registered as SBCs, and that generated gross profit of less than R1 million in 2020/21.[17]

As such, we estimate there are between 107 000 and 972 000 registered companies in South Africa that are actively trading and could be defined as "small" or "very small" in terms of the criteria defined NBS Act. However, to more

[16] Vukile Davidson (National Treasury), discussion with authors, 15 October 2024.

[17] National Treasury of South Africa and South African Revenue Service, *Tax Statistics 2023* (2023), https://www.sars.gov.za/wp-content/uploads/2023-Tax-Statistics-Main-Publication-compressed.pdf.

accurately estimate the potential size of the market for standalone Solar PV systems on small business premises, we would also need to be able to ascertain how many of these firms:

i. Operate out of a free-standing premises suitable for the installation of a standalone Solar PV system, and

ii. Can afford to purchase or lease a standalone PV System.

In the absence of this information, we estimate the total potential size of the market for standalone Solar PV systems is between 107 000 and 972 000 individual installations.

## 2.3 Market outlook- opportunities and risks, and nature of support required

### 2.3.1 Market opportunities - sharp increases in the real cost of grid-supplied power and a further decline in the average costs of solar panels and batteries

ESCos serving the residential and small business market indicated they will soon be able to deliver Solar PV systems to most middle-income households on a bill-neutral basis. ESCos interviewed noted that while they cannot currently provide lower-middle to middle-income households and firms that consume less than 1 000kWh per month with subscriptions for distributed Solar PV and storage systems that are "bill-neutral" (i.e., average monthly electricity savings post-installation is sufficient to cover the cost of the loan payments or subscription fees), it is only a matter of time before the situation changes.

ESCos serving the residential market expect the demand for Solar PV systems by households and small businesses to recover in the next two to three years, supported by further increases in the real cost of grid-supplied power and a further decline in the average costs of solar panels and batteries:

- Eskom has applied for a 36.15% increase in the average electricity tariff it charges its direct customers (including municipal redistributors) for the 2025/2026 financial year, 11.81% in 2026/7, and 9.10% in 2027/8.[18]
- The global price of both Solar PV modules and lithium-ion batteries has fallen significantly in the past year – the spot price of PV modules almost halved in 2023, while the price of lithium-ion batteries fell by ~50% in the nine months to March 2024. This has also translated into a significant reduction in the price of batteries and PV imported and distributed in South Africa. The fall in the price of lithium-ion batteries is particularly relevant as in January 2023, a 10kWh battery cost ~R50 000 which accounted for ~23% of the total cost of installing a Solar PV system designed to meet the essential load (~55% of total monthly consumption) of a household consuming an average of 1 050kWh/month.[19]

ESCos noted that if Eskom is awarded annual tariff increases (of >10%), it will probably only take two to three years before they can offer most lower-middle to high-income households subscriptions to integrated distributed PV, energy efficiency, and storage systems that are 'bill-neutral' or even reduce their monthly expenditure on electricity from the installation date.

---

[18] Ray Mahlaka, "Eskom wants an increase in electricity tariffs of up to 44% next year," *Daily Maverick* 2024, https://www.dailymaverick.co.za/article/2024-06-20-eskom-wants-an-increase-in-electricity-tariffs-of-up-to-44-next-year/.

[19] Kay Walsh et al., *A pre-feasibility study to assess the options for Eskom to accelerate the uptake of distributed energy resources - Part I: Rooftop solar PV and storage* (2023).

### 2.3.2 Market risks – higher fixed charges and reduced risk of load shedding

A downside risk to the improvement in the business case for distributed Solar PV is the proposed unbundling and restructuring of electricity tariffs and shift to higher fixed charges.[20] Eskom has submitted a proposal to NERSA to revise the structure of wholesale and retail electricity tariffs.[21]

Eskom's current tariffs are designed so that 90% of its revenue is recovered through a volumetric R/kWh charge, while ~73% of its costs (in 2024/25) are fixed. This tariff is often referred to in the literature as the "distorted two-part tariff" as it is misaligned with the utility's underlying cost structure and results in an inefficient allocation of resources and unstable utility revenues.[22]

Eskom's current proposal is out for public comment (published in November 2024 on NERSA's website), after which NERSA will consider the comments and publish the approved tariffs that Eskom can implement on 1 April 2025.[23] The Eskom Retail Tariff Plan 2025/26 proposes to increase the proportion of revenue it recovers through fixed charges to ~13% up from 10% and reduce the proportion it recovers through the volumetric charges (usually expressed in R/kWh) from 90% to ~87% (Figure 1).[24] To facilitate the transition to a wholesale electricity market, Eskom is proposing the gradual introduction of higher fixed tariff charges and unbundling the tariff into separate generation, distribution, and transmission charges. It also proposes to update the time-of-use (TOU) ratios and periods and remove the inclining block tariff structure for residential customers currently on Homepower and Homelight tariffs.

---

[20] *Tariff unbundling is the separation of tariff charges and rates into underlying cost components. It ensures that users of an energy service pay for the costs they incur without passing on cost burdens and associated risks to other customers.*

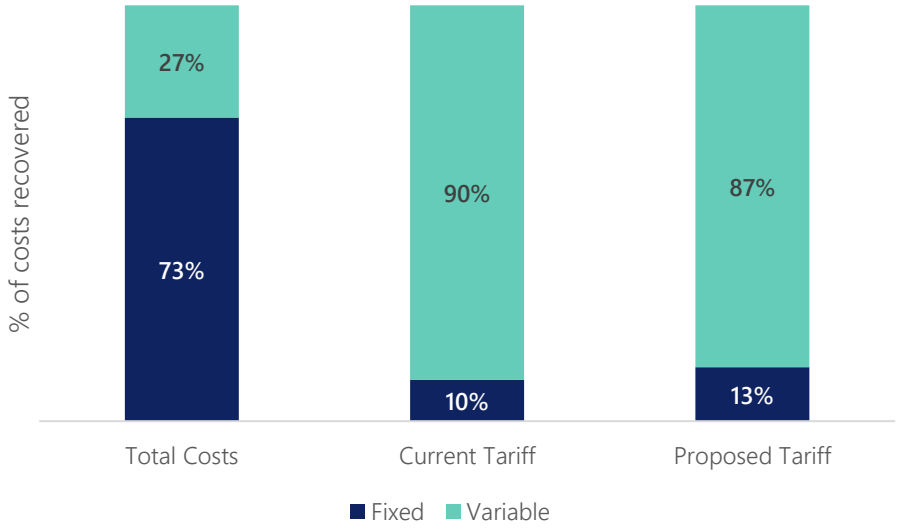
[21] Eskom, *Eskom Retail Tariff Plan: Proposed changes to Eskom Standard Tariffs for implementation in 2025/26* (2024), https://www.eskom.co.za/distribution/wp-content/uploads/2024/11/20240918-Final-Application-to-NERSA_-Eskom-Retail-Tariff-Plan-2025.pdf.

[22] Agustin J Ros, *Volumetric Residential Rates: Socially Regressive or Progressive* (Presented at the Harvard Electricity Policy Group, 2019), https://www.brattle.com/wp-content/uploads/2021/05/16563_volumetric_residential_rates_-_socially_regressive_or_progressive.pdf.

[23] Eskom, "The National Energy Regulator of South Africa (NERSA) publishes Eskom's revenue application for the next three financial years (FY 2026 to 2028)," news release, 2024, https://www.eskom.co.za/the-national-energy-regulator-of-south-africa-nersa-publishes-eskoms-revenue-application-for-the-next-three-financial-years-fy-2026-to-2028/.

[24] Eskom, *Eskom Retail Tariff Plan: Proposed changes to Eskom Standard Tariffs for implementation in 2025/26*.

**Figure 1. Actual costs vs Eskom FY24/25 tariff split vs proposed tariff recovery split**




Eskom's proposal to shift a higher proportion of its costs to the fixed portion of its tariff will better reflect the nature of its costs, but it will (*all else equal*) reduce the implicit tariff cross-subsidy that customers who own or are planning to invest in distributed generation currently enjoy (and the financial incentive to invest). However, because the introduction of slightly higher fixed charges is likely to coincide with increases in Eskom's real average tariff, the net effect will be very muted. It is worth noting that tariffs that include higher fixed charges (e.g., a demand charge), while negatively affecting the economics of self-generation, will make municipal distributors less resistant to promoting the uptake of self-generation as they will no longer be as exposed to potential revenue losses (can still cover the fixed cost of network infrastructure if sales of grid-supplied power decrease as grid-connected customers installed embedded generation).

## 2.4 Overview of firms that finance and install Solar PV systems in South Africa

The main providers of finance for Solar PV systems for households and small businesses in South Africa are commercial banks and energy service companies (ESCos).

### 2.4.1 Overview of ESCos serving the residential and small business segments in South Africa

Industry representatives identified Alumo Energy, GoSolr, Versofy, and Wetility as the largest ESCos serving households and small businesses.

GoSolr is the largest of the four entities in terms of the total Solar PV capacity installed. Patrick Narbel, the co-founder and CTO of GoSolr, noted that they had installed a total of ~75MW of Solar PV capacity and that the average system size was 4.7MW, which equates to roughly 16 000 individual installations (Table 2).[25] Versofy is the second largest of the ESCos serving the residential market with an installed capacity of 30MW across ~4 000 installations. They are followed by Alumo and Wetility.

We estimate that GoSolr has ~R1.5bn of Solar PV and storage assets under management, while Versofy has ~R600m and Wetility and Alumo have ~R400m and R240m, respectively.

[25] Patrick Narbel (GoSolr), interview by authors, 19 September 2024.

**Table 2. The four largest ESCos by installed capacity and assets under management**

| ESCo | Total Solar PV capacity installed (MW) | ~no. of installations | Average system size | Value of assets under management (AUM) (in millions) |
|---|---|---|---|---|
| GoSolr | 75 | 15 957* | 4.7 | 1 500** |
| Versofy | 30 | 4 000 | 7.5*** | 600** |
| Wetility | 12 | 1 600* | 7.5* | 240** |
| Alumo | 20# | 4 041 | 4.8 | 400** |

Note: * Calculated by dividing the installed capacity (in kW) by the average system size. ** Calculated assuming R2m per MW installed. *** Calculated by dividing installed capacity (in kW) by the number of installations. # Calculated assuming all 19 000 panels were 470W.

Two other ESCos that were mentioned by interviewees during the study were ReCharge Rental, which is financed and supported by Investec Bank, and Hohm Energy, which has filed for voluntary liquidation and ceased operations in August 2024. Hohm Energy was a "virtual ESCo" that enabled customers to determine their rooftop Solar PV requirements through a digitally-enabled assessment, to access loans/lease agreements via third-party providers (including Nedbank) and to enable a network of vetted Solar PV installers to design and manage projects. Franc Gray, CEO of Hohm's parent company Spark Energy, noted that Hohm had expanded its cost base too quickly and did not respond quickly enough to a slowdown in residential demand after load shedding ceased in March 2024.[26]

ESCos serving the residential market typically focus on installing a range of standardised Solar PV and battery energy storage systems on the rooftops of single-dwelling homes and business premises. Vincent Maposa from Wetility noted that they install "bundled products" that integrate energy efficiency technologies with Solar PV panels and battery storage.

All ESCos surveyed (except for Hohm Energy) enable customers to purchase Solar PV systems on a subscription basis. Most of the subscriptions take the form of initial 36-month or "evergreen" energy-as-a-service contracts that are automatically extended until the subscription is cancelled. Versofy and Alumo also give their customers the option to purchase the systems on a lease-to-own or cash-upfront basis. Ross Mains-Sheard of Versofy noted they could also act as a broker and secure a loan to finance a Solar PV system from a commercial bank on behalf of their customers.[27]

### 2.4.2 Overview of banks serving the residential and small business segments in South Africa

Commercial banks in South Africa have also played an important role in financing Solar PV systems installed by households and small businesses. Banks provide finance both directly to households and small businesses via their retail banking divisions and indirectly by funding the ESCos that serve households and small businesses via their commercial and investment banking divisions.

The most cost-effective way for households that have home loans to finance the purchase of a Solar PV system is to extend their existing home loan facility. Five banks, including **ABSA, Standard Bank, FNB, Nedbank and Investec** provide mortgage finance and allow existing home loan customers to (i) access the unutilised portion of their existing home loan facilities to finance Solar PV systems, or (ii) effectively extend it by requesting access to a portion of the capital they have already paid down.

[26] William Brederode, "Distressed solar company stung after sharp cooldown in a sizzling SA market," *News24* 2024, https://www.news24.com/fin24/companies/distressed-solar-company-stung-after-sharp-cooldown-in-a-sizzling-sa-market-20240814.

[27] Ross Mains-Sheard (Versofy), interview by authors, 16 July 2024.

**ABSA, Standard Bank, FNB and Nedbank** are also offering low-interest, solar-specific unsecured loans at interest rates that are far more competitive than those typically offered. This improvement is due to the government's Energy Bounce Back Loan Guarantee Scheme (EBBS), which covers the first loss on these loans. Nedbank and FNB offer loans fixed at prime and prime plus one per cent, respectively, while ABSA offers a customer-specific rate capped at prime plus 2.5%.

**Nedbank and FNB** are the only banks that currently offer residential customers solar financing for solutions under their vehicle or asset-backed finance divisions.

Capitec has not launched a Solar-specific unsecured loan, but they ran a pilot to see whether their existing home-improvement loan could be tailored to provide financing for Solar PV systems. Under the home improvement solution, the bank's clients can apply for loans up to R500 000, with a repayment term of up to seven years, offering interest rates significantly lower than standard personal loans – potentially as low as the prime rate. However, the loan funds must be used for purchases at designated home improvement partner stores. Capitec then signed up a solar energy installer with a national footprint to provide a turnkey system. He noted, however, that the uptake was very limited.[28]

**Discovery Bank** offers solar financing solutions through its partnership with the solar system equipment supplier Rubicon. Existing Discovery Bank clients can access funding for the installation of solar systems on their homes; however, the system must be supplied by Rubicon and installed by one of their accredited installers.[29] Discovery offers financing via its 'Unique single credit facility'. The repayment period is up to 72 months, and the maximum value of the loan offering is R300 000.[30] Discovery Bank can provide loans with interest rates as low as prime minus 2%.

## 2.5 Comparative Advantages of Bank-Led vs. ESCo Models

The ESCo model and bank-led models offer distinct approaches to financing and installing Solar PV systems, each with its own comparative advantages.

### 2.5.1 Advantages of the ESCo model

The advantages of the ESCo model over the bank-led model for Solar PV installations in households and small businesses include:

- **Consumers can avoid taking on debt upfront** since the ESCo typically raises finance to cover the upfront costs of the Solar PV system installation; the consumer does not need to take on any additional debt upfront. Instead, they pay through manageable monthly subscription fees or a power purchase agreement (PPA). This structure makes PV systems more accessible, especially for those who may not qualify for traditional bank loans or are reluctant to take on large initial debt. The PPA or subscription agreement is a contingent liability.
- **ESCos have greater flexibility in extending credit to consumers** than traditional banks. Because ESCos are directly involved with the installation, operation, and maintenance of Solar PV systems, they have a better understanding of the residual value of these assets. This product knowledge allows them to assess the risk more accurately, enabling them to offer financing to a broader range of customers, including

[28] Jochemus Hamman (Capitec), interview by authors, 15 July 2024.

[29] MyBroadband, "Discovery Bank promises customers 48-hour solar power installations," MyBroadband, 2023, https://mybroadband.co.za/news/energy/505172-discovery-bank-promises-customers-48-hour-solar-power-installations.html.

[30] Hanno Labuschagne, "Good news for solar loans in South Africa," *MyBroadband* 2024, https://mybroadband.co.za/news/energy/556913-good-news-for-solar-loans-in-south-africa.html.

those who might not meet traditional banking credit criteria. ESCos can view the system itself as collateral, with the confidence that they can manage, repurpose, or even redeploy/resell the system if necessary. By contrast, banks tend to apply standard lending criteria focused more on a customer's creditworthiness rather than the actual asset being financed, often making it harder for customers with lower credit scores or limited financial history to qualify for loans.

ESCos can extend credit under the "subscription model" without falling under the definition of a "credit provider" as outlined in the National Credit Act, and as such, they can operate outside these strict regulations. However, this depends on whether their business model involves formal lending that qualifies as "credit" under the NCA.

- **Incentives and skills to optimise performance and energy-cost savings -** ESCos are incentivised to maintain and optimise system performance to deliver energy-cost savings, which aligns the interests of the ESCo and the customer. In contrast, in the bank-led model, once the loan is disbursed, the bank has no direct stake in the system's ongoing performance.
- **Better system performance and reduced risk for customers -** ESCos often provide end-to-end solutions, including ongoing maintenance, monitoring, and optimisation of the system. This can ensure better system performance and longevity, which reduces the burden on customers and enhances system efficiency.

In short, because ESCos are directly involved with the installation, operation, and maintenance of Solar PV systems, they can integrate EE and BESS, and provide guidance on optimising the load profile to maximise energy cost savings and can view the system itself as collateral. This allows them to assess the risk more accurately and offer subscriptions at a lower cost. This, combined with their ability to extend credit on more flexible terms than traditional banks, means they can offer financing to a broader range of customers, including those who might not meet traditional banking credit criteria.

ESCos are incentivised to maintain and optimise system performance to deliver energy cost savings, which aligns with the interests of the customer. The ESCo model is particularly well-suited for situations where the upfront costs and ongoing operational complexities would otherwise be barriers for consumers, as is the case for many of the 2.95 million lower-to-middle-income households identified in Section 2.2.2. ESCos can make Solar PV systems accessible to a more diverse customer base, ultimately accelerating the adoption of solar energy solutions.

### 2.5.2 Advantages of the bank-led model

The commercial bank-led model for financing Solar PV systems, however, also has some advantages compared to the ESCo model. These include:

- **Customers own the asset:** In a bank-led model, the consumer owns the Solar PV system once the loan is paid off, allowing them to directly benefit from reduced energy costs without ongoing subscription fees or payments after the loan term. This ownership can be financially advantageous in the long term and may increase the property's value. Ownership also gives consumers more control over its use, maintenance, and potential upgrades. This flexibility may be valuable for commercial and industrial consumers who want to tailor the system to their energy needs or integrate it with other technologies over time.
- **Lower interest rates:** Since banks are deposit-taking, they can raise funds at a lower cost and, as such, can offer lower interest rates on loans compared to ESCos, which often rely on more expensive capital, such as private equity. This often makes bank-led loans more affordable for consumers, particularly if the assets are financed on an existing home loan/asset-backed loan.
- **Regulatory and market advantages:** Banks operate under established financial regulations that often make them more attractive to large borrowers or institutional clients. In the case of South Africa, they have

been able to access government-backed funds aimed at promoting renewable energy, further lowering their cost of capital for Solar PV financing.

- **Potential tax and incentive benefits:** When consumers own the Solar PV system, they may be eligible for tax credits, depreciation benefits, and other incentives offered for renewable energy investments, which might not be available if the system is owned by an ESCo. For example, in South Africa, registered Small businesses can make use of tax incentives that allow for accelerated depreciation of Solar PV assets, which can enhance the financial benefits.
- **Reputation and trust in traditional banks:** Established commercial banks may provide a sense of trust and reliability due to their long-standing reputation and experience in financing. This can be appealing to businesses that prefer working with well-known financial institutions rather than specialised energy service companies, which may vary widely in experience and credibility.

In summary, the bank-led model is generally better suited for consumers who seek direct ownership and control over the Solar PV system, can access credit via banks (are creditworthy) and can take advantage of the lower cost of capital, tax incentives, and flexible terms.

## 2.6 Setting targets for the future adoption of Solar PV by households and small businesses, and estimating the total funding required

Installation of rooftop Solar PV systems by households and small businesses in South Africa has made a significant contribution to the total Solar PV capacity that has been installed in South Africa. As discussed earlier in Section 2.2.1, we estimate that households and small businesses have installed ~10.4% (621MW) of the total of 5 953 MW of Solar PV capacity procured by the private sector and 7.5% of the total of 8 239 MW Solar PV capacity that has been installed in South Africa to date (by July 2024).[31]

One of the key objectives of the National Energy Action Plan (EAP) that was announced by President Cyril Ramaphosa in July 2022, to end load shedding and achieve energy security, was to "*unleash businesses and households to invest in rooftop Solar PV*".[32]

While the government has not established specific targets for the adoption of Solar PV systems by households and small businesses, the National Energy Crisis Committee in the Presidency continues to take steps to create an enabling environment to encourage widespread uptake of rooftop solar installations and other distributed energy resources by households and businesses. This includes the design and potential introduction of a "feed-in" or export tariff to incentivise owners of distributed energy resources to export power to the grid, and a workstream that is looking to support the procurement, rollout, and financing of smart meters beyond the existing RT29 tender issued by the National Treasury.

In the absence of a specific policy target and given the decline in demand for rooftop Solar PV systems in this segment since the risk of load shedding subsided in March 2024, the Climate Neutrality Foundation has suggested that the objective of any intervention or support mechanisms should be to sustain the current growth in the grid-connected rooftop Solar PV market.

As such, we believe a reasonably ambitious target would be to double the market penetration rate among middle-to-high-income households living in single-dwelling units from 10.5% to 20% and to triple the market penetration

---

[31] SAPVIA, "SAPVIA solar PV installed capacity data dashboard."

[32] The Presidency: Republic of South Africa, "Energy Action Plan - Six month update - January 2023," (2023). https://www.thepresidency.gov.za/content/update-energy-action-plan-january-2023.

rate among lower-middle to middle-income households (from 3.1% to 10%). This could provide an additional 1 434 MW of distributed Solar PV capacity to the grid, accompanied by 1 867 MWh of storage capacity (Table 3).

We estimate that the total funding that would be required to finance the installation of 1 434 MW of distributed Solar PV capacity and 1 867 MWh of storage capacity is ~R28.7 billion (or ~$160 million at R18/$).

These calculations are based on system prices obtained from Alumo, an ESCo serving the residential sector. We also assume the average system size for lower-middle income households is ~4kWp Solar PV, while the average system size for the middle-to-high expenditure group would be ~6.5kWp.

