



**Making Climate Capital work:
Unlocking \$8.5bn for South
Africa's Just Energy Transition**



With thanks to



ABOUT THIS CONSULTATION PAPER

This consultation paper has been developed by the Blended Finance Taskforce and the Centre for Sustainability Transitions at Stellenbosch University, with the generous support of the Open Society Foundations. Its purpose is to lay out a framework for the investment needs and costs to deliver an ambitious energy transition in South Africa and provide targeted recommendations towards a high-impact, catalytic deployment of climate finance commitments.

We offer this paper as a consultation document, to foster engagement with key stakeholders on these critical issues and welcome all comments and feedback.

Insights and recommendations are based on desktop research, expert interviews and consultation with key stakeholders. The writing team includes Eliza Macmillan-Scott, Katherine Stodulka, Mark Meldrum and Mike Kennedy (Blended Finance Taskforce), and Professor Mark Swilling, Nina Callaghan, Dr. Nthabi Mohlakoana, and Erica Johnson (Centre for Sustainability Transitions). We would like to gratefully acknowledge the contributions provided during the expert consultation by individuals from Actis, Bloomberg Philanthropies, British Investment Institute, Centre for Environmental Rights, Climate Fund Managers, Development Bank of Southern Africa (DBSA), Eskom, Global Energy Alliance for People and Planet (GEAPP), Grantham Research Institute, ICP Hub, Macquarie Green Investment Group, NinetyOne, Open Society Foundations, Open Society Foundations South Africa, Presidential Climate Commission, Presidential Climate Finance Task Team, Rockefeller Foundation, Rocky Mountain Institute, The Brookings Institution, World Resources Institute, and ZeniZeni Sustainable Finance. Nevertheless, the views provided represent the personal views of the individuals consulted, not those of the institutions listed above.



BLENDED FINANCE TASKFORCE

c/o SYSTEMIQ
69 Carter Lane
London EC4V 5EQ
United Kingdom

contact@blendedfinance.earth



CENTRE FOR SUSTAINABILITY TRANSITIONS

19 Jonkershoek Rd, Mostertsdrift,
Stellenbosch, 7600
South Africa

cstenquiries@sun.ac.za

TABLE OF CONTENTS

Foreword	4
Executive Summary	6
1. Accelerating a just energy transition in South Africa is a global and local priority	8
2. Transitioning South Africa's energy system will require at least \$250bn in climate finance over the next three decades	13
3. The \$8.5bn pledge	21
4. Climate capital should be fit-for-purpose	25
5. Conclusion	31
Annex 1: Capital requirements – Underlying data	33



FOREWORD

The 26th Conference of Parties in November 2021 was a climate meeting defined by raised expectations. Dubbed the “Finance COP”, a handful of rich countries pledged \$8.5bn for South Africa’s just energy transition – signalling the first in a series of country-led climate deals to accelerate the phase out of coal, scale up renewables and support workers and communities impacted by the transition to net zero.

But – as is usually the case in the climate world – what happens after the press conference is what matters. Despite the initial optimism surrounding the \$8.5bn pledge, there is still a lot of work to do to ensure it lives up to expectations. Most analysis of the \$8.5bn is speculative – speaking to the lack of transparency surrounding the commitment. Similarly, most recommendations to implement a just energy transition in South Africa are focused on actions that the government and its state-owned utility, Eskom, need to take. There is little scrutiny on the donors – or the composition of the \$8.5bn itself – making it hard to tell if the deal is fit-for-purpose and worth the transaction costs of engaging with a multi-donor funding programme.

This paper takes a different approach. It lays out a framework for the investment needs and costs to deliver an ambitious energy transition in South Africa (at least \$250bn over the next three decades). While the \$8.5bn only represents ~3% of that total figure, deployed right, it can accelerate the broader transition and avoid an additional 1GT+ of emissions compared to South Africa’s current pathway. But this will depend on what the deal really looks like.

Based on current information, it seems that a majority of the \$8.5bn will be sovereign loans deployed via multilateral institutions, with limited concessionality, fragmented coordination between donors and a general lack of engagement with South Africa’s financial institutions, civil society or other pools of capital focused on the just transition, including philanthropies. All are critical

to implementation. Unless the \$8.5bn includes new, not repurposed, funding for catalytic instruments like guarantees, currency hedging and grants, it will not be “fit-for-purpose” to address the most challenging transition costs linked to decommissioning coal, accelerating enabling grid infrastructure and supporting the *just* components of the transition for workers and communities.

This paper includes a set of seven core climate finance principles to inform a better composition of the deal (see on **next page**). Applying these principles will embed integrity into climate pledges, acknowledging that simply offering additional debt to countries (unless on significantly concessional terms to absorb key transition and transaction costs) is not going to cut it. Similarly, pledging already-committed capital goes directly against the principles underpinning the commitment. That is not only insulting, it is greenwashing. No country should accept this kind of a deal.

