

South African Renewables Initiative

October 2011



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Trade and Industry

Renewable programs globally are driven by industrial policy as well as clean energy goals

Ontario – seeking to become the ‘silicon valley of renewables’ aim to create 50,000 jobs in first three years of feed-in-tariff.

Germany – “Ecological Industrial Policy” provided feed in tariff, capital subsidy – over 275,000 jobs, 400,000 expected by 2020.

Brazil – Since 1970s Proalcohol Bioethanol strategy for energy security and job creation.

India – Solar mission aims to generate 20GW from solar by 2022, for energy security and to create favourable conditions for solar thermal manufacturing

China - Plans for 500GW renewables (mainly hydro and wind) by 2020. Local content rules enabled build up of wind industry over past 10 years, recently removed.



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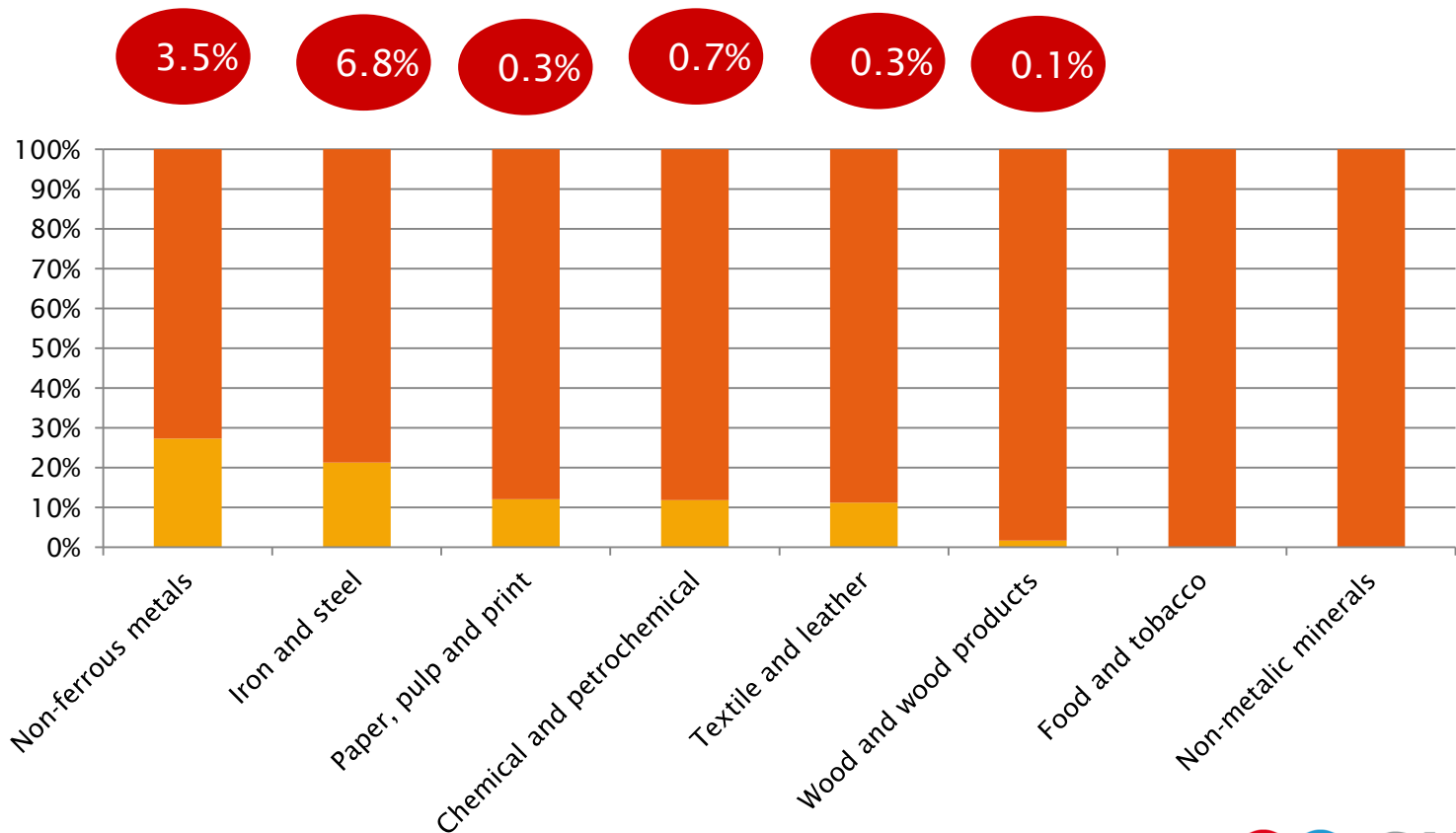
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R85 billion of South African energy intensive exports are vulnerable to the threat of R2.7bn of carbon border tariffs

Vulnerability to potential carbon border taxes, 2020

Effective ad valorem tax rate on vulnerable export categories (US/EU average)

% of total (world) exports vulnerable to US and EU border carbon adjustments



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IISD analysis: Based on 2009 trade data. Assumes border charge of USD 20/ tonne.



SARi's objective is to catalyse a critical mass of investment in renewable capacity to support fleet procurements.

Intra-
governmental
initiative

Lead and supported by the Department of Trade and Industry, Department of Energy and the Department of Public Enterprises.

Aim

To catalyse South Africa towards a green growth pathway.

Objective

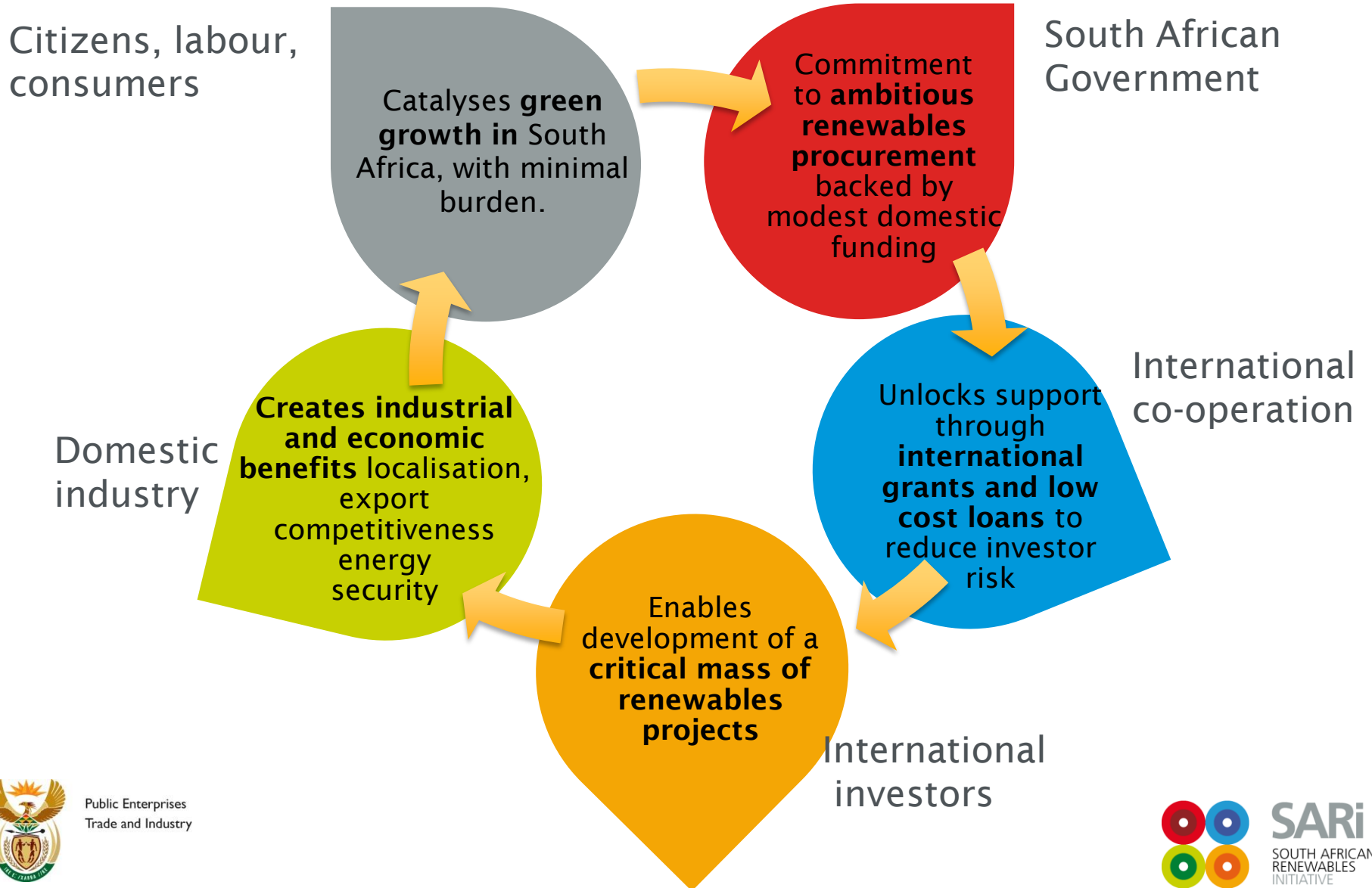
To design and facilitate the establishment of the **financing arrangements** needed to enable a critical mass of renewables to be developed, without incurring unacceptable incremental cost burdens on South Africa.