**Table 3. Estimated investment required to reach target penetration rates in the lower-middle and middle-to-high expenditure SDU households**

| | Calculation* | Lower-middle | Middle-to-high | |
|---|---|---|---|---|
| Number of households | | 2950000 | 1120000 | *a* |
| Current Solar PV penetration | | 3.1% | 10.5% | *b* |
| Number of households without Solar PV | *a x (100% - b)* | 2858550 | 1002400 | |
| Target Solar PV penetration | | 10.0% | 20.0% | *c* |
| Solar capacity per system (kWp) | | 3.68 | 6.44 | *d* |
| Battery size per system (kWh) | | 10.0 | 16.0 | *e* |
| Cost per system (R)** | | 84 886 | 154 307 | *f* |
| Capacity addition (MW) | *a x (c-b) x d* | 749.1 | 685.2 | *g* |
| Storage capacity addition (MWh) | *a x (c-b) x e* | 2 035.5 | 1 698.1 | *h* |
| Average cost (R millions/MW) | *a x (c-b) x f / g* | 23.07 | 24.0 | *i* |
| Investment required to reach target penetration (R billion)*** | *g x R20 million* | 14.98 | 13.70 | *j* |
| **Total investment required (R billion)** | | | **28.69** | |

Note: * Excludes unit conversion calculations for *g*, *h*, and *i*. ** System costs were obtained from Alumo's website for the system sizes specified in *e* and *f*. *** Value calculated assuming R20 million per MW installed. Using the system costs (for cash purchases) provided on Alumo's website, we find similar values, although higher, as these would include their markup on the systems.

# 3. Overview of existing programmes offered by local DFIs in South Africa

## 3.1 Introduction

This section provides an overview of two existing programmes offered by local development finance institutions – the IDC and DBSA – to promote the uptake of Solar PV, energy efficiency, and storage solutions among households and businesses in South Africa. We examine the funding amount, type, and sources for each programme, as well as their institutional structures and financing mechanisms. Finally, we assess the strengths and limitations of each programme, identifying potential improvements to address market barriers more effectively and to support ESCos with more affordable financing options or more favourable loan terms.

## 3.2 Development Bank of Southern Africa's Climate Finance Facility

### 3.2.1 About the Development Bank of Southern Africa

The Development Bank of Southern Africa (DBSA) is a state-owned development finance institution with a mandate to finance and support the implementation of infrastructure projects in Africa that improve the population's quality of life, accelerate the sustainable reduction of poverty and inequality, and promote broad-based economic growth and regional economic integration. DBSA has the mandate to finance both private and public sector activities at a national and regional level across Africa. The DBSA recognises the importance of accelerating energy access and aims to support the development and funding of various energy-related projects.

The DBSA has partnered with two prominent multilateral financial institutions – the Global Environment Facility (GEF) and the Green Climate Fund (GCF) – to fund projects that address climate change, promote sustainable development, and facilitate a transition to a green economy in Southern Africa.

Since its accreditation as a GEF agency in 2014, the DBSA has worked with partners to develop and implement seven GEF-funded projects, such as the (i) equity fund for the Small Projects Independent Power Producer Procurement Programme, and (ii) the accelerating the shift towards electric mobility in South Africa programme.[33]

Since its accreditation as a GCF agency in 2016, the DBSA has raised ~$390 million of funding from the GCF to support climate-related projects in the Sub-Saharan Africa region. This funding is spread across three projects, namely: (i) the Climate Finance Facility ($55 million), (ii) the Embedded Generation Investment Programme ($100 million), and (iii) the Water Reuse Programme ($235 million).

Representatives of the DBSA noted that while they have several initiatives to promote the uptake of renewables, the GCF-supported Climate Finance Facility (CFF) was likely the most relevant to the Climate Neutrality Fund's goal of promoting the uptake of grid-connected distributed Solar PV among households and small businesses. Under the CFF programme, the DBSA can provide credit directly to ESCos which are financing the uptake of distributed Solar PV. However, they noted the CFF only provides 30% of the funding, and the ESCo would need to raise the balance. Harold Mogale from the DBSA noted that while the CFF has been established and will be available until 2026, the process of approving a loan and disbursing the funds can take between 3 to 6 months. The DBSA conducts

[33] DBSA, "Global Environment Facility (GEF)," https://www.dbsa.org/program-fund/global-environment-facility.

a thorough due diligence process, which includes negotiations around the security structure, terms, and participation by other funders. Approval by the DBSA's Investment Committee and Board is also required.[34]

Further detail on the structure and terms of financial support the DBSA can provide to ESCos under the GCF-supported CFF is provided in the sections that follow.

### 3.2.2 Overview of the Climate Finance Facility and progress in implementation

The Climate Finance Facility aims to boost climate-focused investments in four Southern African nations – Lesotho, Namibia, Eswatini, and South Africa. The goal is to mobilise private sector funding by employing a blended finance approach to enhance the bankability of climate projects in the region. It is a Rand-denominated facility targeted at co-funding private sector projects. The facility apportions its support between climate mitigation measures such as renewable energy and energy efficiency projects and measures that support that adaptation to climate change, such as water supply management, efficiency and treatment projects. 70% of the facility is allocated to climate mitigation, while the remaining 30% is available for programmes targeted at adaptation to climate change.

The more specific aims of the CFF are to address market barriers related to climate investment, including:[35]

- Reducing the high perceived risk of climate-related investment.
- Reducing barriers for private businesses to generate power and sell it to off-takers.
- Enabling firms from the sector to secure funding for small, distributed energy and water projects in semi-urban and rural areas.
- Improving the ability to finance energy efficiency in commercial buildings.
- Enabling the development and expansion of microgrid and rural agricultural-focused businesses and projects.

While the facility was approved in October 2018 and became effective in November 2019, progress in implementing the CFF programme and in disbursing funding was initially very slow - largely due to issues related to currency risk exposure. The main issue was that under the original fund structure, the funded sub-projects bore the foreign exchange risk related to the US dollar-denominated GCF Proceeds. The DBSA subsequently applied to have the fund restructured from a trust to a credit line to resolve the currency hedging. The Amendment and Restructuring Agreement (ARA) was finalised in August 2022.[36]

Since the facility was restructured, the DBSA has managed to disburse 6.5% of the funding raised (~$3.5m). The DBSA is, however, eager to disburse funding to more qualifying projects before the fund expires in August 2026.[37]

---

[34] Olympus Manthata, Harold Mogale, Isang Mabe, and Mookho Mathaba (DBSA), interview by authors, 28 August 2024

[35] DBSA, *The Climate Finance Facility - Overview* (2024).

[36] Green Climate Fund, *2023 Annual Performance Report for FP098: DBSA Climate Finance Facility* (2024), https://www.greenclimate.fund/document/2023-annual-performance-report-fp098-dbsa-climate-finance-facility.

[37] Green Climate Fund, "DBSA Climate Finance Facility," 2024, https://www.greenclimate.fund/project/fp098#investment.

### 3.2.3 Amount, nature and source of funding and support provided

The CFF is co-funded by the Green Climate Fund (GCF) and DBSA on a 1:1 basis. The DBSA raised US$55 million of concessional finance from the GCF for this programme and blended it with $55 million of its own funding, and as such, the total available funding of the Climate Facility Fund is US$110 million.

The facility's primary objective is to drive market transformation by attracting private sector investment in climate-related initiatives at a 1:5 leverage ratio (CFF to private sector investment). Through various financial tools and products – including extended loan tenors, subordinated debt, and project aggregation – the CFF aims to mobilise an additional US$440 million in private debt and equity investments.

### 3.2.4 Institutional arrangements and financing mechanisms

Via the CFF, the DBSA can provide 30% of total funding for planned capacity expansion in the form of a subordinated loan of a value of between R45 million and 250 million provided that the sub-borrower (e.g., project contractor, SME/ESCo) can leverage a minimum of 20% equity finance and between 30-50% senior debt from other private lenders (Figure 2). This de-risks the private funding in the capital structure.[38]

The subordinated loan can be provided at an indicative cost of JIBAR (8.04% today) +3% or 4%, depending on the credit risk of the borrower. The loan tenor is up to 15 years, but will be related to the life of the underlying assets (i.e., an 8-year loan if the useful life of assets financed is 10 years). A summary of the key features of the financing terms is provided in Table 4.[39]

Under the CFF, the DBSA can provide financing to renewable energy project developers or ESCo on-balance sheet or via an SPV structure. The DBSA must lend directly to the sub-borrower (i.e., it cannot lend to an SPV that on-lends to multiple ESCos or project developers). This is partly to ensure that the concessional terms of the CFF funding are passed on to the beneficiary and for monitoring and evaluation purposes.[40]

Some additional requirements are that the projects supported by the CFF are new and additional. Funding is typically disbursed for the development of a specific project – e.g., a 20MW Solar PV array installed by one entity. Harold Mogale (DBSA) did, however, confirm that it would be possible to fund an ESCo on their balance sheet or into an "ESCo SPV" structure to finance a large number of smaller systems, but that the ESCo would need to have a defined expansion target (from a megawatt perspective) for their portfolio that the CFF would support.

[38] DBSA, *The Climate Finance Facility - Overview*.

[39] Harold Mogale and Precious Nke (Development Bank of Southern Africa), interview by authors, 7 October 2024.

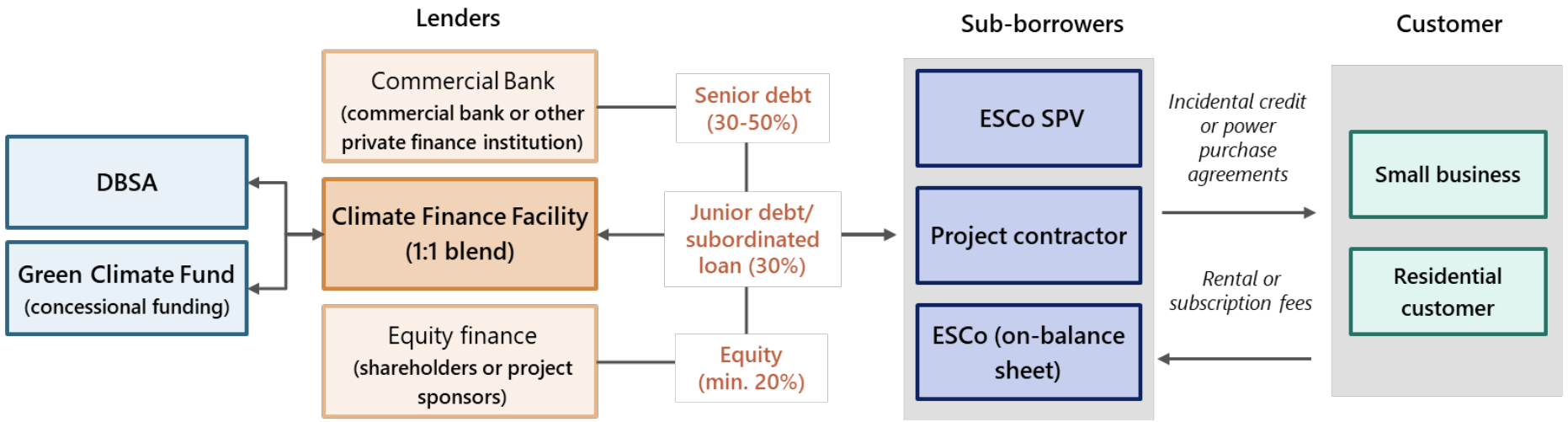
[40] Harold Mogale and Precious Nke (Development Bank of Southern Africa), interview by authors, 7 October 2024.

**Table 4. Key features of the Climate Finance Facility**

| Key features | Description |
|---|---|
| **Project size** | • The size of projects to be considered will range from R 150 million to R 1 billion.<br>• The CFF can therefore only provide funding from R 45 million to R 250 million.<br>• Ticket size for adaptation and cross-cutting projects is to be considered separately. |
| **Capital structure** | • Maximum of 30% Subordinated loan (capped at R 250 million)<br>• Minimum of 20% Equity finance, Project sponsors / Shareholders<br>• 50% Senior loan Commercial banks Private Sector Financial institutions |
| **Private Sector Senior Debt Participation** | • Minimum 30% of project costs |
| **Tenor and repayment profile** | • Up to 15-year tenor<br>• 3-year capital grace<br>• Interest moratorium on an exceptional basis to be decided on a deal-by-deal basis<br>• Monthly, quarterly, and semi-annual repayment profile |
| **Loan Currency** | • ZAR (one blended loan to sub-borrower)<br>• GCF concessional funding blended with DBSA funding on a 50:50 basis |
| **Fees** | Attractive fee structure - ~50 basis points, with an upfront fee of up to 1%. |

Source: Nova Economics based on DBSA's Climate Finance Facility Overview

**Figure 2. The funding model for the Climate Finance Facility**




Source: Nova Economics based on DBSA's Climate Finance Facility Overview

The subordinated loan can be provided at an indicative cost of JIBAR (8.04% today) +3% or 4%, depending on the credit risk of the borrower. The loan tenor is up to 15 years, but will be related to the life of the underlying assets (i.e., an 8-year loan if the useful life of assets financed is 10 years). A summary of the key features of the financing terms is provided in Table 4.[41]

### *3.2.5* Timeframe

The DBSA can provide funding to a borrower within a 3- to 6-month period, depending on the type of borrower and the due diligence process.[42]

### *3.2.6* Attractiveness and drawbacks of the CFF financing mechanism

**Attractiveness**

The CFF provides subordinated debt at competitive "lower than market" interest rates, at longer tenors, and more concessional terms than what commercial banks and other non-bank lenders are currently willing to provide. This is very helpful to ESCos in terms of:

- De-risking lending and reducing the overall cost of finance.
- Enabling them to finance Solar PV assets over a longer period, thereby reducing the mismatch between loan tenor and asset life and providing households with a more attractive subscription or leasing proposition (i.e., lower monthly instalments/subscription fees that may enable them to realise energy cost savings from the outset).

**Potential Drawbacks/Restrictions**

Potential drawbacks and restrictions of the CFF mechanism include:

- The inability to provide funding to an SPV that can lend to multiple ESCos. The fund can only lend directly to a specific ESCo seeking to raise R150 million in additional capital to grow its distributed Solar PV and BESS asset portfolio.
- The requirement that funding can only be provided if ESCos raise additional equity and additional senior debt (in addition to what they have already raised) could be too restrictive/prohibitive – e.g. if they have unutilised debt facilities.
- The DBSA's due diligence and approval processes will take between 3 to 6 months. The due diligence process includes negotiations around the security structure, terms, and participation by other funders. Approval by the DBSA's Investment Committee and Board is required, and ongoing reporting on development impacts must be provided biannually or annually.

### 3.2.7 Feedback from ESCos on the attractiveness and drawbacks of the mechanism

Feedback from Tau Chimanga and Vincent Maposa of Wetility was that the Concessional Finance Facility (CFF) administered by the DBSA is appealing as it could enable them to reduce the cost of finance. Wetility was not aware

[41] Harold Mogale and Precious Nke (Development Bank of Southern Africa), interview by authors, 7 October 2024.

[42] Harold Mogale and Precious Nke (Development Bank of Southern Africa), interview by authors, 7 October 2024.

of the programme until we drew their attention to it. However, they had contacted the DBSA are intended to pursue the opportunity.

Tau Chimanga, head of Strategic Investments in Portfolio at Wetility, noted that being able to secure a subordinated loan at approximately JIBAR + 3–4% over a minimum term of eight years was attractive, provided that they were able to secure senior debt at around JIBAR + 1–2%. He confirmed that if they were successful in structuring finance in this way, it would lower their overall financing costs.

Chimanga noted that it was likely that senior debt would be provided by institutions that are already familiar with Wetility, such as Sanlam and Jaltec. In a previous discussion with the authors, Vincent Maposa explained that Wetility has not taken on commercial debt from banks as they are generally very risk-averse. They had secured funding from institutional finance providers like Sanlam and Jaltech, who had a better understanding of Wetility's subscription model and could extend credit on more flexible terms.

Patrick Narbel, COO of GoSolr, circulated the information we provided about the DBSA CFF internally, receiving a mixed response from the executive team- one member expressed support, while another was more sceptical. GoSolr was previously unaware of the facility and offered to share additional insights; however, we had not yet been able to secure a meeting at the time of writing.[43]

[43] Patrick Narbel (GoSolr), in discussion with the authors, 19 September 2024.

## 3.3 Industrial Development Corporation of South Africa

### 3.3.1 About the Industrial Development Corporation

The Industrial Development Corporation (IDC), established in 1940 through the Industrial Development Corporation Act 22 of 1940, is one of two South African state-owned development finance institutions (DFIs). Their focus is to maximise the development impact through job-rich industrialisation and to contribute to an inclusive economy by funding companies owned and empowered by underrepresented groups.[44]

The IDC offers funding (in the form of loans, equity investments, and project financing) to both new and existing businesses across a variety of sectors, including agriculture, manufacturing, and renewable energy. The corporation often supports ventures that traditional financial institutions might consider too risky.[45]

The IDC has launched two energy funds since 2023 that aimed to alleviate the impact of load shedding on SMEs (which they define as firms with less than 250 full-time employees)[46] in South Africa.[47]

- **The ESCo Energy Solutions Fund,** introduced in May 2023, aimed at providing concessionary funding to ESCos to enable them to provide financed energy solutions to SMEs to reduce or eliminate the impact of load shedding.[48]
- **The Township Energy Fund,** launched in June 2024, allocated R200 million of grant funding to support township, small town, and rural enterprises that were being negatively affected by the energy supply crisis in South Africa. The funding will be administered through strategic implementing partners (SIPs) selected by the IDC.

### 3.3.2 Overview of the ESCo Energy Solutions Fund

In 2023, the IDC launched the fund to support ESCos serving SMEs affected by load shedding. IDC representatives noted that their initial plan was to obtain funding on concessional terms via the National Treasury's Energy Bounce Back Scheme. However, the funding did not materialise as anticipated, and so they opted to use an existing credit facility with the German state-owned development bank KfW to capitalise the fund.[49]

The Energy Bounce Back Scheme (EBBS) was structured as a funded risk-sharing facility. In this arrangement, the South African Reserve Bank (SARB), through its subsidiary, the Corporation for Public Deposits (CPD), provided upfront capital to participating banks. This capital was designated to cover the first 20% of potential losses on loans issued under the scheme. By absorbing this initial portion of risk, the EBBS aimed to encourage banks to extend financing for renewable energy projects, such as solar photovoltaic (PV) systems, to households and small and medium-sized businesses. This structure aimed to reduce the perceived risk for banks and enable them to offer more favourable loan terms to borrowers seeking to invest in energy solutions.

---

[44] IDC, "About Us," accessed 06-11-2024, https://www.idc.co.za/about-us/.

[45] Stuart Bartlett, Christo Fourie, Nell Grobbelaar, Calvany Roger, and Sonja Loggenberg (IDC), interview by authors, 7 August 2024.

[46] IDC, "SME and MIDCAP Companies – IDC Private Sector Facility 2 (EIB)," accessed 11-11-2024, https://www.idc.co.za/sme-and-midcap-companies-idc-private-sector-facility-2-eib/.

[47] Stuart Bartlett, Christo Fourie, Nell Grobbelaar, Calvany Roger, and Sonja Loggenberg (IDC), interview by authors, 7 August 2024.

[48] IDC, *Concessionary Funding for Energy Services Companies (ESCos): Energy Solutions Funding*, (IDC, 2023), https://www-idc-co-za.b-cdn.net/wp-content/uploads/2023/07/NEW-IDC-Energy-Product-Funds_brochure_online.pdf.

[49] Christo Fourie (IDC), interview by authors, 7 August 2024.

Under the first EBBS mechanism, these institutions were then able to offer lower-interest loans directly to SMEs looking to invest in backup and renewable energy solutions. Under the second EBBS mechanism, participating banks could extend EBBS-backed loans to intermediaries such as ESCos and/or development finance institutions. National Treasury, acting as the guarantor, agreed to cover the first 20% of losses incurred on loans issued by participating banks to finance the purchase of Solar PV and energy storage systems by households and businesses. Under this arrangement, when a borrower defaults, the National Treasury absorbs the initial losses up to 20% of the total loan value before the lender (bank) takes on any losses.[50] Unfortunately, given the limited 12-month timeframe of the programme, participating banks noted they prioritised the use of the funds under mechanism one and did not have time to structure product solutions for intermediaries such as ESCos or the IDC.

### 3.3.3 Amount, nature, and source of funding and support provided

In 2019, KfW provided the IDC with a US$80 million loan facility, known as the South African Facility for Green Growth (SAFGG). This facility enables local entities to access funding for investments in the green economy, aiming to mitigate $CO_2$ emissions and promote environmental protection and resource efficiency, including water resource conservation.

The funds are extended by the IDC to eligible companies ("Sub-borrowers") for financing investments that have a beneficial impact on environmental protection and resource efficiency, such as energy efficiency and water conservation measures. An overview of the terms and conditions of funding provided under the ESCo energy solutions fund is provided in Table 5.

### 3.3.4 Progress in implementation and performance to date

Although KfW provided funding at concessional rates, it was not as competitive as the rates offered by the South African government to commercial banks under the EBBS scheme. Consequently, the IDC observed that commercial banks were able to offer some of the major ESCos loans at interest rates that were approximately one percentage point lower than the IDC's rates. However, the tenor of the loans extended by the IDC is more generous than those offered by commercial banks, with a maximum repayment period of up to 10 years (see Table 5).[51]

While the fund aims to support ESCos serving SMEs affected by load shedding, the IDC got approval to extend funding to Wetility, an ESCo that is focused primarily on the residential market but also serves SMEs. Christo Fourie noted the IDC would not be willing to extend funding to ESCos that exclusively serve the residential market because that falls outside of their core mandate.

By August 2024, the IDC had approved credit facilities for four ESCos.[52] Tau Chimanga from Wetility noted that they have R43 million remaining across two facilities from the IDC, with the first valued between R100 million and R120 million and the second at R15 million.[53]

The IDC is willing to consider extending finance to virtual ESCos (or ESCo SPVs), which, unlike traditional ESCos, refer to collaborative, often project-specific entities formed as Special Purpose Vehicles (SPVs) or joint ventures, composed of multiple companies that collectively deliver energy services. Unlike traditional ESCos that manage all aspects of a project in-house, virtual ESCos consist of a network of specialised firms, each responsible for distinct

---

[50] Christo Fourie (IDC), interview by authors, 7 August 2024.

[51] IDC, *Concessionary Funding for Energy Services Companies (ESCos): Energy Solutions Funding*.

[52] Stuart Bartlett, Christo Fourie, Nell Grobbelaar, Calvany Roger, and Sonja Loggenberg (IDC), interview by authors, 7 August 2024.

[53] Tau Chimanga (Wetility), interview by authors, 28 October 2024.

roles across the project lifecycle, such as installation, operations and maintenance, asset management, and monitoring.