The principles in this paper are aimed at donors who, like the rest of the world, cannot afford for this deal to fail. After all, decarbonising South Africa’s coal-dependent energy system is critical to achieving global climate targets under the Paris Agreement as well as more inclusive development in the region, which relies heavily on South Africa for power. Fortunately, South Africa is already leading on the just energy transition agenda – dedicating resources within Eskom, via its Presidential Climate Commission and Presidential Climate Finance Task Team and across civil society to take a more systemic approach to financing a low-carbon, equitable economy. A plan already exists. But given the scale of the challenge, catalytic climate finance will be critical to move fast enough. The opportunity is clear. And the opportunity cost is enormous. There is no time to waste.

At its best, the \$8.5bn commitment can create a blueprint for what “good” looks like – a transparent deal that provides the type of capital needed to tackle the key transition challenges of decommissioning coal while supporting

communities and spurring green growth. At its worst, this will be another announcement without impact, another nail in the coffin for the social compact between rich countries and the rest of the world. And a confirmation that the development finance system cannot – or *will* not – respond to the needs of climate-vulnerable countries, including those with ambitious plans to transition.

The good news is that donor countries are already responding to calls for a more transparent and catalytic composition of the \$8.5bn. Working together to streamline deployment and address South Africa's most critical transition finance gaps could be multilateralism at its best. It will require a coordinated approach as public, private and philanthropic capital seeks to address different parts of the transition.

The next six months will be decisive. If COP26 was the "Finance COP", then COP27 in Egypt should be the "Accountability COP" – one where there are no new deals until there is clarity on how to deploy capital that has already committed. South Africa can lead the way for other carbon intensive, climate-vulnerable countries like Indonesia, India and Vietnam – including being willing to walk away if the pledged capital pledged is not on the right

terms. Failing to decarbonise these energy systems is a death sentence for Paris. Catalytic climate capital can help, but only if it is fit-for-purpose. That is why we have developed this paper: to provide a roadmap for accelerated action. This work is not meant to be duplicative; rather it has been developed to inform the ongoing conversations and negotiations with donors, philanthropy and the private sector; whether in South Africa, or in the countries tagged as "next in line" for an equivalent climate deal at COP27. Furthermore, it is not intended to point fingers but rather to revive the optimism around what effective collaboration can deliver and offer a more informed knowledge-base from which to design the optimal plan for capital allocation.

Author's note: This paper has been jointly developed by Stellenbosch University's "Centre for Sustainability Transitions" and the Blended Finance Taskforce. It was made possible through the generous support of the Open Society Foundations with the input of experts and practitioners in South Africa and across the international finance community. Nevertheless, all errors, assumptions and misjudgements are ours alone and we welcome all input and feedback.

Donor principles to ensure climate finance commitments are fit-for-purpose



Embed transparency & accountability into climate pledges, specifying the source and type of funds and establishing disclosure & reporting requirements



Establish donor coordination & standardisation mechanisms to reduce transaction costs and streamline deployment, avoiding unnecessary burdens on South African counterparts



Make greater use of catalytic instruments to ensure pledges are fit for purpose to solve the challenges at hand, which include just transition funding, debt sustainability, capacity building to strengthen the enabling environment, and mobilisation of private capital



Deploy donor funding in a way that is complementary and coordinated with other catalytic capital, including philanthropic funds, to deliver scale and accelerate just transition outcomes



Ensure funding allocation is demand-driven, responding to domestic market and political structures. Take a whole-of-society approach, fostering multi-sectoral engagement, prioritising local partnerships and capital mobilisation, and engaging communities as engines for lasting social impact



Shift decision-making power in the development finance system, establishing robust and inclusive principles of cooperation and capital deployment



Integrate environmental and social objectives, acknowledging that both are necessary to achieve a sustainable and inclusive transition

EXECUTIVE SUMMARY

Delivering a global just energy transition has rarely looked more complicated. Targeted, transparent deployment of climate finance can help.

80% of the world's energy still comes from fossil fuels – propped up by nearly \$6 trillion a year of subsidies. Conflict in Europe is wreaking havoc on global energy markets, forcing policymakers to balance an accelerated shift to renewables with immediate challenges of energy security, affordability and short-term price fluctuations.

Meanwhile, the long-lasting impacts of the Covid-19 pandemic disproportionately affect vulnerable countries and communities – straining public health systems, increasing debt distress, disrupting workforces, increasing unemployment and forcing climate action down the list of urgent priorities. This is compounded by eroding trust between countries – especially as commitments to mobilise capital for climate action continue to fall short. Wealthy nations have so far failed to meet their annual target of \$100bn climate finance for the Global South. Trust between governments and their citizens is also wearing thin.

The economic and environmental case to decarbonise coal-dependent energy systems is clear.