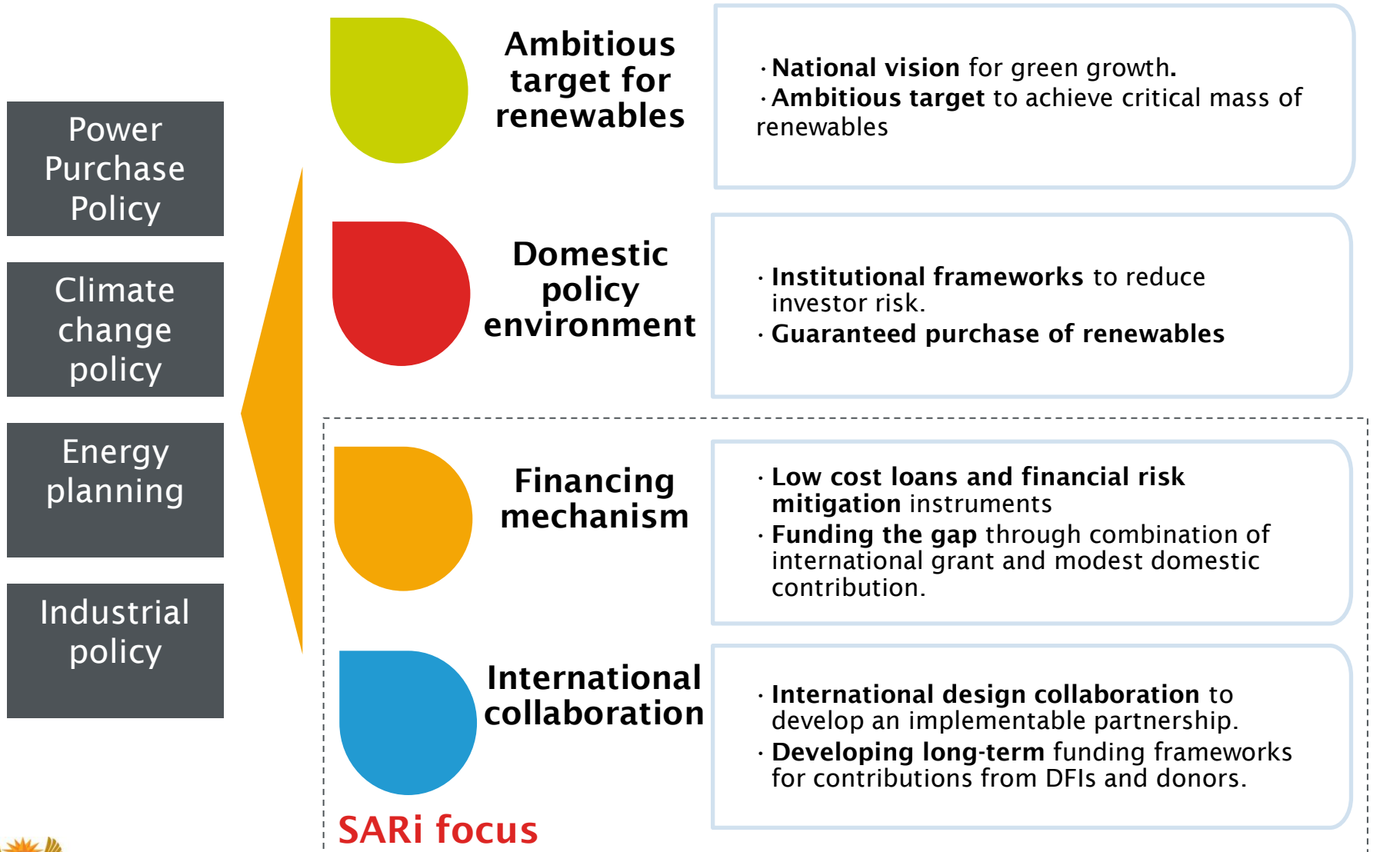
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The South African Renewables Initiative (SARi) unlocks public and private, domestic and international funding to scale up renewables