**Table 5. Funding terms and conditions for the ESCo Energy Solutions Fund**

| | Criteria |
|---|---|
| Qualifying ESCos | Energy Services Companies that provide embedded generation solutions, preferably through contracts (PPAs, PLA, Lease-To-Own, Instalment Sales and other funded solutions). |
| Funding Instruments | A combination of Senior Debt, Subordinated Debt and Mezzanine Debt is to be structured on a case-by-case basis. |
| Repayment period | Maximum of 10 years |
| Interest moratorium | Maximum of 6 Months |
| Facility availability period | 24 months |
| Loan Amount to ESCos | Minimum: R25 million per ESCo; Maximum: R250 million per ESCo |
| Utilisation per project / SME | Maximum: R50 million (Cost of solutions to be restricted to what the SME can afford) |
| Gearing | Up to 95% of the cost of components and direct labour (owned or subcontracted) relating to an installation can be funded. |
| Pricing | Minimum Interest rate: Sub-prime<br>Maximum Interest rate: Prime +3%<br>The risk profile of the ESCo will be taken into account when determining the interest rate. |
| Drawdown | Drawdowns will be based on signed and committed projects. |
| End-user benefit | The benefit of reduced cost of funding must be passed through to the SMEs through affordable tariffs.<br>Tariff escalations should be CPI/Prime-linked depending on the nature of the Contract. |
| Other requirements | Applicants must be at least BBBEE Level 4 or undertake to reach that level within 24 months after approval.<br>Applicants with a BBBEE rating of Level 4 and better will be considered for further discounted funding for a portion of their loan facility. |
| Exclusions | SMEs with an annual turnover of >R100m. |
| Local Content | ESCos must demonstrate that to have endeavoured to source and procure locally assembled and manufactured components. |
| Security | Cession of Contracts and Debtors' Book. |
| Reporting Requirements | ESCos will be required to report on the following:<br>The technical performance of installations (monthly);<br>A metering solution with standardised data reporting the amount of generation, carbon offset, and other performance metrics at a portfolio level (monthly);<br>Audited financials (annually) and management accounts (quarterly);<br>Off-taker / Lessee payment performance, Non-performing Contracts, default rates (monthly); and<br>SME compliance matters, including FICA (at the time of drawdown/as when required). |

Source: IDC – Energy Product Funds Brochure. https://www.idc.co.za/esco-energy-solutions/

### 3.3.5 Institutional arrangements and financing mechanisms

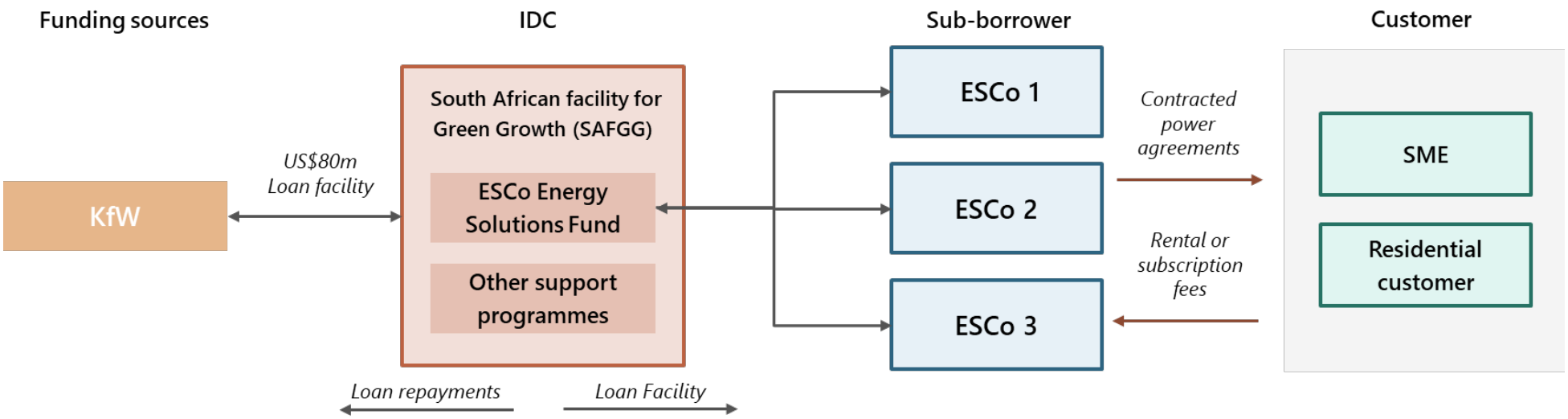
The IDC drew on the US$80 million loan facility previously provided by KfW for the South African Facility for Green Growth (SAFGG) to capitalise on the ESCo Energy Solutions Fund (Figure 3).[54]

The IDC disburses the funds from the fund to sub-borrowers (ESCos) who meet the qualifying criteria outlined in Table 5. The ESCos (i.e., leasing companies and aggregators) will: own, operate, and maintain the distributed Solar PV systems to supply households and small businesses with energy on a lease or subscription basis.

The programme is aimed at supporting growth in the ESCo model, which, as discussed in Section 2.5, has several advantages over the bank-led model for Solar PV installations in households and SMEs. Because ESCos are directly involved with the installation, operation, and maintenance of systems, they can design the system (e.g., integrate EE technologies and BESS) to maximise energy cost savings and can view the Solar PV system itself as collateral. This allows them to assess the risk more accurately and offer subscriptions at a lower cost. This, combined with their ability to extend credit on more flexible terms than traditional banks, means they can offer financing to a broader range of customers, including those who might not meet traditional banking credit criteria, ultimately accelerating the adoption of solar energy solutions.

[54] IDC, "KfW Development Bank signs USD 80 million loan facility with Industrial Development Corporation," updated 2019-02-01, 2019, accessed 30-10-2024, https://www.idc.co.za/kfw-development-bank-signs-usd-80-million-loan-facility-with-industrial-development-corporation/.

**Figure 3. Funding mechanism of the IDC's ESCo Energy Solutions Fund**




Source: Nova Economics based on information obtained from a discussion with the IDC and the IDC's brochure for the programme.

### 3.3.6 Attractiveness and drawbacks of the IDC ESCo Energy Solutions Fund

**The IDC has greater flexibility in extending credit to ESCos than commercial banks.**

The IDC has more discretion when it comes to assessing the credit risk of ESCos than commercial banks. They have a different approach to conducting due diligence and can assess ESCos based on track record, process, and the quality of installations. As such, they have been able to extend credit to ESCos like Wetility, which found it was not able to access credit from banks on favourable terms.

**Loan tenor and funding terms**

Since the IDC can fund up to 95% of the costs of the underlying assets, the need for ESCos to obtain additional co-financing is minimal relative to the DBSA's CFF fund, which requires the ESCo to co-finance 70% of the total cost.

The IDC can offer loan tenors of up to 10 years, which is better aligned with the useful life of the solar assets than unsecured loans currently offered by commercial banks.

**Interest rates are less competitive than those offered by commercial banks to most creditworthy ESCos**

The IDC's funding rates are slightly less competitive than those offered by commercial banks to ESCos that meet their much stricter lending criteria. The IDC's loan costs are dictated by the specific credit lines used for each sector or programme. In contrast, banks, as deposit-taking institutions, generally have access to cheaper capital and can offer lower lending rates, even without the benefit of EBBS loan guarantees.

IDC cannot compete with banks in providing more affordable loans, but has been able to extend credit to ESCos that the banks were unwilling to fund.

### 3.3.7 Feedback from ESCos on the IDC Energy Solutions Fund

Wetility provided insight into their experience, as one of four ESCos that have accessed funding through the ESCo Energy Solutions Fund.[55,56]

Tau Chimanga noted that the ten-year loan tenor is attractive, but the pricing is not as favourable as he felt it could be. The cost of the funding is similar to the cost of debt they were able to source from other commercial lenders, and unlike the debt provided by the DBSA under the CFF programme, it is not subordinated.

Chimanga and Maposa noted that the funding from the IDC had enabled them to innovate and launch initiatives to provide affordable solar energy solutions to a riskier segment of the market – spaza shops in townships, which they have named the "LUXE range". This product line is specifically designed to meet the unique operational needs of spaza shop owners, addressing common infrastructure challenges in these communities. The LUXE range aims to minimise disruptions and ensure business continuity for these essential local businesses and was supported by the IDC. Wetility noted that, given the IDC mandate to support development and job creation in South Africa, they are more flexible and risk-taking than commercial banks and allow recipients of the facility, such as Wetility, to support segments of the market that other funders typically do not allow due to the increased level of risk.

Chimanga and Maposa noted they had experienced significant delays in accessing funds from the IDC's facility, and that the disbursement was too slow. Wetility's business model requires quick capital access, ideally within a week. Chimanga and Maposa added that the slow disbursements from the facility have made the IDC a difficult partner

[55] Tau Chimanga (Wetility), interview by authors, 28 October 2024.

[56] Vincent Maposa (Wetility), interview by authors, 15 July 2024.

to work with. Despite these delays, Wetility has managed to draw more than half of the allocated funds, with only R43 million remaining out of two facilities – the first valued at between R100 and R120 million, and the second at R15 million.

Overall, Wetility has been happy with the flexibility the finance has given them, but would prefer a more efficient disbursement process. They also felt the funding could be provided at more competitive rates.

# 4. International case studies

## 4.1 Introduction and overview of selected case studies

This section provides an overview of three existing programmes offered by international Development Finance Institutions (DFIs) aimed at improving access to credit and reducing financing costs for households seeking to install grid-connected solar PV systems and other distributed energy resources (DERs). These include (i) the World Bank-funded Türkiye Market Transition for Distributed Energy Program-for-Results, (ii) the Rooftop Solar Programme for the Residential Sector in India, and (iii) the Clean Energy Finance Corporation Household Energy Upgrades Fund (HEUF) in Australia.

The case studies are organised under the following five headings:

i. Description of the programme and its key objectives

ii. Overview of the funding, including sources, amounts, and types of financial and non-financial support

iii. Approach to promoting the adoption of DERs

iv. Summary of institutional arrangements and financing mechanisms

v. Insights applicable to the design of a similar programme in South Africa

## 4.2 World Bank Türkiye Market Transition for Distributed Energy Program-for-Results

### 4.2.1 Description of the broader World Bank ECARES programme

The World Bank's Renewable Energy Scale-up in Europe and Central Asia (ECARES) programme aims to accelerate the expansion of renewable energy in the Europe and Central Asia (ECA) region. Much like South Africa, this region's energy mix remains dominated by fossil fuels – natural gas, oil, and coal – which comprise over 80% of the total supply. Furthermore, net import dependency remains high, with nine ECA countries sourcing half or more of their energy from imports.[57]

The ECARES Multi-Phase Programmatic Approach (MPA) is designed to remove barriers and establish enabling conditions to unlock private capital for large-scale renewable energy in the ECA region. This approach involves a coordinated effort between the World Bank, IFC, and MIGA. The ECARES MPA will be implemented over ten years. While the World Bank will provide core funding, additional concessional finance will be secured from regional sources, including climate funds and bilateral donors. The programme is also projected to mobilise US$259 million in private capital.

The first project approved under the ECARES programme is the "Türkiye Accelerating the Market Transition for Distributed Energy Program-for-Results", with additional projects proposed for Armenia, Azerbaijan, Kosovo, Kyrgyz Republic, Tajikistan, Türkiye, Ukraine, and Uzbekistan.

---

[57] World Bank, *The Multiphase Programmatic Approach of the Europe and Central Asia Renewable Energy Scale-Up (ECARES) Program With an Overall Financing Envelope of US$2.00 Billion Equivalent (Up to US$1.69 Billion for IBRD and Up to US$0.31 Billion for IDA)* (2024), https://documents1.worldbank.org/curated/en/099020124165038064/pdf/BOSIB100a0392d0881b97818f251dc45531.pdf?_gl=1*s7195x*_gcl_au*MTQwODQ0NzE2OS4xNzIzNzExODQ5.

### 4.2.2 Description of the Türkiye Market Transition for Distributed Energy Program-for-Results

**Overall objective and alignment with national policy**

The overall objective of the Accelerating the Market Transition for Distributed Energy Program-for-Results (hereafter "Program-for-Results" (PforR))[58] is to expand Türkiye's distributed Solar PV (DSPV) market and pilot distributed battery electricity storage. About US$22 billion investment would be required to achieve the 2035 target of 52.9GW for installed solar capacity, including both utility-scale and distributed generation. A World Bank and IFC market analysis carried out in 2021 showed the potential for the DSPV market to be a minimum of 4.5GW by 2030, requiring at least 750MW of new DSPV per year and US$3.8 billion of financing.[59]

Türkiye plans to add 60GW of solar and wind power by 2035. The PforR will focus on unlocking private sector investments and innovation in DSPV and Battery Energy Storage Systems (BESS), thereby contributing to the achievement of the Government of Türkiye's (GoT) Solar PV and BESS targets.

**Approach to unlocking private sector investment**

The programme intends to facilitate the uptake of DSPV and BESS by:

1. **Increasing the availability of finance.** There is strong government support for renewable energy development, including DERs (DERs include energy efficiency measures, as well as Solar PV and storage). The GoT has strengthened laws and regulations; however, the availability of financing remains a key constraint to developing a domestic market ecosystem.
2. **Supporting the establishment and growth of ESCos and other third-party models.** There is a need to enable aggregation and third-party business models to scale up DERs in Türkiye. While the legislation (the Energy Market Law) was amended in November 2022 to allow for third-party business models and aggregation, the bylaws to implement and regulate such changes are still under development by the Energy Market Regulatory Authority (EMRA). Under the prevailing business model in Türkiye, customers own, install, and maintain DSPV on their own site with full up-front payment for the system. In countries with relatively advanced DSPV markets, third-party models are common, under which private service providers, also known as renewable energy service companies (ESCos), own, finance, install, and maintain DSPV systems at a monthly fee charged to the customers or sign power purchase agreements to sell DSPV electricity to their customers. These models were previously not viable in Türkiye as the participation of aggregators (i.e., ESCos) was not yet provided for in the regulation.

**Overall approach to supporting the development of a fully-fledged commercial market for DER in Türkiye**

The World Bank notes that Türkiye's ambition to develop a fully-fledged commercial market for DERs will require a phased approach, characterised by strong public support in the early days. The expected timeline and significant milestones for the transition of the DSPV and BESS markets in Türkiye are shown in Figure 4.

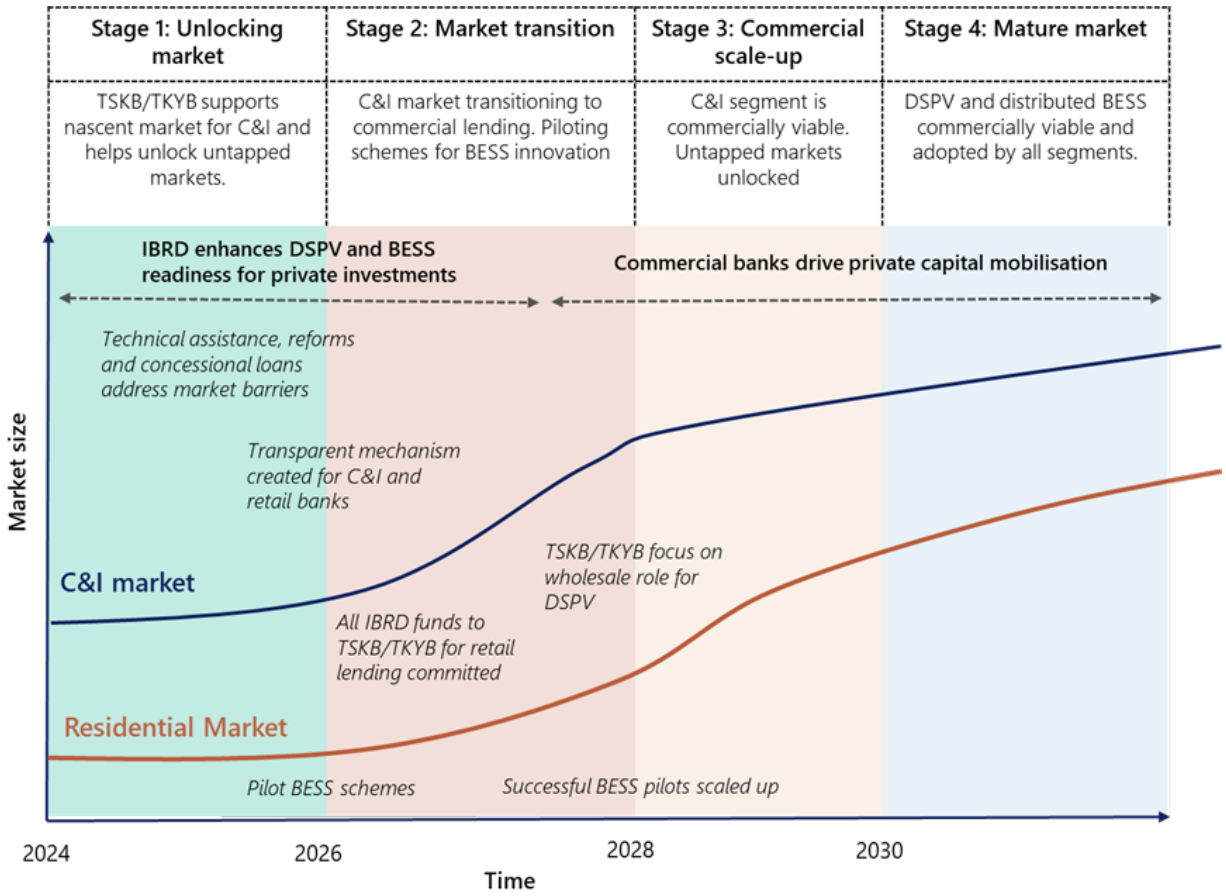
The Programme will use Türkiye's two leading development banks, Industrial Development Bank of Türkiye (*Türkiye Sınai Kalkınma Bankası*, TSKB) and Development and Investment Bank of Türkiye (*Türkiye Kalkınma ve Yatırım Bankası*, TKYB), as the key implementing agencies.

---

[58] PforR is a results based financing approach, which links fund disbursements from the World Bank associates to the borrower, based on the completion of predefined "disbursement-linked indicators".

[59] World Bank, *Accelerating the Market Transition for Distributed Energy: Environmental and Social Systems Assessment* (2024), https://documents1.worldbank.org/curated/en/099922202022432847/pdf/IDU1ac6ee3cc1909199dd112bc1060a57a.pdf.

**Figure 4. Expected timelines and milestones for DSPV and BESS Market Transition in Türkiye**




Source: Nova Economics with information from World Bank (2024), The Multiphase Programmatic Approach of the Europe and Central Asia Renewable Energy Scale-Up (ECARES) Program.

In Stage 1 (2024 to 2026), the two development banks will support the uptake of DSPV in the commercial and Industrial (C&I) sector. The programme will start with a focus on the C&I sector as it is the most financially viable segment, and it is hoped that it will have a demonstrative effect to anchor the development of the broader DSPV market.

The World Bank notes that supporting the uptake of DSPV by C&I clients should help lower overall costs and make the most challenging market segments (households and SMEs) more viable as a customer base. It will also provide a premium to early movers who are taking the current market risk. In this context, the proposed financing structure in Stage 1 will help to develop the broader distributed solar generation ecosystem and should be instrumental for commercial banks and leasing companies to enter the market and meet the emerging demands of small and medium enterprises (SMEs).

In Stage 2, the development banks will establish a credit facility to on-lend to select firms, "Sub-borrowers or Facility borrowers" including commercial banks, leasing companies, distribution companies and any other third parties financing DSPV.

This will improve the financing market for DSPV as the development banks transfer their technical and financial knowledge to other financiers operating in a market that most commercial banks are as yet unable or unwilling to tap into. It is expected that there will be a total private capital mobilisation of ~US$400 million. The Subsequent phases (three and four) are beyond the scope of the current programme and are expected to involve substantially less public or concessional support.

**What are the programme targets?**

The programme targets are as follows:

- By the end of **Stage 1** (2024 to 2026), the World Bank aims to co-finance the commissioning of a total of 692MW of DSPV generation capacity and a total of 64MWh of BESS capacity installed by renewable energy project developers and large C&I customers.

- By the end of **Stage 2** (Stage 2, 2026-2029), the World Bank aims to have co-financed 270MW of DSPV by extending long-maturity loans through a credit facility for new DSPV financers or "sub-borrowers" such as commercial banks, leasing companies, and distribution companies.

### 4.2.3 Amount, sources and cost of funding

The World Bank has pledged significant capital to the Programme. The International Bank of Reconstruction and Development (IBRD) will provide a loan of €600 million for the financing of DSPV, while the Climate Investment Fund's Clean Technology Fund (CTF) will contribute US$30 million (~€27 million) for the financing of BESS.[60] An additional US$3 million has been allocated in grant funding from the Energy Sector Management Assistance Programme (ESMAP).

The IBRD loan rates for Türkiye (pricing Group C) as of July 2024 were EURIBOR + 0.51 % for loans of maturity of up to 8 years and EURIBOR + 0.61 % for loans of maturity of between 8 and 10 years.[61]

### 4.2.4 Institutional arrangements and financing mechanisms

As illustrated in Figure 5, the World Bank funding will be channelled through the Government of Türkiye to two local development banks that will implement the programme:

- The Industrial Development Bank of Türkiye A.Ş. (Türkiye Sınai Kalkınma Bankası [TSKB]), a government-led entity

- The Development and Investment Bank of Türkiye A.Ş. (Türkiye Kalkınma ve Yatırım Bankası [TKYB]) is a privately owned investment and development bank.[62]

This funding will be allocated equally to TSKB and TKYB, with both receiving €300 million from the IBRD, ~€13.5 million from the CTF and ~€1.4 million from the ESMAP, respectively (Figure 5

[60] World Bank, "World Bank and Türkiye Sign Agreement for $1 billion program to support renewable energy expansion efforts," news release, 2024, https://www.worldbank.org/en/news/press-release/2024/05/27/world-bank-and-t-rkiye-sign-agreement-for-1-billion-program-to-support-renewable-energy-expansion-efforts.

[61] World Bank, "IBRD Financial Products: Lending Rates & Fees," 2024, https://treasury.worldbank.org/en/about/unit/treasury/ibrd-financial-products/lending-rates-and-fees#a.

[62] World Bank, "Türkiye - Europe and Central Asia Renewable Energy Scale-Up Program (ECARES) Program using the Multiphase Programmatic Approach (MPA) - Chair Summary," news release, 2024, https://documents1.worldbank.org/curated/en/099032824171027923/pdf/BOSIB14ea43038001ac22120d0af58f0f9.pdf?_gl=1*yh6okl*_gcl_au*MTQwODQ0NzE2OS4xNzIzNzExODQ5.