The economic and environmental case to decarbonise coal-dependent energy systems like those in South Africa, Indonesia, Vietnam and India is clear. But this is a whole-of-economy challenge, and countries walk a tightrope when it comes to the politics of the transition. Targeted, transparent climate finance from donor countries and their implementing institutions, like Multilateral Development Banks (MDBs), can deliver accelerated decarbonisation and ensure climate justice. South Africa is in the spotlight after donor governments agreed to mobilise \$8.5bn for its just

energy transition at COP26 in November 2021. This is the tip of the iceberg (~3%) compared to the total capital requirement of over \$250bn to transform its energy system, let alone the additional requirements to transition to a green economy.

The majority of the \$250bn – over two thirds – will need to be investment in new energy infrastructure, most of which should be financed by the private sector. Some public finance will also be needed to accelerate the initial build out of some enabling infrastructure, particularly for transmission and flexibility as the market develops. Finally, there is an urgent need for well-deployed donor and philanthropic capital to support a just transition, ensuring that those who stand to lose (especially workers and coal-dependent communities) are not left behind.

The \$8.5bn pledge can be a catalyst to unlock this \$250bn. It should offer the global blueprint for transition finance – demonstrating how climate capital can (i) accelerate decommissioning of coal fired power; (ii) rapidly build out enabling infrastructure; and (iii) mobilise private capital for renewables and green industrialisation.

This pledge should also pilot the most effective use of donor funds to support the *just* components of the energy transition. This is a distinguishing feature of the partnership; the deal should have a clear plan to fund retraining, compensation and relocation programmes for workers in the coal value chain – who make up ~1% of South Africa's formal workforce. That should be combined with programmes to rehabilitate local communities, focusing on women and youth, who are not part of the official coal employment figures.

Though progress is being made, the \$8.5bn still looks more like a cautionary tale than a leading example. While originally celebrated at COP26, there is increasing scepticism due to a lack of clarity on the terms of the agreement. For now, evidence points to the majority of the deal being debt, with limited concessionality. Though details are

emerging, the extent to which catalytic instruments - like guarantees, currency hedging, first loss and grants - will be deployed remains unclear.

There is an urgent need to rebuild trust and ensure that the moment is leveraged towards greater collaboration rather than fragmentation. This is needed at all levels, across and within governments, and – critically – between governments and their citizens. Building trust requires informed dialogue. This paper aims to provide targeted recommendations towards a high-impact, catalytic deployment of the \$8.5bn commitment. It does not describe the full range of innovative financial solutions which could be deployed to accelerate a just energy transition (e.g. the Asian Development Bank's Energy Transition Mechanism which creates financial incentives to decommission coal-fired power earlier than planned and creates a direct link scaling investment in renewables through the right financial incentives). Rather, it uses the \$8.5bn as an example of what a fit-for-purpose climate pledge *should* look like in anticipation of future

Though progress is being made, the \$8.5bn still looks more like a cautionary tale than a leading example.

commitments to coal-dependent middle-income countries. This is an ambitious agenda, but it is possible. This paper is laid out in four sections to look at how we can achieve these goals. First, we explore why South Africa's just energy transition is critical and what it must deliver. Next, we look at the capital requirements for the transformation of the energy system and then what the \$8.5bn commitment can deliver against these goals. Finally, we propose a set of recommendations to donors to make sure that the pledge to South Africa, and any that follow, are fit-for-purpose.

We offer this paper as a consultation document, to foster engagement with key stakeholders on these critical issues and welcome all comments and feedback.



1. Accelerating a just energy transition in South Africa is a global and local priority

This section starts by laying out the imperative and the opportunity for the Just Energy Transition in South Africa. We look at South Africa's dependence on coal for electricity generation, as well as the opportunity presented by its natural resources (**Exhibits 1-3**). We also assess how any transition away from coal will affect thousands of workers and their communities and understand that there can be no transition unless it is just. Finally, we consider the steps that South Africa has already taken to make its ambition clear, including the role of key institutions (**Exhibits 4-6**), and how it is time for this leadership to be matched with adequate international support.

South Africa's transition imperative and opportunity

South Africa's energy system is one of the most carbon intensive in the world. Reliant on coal for over 5% of national GDP, the carbon intensity of South African exports is more than double that of China and 75% more than India's. The power sector is responsible for nearly half of South Africa's total carbon footprint – emitting over 210 Mt of CO₂ in 2020 – largely via Eskom, the state-owned energy utility (see more about Eskom's role in the energy transition in **Exhibit 4**). 86% of electricity comes from domestic coal-fired power in South Africa – the highest in the G20.¹

125,000 people are directly employed in the coal value chain², but these numbers are already falling. In 2019, 22,000 coal miners lost their jobs. Under any plausible scenario, the jobs of over a hundred thousand coal workers are insecure, placing between three and ten dependants per worker at risk. South Africa's high-carbon energy system is also failing to meet energy demand. Rolling blackouts reduce productivity; the estimated negative impact on GDP from these disruptions

could be up to 5%. Unequal access to affordable, reliable electricity prolongs energy poverty and reinforces inequality, often leading to social unrest.