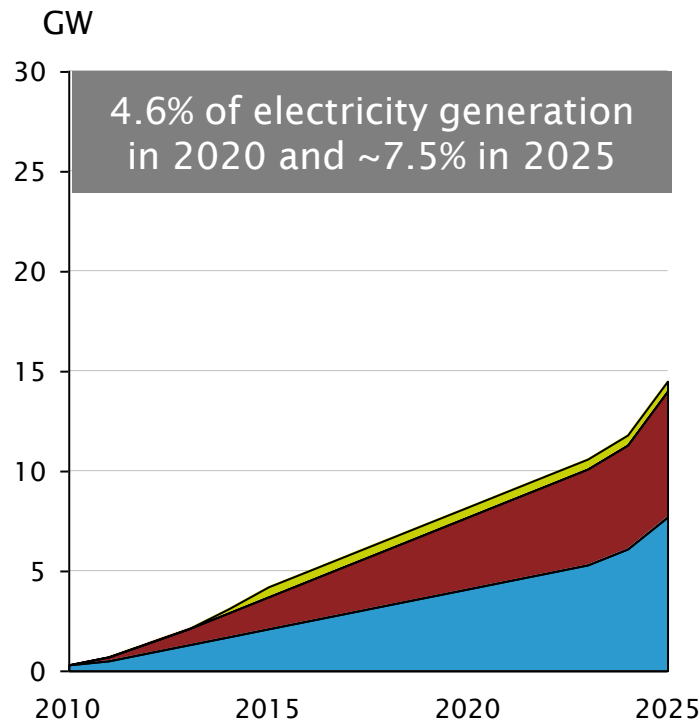


It is important to locate SARi in a broader policy context

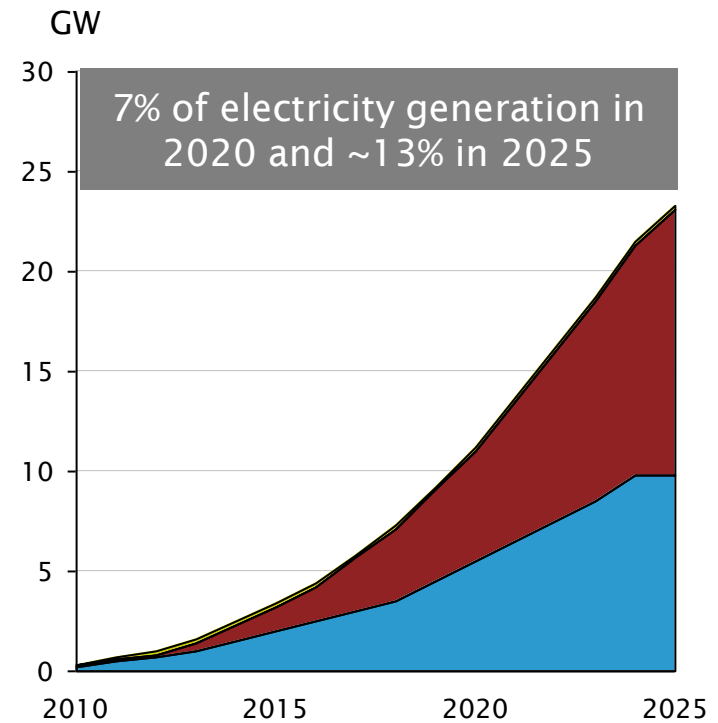


A financing model has been developed to meet or exceed current IRP2 scenario

IRP2 scenario



SARi 'ambitious' scenario

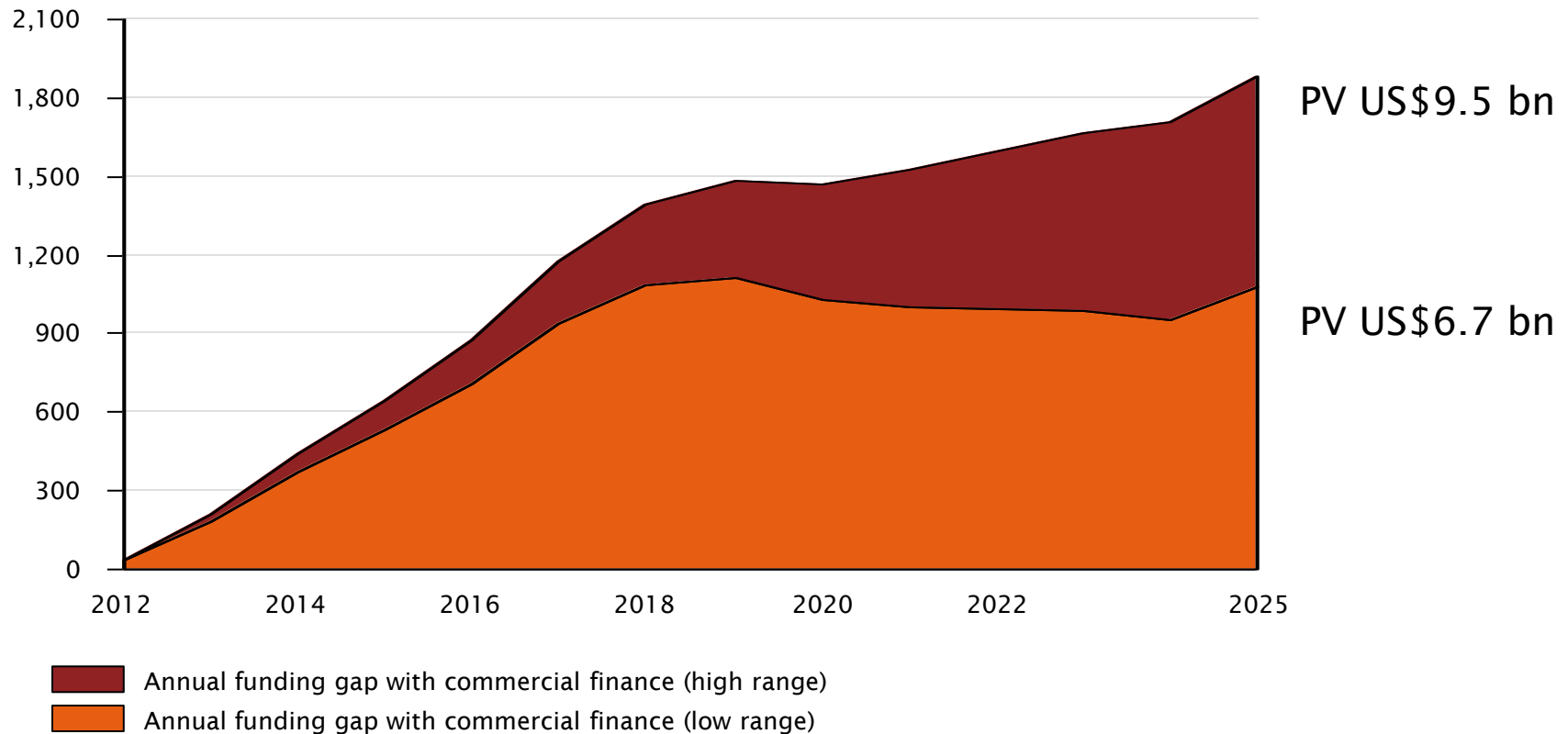


Other Solar Wind



Incremental funding gap of US \$ 6.7 -9.5 billion to reach the ambitious scenario of 23 GW of renewables by 2025

Annual incremental funding gap (\$m) to build up to an ambitious level of renewables (23GW by 2025)



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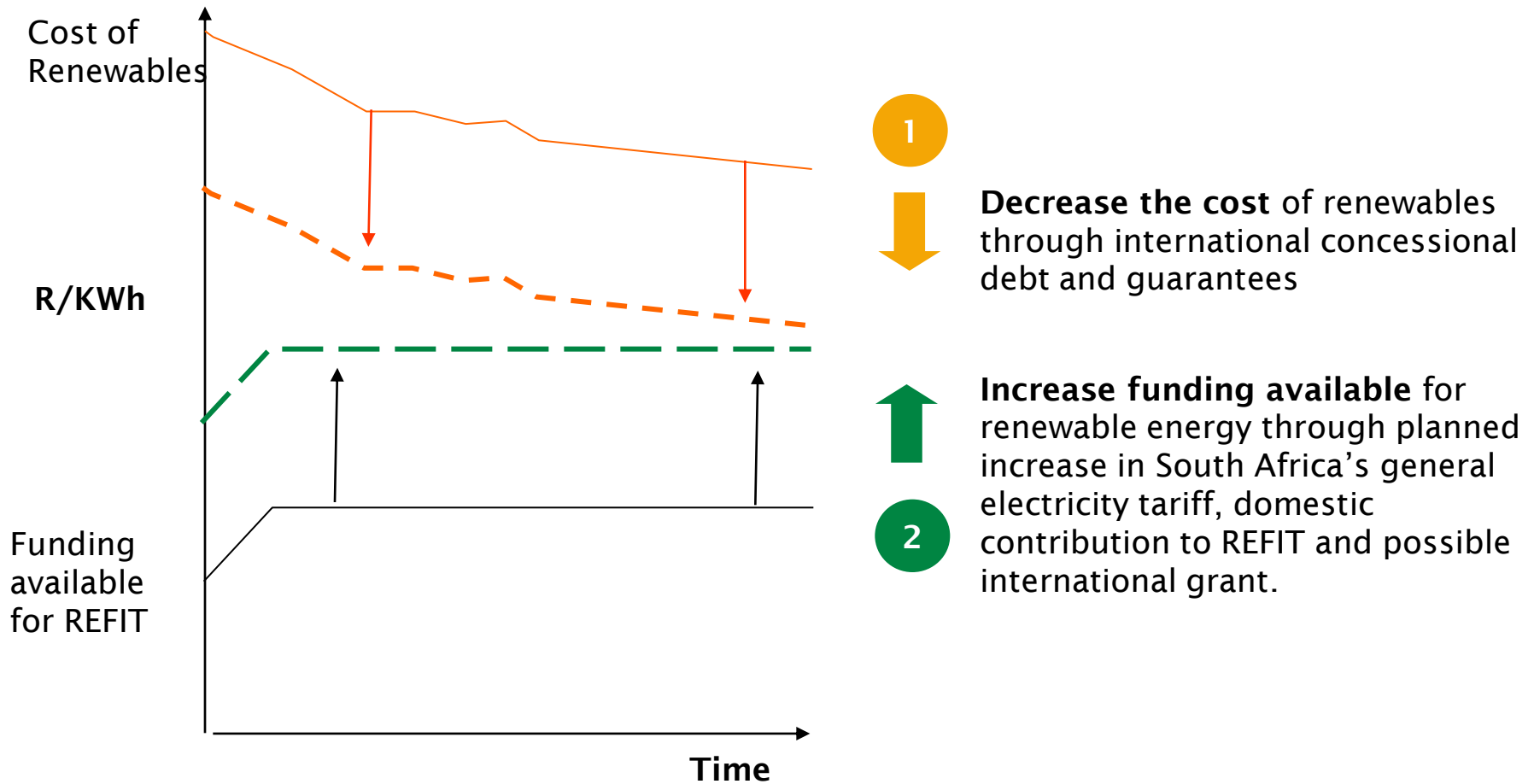
Note: Cash flows discounted at 6% p.a.