Figure 5). TSKB and TKYB will use the grant funding from ESMAP to establish a credit facility which houses the IBRD and CTF funding. The CTF funding will be allocated as loans for the piloting of BESS technologies. The US$3 million ESMAP grants will be used to support the PIAs in providing training and technical support to new DSPV financers.[63]

It is our understanding that TSKB and TKYB have each committed to contributing ~€53m of their own capital to the credit facility. This would mean that the IBRD and CTF together provide 86% of the total funding, while the local development bank provides the remaining 14%. The PforR aims to mobilise a total of ~US$318 million in counterpart financing.

TSKB and TKYB will, in turn, lend:

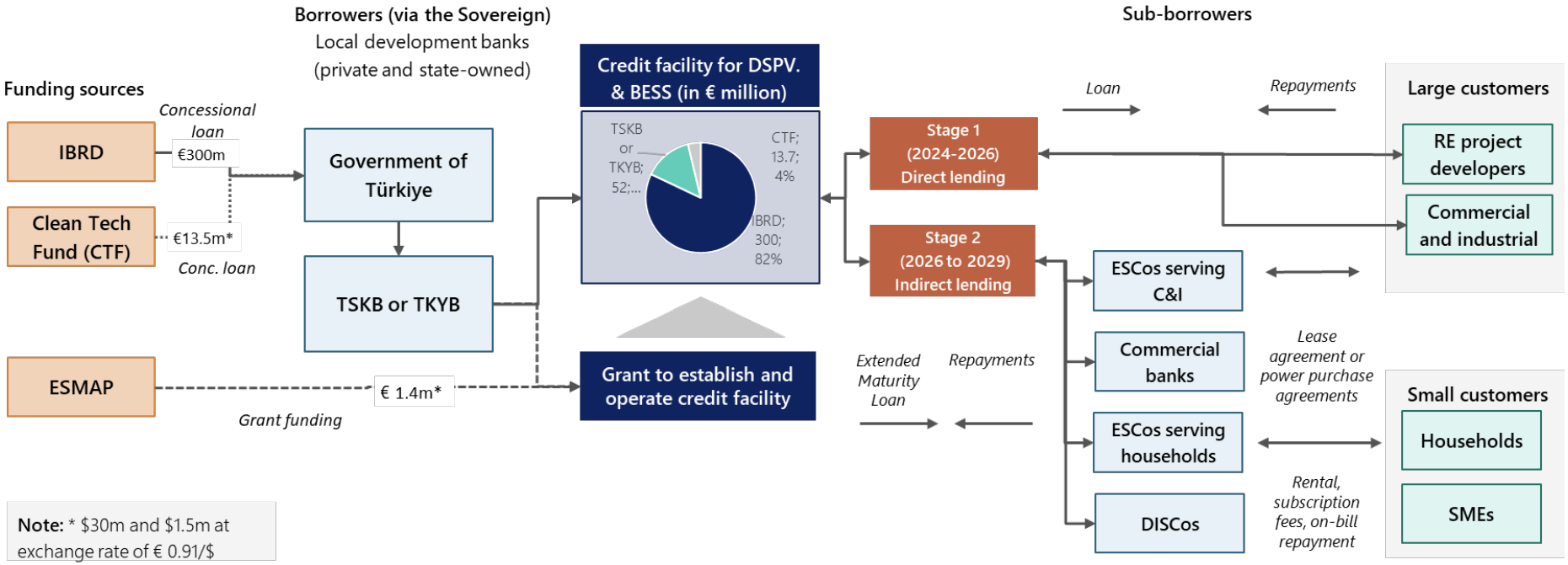
- **Directly** in Stage 1 of the programme (2024 to 2026) to renewable energy project developers and to large C&I customers who may develop, own and operate their systems.
- **Indirectly** in Stage 2 (from 2026) to intermediaries or 'sub-borrowers', including distribution service companies (DISCOs), ESCos (i.e., leasing companies and aggregators), who will own, operate, and maintain the DSPV systems to supply households and small businesses with energy and commercial banks who lend to end-customers.

Installations must be grid-connected DSPV systems (36kV or below) and must be for self-consumption in light of the regulation for 'unlicensed' electricity generation, which exempts those who generate for self-consumption from obtaining a licence. Rooftop Solar PV (RSPV), ground-mounted Solar PV, and other types (e.g., façade PVs and floating PV) are all eligible. Sub-borrowers must be selected by TSKB and TKYB through a transparent and competitive process.

It is envisaged that by extending long-maturity loans through a credit facility for new DSPV financers or "sub-borrowers" such as commercial banks, leasing companies, and DISCos, the World Bank, via the sovereign, and the TSKB and TKYB, will be supporting the establishment and growth of ESCos and other third-party models that are required to enable the scale-up of DSPV and other DERs in Türkiye. The funding mechanism is shown in Figure 5.

[63] TSKB, Accelerating the Market Transition for Distributed Energy Program: Terms of Reference (TOR) for the Independent Verification Agent (IVA) Stage 1, 2024.

**Figure 5. Türkiye Market Transition for Distributed Energy Program-for-Results Funding Mechanism**




Source: Nova Economics with information from World Bank (2024), Proposed funding for Phase 1 of the MPA with the ECARES Program.

### 4.2.5 Disbursement mechanisms, monitoring and evaluation

The programme finance will be disbursed to the local development banks (TSKB and TKYB) via the sovereign in instalments contingent on the achievement of verified results outlined as disbursement-linked indicators (DLIs).

The DLIs are specific, measurable, and verifiable indicators and may be expressed as outcomes, outputs, intermediate outcomes or outputs, process indicators, or financing indicators. DLIs may also be defined as actions or process results deemed critical for strengthening performance under the PforR (this could include actions for improving fiduciary, social and environmental issues and/or monitoring and evaluation), or as indicators of key institutional changes. The achievement of each DLI is measured through one or more "Disbursement Linked Results" (DLRs).

Verification for all DLIs is to be carried out by an Independent Verification Agent (IVA). The selection of the IVA will be conducted through a competitive and transparent process. This process will be jointly managed by TSKB and TKYB.

### 4.2.6 Relevance for South Africa

**Similar context and policy goals**

The Market Transition for PforR has a similar context and policy goals to South Africa. The ECA region is heavily reliant on fossil fuels for energy provision, with it making up nearly 80% of the total energy mix, with ambitious targets for the addition of renewable energy capacity. The context in South Africa is very similar, with data from the Department of Minerals and Energy suggesting that fossil fuels make up 82% of South Africa's primary energy supply and 84% of electricity generated.[64] Türkiye also has ambitious renewable energy capacity targets, with plans to add 60GW of solar and wind by 2035, whilst South Africa's IRP 2023 indicates that ~14GW of additional renewable energy capacity will need to be installed by 2035, with this target increasing to ~60GW by 2050.

**ESCo financing mechanism**

The financing mechanism used in Stage 2 of the programme to support the establishment and ESCos serving the residential market is directly applicable to South Africa. While the market for DSPV and BESS in South Africa is more mature than the market in Türkiye, the market and gap analysis revealed that supporting the establishment and growth of ESCos (and potentially other third parties) that serve the household and small businesses will be crucial to making distributed Solar PV and BESS more accessible to middle-to-low-income households and small business owners where there is significant potential, but uptake has been very limited. We believe a mechanism similar to the one World Bank intends to use in Stage 2 of the Türkiye programme by "setting up a credit facility at a local DFI to lend to sub-borrowers" could be very helpful in supporting and growing the nascent ESCo sector the residential and small business market in South African and promoting the uptake of integrated PV+EE+BESS systems in this segment.

**Insight into the use of local development banks as implementing agencies**

While there are no private development banks in South Africa, the two state-owned DFIs in South Africa, the IDC and DBSA, could potentially implement a similar programme as the Stage 2 programme, where they would establish a credit facility to provide concessional finance and extended maturity loans to a range of "sub-borrowers". The

[64] Department of Mineral Resources and Energy, *The South African Energy Sector Report 2023* (2023), https://www.dmre.gov.za/Portals/0/Resources/Publications/Reports/Energy%20Sector%20Reports/SA%20Energy%20Sector%20Report/2023-South-African-Energy-Sector-Report.pdf?ver=6TOu3ZWrjDaMhxVQWcR3vQ%3D%3D.

DBSA has already established the Climate Finance Facility that can provide finance to ESCos, serving households and small businesses, while the IDC has also extended loans (albeit at rates that are not competitive with commercial bank funding) to ESCos serving small businesses.

**Attractive features of the ECARES programme**

The programme contains several attractive features, including:

- The flexibility of local DFIs to lend to a range of sub-borrowers. After setting up a credit facility (under Stage 2), TYKB and TSKB will be able to lend to a range of intermediaries or 'sub-borrowers', including DISCOs, ESCos, and commercial banks. The flexibility to lend to a range of sub-borrowers seems like a sensible idea. This is particularly applicable as there are a limited number of ESCos that serve the residential market in South Africa, and there are potentially some other third parties such as electricity distributors in South Africa (e.g., Eskom Dx and larger municipal electricity distributors) who may be interested in launching on-bill finance programmes to promote the uptake of DSPV and BESS. Similarly, there may also be interest from commercial banks that serve lower-middle-income households like Capitec.

- The appointment of more than one implementing agency will promote healthy competition and increase the chances of success.

- The requirements for co-financing are not too onerous, with the World Bank providing 86% of the capital, with the local development banks required to provide only an additional 14% with the understanding that sub-borrowers will likely also mobilise some private capital.

- They provide very good terms of finance. While the grant portion is small, the loans are being provided on what appear to be very favourable terms, being lower than market interest rates and with an extended maturity.

## 4.3 World Bank (IBRD) programme to support the uptake of rooftop Solar PV in India

### 4.3.1 Description of World Bank-supported programme to promote the uptake of rooftop Solar PV

India set an ambitious goal under the Jawaharlal Nehru National Solar Mission (JNNSM) in 2010 to add 20GW of solar power to the grid. Their goal was revised twice, and in 2015, the Union cabinet approved a new target of 100GW of solar power by 2022, including 40GW of rooftop Solar PV installations.[65]

The Government of India received funding from the World Bank's International Bank of Reconstruction and Development (IBRD) to support the uptake of rooftop Solar PV. The initiative began with the establishment of the Grid-Connected Rooftop Solar PV (GRPV) Programme, or Phase 1, which targeted the commercial and industrial sectors to encourage the uptake of rooftop solar PV. Following the success of Phase 1, the Government of India, with continued IBRD support, launched Phase 2, focused specifically on the residential sector. This shift was driven by the significantly lower adoption rates in residential areas, which represented only 20% of installed GRPV capacity, as well as the persistent financial barriers in this market. By the end of 2022, only 6.3 GW of rooftop solar PV had been installed, underscoring the need for ongoing World Bank support.

[65] Asian Development Bank, *Framework Financing Agreement (IND: Solar Rooftop Investment Program)* (2016), https://www.adb.org/sites/default/files/project-documents//49419-001-ffa.pdf.

Phase 1 of the GRPV Programme, launched in 2016, aimed to stimulate growth in India's GRPV market and mobilise private investment. To facilitate this, the World Bank provided funding through the IBRD, the Clean Technology Fund (CTF), and the Global Environmental Facility (GEF). Together, these initiatives contributed a US$500 million loan, US$125 million (comprising a US$120 million loan and a US$5 million grant), and a US$22.94 million grant for technical assistance, respectively.

Concluding in November 2022, Phase 1 successfully mobilised US$151.61 million in private sector equity financing and connected 365.5 MW of capacity to the grid – exceeding the original 250 MW target. Over its five-year span, the programme spurred a 600% market growth, reaching a total market value of US$3.6 billion. The World Bank rated the programme's achievements as "highly satisfactory", leading to the launch of Phase 2.

Introduced in 2022, Phase 2 (also known as the Additional Financing Programme) focuses on accelerating the growth of the residential GRPV market. Scheduled to run until 2027, this phase aims to help the Government of India meet its target of installing 40 GW of GRPV. To further drive adoption in the residential sector, the government has committed to providing a capital subsidy, aiming to achieve an additional 4 GW of GRPV capacity. This subsidy is administered through the Central Financial Assistance scheme, offering households financial support based on system size.

Despite a compelling business case for residential GRPV – particularly for households with high electricity consumption paying elevated grid tariffs – uptake in this sector remains limited. Key obstacles include a lack of affordable financing options and the absence of scalable business models for GRPV. Contributing factors are (i) limited access to collateral-free, low-interest financing; (ii) inadequate awareness of the benefits and installation process of rooftop solar; and (iii) challenges with the ESCO model, which, while effective in serving commercial and industrial consumers, has struggled to gain traction in the residential market. This difficulty stems from smaller system sizes in residential applications, leading to higher transaction costs and heightened payment security risks for developers.

### 4.3.2 Amount, sources and cost of funding

The IBRD financing will cover 49% of total expenditure, in the form of a US$150 million loan and 4% GPG (the IBRD's Fund for Innovative Global Public Good Solutions) grant. The Government of India is providing US$101 million in grant funding as a subsidy to residential customers, and the remaining 21% is expected to be mobilised from private investors through equity contributions. The exact terms of the IBRD loans are not provided; however, as a Pricing Group B country, India typically receives flexible rates of between SOFR+0.94% and SOFR+1.64% for USD-denominated debt with a maturity between 8 and 20 years.[66]

### 4.3.3 Institutional arrangements and financing mechanisms

The Government of India is the primary borrower, as the IBRD can only lend to sovereign entities (Figure 6). The State Bank of India (SBI), India's largest bank and a publicly traded company with 60.2% of its shares held by the central government (as of 30 September 2015), was designated as the programme's implementing agency.

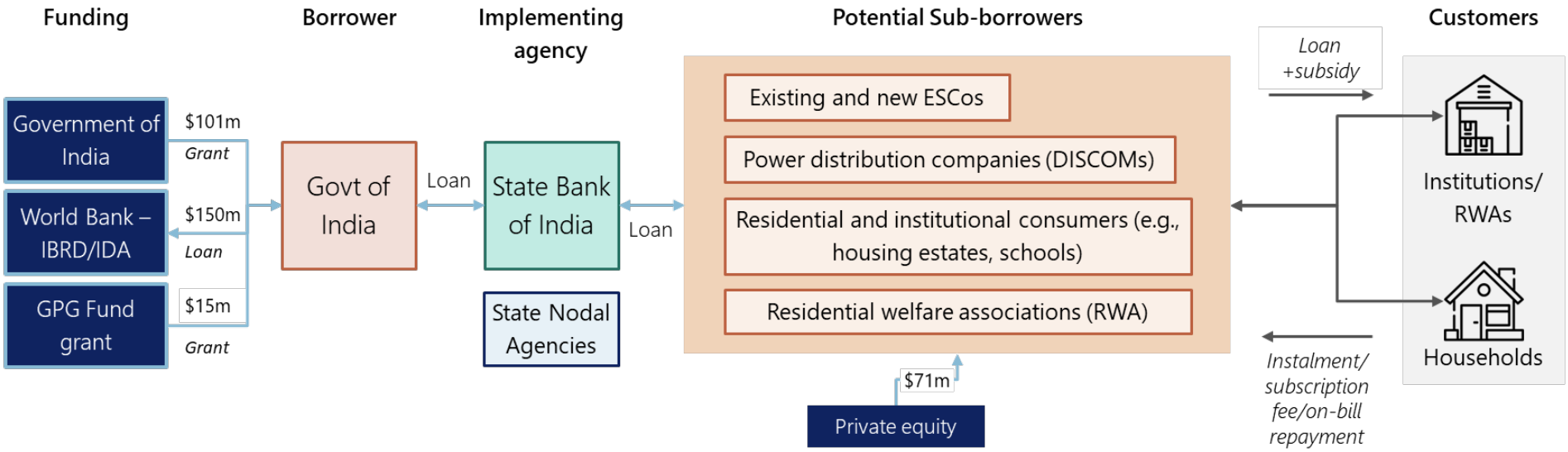
SBI will on-lend programme funds to a range of potential sub-borrowers or aggregators, including (i) established and emerging renewable energy ESCos, (ii) power distribution companies (DISCOMs), (iii) residential and institutional consumers, and (iv) residential welfare associations. For Phase 2, the World Bank (through IBRD)

[66] World Bank, "IBRD Financial Products: Lending Rates & Fees."

funding will contribute 49% of the project cost, the Government of India will provide a subsidy of 30%, while the residential customer will have to provide the equity for the remaining 21%.[67]

[67] World Bank, *Additonal Financing: Rooftop Solar Programme for Residential Sector* (2022), https://documents1.worldbank.org/curated/en/339041656371255291/pdf/India-Rooftop-Solar-Program-for-Residential-Sector-Project-Additional-Financing.pdf.

**Figure 6. India Rooftop Solar Programme for the residential sector**




Source: Nova Economics, based on information provided in the World Bank's program paper on a Proposed additional IBRD loan in the amount of US%150 million.

### 4.3.4 Disbursement mechanism

The Phase 2 Programme will be a results-based funding programme, that is, it will disburse funds against the new disbursement-linked indicators (DLIs) – the amount of rooftop solar loans signed by SBI (i) in the residential sector (US$), (ii) for the innovative utility-led model or GRPV with BESS in the residential sector, and (iii) the amount of additional equity financing from private sources mobilised by SBI in the residential sector.

### 4.3.5 Insights that could inform the design of a similar programme in South Africa

The programme to support the uptake of rooftop Solar PV in India is relevant to South Africa in several respects, such as.

- **The government set specific targets for household adoption of rooftop PV.** The GoI set a specific target for the adoption of GRPV in the residential sector of 4GW.[68]

  Similarly, the South African Government set a target of increasing the adoption of rooftop Solar PV by households and businesses of at least 850MW in 2023 as part of the Energy Action Plan to reduce the risk of load shedding. It is not clear, however, that the SA government will set longer-term targets specific to this sector.[69]

- **Slow uptake of rooftop Solar PV, despite a strong business case, due in part to a lack of affordable finance**. Similar to India, there is a strong business case for residential GRPV in South Africa, particularly for households that have high electricity consumption (>450kWh per month) and are paying higher tariffs for grid power. However, our market analysis suggests there has only been a modest uptake of GRPV systems in the residential sector, particularly among lower-middle-income households.

  Similar to India, this is partly due lack of affordable financing. In contrast to India, South Africa has seen the establishment of several ESCos or RESCos that serve the residential market, due mostly to the worsening of load shedding since 2022. However, as the risk of load shedding recedes, these entities may struggle to sustain their previous growth.

- **Heavy reliance on fossil fuels**. In 2022, 70% of India's energy needs were met with fossil fuels (coal and oil), while coal is used for 72% of its electricity production.[70] Similarly, 82% of South Africa's energy needs in 2022 were met with coal and oil, while 84% of its electricity is produced using coal and oil.[71] This shows the need for further support to transition the energy sources of these countries to renewable and/or cleaner sources.

**Attractive features of the World Bank programme**

The Rooftop Solar Programme for the residential sector in India includes a range of attractive features that could be incorporated into a similar funding model in South Africa, these include:

- Similar to the ECARES programme implemented in Türkiye, the flexibility is given to SBI to lend to a range of sub-borrowers, including DISCOMs, ESCos, and even directly to large institutional or residential customers (schools, housing estates, residential welfare associations, etc.). The flexibility to lend to a range of sub-borrowers seems like a sensible idea.

---

[68] World Bank, *Additonal Financing: Rooftop Solar Programme for Residential Sector*.

[69] The Presidency: Republic of South Africa, Energy Action Plan: Update: December 2022, (2022).

[70] IEA, "India," IEA, 2022, accessed 28-10-2024, https://www.iea.org/countries/india.

[71] IEA, "South Africa," IEA, 2022, accessed 28-10-2024, https://www.iea.org/countries/south-africa.

There are a limited number of ESCos that serve the residential market in South Africa, and there are potentially some other third parties, such as electricity distributors in South Africa (e.g., Eskom Dx and larger municipal electricity distributors), who may be interested in launching on-bill finance programmes to promote the uptake of Solar PV systems. Similarly, there may also be interest from commercial banks that serve lower-middle-income households like Capitec.

- Requirements for co-financing are not too onerous – the World Bank is providing 49% of the capital, the Government of India will provide 30% of the capital as a subsidy, while the remaining 21% is to be mobilised from the private sector (commercial bank loans or equity by the customer).

- A significant proportion is grant funding – nearly 50% of the funding provided for the programme is in the form of grants (that do not have to be repaid). This should help to catalyse the demand for residential PV. While significant government subsidies may not be necessary in South Africa since load shedding acted as the catalyst, some grant funds to provide technical assistance and reduce the cost of finance would still be very helpful.

- Favourable loan terms – the IBRD provides loans at lower than market interest rates. South Africa is likely to be able to access similar pricing arrangements, given that they are both Pricing Group B countries.

## 4.4 Australia's Clean Energy Finance Corporation and Household Energy Upgrades Fund

### 4.4.1 Description of the broader Clean Energy Finance Corporation (CEFC)

The Australian government established the Clean Energy Finance Corporation (CEFC) in 2012 as part of its strategy to reduce greenhouse gas emissions and transition to a more sustainable energy future. As a government-owned entity, the CEFC aims to promote and finance renewable energy projects, energy efficiency initiatives, and low-emission technologies.

The CEFC offers tailored financial support, which may include direct debt or equity, small-scale asset financing, investments in listed and unlisted funds, and sustainability-themed bonds. The CEFC has access to AU$30.5 billion from the Australian Government and seeks to stimulate private sector investment in clean energy projects that may struggle to secure funding through traditional channels. By working alongside co-investors, the CEFC has seen the AU$11.4 billion of capital they have deployed generate nearly AU$58.4 billion in total transaction value (as of June 2024).[72]

Funding by the CEFC is administered under their General Portfolio and Special Investment Programmes:[73]

- **General Portfolio:** The CEFC aims to make commercial investments that address market gaps, overcome financing barriers, and align with broader public policy goals. Under the general portfolio, the CEFC typically invests in businesses and projects that develop, commercialise, or implement renewable energy, low-emission, or energy efficiency technologies, as well as in businesses that provide goods or services essential to the development or use of these technologies.

- **Specialised Investment Funds:** The Investment Mandate identifies five Specialised Investment Funds that have particular focus areas, financial allocations and risk and return profiles (Table 6).

---

[72] Clean Energy Finance Corporation, "Where we invest," 2024, https://www.cefc.com.au/where-we-invest/.

[73] Clean Energy Finance Corporation, *New capital, new ambition (Annual Report 2022-23)* (Australian Government, 2023), https://www.cefc.com.au/document?file=/media/l4igzbpf/cefc_ar23_web_sml.pdf.