To guarantee energy security and affordability, South Africa is looking to its vast solar, wind and mineral resources. The cost of building new wind and solar capacity in South Africa is already 40% cheaper than new coal, based on the levelised cost of energy,³ promising new investment and job opportunities under an accelerated transition to a low carbon energy system. The recently approved National Infrastructure Plan adheres to a "least cost" pathway, aiming to reduce emissions from ~200 Mt a year today to ~50Mt in 2050. This plan represents cumulative emissions of 3.9Gt from the power sector in South Africa through to 2050. However, to meet climate goals, these cumulative emissions must be at least 1Gt lower (cumulatively 2.8-3.0 Gt or less).⁴

Under an accelerated decommissioning schedule, South Africa's power sector could avoid an additional 1.4Gt of carbon emissions against the least-cost reference case. This would require coal to come offline faster than currently scheduled (i.e. by 2040), with investments and costs coming to over \$250bn over the next three decades (see next section for a detailed breakdown of investment needs and costs).

Under an ambitious scenario, South Africa can install around 5GW a year of renewable energy capacity out to 2050 (effectively doubling current installation rates) to meet the projected energy demand growth of around 1.5x by 2050, while also replacing ageing coal-fired power stations. To meet this ambition, ~50% of the country's electricity generation needs to be renewable by 2030 – leaving less than 10 years to

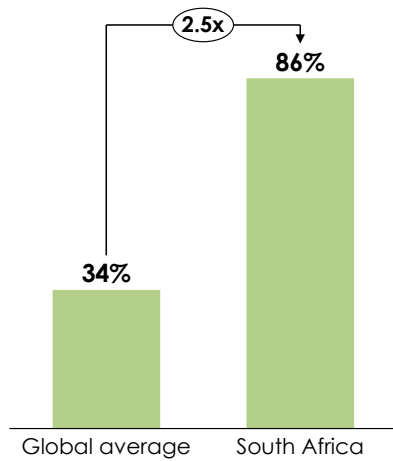
¹ 'Global Electricity Review 2021', 2021

² 'National Employment Vulnerability Assessment', Trade and Industrial Policy Strategies (TIPS), 2019

³ Levelised cost of energy, or levelised cost of electricity (LCOE), is a measure of the average net present cost of electricity generation for a generating plant over its lifetime. It is used for investment planning and to compare different methods of electricity generation on a consistent basis. LCOE represents the average revenue per unit of electricity generated that would be required to recover the costs of building and operating a generating plant during an assumed financial life and duty cycle. The LCOE of utility scale solar power and onshore wind power is less than coal and gas-fired power stations

⁴ 'A Vital Ambition', Meridian Economics (2020)

Exhibit 1: Electricity production from coal - global average and South Africa



South Africa currently generates 86% of its electricity from domestic coal-fired power. It is also home to some of the best solar and wind resources globally, offering economic opportunities through an accelerated energy transition.

Exhibit 2: Solar resource map - direct normal irradiation⁵

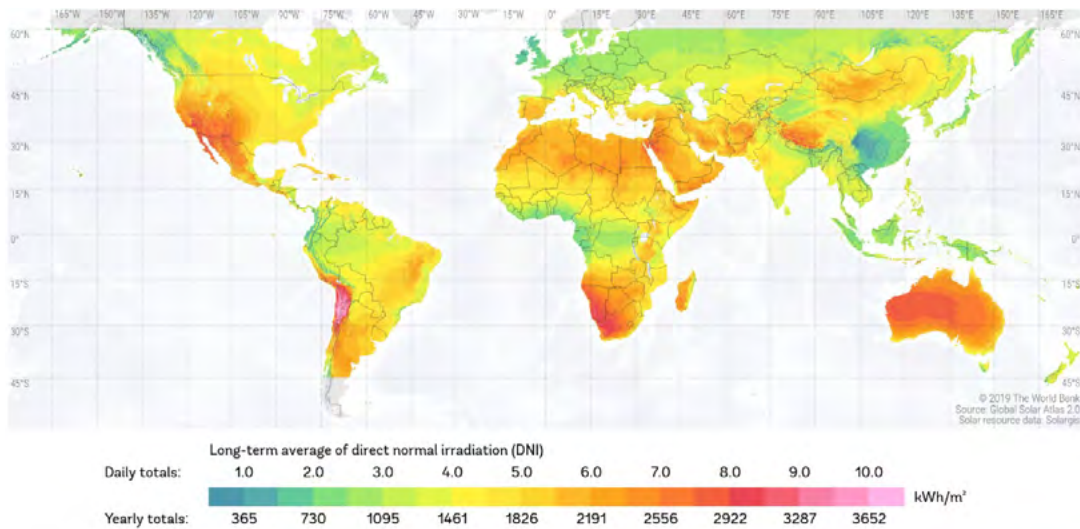
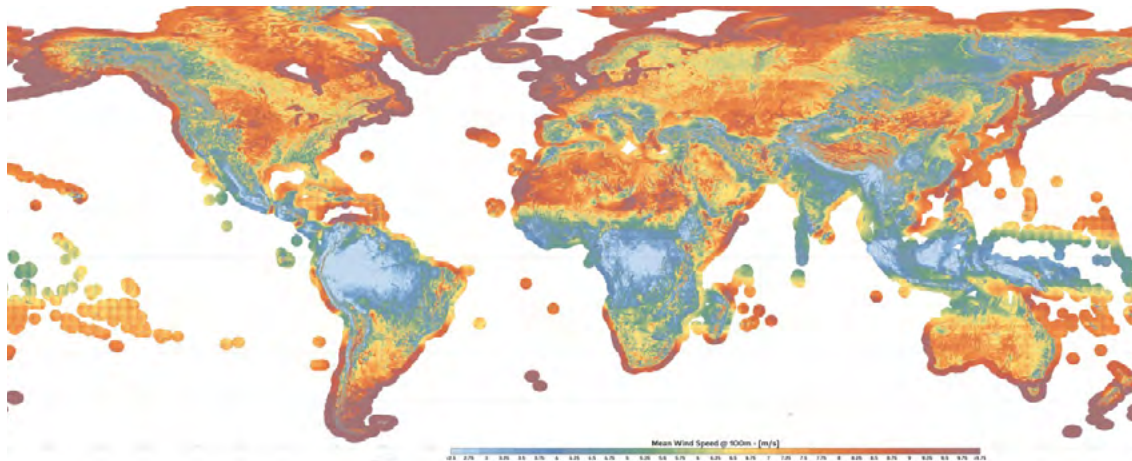