Source: Marquard et al (2008); IRP2; LTMS 1 (2007); EIA (2007); E-on UK; EIA Annual Energy Outlook (2010); Lazard (2010); NREL (2009); US DOE (2009); expert interviews; SARI model v2.1.8; team analysis



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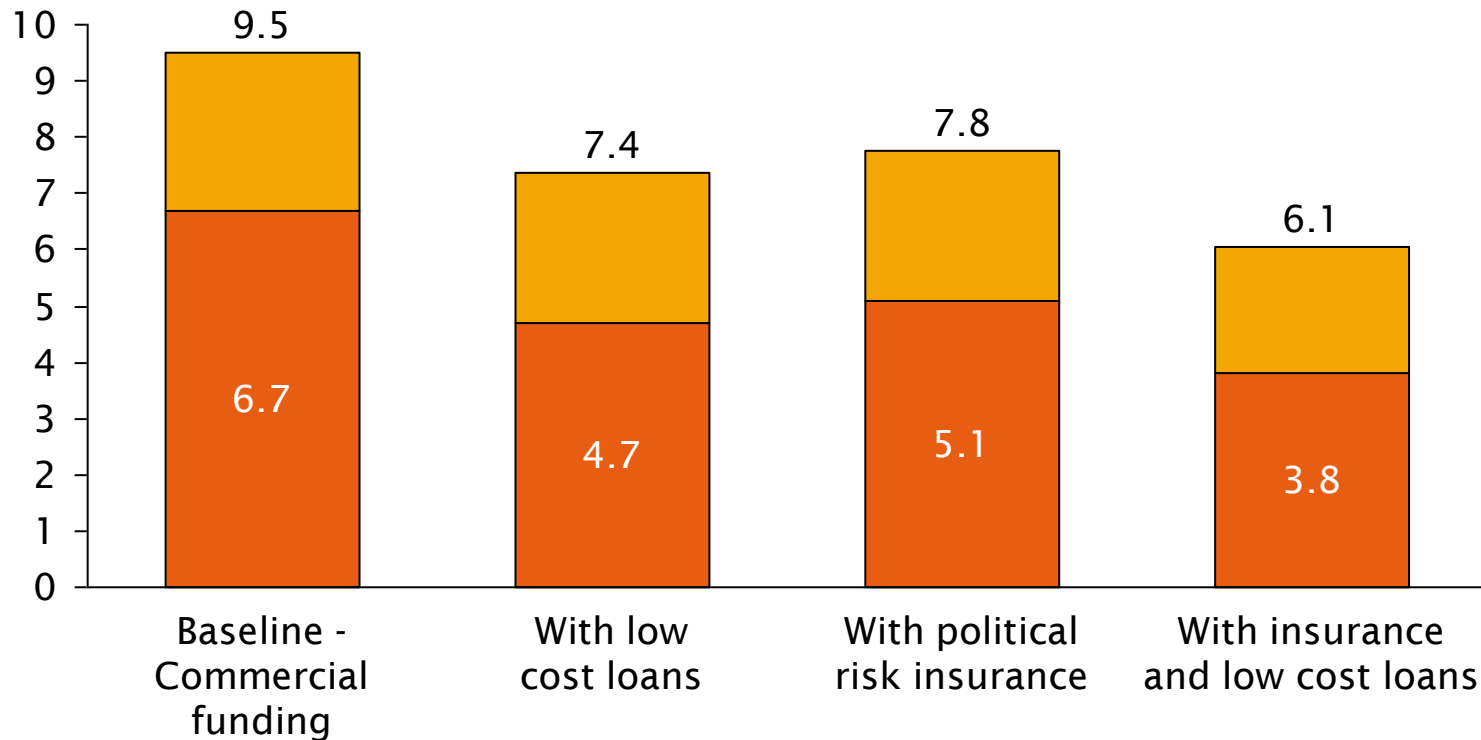
SARi's financing strategy involves bringing down the cost of capital for renewables and providing additional funding for the REFIT.



1

Low cost loans and political risk insurance can reduce the renewable premium to between \$3.8 – 6.1 billion

PV of total funding gap 2012 to 2025 US\$bn



Assumptions: (1) Low cost loans reduce rate from 11.5% to 8.5% nominal, (2) 8.5% nominal cost of low cost loans includes 2.5% hard currency denominated borrowing cost and 6% ZAR hedging cost; (3) Political risk insurance reduces cost of equity by 3% after netting purchase cost (4) low cost loans and insured equity used to bring overall return on capital up to equity hurdle rates of 20% in pioneering phase, and 15% in mature phase. Low cost loans are at 8.5%, which would potentially allow for loans to developers not intermediated by government.

Source: Expert interviews; team analysis; SARI model v2.1.8



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2

There are three potential sources of funding to increase the price paid for renewables

Domestic contribution

Fiscal Contribution

- Domestic contribution from the fiscus recognising the national energy portfolio, economic growth and job creation and industrial development benefits derived from achieving scale with international support.

Green Purchase Obligation

- Purchase of “green energy” to make energy intensive exporters compliant with trade partner carbon requirements.

International contribution

Grant funding

- Pay-for-performance climate related grant funding to cover the incremental costs of climate mitigation based on cost-effective carbon mitigation mechanism.