**Table 6. Specialised Investment Funds supported by the CEFC**

| Investment Fund | Description | Amount |
|---|---|---|
| Rewiring the Nation (RTN) Fund | Through the CEFC RTN Fund, capital will help spearhead investment in a range of essential projects, including transmission infrastructure, long-duration storage, electricity distribution network infrastructure, and distributed energy resources. | AU$19 billion |
| Household Energy Upgrades Fund (HEUF) | The HEUF will provide discounted consumer finance to increase sustainability across the housing sector, including through investment in energy efficiency upgrades, high-performing appliances, and battery-ready Solar PV for existing households. | AU$1 billion |
| Powering Australia Technology Fund | The Powering Australia Technology Fund will invest in businesses and entities that are developing, commercialising, and supporting the deployment of technologies with the potential to accelerate Australia's transition to net zero emissions by 2050. | AU$500 million |
| Advancing Hydrogen Fund | Through the Advancing Hydrogen Fund, the CEFC is working to support the growth of a clean, innovative, safe, and competitive Australian hydrogen industry. | AU$300 million |
| Clean Energy Innovation Fund | The Clean Energy Innovation Fund invests in pre-seed to growth-stage technology companies focused on decarbonisation. | AU$200 million |

### 4.4.2 Description of the Clean Energy Finance Corporation's Household Energy Upgrades Fund

The CEFC allocated AU$1 billion in concessional finance to the Household Energy Upgrades Fund (HEUF) to support the private sector in offering concessional loans that encourage the adoption of clean energy technologies to residential customers. The fund is designed to drive sustainability in the housing sector through investments in energy efficiency upgrades and appliances, and Solar PV systems.[74]

The objective of the Fund is to improve the energy efficiency of the 11 million existing homes in Australia that contribute over 10% of national emissions. Many of these homes were built before the sustainability standards were implemented, and so stand to benefit from energy-saving and efficiency measures. This is believed to be a critical component to reaching net-zero emissions by 2050.

Modelling indicates that Australian households could potentially save up to AU$1 600 annually on their energy bills by enhancing energy efficiency. Upgrading just one million existing homes could result in energy savings of up to 9 000kWh per home each year, reducing household emissions by as much as 5.8 tonnes annually per home.[75],[76]

[74] Clean Energy Finance Corporation, *New capital, new ambition (Annual Report 2022-23)*.

[75] Clean Energy Finance Corporation, "Plenti and CEFC team up with low cost finance to lift household sustainability," 2024, https://www.cefc.com.au/case-studies/plenti-and-cefc-team-up-with-low-cost-finance-to-lift-household-sustainability/.

[76] Cooperative Research Centres Program, "Home retrofits would cut energy use, increase comfort of Australian homes - new study," https://racefor2030.com.au/home-retrofits-would-cut-energy-use-increase-comfort-of-australian-homes-new-study/.

As such, the HEUF is focused on supporting clean energy upgrades for existing residential properties and knockdown-rebuild projects that do not meet the national construction code standards.[77]

The CEFC has prioritised technologies with the potential to deliver the largest energy or emissions reduction benefits for households. Eligible technologies that can be financed include:[78]

- Solar PV systems and batteries, Solar hot water systems.
- Double-glazed windows, insulation, air-conditioners, ceiling fans, and heat pumps.
- EV chargers, energy monitoring systems, pool pumps, and induction stoves.

### 4.4.3 Nature and amount of funding provided under the HEUF

The CEFC has allocated AU$1 billion to the HEUF to provide low-cost, concessional finance for initiatives that promote energy efficiency. The goal is for HEUF investments to be matched by an equivalent amount of private-sector funding across the portfolio. The HEUF is collaborating with co-financiers to develop customised, discounted green finance products that are easily accessible for households.[79] These offerings may include:

- Green home loans: Designed to support renovations and retrofits that utilise clean energy technologies to significantly enhance energy performance, as verified by credible home energy assessments.
- Green personal loans: Focused on financing home energy improvements and clean energy technologies.
- Innovative concessional financial products: Tailored products aimed at unlocking energy savings for borrowers, including rental and strata property owners, by facilitating access to energy efficiency and clean energy technologies.

### 4.4.4 Institutional arrangements and financing mechanisms

The Household Energy Upgrades Fund (HEUF) is currently administered through two co-financiers: (i) Plenti, a fintech company based in Australia, and (ii) Westpac, one of Australia's "Big Four" banks. Leveraging the customer networks and expertise of these co-financiers allows HEUF Finance to reach a broad segment of Australian households.

Co-financiers pass on the benefits of HEUF concessional finance to borrowers and manage the day-to-day needs of individual customers. They operate the financial products on behalf of the CEFC and are responsible for assessing loan applications. As a result, the CEFC does not handle individual consumer loan applications and will not review or assess them.[80]

---

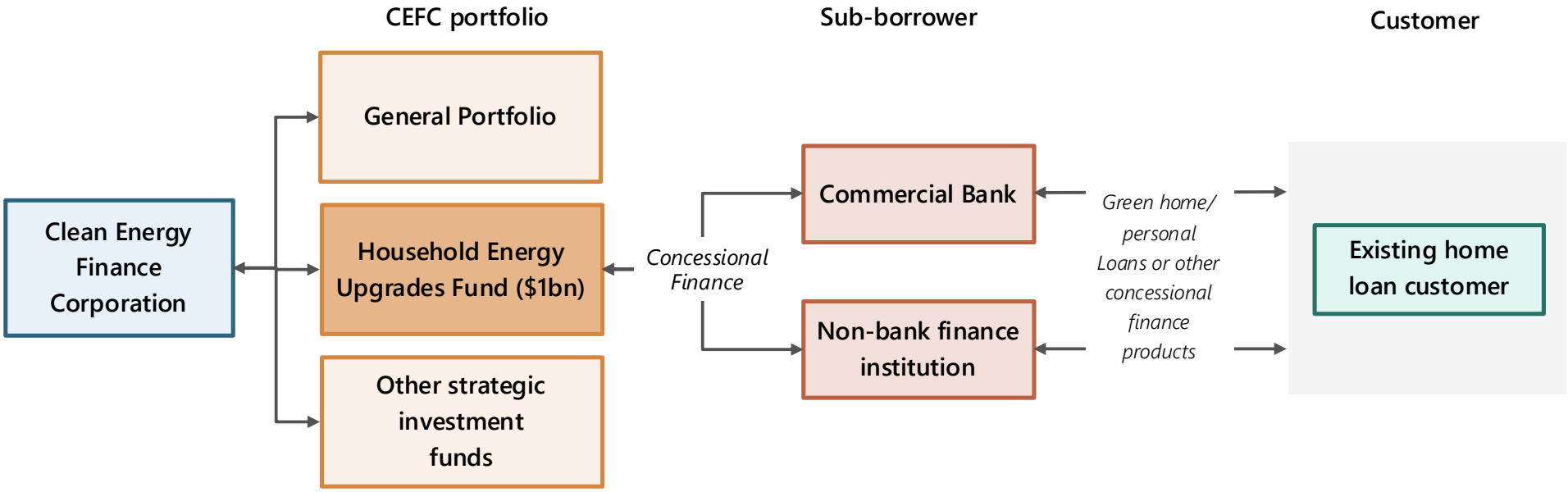
[77] Clean Energy Finance Corporation, "Household Energy Upgrades Fund," 2024, https://www.cefc.com.au/where-we-invest/special-investment-programs/household-energy-upgrades-fund/.

[78] Corporation, "Household Energy Upgrades Fund."

[79] Clean Energy Finance Corporation, *CEFC Investment Policies* (Australian Government, 2024), https://www.cefc.com.au/document?file=/media/xc2f42tt/cefc-investment-policies-2024.pdf.

[80] Corporation, "Household Energy Upgrades Fund."

**Figure 7. Household Energy Upgrades Fund funding model**




Source: Nova Economics based on the CEFC HEUF webpage (https://www.plenti.com.au/heuf-discounted-green-loans/)

**Plenti: HEUF Discounted Green Loan**

Plenti is a fintech company and a marketplace lender that operates as a non-bank financial institution. Specialising in consumer loans, automotive loans, renewable energy finance, and personal loans, Plenti leverages technology to deliver faster and more efficient services compared to traditional banks.[81]

Plenti has been selected by the CEFC as the inaugural financier for the HEUF. This partnership enables Plenti to offer discounted rates on its standard green loans to Australian households through its network of accredited installers. **Plenti is utilising AU$60 million** in HEUF financing to provide tailored green finance solutions for households across Australia.[82]

Features of Plenti's financing programme include:

- Access to an extensive network of accredited partners and installers.
- Discounted rates on Plenti's standard green loans: a discounted rate of up to **3.34% p.a.**, loan amounts of **AU$2 000 to AU$50 000**, a loan term of between **3 and 15 years**.
- Upgrades include solar battery systems and energy-efficient home assets.

**Westpac: Sustainable Upgrades Home Loan**

Westpac is one of Australia's "Big Four" banks and operates as a commercial bank and financial services institution. As a traditional bank, Westpac holds a banking license and is regulated by the Australian Prudential Regulation Authority (APRA). The CEFC has **committed AU$160 million towards the Westpac Sustainable Upgrades Home Loan product,** which is expected to support **at least AU$320 million** in discounted loans to eligible Westpac home loan customers.[83]

Features of the Westpac Sustainable Upgrades Home Loan product:[84]

- Available for **those with an approved Westpac home or investment loan** of $150 000 or more.
- A maximum loan of $50 000 is available for a maximum loan term of 10 years, at a **4.49% p.a. variable interest rate**. (Note: the comparison rate quoted by Westpac is 4.87% p.a. and is based on a loan of AU$30 000 over the term of 5 years).
- No loan initiation or monthly account fees are charged. The loan takes the form of a second home or investment loan secured against the existing property.
- Customers can choose from a list of 20 vetted installers.

---

[81] Corporation, "Plenti and CEFC team up with low cost finance to lift household sustainability."

[82] Plenti, "Household Energy Upgrades Fund (HEUF)," https://www.plenti.com.au/heuf-discounted-green-loans/.

[83] Westpac, "A loan to make your home more sustainable," 2024, https://www.westpac.com.au/personal-banking/home-loans/sustainable-upgrades-home-loan/.

[84] Clean Energy Finance Corporation, "Doors open for Westpac customers to boost home sustainability," 2024, https://www.cefc.com.au/case-studies/doors-open-for-westpac-customers-to-boost-home-sustainability/.

### 4.4.5 Attractiveness/drawbacks of this financing mechanism

**Use of both bank and non-bank financial institutions as implementing partners**

An attractive feature of this programme is its use of both bank and non-bank financial institutions (NBFIs) as implementing partners. NBFIs are, in many cases, more flexible in their lending approach, and, as such, may be able to serve a segment of the market that commercial banks typically cannot. Institutions such as Plenti, the fintech through which the HEUF is dispersed, leverage technology to deliver faster and more efficient services compared to traditional banks.

This is evident in Westpac (the HEUF commercial bank implementing partner), limiting access to concessional finance to households with existing home loan facilities, and Plenti on-lending concessional finance to a broader range of customers through its standard green loan.

**Restriction of Westpac's HEUF to households with an existing home loan facility**

Westpac's requirement for eligible customers to have an existing home loan facility with the bank limits access by customers to the concessional finance provided by the HEUF. While this may be deemed appropriate for the objective of the study (to increase the energy efficiency of existing homes), it risks excluding the customers who may need access to more affordable credit to finance EE and Solar PV technologies the most.

In the context of South Africa, this would restrict the reach of the concessional financing as only ~51% of the middle-to-high income households, and ~25% of lower-middle-income households in the addressable market for standalone residential systems (as defined in the market and gap analysis report)[85] are paying off their homes. While providing concessional finance in this way may still help to encourage the adoption of EE and Solar PV and/or BESS among this customer group, it will limit the reach.

Feedback from stakeholders on the success of the South African Energy Bounce Back Scheme (EBBS) suggests that offering a revised EBBS or similar mechanism that is not limited to disbursement through commercial banks could help to improve access to funding to a broader customer group.

[85] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

# 5. The case for support: identifying the key levers DFIs can use to encourage Solar PV adoption by households and small businesses

## 5.1 Introduction

This section presents our summary of the overall motivation for providing support for the adoption of Solar PV systems by households and small businesses in South Africa and introduces the three strategic levers we recommend DFIs employ.

## 5.2 Overall motivation for providing support

Although middle-to-high-income households[86] and small businesses consuming over 1 000 kWh per month have a strong financial incentive to install distributed Solar PV systems, adoption rates slowed as soon as the threat of load shedding diminished. Furthermore, Solar PV penetration remains relatively low – it is estimated that only 10.5% of the approximately 1.1 million middle-to-high-income households in single-dwelling units have installed a solar PV system.

Similarly, ESCos serving the sector observe that many of the approximately 2.95 million lower-middle to middle-income households[87] could also realise long-term energy cost savings by investing in distributed energy resources. However, uptake in this group is very limited, with only 3.1% of these households reporting the installation of a Solar PV system.

As discussed in Section 2.2.3, several factors are limiting the uptake of Solar PV among households and small businesses that could otherwise benefit. These include:

- **High financing costs for Solar PV systems:** The cost of financing Solar PV systems remains unnecessarily high, partly due to commercial banks' limited understanding of the residual value of Solar PV and battery energy storage assets. Banks, which lend directly to households and indirectly to ESCos serving this segment, often treat these loans as unsecured (i.e., not backed by collateral). This approach increases perceived risk, driving up financing costs.
- **Limited credit access for lower-middle-income households:** Approximately 2.95 million lower-middle-income households in South Africa could gain financially from installing Solar PV, but face difficulties in obtaining credit from banks. Banks typically apply standard lending criteria, prioritising a customer's creditworthiness over the asset itself, which restricts access for customers with lower credit scores or limited financial history.
- **Challenges for ESCos in securing favourable credit terms:** ESCos in the sector report difficulties in obtaining debt financing from commercial banks, citing stringent credit requirements and a lack of understanding of the ESCo business model. For example, one ESCo, Wetility, withdrew from potential deals due to excessive demands from banks for cross-creditor guarantees and collateral. While ESCos often consider the Solar PV system as collateral, confident they can manage, repurpose, or redeploy it if

[86] Defined in this report as households spending more than R30 000 per month.

[87] Defined in this report as households spending between R10 000 and R30 000 per month.

necessary, banks remain hesitant, lacking a clear understanding of the potential residual value of these assets. Additionally, retail banks are not well-positioned to repossess these systems.

- **The mismatch between loan tenors and asset lifespans:** The term lengths of loans, leases, and subscription agreements available to households and small businesses for Solar PV financing are often misaligned with the assets' useful lives. For instance, while solar panels typically have a lifespan of 20-30 years and batteries around 10 years (with daily cycling), loan tenors offered by banks and subscription agreements from ESCos are generally shorter. Banks tend to offer loans of between 5 and 8 years, while ESCos such as WeTility and Versofy offer subscriptions for a minimum of three years with the option to renew the contract. GoSolr, on the other hand, offer a month-to-month evergreen contract.. This creates a barrier for approximately 3 million lower-middle to middle-income households and small businesses, as, although they stand to benefit from long-term energy savings, these savings are not immediately evident. In the short term, their electricity costs (including loan payments or subscription fees) may increase considerably.
- **Limited incentives for grid export due to smart meter costs and suboptimal tariffs:** Most residential and small business customers with distributed generation do not export power to the grid. This is partly because (i) they are required to cover the upfront costs for grid connection and for replacing their existing utility meters with smart meters, and (ii) current tariff structures provided by municipal distributors offer minimal credits for power exports, with little financial incentive to export surplus energy.

These factors collectively hinder the adoption of distributed Solar PV systems by households and small businesses, despite their potential to deliver long-term energy savings and resilience against electricity disruptions.

### 5.2.1 Demand is expected to recover, driven by increases in the real cost of grid-supplied power and a further decline in technology costs.

Furthermore, although adoption rates slowed as load shedding subsided, ESCos and banks in the sector expect residential and commercial demand for grid-connected Solar PV systems to increase over the next two to three years. This growth is likely to be driven by sharp rises in the real cost of grid-supplied electricity and continued declines in the average costs of solar panels and batteries.

ESCos noted that if Eskom receives annual tariff increases of over 10%, it may only take two to three years before they can offer lower-middle to high-income households subscriptions to integrated distributed Solar PV, energy efficiency, and storage systems that are 'bill-neutral' – or even reduce monthly electricity costs from the date of installation.

As such, we believe it is crucial to provide targeted support to the ESCos that emerged during the load shedding period over the next two to three years to sustain adoption rates. While demand is likely to recover naturally within this timeframe due to rising grid electricity costs and decreasing costs of Solar PV and storage systems, interim support will be essential for these newer ESCos to bridge the gap and maintain momentum. Without such support, these ESCos may struggle to remain viable in the short term, potentially undermining long-term adoption just as demand is set to increase again.

## 5.3 Identifying the key levers DFIs can employ to encourage the adoption of grid-connected Solar PV by households and small businesses.

We have identified three primary levers through which Development Finance Institutions (DFIs) can drive the broader adoption of grid-connected Solar PV systems by households and small businesses in South Africa:

- **Lever 1:** Support the expansion of ESCos to sustain Solar PV adoption and enhance accessibility.
- **Lever 2**: Promote continued direct lending by banks to households and small enterprises.
- **Lever 3:** Strengthen incentives for owners of Distributed Energy Resources (DER) to feed power back into the grid.

Sections 6, 7 and 8 provide a detailed rationale for the use of each of these three levers, outline the challenges they seek to address and provide recommendations on the potential support mechanisms that can be provided by DFIs with reference to existing programmes and international examples.

These recommendations are informed by the findings of the market and gap analysis (summarised in Section 2), the local and international case studies examined in Sections 3 and 4, and insights gathered from additional interviews with representatives from a selection of local and international DFIs and ESCOs that are active within climate-finance in South Africa.[88]

We have been mindful of the fact that this study aimed to identify practical solutions that can be implemented within a one-year timeframe, and where possible, should build on the progress and achievements already made.

[88] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

# 6. Lever 1: Support the growth of ESCos to sustain Solar PV adoption and broaden access

## 6.1 The rationale for support in this area

With the risk of load shedding reduced, banks and ESCos anticipate that energy cost savings, rather than power resilience, will soon become the primary driver of adoption among households and small businesses.

ESCos are better positioned than traditional banks to optimise system configuration and performance to deliver energy cost savings. For instance, they can recommend a system size tailored to a customer's energy usage and often integrate energy efficiency technologies, such as smart geyser controls, to reduce consumption further.

Additionally, because ESCos are directly involved in the installation, operation, and maintenance of Solar PV systems, they have a deeper understanding of the residual value of these assets. Thus, they have a deeper understanding of the residual value of these assets. This approach helps ESCos assess risk more accurately and offer subscriptions at lower costs. Additionally, ESCos can extend credit on more flexible terms than traditional banks, allowing them to serve a broader range of customers, including those lower-middle-income households who may not meet standard banking criteria.

As discussed in Section 2.5.1, the ESCo model is especially well-suited for cases where upfront costs and operational complexities are barriers, as is true for many of the 2.95 million lower-to-middle-income households identified.

It is also worth noting that many ESCos serving the residential and SME markets were established within the past five years in response to demand created by load shedding. While demand for residential Solar PV has slowed as load shedding concerns eased, it is expected to recover naturally over the next two to three years due to rising grid electricity costs and decreasing costs of Solar PV and storage systems. In the interim, however, without additional support, these ESCos may struggle to remain viable, potentially undermining long-term adoption just as demand is set to increase again.

As such, we recommend that DFIs aiming to support the sustained adoption of Solar PV systems provide targeted assistance to ESCos serving the household and SME segments, particularly over the next two to three years. This support will help maintain the momentum gained during load shedding, bridge the current gap until demand recovers, and assist ESCos in pricing Solar PV systems at rates accessible to a broader customer base.

### 6.1.1 Primary challenges to address

DFIs can assist ESCos in overcoming two primary challenges they face:

- **Access to Debt Financing:** ESCos face difficulties securing debt financing from commercial banks on favourable terms, partly because banks lack both a clear understanding of the potential residual value of these assets and the ability of ESCos to repossess or redeploy them.
- **Mismatch Between Loan Tenors and Asset Lifespans:** ESCos often experience a mismatch between the tenors of loans they obtain and the lifespan of the assets they finance. DFIs can help bridge this gap,

ensuring ESCos have access to financing that aligns with the long-term nature of Solar PV and energy storage systems.

## 6.2 Potential support mechanisms

To assist ESCos to overcome these challenges, DFIs could:

i. **Provide direct financial support to ESCos,** enabling them to access financing at a lower cost and with loan tenors that align more closely with the lifespan of the Solar PV and energy storage assets they fund. This support typically includes concessional loans or blended finance models that combine concessional funding with commercial bank funds.

ii. **De-risk and reduce the cost of finance for banks** to lend to ESCos by:

   a. Providing credit guarantees or partial risk guarantees to reduce the perceived risks for commercial banks associated with lending to ESCos.

   b. Provide technical assistance and capacity building for commercial banks to improve their understanding of the ESCo business model, and the lifecycle value of solar assets, and to develop asset-backed lending models using Solar PV and storage assets as collateral.

## 6.3 Options to provide direct financial support to ESCos

Our assessment of the options to provide direct financial support to ESCos is based on insights from the case studies presented in Sections 3 and 4 and consultation with representatives from a selection of local and international DFIs and ESCos that are active within climate finance in South Africa.

Broadly speaking, the options to provide direct financial support to ESCos include:

- **Option 1: Support or enhance the existing financing mechanisms** available to ESCos and provided by local development banks – the DBSA and IDC
- **Option 2: Launch a new programme**, similar to those the World Bank has established in India and Turkiye, which employed blended finance mechanisms – combining concessional loans from the IBRD and local DFIs with grant funding from the government – to mobilise private sector investment and promote the adoption of Grid-Connected Rooftop Solar PV by households and businesses.

### 6.3.1 Support or enhance the existing financing mechanisms provided by local development banks

Mindful of the fact that this study aimed to identify practical solutions that can be implemented within a one-year timeframe, our recommendation would be to support or enhance the existing financing mechanisms that are currently provided to ESCos by local development banks – the DBSA and IDC.

As discussed in Section 3, the IDC and DBSA have both launched programmes that are aimed at supporting ESCos directly by extending credit on concessional terms. Feedback from the DBSA and IDC on how international DFIs could potentially support the existing mechanisms is provided below.

**The Development Bank of Southern Africa's Climate Finance Facility**

The CFF provides subordinated debt at competitive "lower than market" interest rates, at longer tenors, and more concessional terms than what commercial banks and other non-bank lenders are currently willing to provide. This

could help ESCos to de-risk lending, reducing the overall cost of finance and potentially enabling them to finance Solar PV assets over a longer subscription period.