Exhibit 3: Wind resource map - wind speed⁶



⁵ World Bank Group, ESMAP and Solargis

⁶ World Bank Group, ESMAP, DTU Wind Energy and Vortex

invest in the right infrastructure. Though meeting these ambitions will require international support, mobilising domestic capital must be a priority. This is the only way to ensure a long-term transition, sustainably manage currency risk and ensure alignment with the domestic policy agenda.

Why a “just” transition matters

An ambitious build-out of renewable infrastructure could create 50,000 jobs a year over the next decade in construction, operations and maintenance of wind and solar plants⁷ – more than three jobs created for every job lost in the coal value chain.⁸ Around 30% of these newly created jobs would be in manufacturing of components and systems – an industry not well-established in South Africa. However, a cross-sectoral approach – including a long-term vision to upskill the workforce and unemployed youth – is needed to ensure all workers can benefit from the energy transition. Even where skills are transferable, there is minimal overlap between coal-reliant provinces and Renewable Energy Development Zones (REDZ). This makes it difficult to simply re-employ coal workers in solar and wind farms. The geographical mismatch also increases the impact on communities centred around a mine or power station, unless an intentional effort is made on job creation in the same areas.

To ensure that the energy transition doesn't reinforce existing inequalities or exacerbate vulnerabilities, the definition of a “just” transition must extend beyond workers to address the challenges faced by communities in coal-dependent areas. A “just” transition must be people-centred, tackling access and affordability as well as health outcomes, education, poverty alleviation and support for unemployed youth and care-givers. 80% of coal activity is concentrated in one region: the Nkangala district in the Mpumalanga Province. The region has a population of 2.7 million people, many of whom are reliant on the coal sector for their livelihoods. Accordingly, investing in the transition to a low-carbon energy system must include a focus on projects that

rehabilitate local areas to guarantee liveable conditions and support existing community-based economic activities, unlocking new jobs and investment opportunities based on local needs, skills and resources.

These communities are highly aware of the challenges they face – both in terms of job losses and the health impact of continued exposure to pollutants. They must be actively engaged in any decision-making process. In some instances this is already happening, such as the Presidential Climate Commission's (see **Exhibit 6**) recent community consultation programme to inform the development of its Just Transition Framework.

Accelerating South Africa's just energy transition creates a once-in-a-generation opportunity to tackle structural inequalities by ensuring more affordable energy access and energy security for all South Africans – out of 164 countries, South Africa is currently last on the equality index, according to a recent World Bank report.⁹ The report found a disproportionate distribution of wealth, with 71% of wealth concentrated amongst the top 10%. Race was identified as the largest contributor to inequality. The potential to decarbonise and re-industrialise the economy through an ambitious renewable energy scale up is an opportunity to loosen a century-old, unjust political settlement, link climate action – and climate finance – with poverty alleviation and achieve a fairer distribution of benefits between government and society.

South African leadership must be matched by global support

South Africa has already taken concrete steps to meet its emission targets, including setting up a Presidential Climate Commission as a cross-government, multistakeholder forum to align decision-making on climate action (**see Exhibit 6**), establishing a Presidential Climate Finance Task Team to coordinate negotiation on the \$8.5bn commitment and introducing legislation for a more competitive electricity generation market.