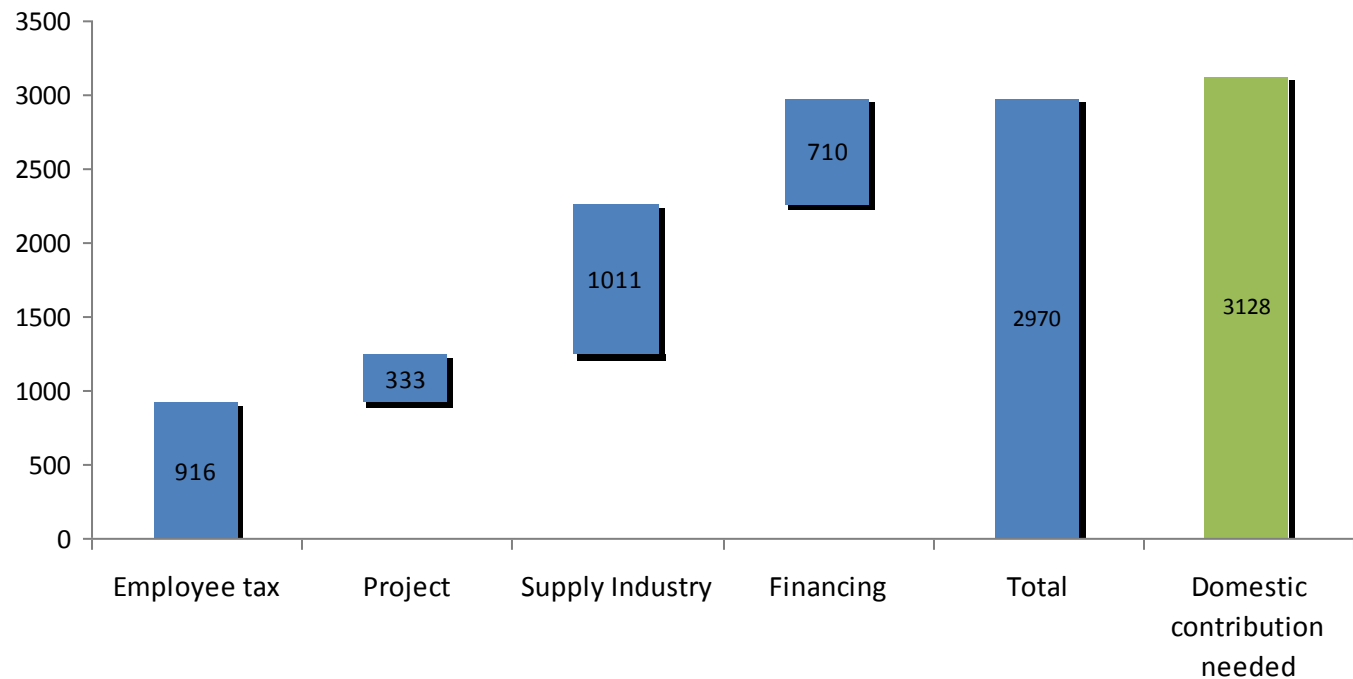


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A potential formula for the domestic contribution is based on the principle of achieving fiscal neutrality over the medium term.

PV of tax revenue and domestic SARI costs, 2012 - 2025 \$m

Illustrative



Future taxes are an elegant means of quantifying government's obligation to support economic growth



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Note: (1) This is not incremental tax revenue compared to a baseline of installing coal, but total revenue
(2) PV calculated at a discount rate of 6%

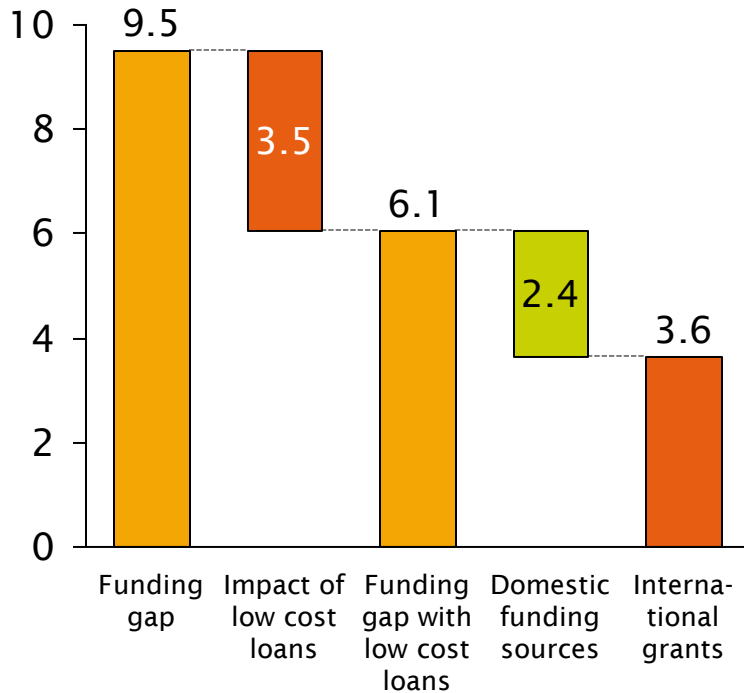
Source: SARi model v10.1; expert interviews; desk research; team analysis



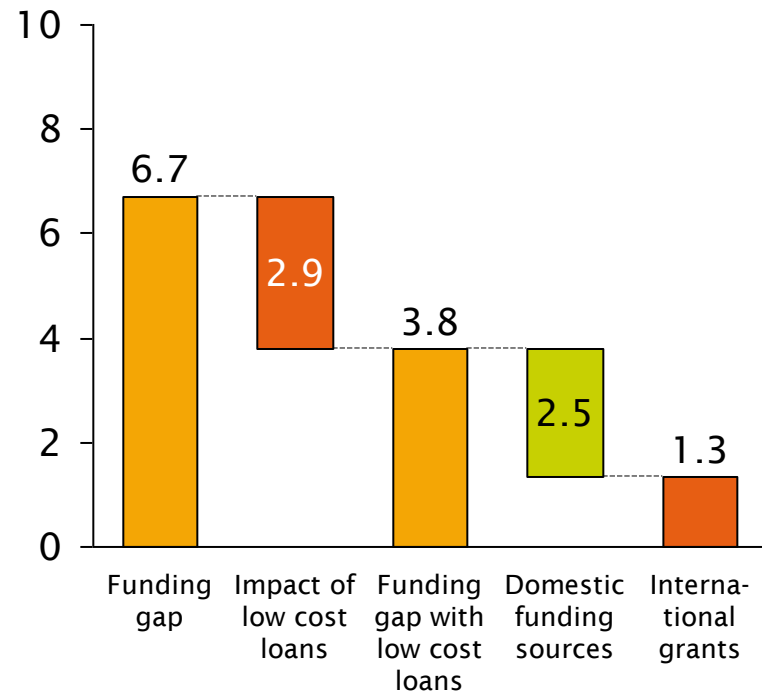
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One solution is to combine domestic contribution up to neutral impact condition with international grants

PV of funding needed from 2012 to 2025, Upper range, \$bn



PV of funding needed from 2012 to 2025, Lower range, \$bn



International sources
Domestic sources



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Source: Team analysis; SARI model v2.1.8

Concessionary and commercial finance could be blended in three phases towards commercial maturity



Risk profile

- High policy and institutional uncertainty
- Policy, Institutional Alignment; Residual technology risks
- Mature markets, institutions; technologies

Description

- Support from low cost loans to provide base capital, build investor confidence, institutional capacity and mitigate political risks
- Low cost loans needed to support technologies not yet at grid parity
- Commercially viable markets, institutional and policy risks normalized to levels of mature, active markets