*Feedback from the DBSA on how international DFIs could support the existing CFF facility*

Harold Mogale from the DBSA indicated that the organisation collaborates closely with international Development Finance Institutions (DFIs). If a DFI, such as KfW, were interested in providing further funding for the restructured Climate Finance Facility (CFF), the DBSA would establish a credit line with that DFI to access the funds.

He noted the original intent was that the DBSA would attract financial support from one or two additional DFIs to create a "blended finance" structure – combining funds from multiple sources to reduce risk and increase capital availability.

However, DBSA was unable to secure this additional DFI support. As a result, the CFF was launched with funding solely from the DBSA and the Green Climate Fund (GCF), each contributing equally (on a 1:1 basis).[89]

*Feedback from international DFIs on willingness and ability to provide support*

Anne Keppler, a representative of the German Investment and Development Corporation (DEG), noted that they provide equity finance, advice, and support to private enterprises operating in developing and emerging-market countries. DEG is funded entirely through capital markets; as such, it raises money from investors and must generate returns on its investments.[90]

DEG has an equity stake in at least one ESCo Wetility through its investment in Metier's Sustainable Capital Fund II (MSC II). DEG is a limited partner in MSC II, which has, in turn, invested in Wetility. Anne noted that while DEG can invest indirectly in ESCos via private equity funds that manage a portfolio of investments, it would not invest directly in a standalone private entity.

Via the CFF, the DBSA can provide 30% of total funding for planned capacity expansion in the form of a subordinated loan of a value of between R45 million and 250 million provided that the sub-borrower (e.g., project contractor, SME/ESCo) can leverage a minimum of 20% equity finance and between 30-50% senior debt from other private lenders. Anne noted, however, that DEG would not be able to provide the 20% equity finance the DBSA requires ESCOs to leverage from private lenders because DEG does not make direct private equity investments in individual companies. Instead, it invests in funds that provide exposure to a diversified portfolio of companies.[91]

*Recommendations on support that could be provided based on feedback received*

Since the restructuring of the CFF was approved in 2022, the DBSA has managed to disburse 6.5% of the total funding raised (~US$3.5m). The DBSA is, however, eager to disburse funding to more qualifying projects before the CFF expires in August 2026.

As Harold Mogale from the DBSA noted, while the CFF initially launched with only DBSA and GCF funding, there is still room for other DFIs like KfW to participate by establishing a credit line with the DBSA that will enable it to

[89] Harold Mogale and Precious Nke (Development Bank of Southern Africa), interview by authors, 7 October 2024.
[90] Anne Keppler (DEG), interview by authors, 25 October 2024.
[91] Anne Keppler (DEG), interview by authors, 25 October 2024.

channel additional funds into the CFF. This arrangement would provide a new funding source for the facility, increasing its capital pool to support more projects.

Based on the feedback given by Wetility representative Tau Chimanga, the programme presents an attractive funding opportunity to some ESCos, but none of the three ESCos interviewed were aware of the facility before we alerted them to it. As such, one of the key issues seems to be a lack of proactive marketing or visibility after restructuring.

The CFF requirement that the sub-borrower raise between 50% and 70% of capital from private investors – 20% as equity and 30-50% as senior debt – may be too restrictive as it places a significant onus on the sub-borrower to independently attract substantial investment before accessing the DBSA's subordinated loan. This may limit the ability of smaller or newer ESCos to qualify, potentially restricting participation to more established entities with strong investor relationships.

**The IDC's ESCo Energy Solutions Fund**

The IDC's ESCo Energy Solutions Fund (Section 3.3) was established to provide financing to ESCos supporting SMEs, aiming to mitigate the impact of load shedding on these businesses. The South African Facility for Green Growth (SAFGG), the fund, had, by August 2024, approved financing for four ESCos.

*Feedback from the IDC on how international DFIs could support the existing ESCo Energy Solutions Fund*

Christo Fourie from the IDC indicated that when the IDC launched the fund to support ESCos serving SMEs affected by load shedding, the intention was to obtain funding on highly concessional terms via the National Treasury's Energy Bounce Back Scheme. However, the funding did not materialise as anticipated, and so they opted to use an existing credit facility with the German state-owned development bank KfW to capitalise the fund.[92]

Although KfW provided funding at concessional rates, it was not targeted specifically at supporting the uptake of distributed energy resources (asset-backed finance), as such interest rates offered by the IDC were not as competitive as those offered by the South African government to commercial banks under the EBBS scheme. The IDC observed that commercial banks have been able to offer some more established ESCos loans at interest rates that were approximately one percentage point lower than funding provided under the IDC fund. However, the tenor of the loans extended by the IDC is more generous than those offered by commercial banks, with a maximum repayment period of up to 10 years.[93]

Fourie noted that if a DFI, such as KfW, were interested in providing further, more targeted support, it would be helpful if they could structure it so that the IDC can lend to ESCos on more favourable terms.

*Feedback from international DFIs on willingness and ability to provide support*

Anders Pederson of the African Development Bank (AfDB) indicated that the National Treasury had approached both the IFC and AfDB to gauge their interest in serving as anchor institutions for a 'Second Energy Bounce-Back Scheme' so this is where they appear to have been focusing their attention (as opposed to lending to local development banks like the DBSA and IDC).

---

[92] Christo Fourie (IDC), interview by authors, 7 August 2024.

[93] IDC, *Concessionary Funding for Energy Services Companies (ESCos): Energy Solutions Funding*.

Heidi Akran from the IFC explained that the IFC deals exclusively with the private sector, so they would not provide funding via the IDC or DBSA.[94]

*Recommendations on support that could be provided based on feedback received*

The IDC's ESCo Energy Solutions Fund is already well-positioned to provide direct financial support to ESCos serving small businesses. However, both the IDC and ESCOs felt that the funding could be provided at more competitive rates and/or concessional terms if they were able to secure targeted support for the Uptake of distributed energy resources from DFIs such as KfW.

It is also worth noting that the IDC appear reluctant to extend finance to ESCos that are predominantly installing systems on households, noting that the original aim was to enable ESCos to provide financed energy solutions to small and medium enterprises to reduce or eliminate the impact of load shedding.

### 6.3.2 Launch a new blended finance programme similar to World Bank programmes in Turkiye and India.

An alternative option to provide direct support to ESCos via the existing programmes highlighted above would be to launch a new programme similar to those the World Bank has established in India and Türkiye. These programmes employ blended finance mechanisms – combining concessional loans from the IBRD and local development banks with grant funding from the government – to mobilise private sector investment and promote the adoption of Grid-Connected Rooftop Solar PV by households and businesses.

We believe a mechanism similar to the one World Bank intends to use in Stage 2 of the Türkiye programme by "setting up a credit facility at a local DFI to lend to sub-borrowers" could be very helpful in supporting and growing the nascent ESCo sector serving the households and small businesses in South African and promoting the uptake of integrated Solar PV+EE+BESS systems in this segment.

However, this study aimed to identify practical solutions that can be implemented within a one-year timeframe, and it would likely take significantly longer to design and launch a new programme that would likely be implemented by the same institutions (DBSA and IDC) than to support or enhance the programme already in place.

These programmes had several attractive features that could inform the design of a similar programme in South Africa, including:

- The flexibility of local DFIs to lend to a range of sub-borrowers. Implementing partners can lend to a range of intermediaries or 'sub-borrowers', including DISCOs, ESCos, and commercial banks. The flexibility to lend to a range of sub-borrowers is attractive because there are a limited number of ESCos that serve the residential market in South Africa, and there are potentially some other third parties such as electricity distributors in South Africa (e.g., Eskom Dx and larger municipal electricity distributors) who may be interested in launching on-bill finance programmes to promote the uptake of DSPV and BESS. Similarly, there may also be interest from commercial banks that serve lower-middle-income households like Capitec.
- The appointment of more than one implementing agency promotes competition and increases the chances of success.
- Unlike the DBSA's existing CFF, the requirements for sub-borrowers to raise co-financing are not too onerous, with the IBRD providing 86% of the capital, with the local development banks required to provide

[94] Heidi Akran (World Bank IFC), interview by authors, 23 October 2024.

only an additional 14% with the understanding that sub-borrowers will likely also mobilise some private capital.

- The loans are being provided on what appear to be very favourable terms, being lower than market interest rates and with an extended maturity.

*Feedback from international DFIs on willingness to support the launch of a similar programme*

Heidi Akran noted that the IFC focuses exclusively on the private sector, while the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA) serve the public sector, offering funding and technical support as needed. For programmes like the Türkiye Market Transition for Distributed Energy Program-for-Results, the IBRD would not lend directly to a private bank. Instead, it would lend to the Turkish government, which could then decide to extend financing to the chosen implementing agencies – typically a state-owned development bank, but in the case of Türkiye, it also selected a privately owned development bank.[95]

She noted that while **the World Bank/IBRD** may be willing to establish and fund a similar programme to promote the uptake of grid-connected rooftop Solar PV in South Africa, the impetus would need to come from the government, which would need to provide the motivation for the programme and set clear policy targets.

## 6.4 Options to mitigate risk and lower financing costs for banks lending to ESCos directly or indirectly via intermediaries

Aside from providing direct financial support to ESCos, DFIs can also support the growth of the nascent ESCo sector by encouraging commercial banks to lend to ESCos on more favourable terms. Banks remain hesitant to lend to ESCos serving the household market, partly because:

- They are relatively new businesses – most of which were established within the last five years.
- Banks lack a clear understanding of the potential residual value of the underlying Solar PV and BESS assets and the ability of ESCos to repossess or redeploy them.
- Many of the ESCos serving the residential market emerged during the load shedding period, and they believe that now that load shedding has ended, the ESCo sector will consolidate, and many companies will not remain profitable and will consequently exit the market. Based on the market analysis, we established that there are about four major ESCos serving the residential and small business market in South Africa, these include GoSolr, Wetility, Alumo and Versofy (which has since partnered with Recharge rental to serve the commercial market). Several other firms advertise solar subscriptions for residential power users, such as Technosolar, Solar4life and Sunsavings, but it is not clear how many systems they have installed to date.

To encourage banks to lend to ESCos and on more favourable terms, DFIs can:

i. **Provide credit guarantees or partial risk guarantees** to reduce the perceived risks for commercial banks associated with lending to ESCos.

ii. **Provide technical assistance and capacity building** for commercial banks to improve their understanding of the ESCo business model, and the lifecycle value of solar PV assets, and to develop asset-backed lending models using solar PV and storage assets as collateral.

[95] Heidi Akran (World Bank IFC), interview by the authors, 23 October 2024.

### 6.4.1 Providing credit guarantees or partial risk guarantees to reduce the perceived risks for commercial banks associated with lending to ESCos

After consultation with international DFIs, we identified the following options to de-risk bank lending to ESCos:

- **Option 1: Extend the existing EBBS scheme** to provide stronger incentives for banks to lend to intermediaries under the second EBBS mechanism, which was not utilised by banks in the first phase of the programme. This should include ensuring access by local development institutions such as the IDC and DBSA.
- **Option 2: Launch a new credit enhancement mechanism** in partnership with one or more commercial banks.

**Option 1: Extend the existing EBBS scheme but provide stronger incentives for banks to lend to intermediaries**

Anders Pederson from the African Development Bank (AfDB) indicated that the National Treasury had approached both the IFC and AfDB to assess their interest in acting as anchor institutions for a proposed "Second Bounce-Back Scheme."

He explained that, through subsequent discussions with the participating banks, the AfDB discovered differing perspectives among the banks regarding a private sector-led Bounce-Back Scheme. Pederson noted that the banks were primarily interested in using the scheme to extend loans for Solar PV installations to middle- and high-income households already on their mortgage books.

In contrast, the AfDB is more focused on how banks could leverage this facility to lend to middle-income households who may otherwise struggle to access or afford credit for Solar PV installations. Pederson added that they had encouraged the banks to develop tailored solutions to meet the needs of these customers.[96]

However, as noted above, ESCos are, in many respects, better positioned than traditional banks to design and deliver affordable solutions for lower-middle-income households, who are less likely to meet conventional banking criteria.

The EBBS was initially structured as a risk-sharing mechanism, with the South African Reserve Bank (SARB), through its subsidiary, the Corporation for Public Deposits (CPD), providing concessional funds to participating banks. Under the first EBBS mechanism, these institutions could offer lower-interest loans directly to SMEs investing in backup and renewable energy solutions. The second mechanism enabled participating banks to extend EBBS-backed loans to intermediaries, such as ESCos and development finance institutions. However, due to the limited 12-month timeframe of the programme, participating banks prioritised funds under the first mechanism and lacked time to develop tailored products for intermediaries like ESCos or the IDC.

*Willingness to extend and redesign the EBBS scheme to strengthen incentives for lending to intermediaries*

While the government is keen to extend the existing EBBS scheme, it is uncertain whether they are willing to provide stronger incentives for banks to lend to intermediaries serving households and small businesses. Vukile Davidson from the National Treasury noted that the revised EBBS should focus on lending to the commercial and industrial sector, which is viewed as the most efficient way to "*get more panels on roofs*". From a policy perspective, they also aim to help C&I customers reduce reliance on carbon-intensive energy sources and remain competitive as carbon

[96] Anders Pedersen (AFDB), interview by the authors, 7 August 2024.

border adjustment mechanisms are introduced. This strategy aligns with the IFC's mandate and priorities, as they have been advising the National Treasury on the potential extension of the EBBS.

Heidi Akran from the IFC indicated that, while they recognise the role of distributed energy resources in displacing some centralised generation at the lowest cost, they do not believe the IFC is ideally placed to finance small-scale systems (directly or indirectly). Their support for the EBBS will therefore concentrate on larger commercial and industrial customers, with retail banks viewed as better positioned to assess the credit risk of residential and small business clients.[97]

The AfDB expressed interest in exploring how banks might use the EBBS facility to extend credit to middle-income households, who may otherwise struggle to access or afford Solar PV installations. Anders Pederson noted that they had encouraged banks to design solutions for these customers.[98]

*Recommendations for Extending and Redesigning the EBBS Scheme to Strengthen Incentives*

Representatives from FirstRand highlighted that the EBBS imposes a cap on lending to single entities, which they recommended lifting. They had considered setting up an SPV to lend to multiple ESCos (sub-borrowers) serving households and small businesses, but the current R500 million limit on lending to a 'single entity' made this unfeasible.

Additionally, one of the prominent barriers to the adoption of Solar PV systems we identified in the Market and Gap Analysis is the mismatch between loan tenor and the economic lifetimes of Solar PV systems. The EBBS's tenor was significantly shorter than the lifetime of solar assets; it was only half the solar asset's lifetime (at 5 years). Extending the maximum tenor would allow banks to offer loans where the monthly instalments are much closer to the cost of the displaced grid-supplied electricity consumed.

Participating banks noted that one reason they did not utilise the second EBBS mechanism to extend EBBS-backed loans to intermediaries, such as ESCos or development finance institutions, was the limited 12-month timeframe. This led them to prioritise direct lending, leaving insufficient time to create products for intermediaries.

Therefore, we recommend that banks participating in the next iteration of the EBBS be offered both stronger incentives and additional time to develop financing solutions for intermediaries such as ESCos, DFIs, and other potential sub-borrowers (e.g., municipalities and smaller retail banks). Potential support mechanisms by DFIs could include the provision of grant funding to support the development of financing solutions for intermediaries or "sub-borrowers," such as ESCos, the IDC, and potentially municipal distributors or other categories of sub-borrowers.

Recommendations for support mechanisms relating to the direct lending of banks to households and small businesses under the EBBS are discussed in Section 7.2.1.

**Option 2: Launch a new credit enhancement mechanism in partnership with commercial banks**

*Introduction*

An alternative to extending the EBBS would be to establish a new credit enhancement mechanism in partnership with one or more major commercial banks in South Africa. The goal of this mechanism would be to de-risk lending

[97] Heidi Akran (World Bank IFC), interview by the authors, 23 October 2024.

[98] Anders Pedersen (AFDB), interview by the authors, 7 August 2024.

and, in doing so, increase banks' willingness to extend credit to intermediaries such as ESCos and/or development finance institutions.

Both Carla Rooseboom (KfW) and Heidi Akran (IFC) suggested that setting up a facility with a commercial bank to lend to a portfolio of sub-borrowers could be relatively straightforward. This credit enhancement mechanism could take the form of either a blended finance facility or a risk-sharing arrangement.

However, Heidi Akran noted that it is unlikely the IFC would establish a facility specifically for lending to ESCos focused on the residential and small business markets. With only a handful of major players in this segment (four or five), and with the reduced risk from load shedding, further market consolidation is anticipated.

Akran indicated that the IFC might be more open to establishing a risk-sharing facility for a wider pool of sub-borrowers investing in distributed energy resources, including larger commercial and industrial (C&I) clients of the banks. She outlined two potential solutions to support the uptake of distributed energy generation, energy efficiency technologies, and storage solutions for both ESCos serving households and small businesses, as well as directly for larger C&I clients:

i. An unfunded risk-sharing facility, or

ii. A blended finance facility including concessional finance from the IFC.

**Overview of the Potential Unfunded Risk-Sharing Facility**

The first solution proposed involves the IFC collaborating with one or more major commercial banks to establish an unfunded risk-sharing facility (RSF) to promote the adoption of distributed energy generation, efficiency technologies, and storage, as illustrated in Figure 8.

An unfunded RSF is a financial arrangement where the IFC assumes a specified portion of the credit risk associated with a loan or debt facility extended by a financial institution to a portfolio of borrowers, under a pre-approved debt facility, without providing upfront funding. In this context, distributed generation and storage refer to any "behind-the-meter" installations co-located with the load, whether rooftop or ground-mounted.

Commercial banks find Risk Sharing Facilities (RSFs) valuable when introducing new products or lending to customer segments (e.g., ESCos serving the residential market) where there is little or no historical performance data to estimate potential losses. This model has strong potential, as the lack of historical loss data for Solar PV loans – particularly those extended to households and SMEs under the ESCo model – currently acts as a barrier to the extension of credit to ESCos serving this segment (and indirectly the uptake of distributed Solar PV in this market).[99] An IFC-backed RSF would aim to alleviate this constraint by sharing the risk of losses with the originating commercial bank.

*How It Would Work*

Typically, an IFC RSF reimburses the originator (commercial bank in this case) for a set percentage of incurred losses that exceed a predefined threshold (first loss).

The commercial bank and the IFC must agree before signing the RSF on the eligibility criteria, which assets will be covered under the RSF. Because it is unlikely the IFC would establish a facility specifically for lending to ESCos

[99] International Finance Corporation, *Structured and Securitized Products*, https://www.ifc.org/content/dam/ifc/doc/2023/ifc-product-description-risk-sharing-facility.pdf.

focused on the residential and small business market, but would be open to establishing a risk-sharing facility for a wider pool of sub-borrowers investing in distributed energy resources. We propose that the IFC require that a minimum of 30% of the funds be allocated to finance assets ultimately installed by households and small businesses, but this may be difficult to enforce in practice, given that the RSF facility is unfunded and that there are only a handful of ESCos currently serving this segment.

The commercial bank and IFC would agree, before signing the RSF, on the remaining loss coverage after the initial percentage (first loss) is borne by the commercial bank (and potentially a third party). All newly originated asset-backed loans would need to be added to the facility portfolio during a ramp-up period that typically lasts two to three years, or under it reaches a predefined maximum volume.

Portfolio performance would be monitored by the commercial bank, and once losses exceed the pre-defined first-loss threshold, the IFC will reimburse the originator following the pre-agreed formula. The first loss must be covered by the originator (commercial bank) unless it is covered by another third party.

The commercial bank could manage the unfunded RSF either on its balance sheet or through a Special Purpose Vehicle (SPV), at its discretion.[100]

*Potential risks/drawbacks*

If the IFC doesn't share in the first loss, this risk is still borne by the commercial bank or must be covered by another third-party lender.

There is a stronger financial incentive for customers in the C&I segment to install Solar PV assets. As such, there is a risk that banks will not extend finance to ESCo serving the residential market but will focus on more bankable projects in the C&I sector.

Tau Chimanga from Wetility was sceptical about the effectiveness of credit enhancement mechanisms designed to encourage banks to lend to them, noting that he didn't feel credit enhancement alone would be sufficient to overcome banks' stringent credit requirements, which often include excessive cross-creditor guarantees and demands for collateral or a better appreciation of their subscription-based revenue model. He therefore advocated for more direct financial support.

*Other DFIs that might be willing to contribute to a new credit enhancement mechanism*

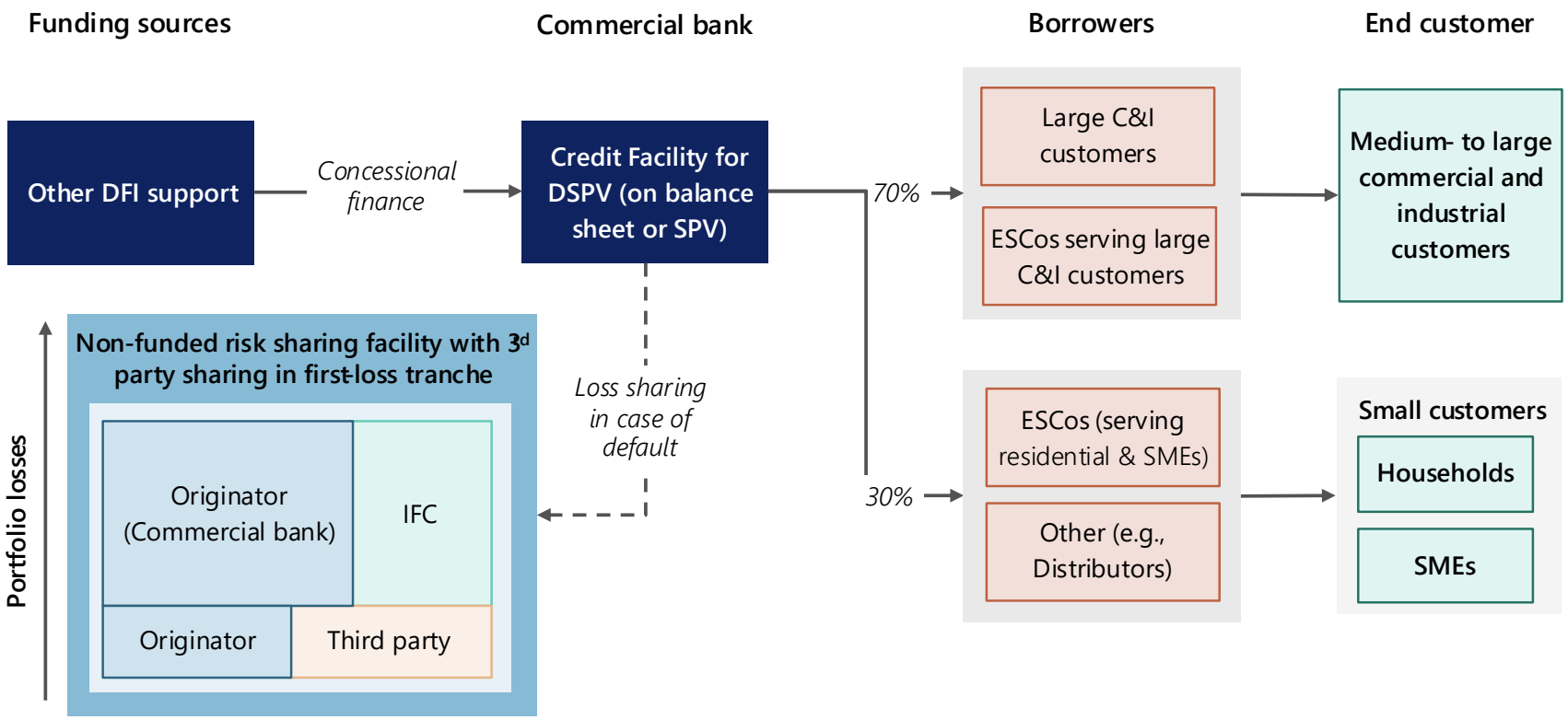
The African Development Bank (AfDB) is another DFI that could provide support for a private sector-managed programme. Anders Pederson noted that they are wary of extending credit in ways that would undercut the private sector (commercial banks) and potentially crowd them out. As such, they may prefer to support a new credit enhancement mechanism in partnership with one or more commercial banks the African Development Bank (AfDB) can lend directly to commercial banks, via its Private Sector Operations (PSO) branch, which allows it to provide loans, lines of credit, and risk-sharing facilities directly to private sector entities, including commercial banks.