⁷ <https://www.dailymaverick.co.za/article/2021-06-20-imagine-no-load-shedding-its-easy-if-you-try-no-hell-below-us-above-us-only-sky/>

⁸ Own estimates based on available literature for renewable energy job creation. Coal value chain jobs lost in South Africa are assumed to be ~125,000. Beyond the number of jobs lost or created, the quality and durability of employment must be considered

⁹ Inequality in Southern Africa: An Assessment of the South African Customs Union

In a celebrated move, the government raised the licensing threshold for embedded generation projects from 1MW to 100MW in 2021, allowing companies to meet their own electricity needs more flexibly.¹⁰

During the COP26 Climate Conference in Glasgow, the South African government submitted a revised, more ambitious, Nationally Determined Contribution or “NDC” – aligning its emissions targets with the goal of limiting global temperature rise to 1.5 degrees Celsius. At the same time, it negotiated an \$8.5bn climate commitment from a handful of donors for South Africa’s just energy transition.

Of course, investment in the energy transition must begin at home. South Africa has well-developed public financial institutions and deep, highly-regulated capital markets. The most

important public financial institutions are major investors in the existing coal-based energy system, as well as in the emerging renewables-based energy system. In partnership with other entities like Eskom, the Government Employees Pension Fund (GEPF), Public Investment Corporation (PIC), Development Bank of Southern Africa (DBSA) and Industrial Development Corporation (IDC) are well-placed to play a central role in financing the energy transition (**see more in Exhibit 5**).

However, to reach national climate targets and more inclusive development in the region will require both engaged domestic financial institutions and fit-for-purpose international support. Delivering a just energy transition in South Africa is not just a domestic agenda. It is critical to achieving *global* climate targets under the Paris Agreement.



Exhibit 4: Deep Dive – Eskom has a central role to play in South Africa’s energy transition

Eskom generates 95% of the electricity used in South Africa, is 100% owned by the South African government and is arguably the most important implementing institution for the region’s just energy transition. But years of delayed commissioning and underperformance of new-build generation capacity, as well as the degradation of the existing coal fleet, have caused a continued decline in Eskom’s Energy Availability Factor or “EAF” – a metric that captures generation performance. Eskom’s EAF currently stands at around 63%; the minimum required for energy security is 72%. Both 2019 and the first half of 2020 saw ~1.3TWh of load shedding (controlled rolling demand reduction), the most intense periods experienced yet. This reinforces the need to shift away from a coal-based system towards a more reliable energy supply premised on renewable energy and storage.

Eskom is also deeply indebted, making it harder to prioritise the up-front investment needed in low carbon infrastructure. Further, an accelerated decarbonisation pathway will close coal plants earlier than the end of their economic life, potentially adding short-term pressure to the utility. With around R392bn (\$26bn) in debt – half of which is unserviceable or backed by short-term funding from National Treasury – it is key that any climate finance must include support for Eskom’s own transition. This is especially true as economic shocks like Covid-19 have narrowed the government’s fiscal space, with gross national debt projected to rise to 89% of GDP by 2025 from its current levels of 80%, making it harder to back Eskom’s guaranteed debt repayments.

Fortunately, Eskom is taking the lead. As set out in the latest “Roadmap for Eskom”, the government is working closely with Eskom management and stakeholders to ensure the utility can provide South Africa with affordable and reliable electricity – all the while increasing the use of renewable energy. Eskom is currently

undergoing a multi-year ‘unbundling’ process to separate its generation, transmission and distribution businesses into independent entities. The unbundling of the transmission unit is expected to be completed by Q2 2022, following which the National Transmission Company of South Africa will be operational. Initially, the National Transmission Company will operate as a wholly owned subsidiary of Eskom and consist of the network service provider, system operator, market operator, central energy purchasing agency and international trader. The National Transmission Company will be responsible for network strengthening and refurbishment. It will also prioritise expanding its network to allow for increased access by suppliers and customers. This unbundling is expected to yield greater transparency, management focus and efficiency improvements and to ultimately be part of the solution that will return Eskom to financial viability in the long-term.

Enabling policy should also be prioritised to support these measures. In June 2021, Eskom submitted its revenue application for the period through March 2025 to National Energy Regulator of South Africa, but the application was rejected in September. Following an updated submission by Eskom and a process in court, the Regulator made its decision public at the end of February 2022, approving a 9.6% tariff increase – effective April 1, 2022 – less than half of the 20.5% the utility had requested. This represents a below-inflation tariff increase (the allowable revenues from standard tariff customers increase approved was 3.5%). The implications on Eskom’s long-term financial sustainability are yet to be understood.

Given its systemic importance, Eskom’s financial position must be addressed to attract the additional financing and enabling policy required for a corporate turnaround and accelerated energy transition.