Type of debt

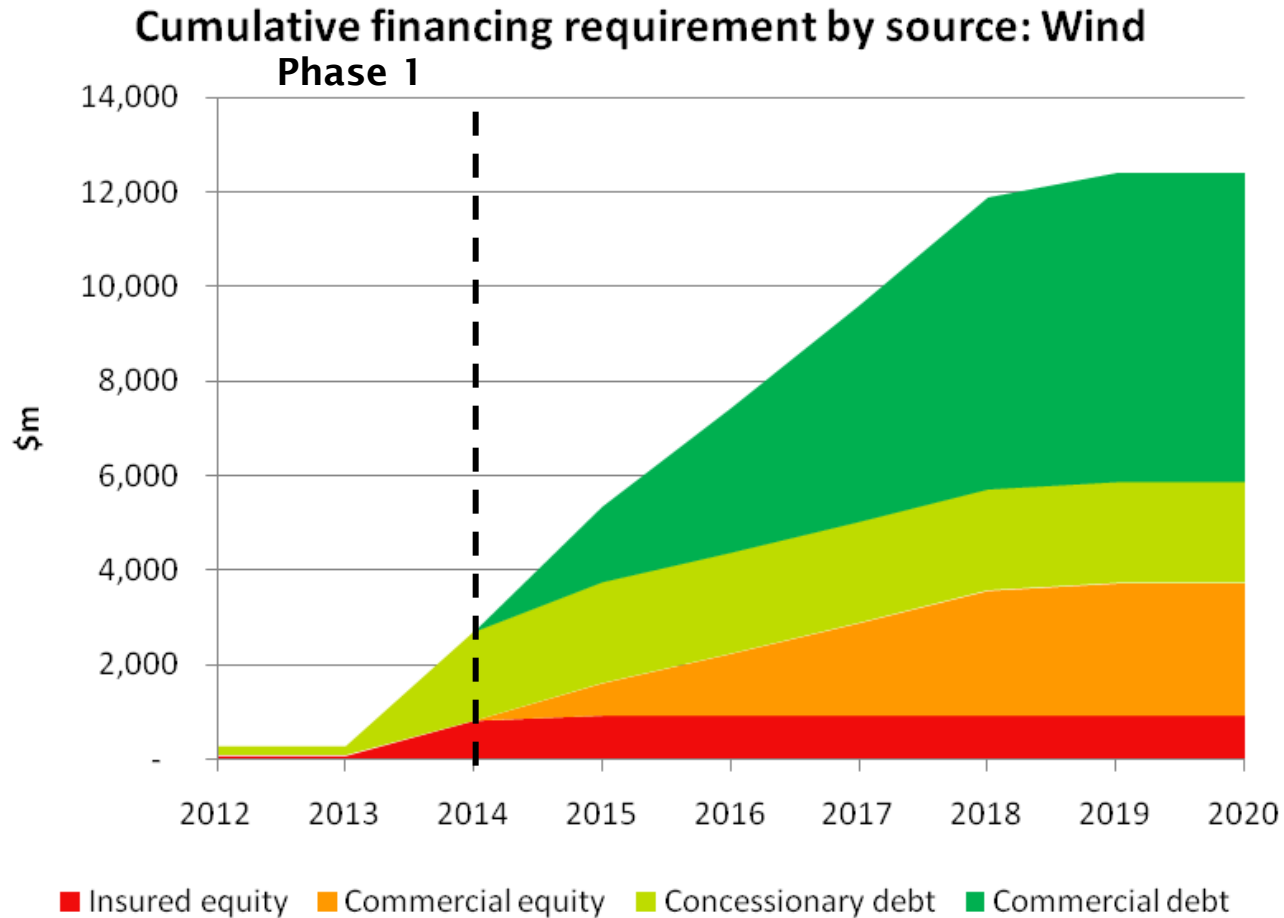
- Low cost loans
- Low cost loans withdrawing, commercial competing
- Pure commercial

Type of equity

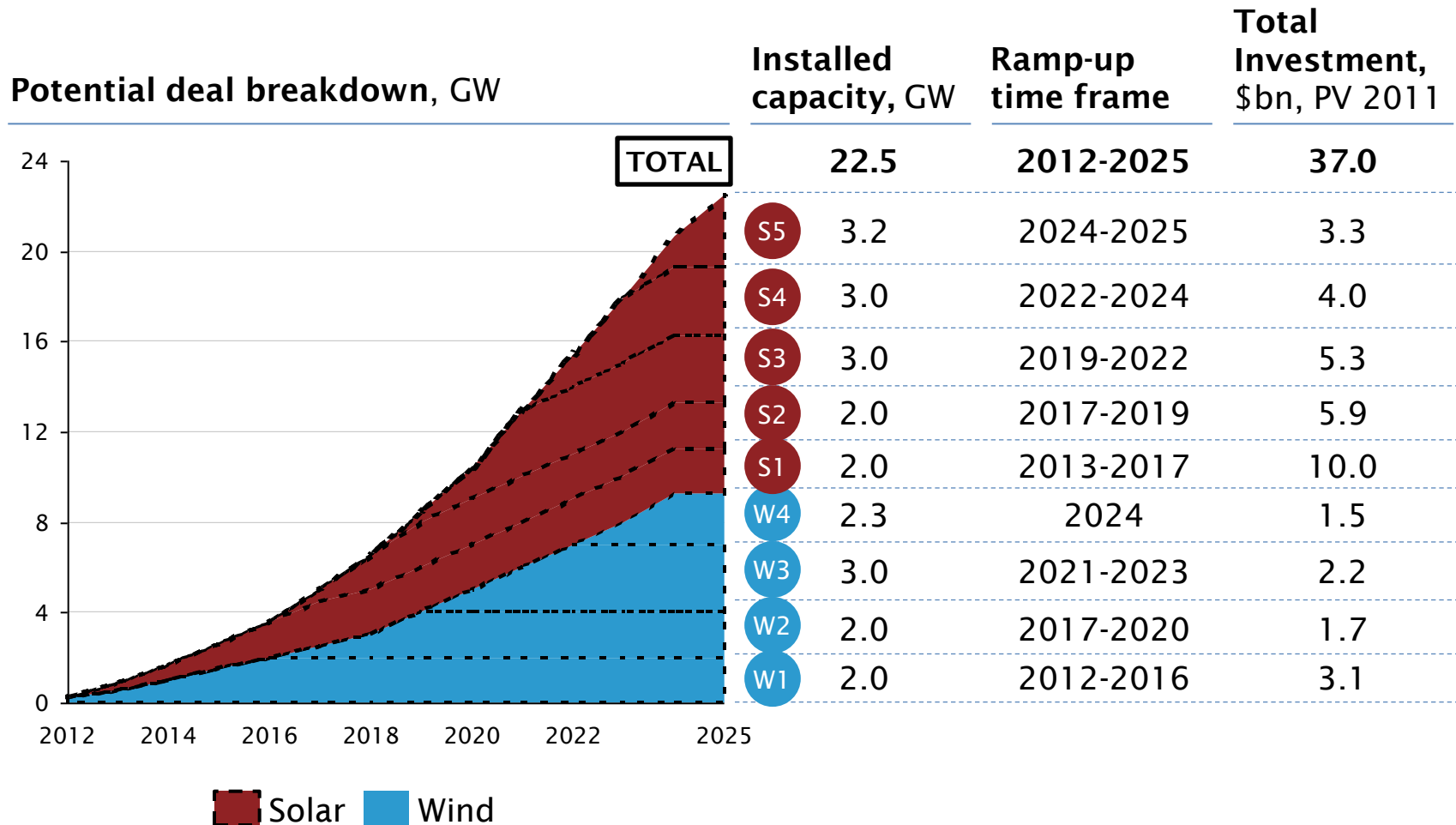
- Insured against political risk, venture / high risks
- Managed / institutional risks
- Institutional / infrastructure risks



After initial support, wind moves rapidly to grid parity and commercial viability – hence wind is a good place to start...



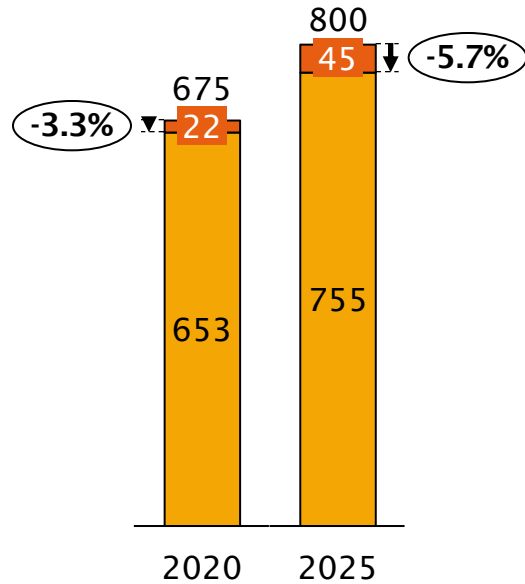
In practice, funding will come through a series of deals.