Peterson cautioned that the AfDB's processes take a significant amount of time; as such, they do not typically consider programmes with an investment size below US$100 million.

---

[100] AfDB et al., *DFI Working Group on Blended Concessional Finance for Private Sector Projects: Joint Report, March 2023 Update* (2023), https://www.ifc.org/content/dam/ifc/doc/mgrt/2023-03-dfi-bcf-joint-report.pdf.

**Figure 8. Unfunded risk-sharing facility to support the uptake of distributed energy generation, efficiency technologies & storage**




Note: Large-scale customers system size: PV – 0.5 MW to 10 MW, BESS - 250 kWh to 10 MWh, EE – HVAC, LED lighting, VSDs, EMS; while smaller households and SME system size: PV – 5kWp to 30kWp, BESS – 5 kWh to 100 kWh and EE – Heat pumps, smart thermostats, LED lighting.

Source: Nova Economics based on information provided by an IFC representative.

**Overview of potential blended finance facility, including a concessional loan from the IFC**

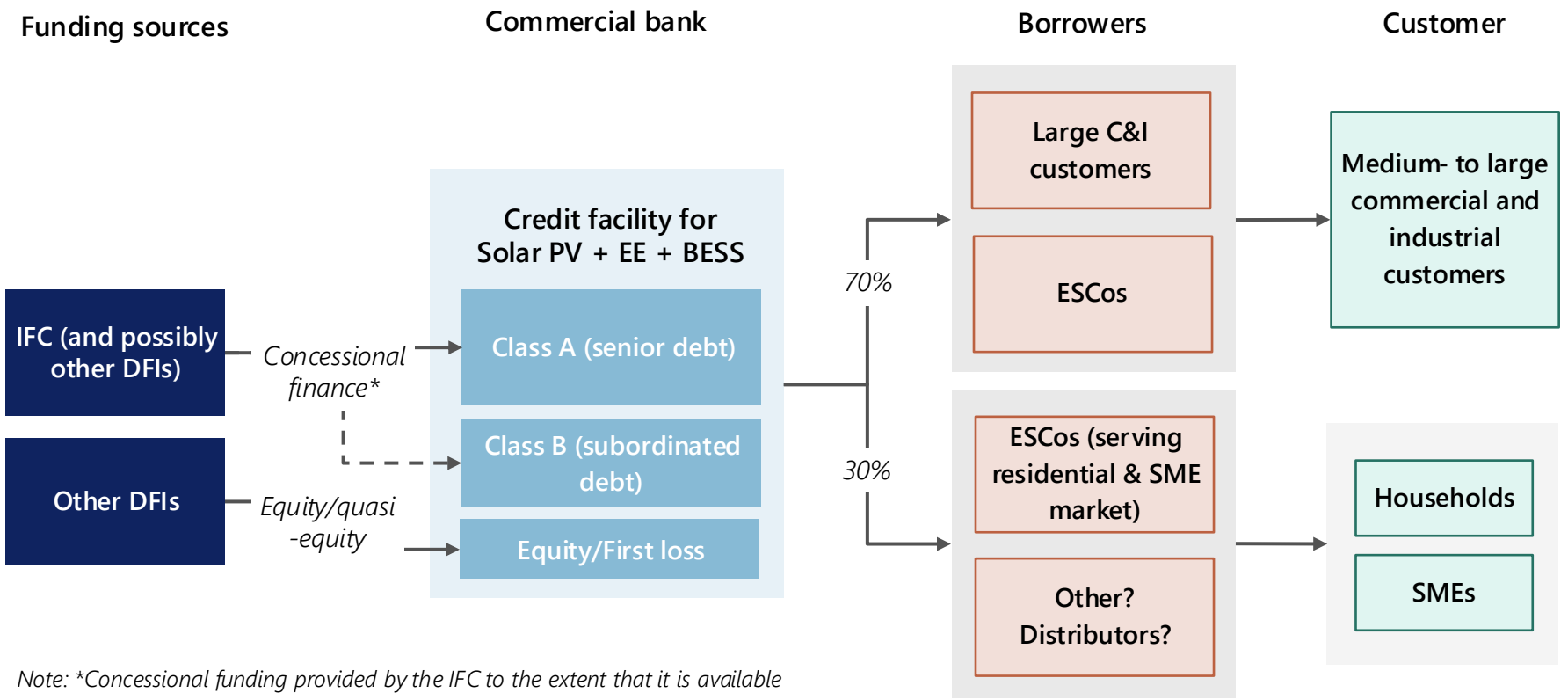
Heidi Akran noted that the IFC may also be willing to extend a loan to a commercial bank to establish a credit facility (either on-balance-sheet or administered via an SPV) to on-lend to a portfolio of potential sub-borrowers financing investment in distributed energy resources (Figure 9).

It is not clear whether the IFC would provide senior debt (which made up 42% of all concessional finance provided by DFIs in 2021) or subordinated debt (11%).[101] It is possible that if the structure were established as an SPV, a third party would be willing to contribute equity finance, but we had not identified a potential contributor.

Akran emphasised that the IFC would be more likely to fund a programme that focuses on providing the more bankable projects in the C&I sector, but that a portion of the funding in such a facility could be earmarked for the residential sector and there may be third-parties willing to provide additional credit support for the extension of credit to intermediaries serving the residential and small business sector.

[101] AfDB et al., *DFI Working Group on Blended Concessional Finance for Private Sector Projects: Joint Report, March 2023 Update*.

**Figure 9. Loan mechanism to support the uptake of distributed energy generation, efficiency technologies & storage**




Note: Large-scale customers system size: PV – 0.5 MW to 10 MW, BESS - 250 kWh to 10 MWh, EE – HVAC, LED lighting, VSDs, EMS; while smaller households and SME system size: PV – 5kWp to 30kWp, BESS – 5 kWh to 100 kWh and EE – Heat pumps, smart thermostats, LED lighting.

Source: Nova Economics based on information provided by an IFC representative.

# 7. Lever 2: Continue to support direct lending by banks

## 7.1 The rationale for support in this area

While ESCos are well-positioned to optimise system configuration and performance to deliver energy cost savings, as well as offer more flexible credit options, the bank-led model for financing Solar PV systems also presents distinct advantages over the ESCo model.

As outlined in Section 2.5.2, the bank-led model generally suits consumers who prefer direct ownership and control over their Solar PV systems, can access credit through banks (are creditworthy), and can benefit from lower-cost credit, tax incentives, and flexible terms. Established commercial banks offer customers a greater sense of trust and reliability due to their longstanding reputation and expertise in financing. Furthermore, banks operate under established financial regulations, which makes them more appealing to large borrowers and institutional clients.

One of the key advantages of the bank-led model is that, as deposit-taking institutions, banks can raise funds at a lower cost and, therefore, can provide more competitively priced loans than ESCos, which often rely on more expensive capital sources, such as private equity.

As noted in Part I of this report, the most cost-effective way for households with home loans to finance the purchase of a Solar PV system is by extending their existing home loan facility. Five retail banks – ABSA, Standard Bank, FNB, Nedbank, and Investec – allow their home loan clients to (i) access the unutilised portion of their existing home loan facilities for Solar PV financing, or (ii) effectively extend their facility by accessing a portion of the capital they have already repaid.[102]

Traditional banks are thus best positioned to offer around 1 million middle- and higher-income households in South Africa, who have not yet installed Solar PV, cost-competitive financing solutions. This represents nearly 20% of the "addressable residential market for Solar PV", which, as discussed in Section 2.2.2, consists of around 4.9 million households, most of whom (~4.1 million) reside in single-dwelling units. It is estimated that ~51% of this group (middle- to high-income households living in single-dwelling units) have mortgages, while a further 32.7% own their homes outright, having paid off or purchased without a mortgage.[103]

Although approximately 1.1 million middle- to high-income households[104] and small businesses consuming over 1 000 kWh per month have strong financial incentives to install distributed Solar PV systems, adoption rates slowed once the threat of load shedding diminished. Solar PV penetration remains relatively low – it is estimated that only 10.5% of the 1.1 million middle- to high-income households in single-dwelling units have installed a Solar PV system.

Initial evidence suggests that the Energy Bounce Back Scheme (EBBS), designed and implemented by the National Treasury in August 2023 to assist banks in extending Solar PV finance, is having a positive impact.

The EBBS was structured as a funded risk-sharing facility. In this arrangement, the South African Reserve Bank (SARB), through its subsidiary, the Corporation for Public Deposits (CPD), provided upfront capital to participating banks. This capital was designated to cover the first 20% of potential losses on loans issued under the scheme. By absorbing this initial portion of risk, the EBBS aimed to encourage banks to extend financing for renewable energy

---

[102] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

[103] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

[104] Defined as those who spend more than R30000 on average per month.

projects, such as Solar PV systems, to households and small and medium-sized businesses. This structure aimed to reduce the perceived risk for banks and enable them to offer more favourable loan terms to borrowers seeking to invest in energy solutions.

Two of the three participating banks interviewed for this study expressed strong support for the scheme's continuation, expressing optimism that it would be extended in an improved format incorporating feedback and insights from the first twelve months.

A representative from ABSA's retail banking division noted that participating in the EBBS had enabled them to offer clients more competitive interest rates than on their standard solar loans or home loan extensions (with a discount of approximately 50 basis points). However, they suggested that affordability and uptake would improve if they could extend the loan tenure from five to ten years.[105]

Representatives from Standard Bank felt that the EBBS needed restructuring to expand access to solar finance for lower-middle-income households, aiming to deliver Solar PV finance at significantly lower costs to the end-user. Standard Bank's retail division recommended that the focus of the EBBS shift from providing a credit risk guarantee to delivering a blended finance solution that would substantially reduce the cost of Solar PV finance for end-users and expand access for lower-middle-income households.[106]

As such, we recommend that DFIs continue to support direct lending by banks to sustain the adoption of residential Solar PV systems by middle- to higher-income households. Such support will help maintain the momentum gained during load shedding, bridge the current gap until demand recovers, and assist banks in offering Solar PV loans at rates that appeal to middle- to high-income households.

### 7.1.1 Primary challenges to address

DFIs can assist banks in overcoming two primary challenges they face:

- **Mismatch Between Loan Tenors and Asset Lifespans:** Banks offer financing for Solar PV assets with tenors of between three and eight years, which is significantly shorter than the solar assets' economic life, 20 to 30 years for solar panels, and ~10 years for the battery (with daily cycling).
- **Banks lack a clear understanding of the residual value of Solar PV assets:** Banks lack a clear understanding of the residual value of Solar PV and battery energy storage assets and frequently default to the assumption that these assets have no residual value, which means they treat loans (both direct and to intermediaries such as ESCos) as unsecured which increases financing costs.

## 7.2 Options to support direct lending by banks

To assist banks in overcoming these challenges, DFIs could:

- **Option 1: Provide support to enhance and extend the existing Energy Bounce Back Scheme** – a funded risk-sharing facility designed and implemented by the National Treasury in August 2023 that aims to reduce the perceived risk for banks and enable them to offer more favourable loan terms to households and businesses seeking to invest in distributed energy solutions.
- **Option 2: Provide technical assistance to assist banks in estimating the Loss Given Default (LGD) for solar assets, to assign "risk weights"** and to apply to have the prudential limits that banks follow to

[105] Rashveer Manilal, Portia Letlape, and Amelia Dieperink (Absa), interview by authors, 7 August 2024.
[106] Clive Spitz and Tony Anderson (Standard Bank), interview by authors, on 20 August 2024.

manage their risk exposure revised or specific limits for Solar PV loans revised (which dictate the minimum capital reserves banks must hold against these assets). While some banks have developed models to estimate the LGD for Solar PV assets, final approval and validation are required from regulatory bodies like the Prudential Authority within the South African Reserve Bank.

### 7.2.1 Option 1: Provide support to enhance and extend the existing Energy Bounce Back Scheme

In Part 1 of this study (Market and Gap Analysis), we presented feedback on the design of the EBBS from both participating and non-participating banks, ESCos, and local and international DFIs.[107] While most of the participating banks supported the continuation of the scheme, they also provided many suggestions on how the scheme could be improved.

**Setting up an EBBS-backed product**

One of the major barriers that banks noted was the **short programme timeframe**. Investec stated they were not willing to invest the resources to develop products to participate in the EBBS. This was also partly due to their clientele, where they typically focus on customers who would be able to afford a loan, either by extending their existing home loan or taking out a personal loan.

Secondly, Capitec and Investec noted that the **reporting requirements were too onerous** and the costs to comply would be too high for them to integrate the EBBS into existing programmes.

**Terms of the EBBS loan guarantee**

As noted under Option 1 of Section 6.4.1 ne of the prominent barriers to the adoption of Solar PV systems we identified in the Market and Gap Analysis is the mismatch between loan tenor and the economic lifetimes of Solar PV systems is a prominent barrier to the adoption of solar PV systems. The EBBS's tenor should be extended for both mechanisms 1 (direct lending by banks to customers) and mechanism 2 (lending by banks via intermediaries such as ESCos) to better match the life of the asset. The EBBS's tenor was significantly shorter than the lifetime of solar assets; it was only half the solar asset's lifetime (at 5 years). Extending the maximum tenor would allow banks to offer loans where the monthly instalments are much closer to the cost of the displaced grid-supplied electricity consumed. ABSA representatives noted that the **loan limit** to commercial customers should be increased to R20 million (from R10 million), as they have found this limit to be restrictive for certain customers. This would allow commercial customers to finance a system of ~1MW.

**Additional comments on the EBBS**

In reviewing the EBBS and what a revised scheme would look like, the National Treasury approached the AfDB and the IFC to gauge their willingness to be anchor institutions. Anders Pedersen noted that they subsequently met with four banks to discuss the EBBS and their view on what it could look like. He noted that they all had different approaches, and while they were innovative, the banks were more interested in accessing the EBBS for their mortgage book. On the contrary, the AfDB would be more interested in banks creating products and solutions to extend their credit base to customers who they currently don't serve through mortgages – i.e. customers who don't have home loans that they can extend the loan on for a Solar PV system.[108]

---

[107] Walsh et al., *An assessment of funding models to enable rooftop Solar PV investment in South Africa: Part I: Market and gap analysis report*.

[108] Anders Pedersen (African Development Bank), interview by authors, 7 August 2024.

However, if the EBBS were targeted at lower-income households, it would require a complete redesign according to Jochemus Hamman (from Capitec), who questioned the efficacy of a loan guarantee scheme to extend access to Solar PV systems, especially with banks needing to comply with the National Credit Act.[109]

In a follow-up discussion with Vukile Davidson (National Treasury), he noted that the National Treasury is considering targeting the revised EBBS in the commercial and industrial sector, as this sector would allow them to "*get more panels on roofs*" and assist the country in reaching its nationally determined contributions (NDCs). Particularly, they want to focus on the medium and large C&I groups to assist them in reducing their reliance on carbon-intensive energy sources. This will help to future-proof producers against regulations and align with carbon border adjustment mechanisms. Therefore, it seems unlikely the revised EBBS would target households and SMEs at all.[110]

Regardless of the target market of the revised EBBS, Pedersen also questioned whether the AfDB or IFC would be able to provide any meaningful assistance in lowering the cost of credit for the banks, given the National Treasury's reluctance to provide sovereign guarantees. Additionally, the funding that they can provide will likely not have similar terms to the funding and support they would provide to, say, Mozambique, as South Africa is a middle-income country with a well-functioning private financial sector.[111]

**Setting up an EBBS-like mechanism**

If the National Treasury does decide to either change the target market for the revised EBBS or discontinue the scheme, it would be worth implementing a similar programme to Mechanism 1 of the EBBS. In this case, however, the funding would not necessarily have to flow through the SARB, which did cause some difficulties for DFIs in accessing the funds. Regardless, the EBBS has been important in shifting commercial banks' approach to solar asset finance (see below), and a similar mechanism to reduce banks' LGDs could be introduced to further support bank lending until they have a better understanding of the second-hand value of the underlying assets. This model would likely be a risk-sharing facility signed with interested commercial banks and could be funded or unfunded.

### 7.2.2 Option 2: Provide technical assistance to improve the understanding of the LGD of solar assets

Representatives from FirstRand and Investec interviewed noted that one of the factors that was preventing banks from offering or expanding asset-backed finance solutions for Solar PV and energy storage assets was (i) their limited understanding of the residual value of these assets and (ii) the uncertainty around the cost and feasibility of repossessing them in the event of default.

As such, they would appreciate technical assistance to develop the necessary regulatory frameworks and structures for an improved understanding of the risks and "Loss Given Default" (LGD) associated with Solar PV system assets. Ultimately, this would assist them in applying to have the prudential limits that banks follow to manage their risk exposure in the event of a default on a loan, revised or specific limits for Solar PV loans established. In South Africa, the Prudential Authority (PA), a part of the South African Reserve Bank (SARB), is responsible for setting prudential limits and regulations for financial institutions, including those related to LGD.

Cameron Gough, Head of Structuring at FirstRand, noted that several research papers, including some from the prudential authority, estimate that the LGD of solar assets is 100% which makes them difficult to finance. FirstRand has developed decay models and proxy Loss Given Default (LGD) calculations for Solar PV. However, risk

[109] Jochemus Hamman (Capitec), interview by authors, 15 July 2024.

[110] Vukile Davidson (National Treasury), discussion with authors, 15 October 2024.

[111] Anders Pedersen (African Development Bank), interview by authors, 7 August 2024.

calculations and assessments ultimately need to be approved and validated by regulatory bodies like the Prudential Authority within the South African Reserve Bank (SARB).[112]

Travis Clarke (Investec) explained that it is necessary to have an established liquid market for solar assets for them to understand the residuals and value of the asset so that they can be priced properly. However, there is significant uncertainty in the market with both demand (due to the lack of load shedding, increased Eskom tariffs and its potential restructuring, etc.), and supply (increases in import tariffs, further innovation and price decreases, etc.), which makes valuing these assets incredibly difficult.[113]

**Box 1. Importance of being able to accurately estimate the loss given default for Solar PV system assets**

Loss-given default (LGD) can be calculated in two ways:[114]

- Multiply the exposure at default (i.e., the outstanding balance of a loan) by one minus the recovery rate (i.e., the share of the outstanding balance not recovered).
- One minus the ratio of potential sale proceeds to the outstanding balance of a loan.

In the case of Solar PV, the banks are struggling with quantifying the LGD as they are unsure of the recovery rate or value of potential sale proceeds. They therefore assume these to be zero, or near-zero, which significantly increases the LGD (pushing it to 100% or the full outstanding balance if they assume these values to be zero).

The LGD, along with the probability of default, exposure at default, and effective maturity, is used in Basel models (quantitative frameworks and methodologies used by banks to calculate and manage various types of financial risks in alignment with Basel regulatory standards) to calculate risk-weight functions for each asset class.[115] The risk weight is a key element of Basel regulations, as it determines the amount of capital a bank must hold in reserve (i.e., regulatory capital) against its assets. A higher LGD requires banks to retain more capital in reserves, which could otherwise be allocated to other activities, such as funding higher-value, lower-risk loans.

[112] Cameron Gough (First Rand), interview by authors, 22 July 2024.

[113] Travis Clarke (Investec), interview by authors, 24 July 2024.

[114] Alicia Tuovila, "Loss Given Default (LGD): Two Ways to Calculate, Plus an Example," Investopedia, 2023, accessed 04-11-2024, https://www.investopedia.com/terms/l/lossgivendefault.asp.

[115] Bank of International Settlements, "CRE32 - IRB approach: risk components," updated 2023-01-01, 2020, accessed 04-11-2024, https://www.bis.org/basel_framework/chapter/CRE/32.htm.

# 8. Lever 3: Reduce the barriers to export

## 8.1 The rationale for support in this area

**The challenge**

In South Africa, most residential and small business customers with distributed generation are not exporting power to the grid. This is because (i) the current tariff designs for small power users are suboptimal and do not provide sufficient incentive for those who have invested in distributed energy resources (DERs) to export power to the grid and (ii) customers who install DERs are expected to cover the upfront costs of grid connection and the replacement of their existing utility-side electricity meters with smart meters. Under the prevailing export tariffs, which provide credit for power exported to the grid, customers will only be able to recoup the costs after several years.

**Suboptimal tariff design**

Only nine of the 23 largest electricity distributors (by volume of electricity sales) have designed and implemented import and export tariffs for customers who own distributed generation – i.e. to credit customers for the power they export to the grid.[116] While a further ~30 have designed export tariffs, these have not yet been implemented. As a result, there is currently surplus energy that is being generated by DSPV that is wasted and could be "harnessed" if export tariffs were more widely adopted.