Exhibit 5: Deep Dive – South Africa’s public and development finance institutions are well-placed to accelerate the just energy transition. They should be central to any deployment of climate finance



South African private, public and development finance institutions are well-placed to play a key role in financing the energy transition. The **Government Employees Pension Fund (GEPF)** has R2tn (\$137bn) in assets under management and is managed by the **Public Investment Corporation (PIC)**. The GEPF/PIC hold over a quarter of Eskom’s debt. The PIC is the largest institutional investor on the Johannesburg Stock Exchange and co-invests with numerous private financial institutions. Many of these are already heavily invested in renewable energy, which is why the majority of funds for the Renewable Energy IPP Procurement Programme (REIPPPP) were sourced from local South African institutions.

The **Development Bank of Southern Africa (DBSA)** – a bilateral DFI owned by the South African government – established the IPP Office that manages the REIPPPP. It has invested R20bn (\$1bn) in clean energy, co-investing in renewables projects that make up nearly half of the 6.2 GW of installed capacity built over the past decade. In 2020, the DBSA also established

the **Infrastructure Fund**, South Africa’s largest blended finance vehicle, which aims to use R100bn (\$7bn) of its government-funded capital to crowd in a further R900bn (\$62bn) in private sector co-investments over the next decade. The Infrastructure Fund is now well-staffed with executives recruited mainly from the private sector and has a pipeline of projects worth R85bn (\$6bn) across a number of sectors. It is ready and able to package large-scale blended finance initiatives aimed at accelerating the energy transition, with a special emphasis on grid extension and transmission. Similar to the role played by the PIC across different sectors, the Infrastructure Fund is well-placed to manage a new generation of energy infrastructure investments.

The **Industrial Development Corporation (IDC)**, with assets worth R144bn (\$10bn), is primarily invested in South African coal mines and, therefore, faces the threat of stranded assets. This provides clear impetus for its diversification into financing the low-carbon infrastructure that will underpin South Africa’s Just Energy Transition.

Exhibit 6: South Africa's multistakeholder coordination and dedicated resource allocation has helped prioritise climate action and align interests across government, civil society and with the international community

Presidential Climate Commission – South Africa's Presidential Climate Commission (PCC) is a leading example of cross-governmental, multi-sectoral partnerships to accelerate national ambition on climate. It is made up of 22 commissioners, 12 of whom are from key government departments while the rest are from labour, academia, business, civil society, traditional leadership and State-Owned Enterprises.

This broad social base can help avoid undue political influence and develop a balanced approach to weighing up climate change responses, considering the ways these responses enact social justice and facilitate partnerships for development. The PCC's multi-stakeholder approach helps forge stronger state-state relationships to drive a more even understanding, with the ability to monitor central issues across government departments and other key bodies. A just energy transition requires state-wide buy-in and cooperation, so the PCC helps multiple departments and levels of government to internalise the mandate for climate action.

Policy-making and implementing departments must plan for, budget, and measure climate action in relationship to each other. The alternative, fragmentation, will not deliver ambitious and equitable climate and social outcomes. The PCC's mandate therefore helps decision-makers view climate action with a more systemic lens to drive synergies and avoid duplicated efforts.

The PCC is playing an increasingly significant role in the ways it brokers information, coordinates and exerts influence within and between government departments and civil society to ensure a coherent and shared vision on the South Africa's just energy transition as it relates to jobs, coal worker compensation, social support, governance and

skills development. Facing both government and the public, the PCC is attempting to build a more meaningful relationship with civil society through its approach to convening, consultation and research. Its findings then feed back into the ways it develops project proposals and frameworks for the just transition. These frameworks are then socialised within government, business and the greater public to nurture consensus about how a low-carbon economy can address the triple challenges of poverty, inequality and unemployment. The latest example is the Just Transition Framework, which will be presented to Cabinet for consideration in mid-2022. The PCC is the most prominent body engaging with a variety of stakeholders and bridging the dialogue between government and civil society on the just transition. It is uniquely positioned to facilitate trust-building efforts in order to build civil society buy-in on the process.

Presidential Climate Finance Task Team

In February 2022, the President of South Africa established the Presidential Climate Finance Task Team, whose role is explicitly focused on the \$8.5bn commitment. The Task Team's responsibilities include engaging with the partner countries designated in the declaration and advising Cabinet on the composition, affordability and alignment with South Africa's regulatory environment of any proposed deal – eventually bringing recommendations on an investment plan and financing package forward. The Task Team has been active from the time of the \$8.5bn announcement, acknowledging the significant resources needed to interface with multiple donors and aligning key stakeholders within and beyond government, as well as the international community. The Task Team is uniquely positioned to devise the "plan" for the \$8.5bn and act as a coordinating entity for stakeholders in South Africa. It should serve as a blueprint for other countries looking to negotiate their own climate deals with donors.