SARi drives significant environment benefits at low costs

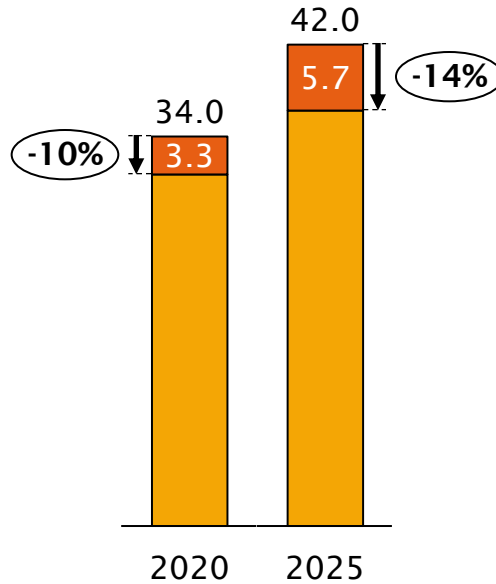
 SARi impact

Business as Usual emissions in SA, MtCO₂e



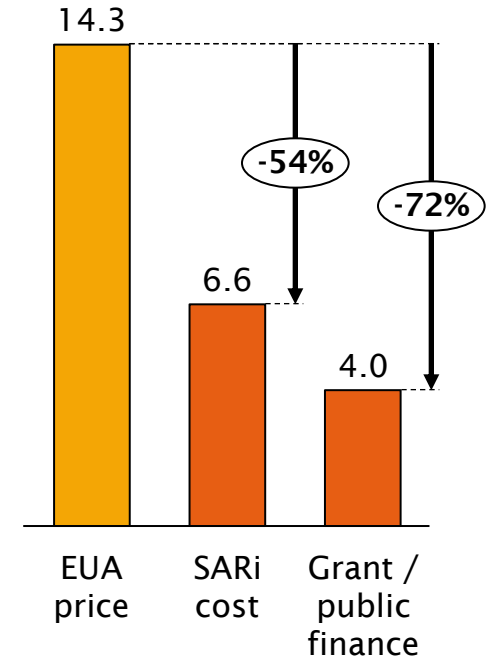
Reduces around ~6% of BAU emissions once fully ramped up

Copenhagen Accord target, % of BAU emissions



Contributes 10-14% of Copenhagen Accord targets

Cost of GHG mitigation, EUR/tCO₂e



Reduces emissions 72% cheaper than carbon market prices



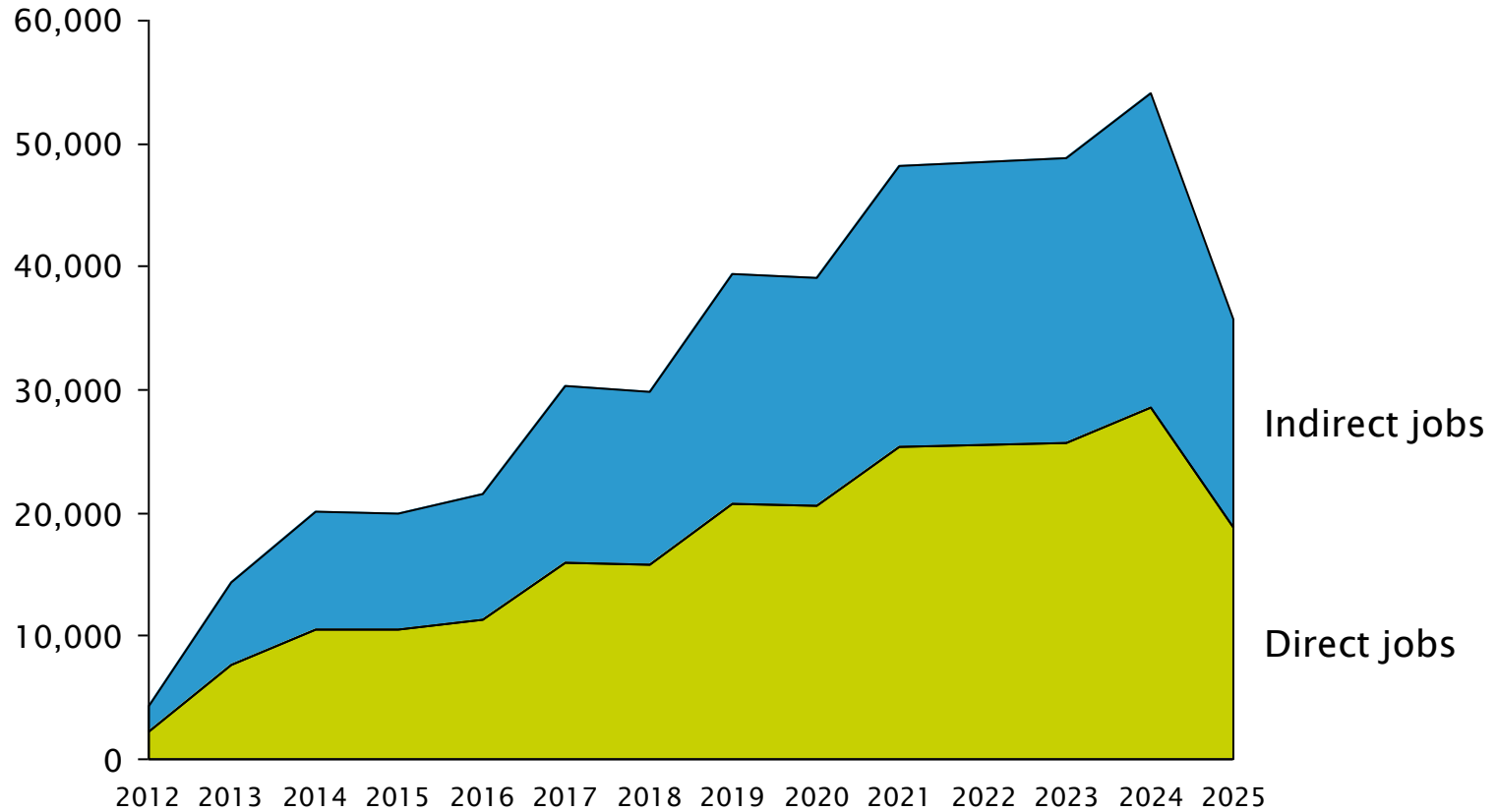
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* EUA prices from www.pointcarbon.com. January 2010
Source: LTMS; Expert interviews; team analysis; SARi model v2.1.8



By 2020-2025, 40,000-54,000 jobs created per year

Local Job creation over time



(1) Localization :