In addition, only four of the electricity distributors have designed and implemented ToU-based export tariffs (incl. George, Nelson Mandela Bay, Eskom Dx and Stellenbosch), which are essential to provide price signals that promote the efficient use of DERs. The remaining ~37 distributors that have developed export tariffs (although not yet implemented in many of the municipalities) have set export tariffs at a flat rate.

**Upfront costs of grid connection & meter replacement.**

Customers who have installed distributed generation and want to export power to the grid are expected to cover the upfront costs of grid connection and the replacement of their existing utility-side electricity meters with smart meters. This can cost the customer up to R13 000 incl. VAT (cost varies by municipality), plus installation costs and an additional monthly subscription fee for the management of the meter.[117] Given the suboptimal tariff design, which provides limited credit for power exported to the grid, customers are unlikely to be able to recoup the costs in less than five years.

**Potential benefits**

Enabling customers to export power to the grid is essential for promoting the adoption of Solar PV and BESS, as it supports economically efficient investment in and use of DERs. Compensating DER owners for excess solar energy generated and exported provides an additional revenue stream for households, enhancing the business case to invest in Solar PV and BESS by reducing the payback period.

The predictable income stream provided by export tariffs allows individuals, businesses, and financiers to assess the future returns of Solar PV systems with greater accuracy, thereby reducing the perceived investment risk in

[116] Customers are not compensated with cash for energy exported to the grid. Rather, credits for energy exported merely offset the amount of electricity consumed at a single point of distribution, and is only able to offset the energy portion of the tariff. City of Cape Town is currently the only distributor where by export credits can be offset against fixed charges.

[117] Representatives from the City of Cape Town SSEG team, discussion with authors, 6 September 2024.

distributed Solar PV (DSPV) for all stakeholders. Importantly, some financiers categorise these revenue flows as cash flows to the customer or business, improving their assessment of the bankability of these projects.

If tariffs are designed to ensure that self-generating customers contribute their fair share of fixed costs and preserve the financial health of the utility, then the integration of DERs can benefit distribution system operators. For example, by implementing time-of-use (ToU) tariffs, utilities can encourage customers with DERs, like Solar PV paired with battery storage, to store energy during off-peak hours and export it back to the grid during peak demand times. This helps balance supply and demand, reduces strain on the grid during high-demand periods, and minimises the need to purchase power from expensive peaking power plants, relieving grid pressure and reducing costs for the utility.

We recommend that Development Finance Institutions (DFIs) provide support to reduce the barriers to export, as this could significantly improve the business case for households to invest in Solar PV systems, promote the optimal use of DERs that have already been installed and assist distribution system operators to reduce the cost of distributing electricity.

### 8.1.1 Primary challenges to address

- **Suboptimal tariff design for households and firms that install distributed generation.** Current tariff structures offered by municipal distributors to residential customers are not time-of-use-based and do not provide them with a sufficiently strong financial incentive to use DERs in an economically efficient way. There is little incentive to reduce consumption of grid-supplied power in peak periods, nor to export surplus power to the grid. Tariffs offered to small businesses are often ToU-based but provide very limited incentives to export power to the grid. Owners of distributed generation do currently, however, benefit from the current tariff design whereby the majority of costs are recovered via the volumetric portion of the tariff and fixed costs remain low.
- **Upfront costs of grid connection & meter replacement.** The majority of residential and small business customers who have installed distributed generation are not exporting power to the grid. This is partly because they are expected to cover the upfront costs of grid connection and the replacement of their existing utility-side electricity meters with smart meters, and under a suboptimal tariff design, which provides limited credit for power exported to the grid, they are unlikely to be able to recoup the costs in under 5 to 10 years.

## 8.2 Options to reduce barriers to export

To assist banks in overcoming these challenges, DFIs could:

- **Option 1: Support efforts to develop an advanced metering infrastructure (AMI) strategy and rollout –** The National Energy Crisis Committee in the Presidency has established a workgroup that is focused on developing an advanced metering infrastructure strategy and interventions to accelerate the rollout of smart meters.
- **Option 2: Technical assistance to improve the design of retail tariffs to incentivise owners of DERs to export power to the grid,** and to apply to have the prudential limits that banks follow to manage their risk exposure revised or specific limits for Solar PV loans revised (which dictate the minimum capital reserves banks must hold against these assets). While some banks have developed models to estimate the LGD for Solar PV assets, final approval and validation are required from regulatory bodies like the Prudential Authority within the South African Reserve Bank.

### 8.2.1 Option 1: Support government efforts to develop an advanced metering infrastructure (AMI) strategy and rollout

The National Energy Crisis Committee in the Presidency has established a workgroup that is focused on developing an Advanced Metering Infrastructure strategy and interventions to accelerate the rollout of smart meters.

Seven areas of work have been initiated, including:

- The development of an AMI strategy;
- Unlocking the value of smart meters through specific use cases (e.g., promoting the uptake and optimal use of DERs owned by small power users), which will inform the strategy;
- Creating a repository of AMI information;
- Leveraging the RT29 smart meter contract for accelerated and more coordinated procurement;
- Standardisation of specifications and procurement processes;
- Coordination of efforts to secure funding and to develop innovative financing mechanisms; and
- Facilitation of knowledge sharing and training.

Our recommendation to DFIs interested in promoting the uptake of DERs by reducing barriers to export is to support existing government efforts to develop an AMI strategy. In particular, the work to unlock the value of smart meters in specific use cases, the efforts to secure funding and develop financing mechanisms and the accelerated and coordinated procurement of smart meters.

ESCos interviewed during the study noted that DFIs could potentially assist by providing finance and support for smart meter rollout to households and small businesses most likely to install a Solar PV system. Distribution network operators can raise concessional finance to cover the costs relating to the upfront installation and meter replacement, gradually recouped through the tariff, similar to the recovery process for other network infrastructure investments.

Patrick Narbel from GoSolr noted that the introduction of standardised time-of-use-based tariffs across all municipal distributors (for consumption and export) and financing of the replacement of utility-side meters with smart meters (see section below) would significantly strengthen the financial incentive for households and small businesses to invest in embedded generation. He noted that Norway had recently replaced all three million of its electricity meters with high-quality smart bi-directional meters at an average cost of R3 000 and questioned why these devices cost up to R10 000 in South Africa.[118] He maintains that customers should not be expected to finance infrastructure on the utility side of the meter (including the meter). He noted that while GoSolr is willing to extend finance to customers for the replacement of the utility meter, the utility owns the meter and should ideally finance the smart meter and recover the costs via the tariff, as with all utility infrastructure.

*DFIs that might be willing to contribute to the financing and rollout of smart meters*

Anders Pedersen from the AfDB noted that the cost of smart meter replacement remains a significant barrier to the adoption of Solar PV systems by households. The smaller the system, the larger the share of the upfront cost it represents, with system size typically closely linked to household income – i.e. the poorer households tend to install

[118] Patrick Narbel (GoSolr), interview by authors, 19 September 2024.

smaller systems. As such, the AfDB is working with the National Treasury to explore how DFIs can support smart meter rollout.

### 8.2.2 Option 2: Technical assistance to improve the design of retail tariffs to incentivise owners of DERs to export power to the grid

Representatives of ESCos noted that technical assistance to government and utilities to improve the design of retail tariffs and provide them with an incentive to export (e.g., ToU-based with less restriction on credits for exports) would improve the business case for Solar PV systems.

As discussed in Section 2.3.2, Eskom recently submitted a proposal to NERSA to revise the structure of wholesale and retail electricity tariffs – Eskom Retail Tariff Plan 2025/26.[119]

Eskom's current tariffs are designed so that 90% of its revenue is recovered through a volumetric R/kWh charge, while ~73% of its costs (in 2024/25) are fixed. This tariff is often referred to in the literature as the "distorted two-part tariff" as it is misaligned with the utility's underlying cost structure and results in an inefficient allocation of resources and unstable utility revenues.[120]

The Eskom Retail Tariff Plan 2025/26 was made available for public comment on the 7th of November 2024, and comments are due by the 17th of December. NERSA will then consider the comments and publish the approved tariffs that Eskom can implement on the 30th of January 2025.[121] The Eskom Retail Tariff Plan 2025/26 proposes to increase the proportion of revenue it recovers through fixed charges to ~13% up from 10% and reduce the proportion it recovers through the volumetric charges (usually expressed in R/kWh) from 90% to ~87% (Figure 1).[122] To facilitate the transition to a wholesale electricity market, Eskom is proposing the gradual introduction of higher fixed tariff charges and unbundling tariffs into separate generation, distribution, and transmission charges. It also proposes to update the ToU ratios and periods and remove the inclining block tariff structure for residential customers currently on Homepower and Homelight tariffs.

In most municipalities in South Africa, electricity consumers who export power to the grid are only credited up to the amount of electricity they consume, meaning any surplus they export beyond that has little or no value. Patrick Narbel from GoSolr noted that if consumers were compensated for all the power they export to the grid, it would fundamentally change the way they build their installations and would enable them to start profitably serving the lower-middle-income market without any additional financial support.

Although there is a need to improve the design of retail tariffs, this is a complex task involving several stakeholders, including Eskom Generation, Transmission and Distribution, municipal electricity distributors, NERSA and electricity consumers.

There is currently a workgroup within NECOM in the Presidency (Workgroup 2) that is focused on enabling private generation and one of the projects they are working on is (i) how to redesign tariffs for large power users and potentially introduce additional pricing or procurement mechanisms to promote economically efficient investment in and utilisation of, distributed energy resources (DERs) and (ii) how to redesign tariffs for higher consumption small power users (those consuming an average of >450kWh per month) and potentially introduce additional

---

[119] Eskom, *Eskom Retail Tariff Plan: Proposed changes to Eskom Standard Tariffs for implementation in 2025/26*.

[120] Ros, *Volumetric Residential Rates: Socially Regressive or Progressive*.

[121] Eskom, "The National Energy Regulator of South Africa (NERSA) publishes Eskom's revenue application for the next three financial years (FY 2026 to 2028)," news release.

[122] Eskom, *Eskom Retail Tariff Plan: Proposed changes to Eskom Standard Tariffs for implementation in 2025/26*.

pricing mechanisms to promote economically efficient investment in, and utilisation of, distributed energy resources (DERs).

Our recommendation to DFIs interested in promoting the uptake of DERs by reducing barriers to export is to support existing efforts to improve the design of retail tariffs by providing technical assistance.

# References


AfDB, ADB, AIIB, EBRD, EDFI, EIB, IDBG, ICD, and IFC. *Dfi Working Group on Blended Concessional Finance for Private Sector Projects: Joint Report, March 2023 Update*. (2023). https://www.ifc.org/content/dam/ifc/doc/mgrt/2023-03-dfi-bcf-joint-report.pdf.

https://www.afdb.org/en/projects-and-operations/financial-products/african-development-bank/loans.

Asian Development Bank. *Framework Financing Agreement (Ind: Solar Rooftop Investment Program)*. (2016). https://www.adb.org/sites/default/files/project-documents//49419-001-ffa.pdf.

https://www.bis.org/basel_framework/chapter/CRE/32.htm.

Bank, World. *Accelerating the Market Transition for Distributed Energy: Environmental and Social Systems Assessment*. (2024). https://documents1.worldbank.org/curated/en/099922202022432847/pdf/IDU1ac6ee3cc1909199dd112bc1060a57a.pdf.

———. "Türkiye - Europe and Central Asia Renewable Energy Scale-up Program (Ecares) Program Using the Multiphase Programmatic Approach (Mpa) - Chair Summary." news release, 2024, https://documents1.worldbank.org/curated/en/099032824171027923/pdf/BOSIB14ea43038001ac22120d0af58f0f9.pdf?_gl=1*yh6okl*_gcl_au*MTQwODQ0NzE2OS4xNzIzNzExODQ5.

———. "World Bank and Türkiye Sign Agreement for $1 Billion Program to Support Renewable Energy Expansion Efforts." news release, 2024, https://www.worldbank.org/en/news/press-release/2024/05/27/world-bank-and-t-rkiye-sign-agreement-for-1-billion-program-to-support-renewable-energy-expansion-efforts.

Brederode, William. "Distressed Solar Company Stung after Sharp Cooldown in a Sizzling Sa Market." *News24*, 2024. https://www.news24.com/fin24/companies/distressed-solar-company-stung-after-sharp-cooldown-in-a-sizzling-sa-market-20240814.

Clean Energy Finance Corporation. *Cefc Investment Policies*. (Australian Government, 2024). https://www.cefc.com.au/document?file=/media/xc2f42tt/cefc-investment-policies-2024.pdf.

https://www.cefc.com.au/case-studies/doors-open-for-westpac-customers-to-boost-home-sustainability/.

———. *New Capital, New Ambition (Annual Report 2022-23)*. (Australian Government, 2023). https://www.cefc.com.au/document?file=/media/l4igzbpf/cefc_ar23_web_sml.pdf.

https://racefor2030.com.au/home-retrofits-would-cut-energy-use-increase-comfort-of-australian-homes-new-study/.

https://www.cefc.com.au/where-we-invest/special-investment-programs/household-energy-upgrades-fund/.

https://www.cefc.com.au/case-studies/plenti-and-cefc-team-up-with-low-cost-finance-to-lift-household-sustainability/.

https://www.cefc.com.au/where-we-invest/.

https://www.dbsa.org/program-fund/global-environment-facility.

Eskom. *Eskom Retail Tariff Plan: Proposed Changes to Eskom Standard Tariffs for Implementation in 2025/26*. (2024). https://www.eskom.co.za/distribution/wp-content/uploads/2024/11/20240918-Final-Application-to-NERSA_-Eskom-Retail-Tariff-Plan-2025.pdf.

———. "The National Energy Regulator of South Africa (Nersa) Publishes Eskom's Revenue Application for the Next Three Financial Years (Fy 2026 to 2028)." news release, 2024, https://www.eskom.co.za/the-national-energy-regulator-of-south-africa-nersa-publishes-eskoms-revenue-application-for-the-next-three-financial-years-fy-2026-to-2028/.

Green Climate Fund. *2023 Annual Performance Report for Fp098: Dbsa Climate Finance Facility*. (2024). https://www.greenclimate.fund/document/2023-annual-performance-report-fp098-dbsa-climate-finance-facility.

Labuschagne, Hanno. "Good News for Solar Loans in South Africa." *MyBroadband*, 2024. https://mybroadband.co.za/news/energy/556913-good-news-for-solar-loans-in-south-africa.html.

Mahlaka, Ray. "Eskom Wants an Increase in Electricity Tariffs of up to 44% Next Year." *Daily Maverick*, 2024. https://www.dailymaverick.co.za/article/2024-06-20-eskom-wants-an-increase-in-electricity-tariffs-of-up-to-44-next-year/.

"Discovery Bank Promises Customers 48-Hour Solar Power Installations." MyBroadband, 2023, https://mybroadband.co.za/news/energy/505172-discovery-bank-promises-customers-48-hour-solar-power-installations.html.

National Transmission Company of South Africa. *Weekly System Status 2024 Week 34*. (2024). https://www.ntcsa.co.za/wp-content/uploads/2024/08/Weekly_System_Status_Report_2024_w34.pptx.

National Treasury of South Africa, and South African Revenue Service. *Tax Statistics 2023*. (2023). https://www.sars.gov.za/wp-content/uploads/2023-Tax-Statistics-Main-Publication-compressed.pdf.
"Household Energy Upgrades Fund (Heuf)." https://www.plenti.com.au/heuf-discounted-green-loans/.
Ros, Agustin J. *Volumetric Residential Rates: Socially Regressive or Progressive*. (Presented at the Harvard Electricity Policy Group: 2019). https://www.brattle.com/wp-content/uploads/2021/05/16563_volumetric_residential_rates_-_socially_regressive_or_progressive.pdf.
"Sapvia Solar Pv Installed Capacity Data Dashboard." SAPVIA, 2024, http://sapvia.co.za/dataportal.
The Presidency: Republic of South Africa. "Energy Action Plan - Six Month Update - January 2023." 2023. https://www.thepresidency.gov.za/content/update-energy-action-plan-january-2023.
———. *Energy Action Plan: Update: December 2022*, 2022.
TSKB. Accelerating the Market Transition for Distributed Energy Program: Terms of Reference (Tor) for the Independent Verification Agent (Iva) Stage 1. 2024.
"Loss Given Default (Lgd): Two Ways to Calculate, Plus an Example." Investopedia, 2023, accessed 04-11-2024, https://www.investopedia.com/terms/l/lossgivendefault.asp.
Walsh, Kay, Jessica Kiln, Jaco Nel, and Peter Meihuizen. *An Assessment of Funding Models to Enable Rooftop Solar Pv Investment in South Africa: part I: Market and Gap Analysis Report*. Nova Economics (2024).
Walsh, Kay, Jaco Nel, Jessica Kiln, Mohammed Allie Ebrahim, and Joslin Lydall. *A Pre-Feasibility Study to Assess the Options for Eskom to Accelerate the Uptake of Distributed Energy Resources - Part I: Rooftop Solar Pv and Storage*. (2023).
"A Loan to Make Your Home More Sustainable." 2024, https://www.westpac.com.au/personal-banking/home-loans/sustainable-upgrades-home-loan/.
World Bank. *Additonal Financing: Rooftop Solar Programme for Residential Sector*. (2022). https://documents1.worldbank.org/curated/en/339041656371255291/pdf/India-Rooftop-Solar-Program-for-Residential-Sector-Project-Additional-Financing.pdf.
———.

# Appendix A. List of stakeholders interviewed

**Table 7. List of stakeholders interviewed**

| Stakeholder | Representatives | Stakeholder type | Meeting date |
|---|---|---|---|
| **Part I – Market and gap analysis** | | | |
| SAPVIA | De Wet Taljaard | Industry association/expert | Friday, 28th June |
| National Treasury | Vukile Davidson | Government institution | Monday, 8th July |
| Capitec | Jochemus Hamman | Commercial bank | Monday, 15th July |
| WeTility | Vincent Maposa | Energy services company | Monday, 15th July |
| Mzansi Clean Energy Capital | Jackline Okeyo | Energy services company | Monday, 15th July |
| Sasfin/Sunlyn | Michael Moses | Commercial bank | Tuesday, 16th July |
| VersofySolar | Ross Mains-Sheard | Energy services company | Tuesday, 16th July |
| FirstRand | Cameron Gaugh, Bhulesh Singh, and Amit Mohanlal | Commercial bank | Monday, 22nd July |
| Investec | Travis Clarke | Commercial bank | Wednesday 24th July |
| Catalyst Solutions | Joslin Lydall | Industry association/expert | Tuesday, 30th July |
| African Development Bank | Anders Pedersen | Development Finance Institution | Wednesday, 7th August |
| ABSA | Rashveer Manilal, Portia Letlape, and Amelia Dieperink | Commercial bank | Wednesday, 7th August |
| IDC | Stuart Bartlett, Christo Fourie, Nell Grobbelaar, Calvany Roger, and Sonja Loggenberg | Local DFI | Wednesday, 7th August |
| Standard Bank (Retail) | Clive Spitz and Tony Anderson | Commercial bank | Tuesday, 20th August |
| GoSolr | Patrick Narbel | Energy services company | Thursday, 19th September |
| **Part II – Possible solutions** | | | |
| Standard Bank (CIB) | Rentia van Tonder | Commercial Bank | Thursday, 10th October |
| Development Bank of South Africa (DBSA) | Harold Mogale and Precious Nke | Local DFI | Monday, 7th October |
| Industrial Development Corporation (IDC) | Sonja Loggenberg, Christo Fourie and Stuart Bartlett | Local DFI | Wednesday, 13th November |
| KfW | Carla Rooseboom | International DFI | Monday, 5th August |
| IFC | Heidi Akran | International DFI | Wednesday, 23rd October |
| KfW DEG | Anne Keppler | International DFI | Wednesday, 9th October and Tuesday 22nd October |
| Wetility | Tau Chimanga | Energy services company | Monday, 28th October |

# Appendix B. Types of support that selected DFIs provide

In proposing solutions, we were cognisant of the type of support that DFIs provide in terms of their respective mandates. A brief description of the DFIs and their funding mandates is provided in Table 8.

**Table 8. Entities Development Finance Institutions would support, and the typical support they provide**

| DFI | Overview of the support they provide |
|---|---|
| **KfW** | KfW is a German development bank. It is purely government-funded and typically provides support to **public sector institutions**, for example, the sovereign, local development finance institutions, or local government. Although KfW can lend to an SPV, it can only do this if there is a public shareholding in the SPV; if an entity is 100% privately owned, this would fall outside of KfW's mandate. However, KfW would be wary of lending to an SPV due to the added layer of complexity and evidence of previous SPVs that did not distribute the funds. |
| **KfW DEG** | KfW DEG is a subsidiary of KfW Development Bank, which offers financing, advice, and support to **private sector enterprises** operating in developing and emerging-market countries. DEG is exclusively capital market funded and therefore needs to generate a return on its investments. This leads to DEG being more risk-averse and acting very much on similar terms to commercial banks.[123] |
| **World Bank IBRD** | The IBRD, often referred to as the "World Bank" itself, focuses on lending to **sovereign governments or government-backed projects** to support large-scale public projects. Its goal is to reduce poverty and support infrastructure, healthcare, education, and climate resilience initiatives within developing countries. |
| **World Bank IFC.** | The World Bank's IFC is organised into several departments that target support and finance to various **private sector projects** across various industries and regions. Heidi Akran from the **IFC (infrastructure and natural resources division)** noted that they have traditionally focused on supporting large-scale infrastructure projects. While they understand distributed energy resources have a role to play in displacing some centralised generation at the least cost, they don't believe they are well-placed to finance small-scale systems.[124] She noted that **the Financial Institutions Group (FIG)** can provide support for rooftop solar to residential and small businesses; however, they do this by providing loans to commercial banks, who are more familiar with the credit risk of these customers. |
| **AfDB** | The African Development Bank can extend both sovereign and non-sovereign loans. They can lend to Regional Member Countries (on both loan types), public enterprises (with or without the support of the sovereign), multinationals (on sovereign terms, with the support of the sovereign), and private entities (non-sovereign loans) – i.e., **public and private entities**.[125] However, they doubt they would be able to provide sufficient support to reduce the commercial cost of finance if no sovereign guarantee is provided.[126] |

Source: Nova Economics

[123] Anne Keppler (DEG), interview by authors, 25 October 2024.
[124] Heidi Akran (IFC), interview by authors, 23 October 2024.
[125] African Development Bank Group, "African Development Bank (ADB) Loans," (2019-06-24T18:08+00:00), https://www.afdb.org/en/projects-and-operations/financial-products/african-development-bank/loans.
[126] Anders Pedersen (AfDB), interview by authors, 7 August 2024.