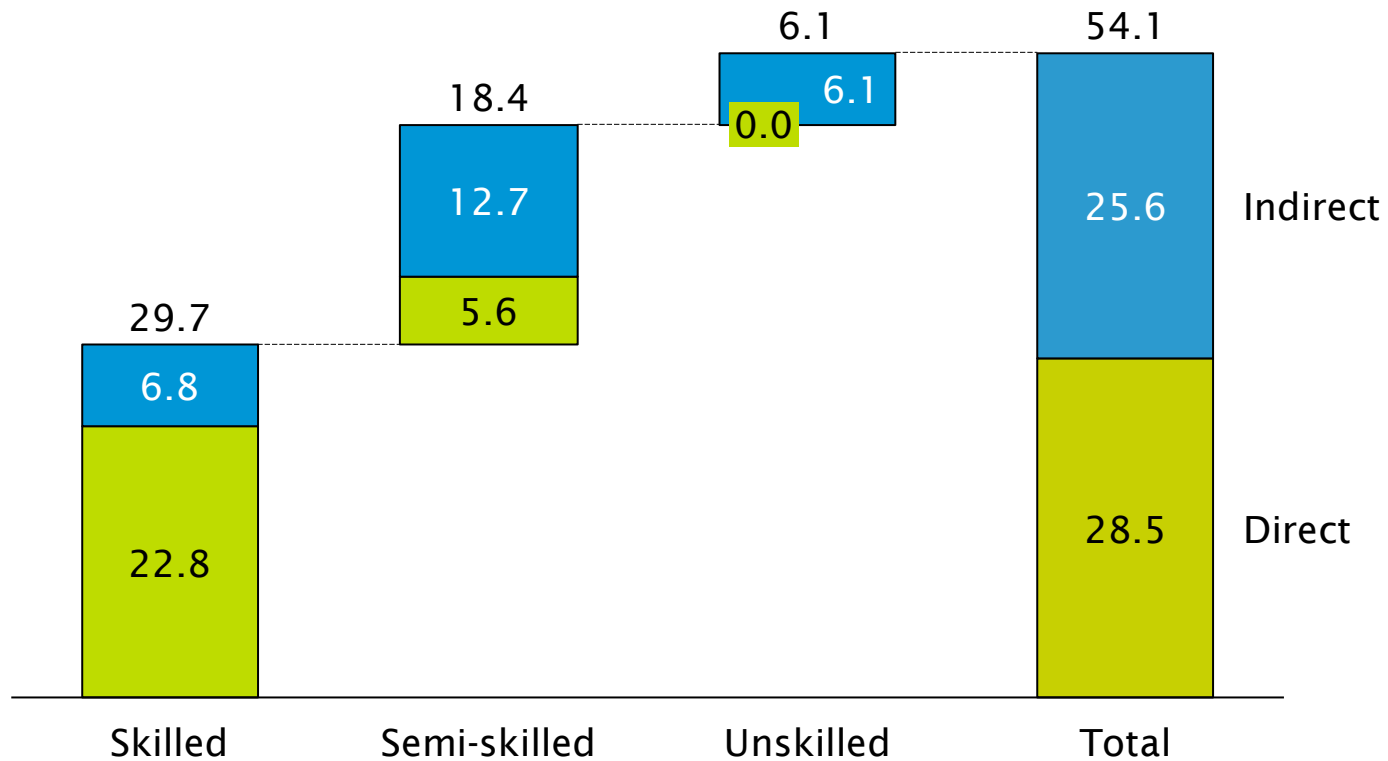
- CSP: manufacturing = 63%, installation = 100%, operation and maintenance = 100%
- Public Enterprises • Wind: manufacturing = 78%; installation = 80%; operation and maintenance = 80%
- Trade and Industry • PV: manufacturing = 20%; installation = 50%; operation and maintenance = 50%

Source: Energy Sector jobs to 2030: A global analysis; Jay Rutovitz, Alison Atherton; Institute for Sustainable Futures, Putting Renewables and Energy Efficiency To Work, University of Berkeley; team analysis; SARI model v2.1.17



These jobs are mainly skilled or semi-skilled in nature

Number of jobs created through SARI in 2024, thousands



- (1) Direct jobs: breakdown estimated from Agama (2003) wind jobs breakdown. Skilled (80%) include managers, professionals, technicians and craftsmen; Semi-skilled (20%) include semi-skilled, commercial / admin and trainees
- (2) Indirect jobs: breakdown according to overall economy excluding inapplicable sectors. Skilled (27%) include managers, professionals and technicians; Semi-skilled (50%) include clerks, sales & services, trade workers and plant & machine operators; Unskilled (23%) include elementary occupations

Source: Agama Energy, "Employment potential of renewable energy in South Africa", 2003; Department of Labour, "Job opportunities and employment in the South African Labour Market", 2010; team analysis; SARI model v2.1.8



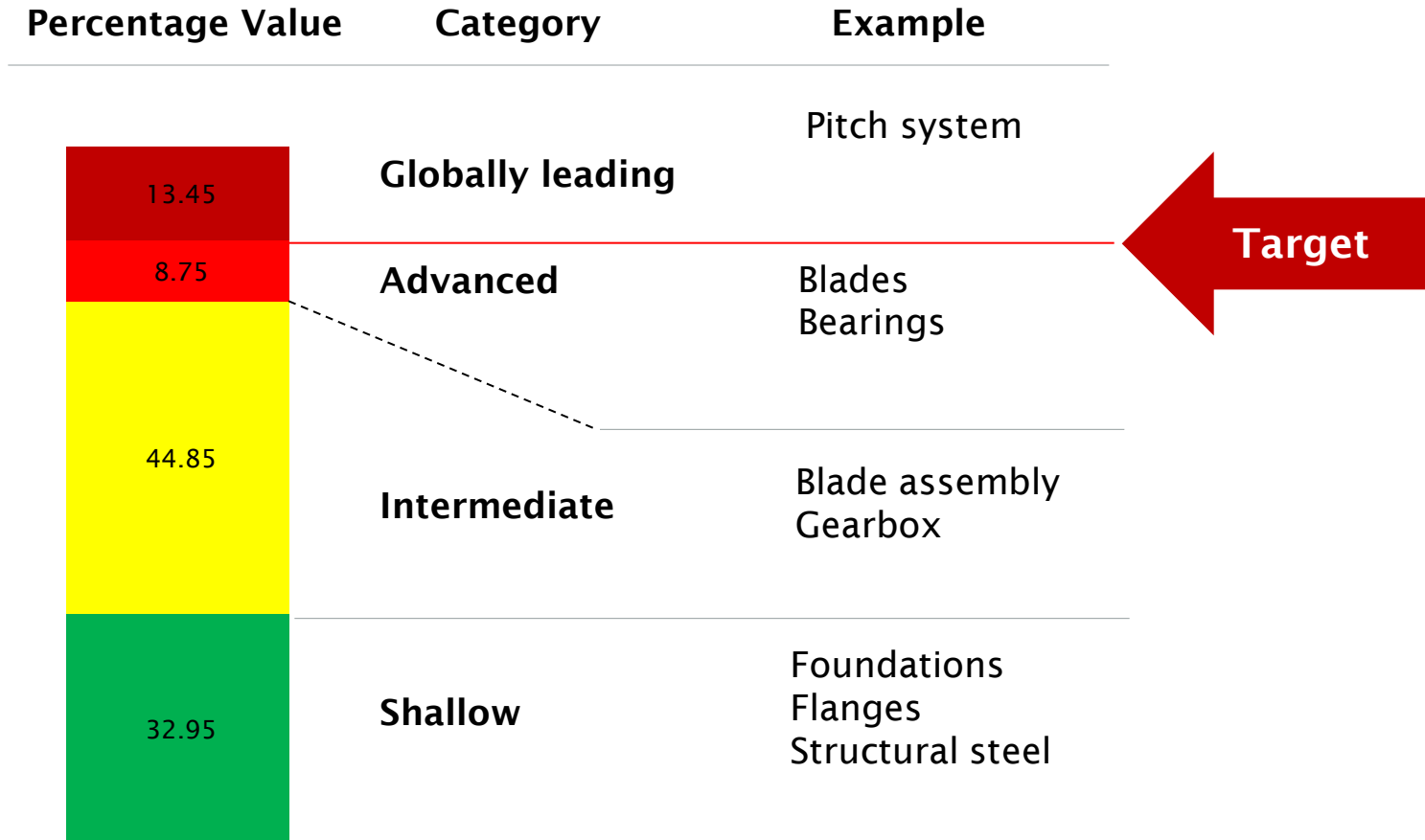
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There is also significant potential for localising renewable supply chains.

WIND TECHNOLOGY



Source: IWECC, DCD Dorbyl

Summary: There are a range of benefits associated with SARI

- ✓ **Industrial development opportunity.** Sustained installation demand can drive high levels of localisation. This is an economic opportunity to create 40,000 jobs arising and attract investments of US\$50bn.
- ✓ **Enhanced energy security.** Embarking on an ambitious renewables development pathway would improve South Africa's reserve margin.
- ✓ **Competitiveness of exports** – would ensure that energy intensive exporters get real value for money that would otherwise be lost through carbon border taxes.
- ✓ **Achievement of Copenhagen commitments.** Significant contribution to reducing carbon GHG emissions growth.
- ✓ **Minimal domestic cost.** The net domestic burdens would be relatively small, with tax revenues from investments and associated labour income approaching fiscal neutrality over time.