2. Transitioning South Africa's energy system will require at least \$250bn in climate finance over the next three decades

With an understanding of the imperative and opportunity for South Africa's Just Energy Transition, **this section** turns to an overview of the capital needs over the next three decades – broken down by investments and costs (summarised in **Exhibit 9**) – and the necessary sources of capital (**Exhibit 8**) before assessing the potential of the \$8.5bn commitment in the next section.

It will take at least \$250bn spent over the next three decades to transition to a low-carbon, more equitable energy system in South Africa under an ambitious decarbonisation scenario (coal off by 2040). While that is a significant number – almost the size of South Africa's GDP – over two thirds (or around \$175bn) can come from the private sector, with little de-risking required. The rest will need to come from a range of funding sources. This aligns with South Africa's recently adopted National Infrastructure Plan 2050, which places a strong emphasis on "blended" finance (using both public and private capital in a financial structure). The National Infrastructure Plan reinforces that a large part of the infrastructure investment needs through to 2040 should be sourced from the private sector or via public-private partnerships.

The remaining transition requirements should come from well-deployed concessional capital (e.g. from public budgets, donors and philanthropy) to rapidly decommission coal plants, de-risk enabling green infrastructure, build institutional capacity and, most importantly, support the social costs of a just transition. Of this concessional capital, at least \$75m a year¹¹ is needed through 2040 to transition South Africa's coal workforce: including compensation, retraining, relocation and rehabilitation of regions under an accelerated decommissioning schedule. Communities that rely on the coal value chain and its employees will also require dedicated funding support.

Aligning the right type of capital with the right investments and costs is key to meeting South Africa's just energy transition objectives. The categories of South Africa's just energy transition which are "investable" (i.e. generate a commercial return like wind and solar infrastructure) should naturally be financed by private capital. For categories which are less "investable" (i.e. don't generate a commercial return like retiring coal power stations or paying for social transition costs for workers and communities), then grants and other catalytic capital from governments or philanthropy will be needed (see **Exhibit 8** for a breakdown of different types of capital). As we continue to experience the effects of a changing climate, all new investments into infrastructure must integrate **adaptation and resilience** considerations, including effects on water and land-use.

Breakdown of transition finance investments and costs

The different categories of **investment** for a just energy transition in South Africa include capital for (i) renewable energy to meet growing electricity needs; (ii) storage to support grid stability; (iii) gas plants for flexibility; (iv) transmission & distribution to expand the grid and system capacity; and (v) green industrialisation. **Costs** include funding to support (vi) early retirement of coal power stations with "coal off" by 2040; and (vii) climate justice outcomes for workers and communities. More details of this breakdown are set out below and in **Exhibit 9** (further detail provided in **Annex 1**):



Renewable energy to meet growing electricity needs: A majority of investment – around \$125bn – will be needed in a rapid, but realistic ramp up of wind and solar installation to replace coal-fired capacity as it comes offline. Increasing annual wind and solar installation rates

¹¹ Based on estimate of \$1.5bn funding for workers under coal off by 2040 scenario

from 2.5 GW/year in 2022 towards 6 GW/year for 2026 through 2033 will be key. Total wind and solar installation required for 2022-2050 is estimated to be 150 GW, complemented with 15 GW of small-scale embedded generation (SSEG) and 2 GW of biofuel-fired capacity. See the work of Meridian Economics for a detailed analyse of energy system decarbonisation scenarios.



Storage to support grid stability:

A significant portion of investment will be needed in building out electricity storage. The substantial increase in intermittent renewable capacity on the grid means that additional dispatchable capacity is crucial to grid stability. This will require green storage solutions complemented by open-cycle gas turbine peaking solutions. The green storage solutions required are:

- **Battery storage:** Installation of 0.5 GW of storage capacity per year to 2035 when installations increase to 1.5 GW per year or more through 2050. Total required battery storage capacity installed from 2022-2050 estimated at 33 GW with an investment of ~\$18bn
- **Pumped hydro storage:** Modelling indicates that there are cost efficient opportunities to install 5 GW of pumped storage in the late 2030s with an investment of ~\$8bn



Gas plants for flexibility: Natural gas has a role to play in dispatchable power to contribute to security-of-supply when wind and/or solar conditions are unfavourable. Cost-optimal scenarios with no more coal by 2040 see an addition of 30 GW of gas capacity, mostly in the late 2030s. This capacity requirement could decrease with an improvement in long-duration storage technologies, though the extent of this is still uncertain given technology readiness levels. The vast majority of this gas fleet would be open-cycle gas turbines that can operate with a high degree of flexibility. This capacity should be built and contracted under capacity contracts, i.e. paid to be available but with incentives and intentions to not run frequently. Based on hourly wind and solar data for South Africa, such flexible “peaker” gas plants should constitute less than 1% of total

electricity generation. Installation of this gas capacity would require investment of around \$18bn.



Transmission & distribution to expand the grid and system capacity:

Connecting the distributed footprint of wind and solar generation assets to demand centres requires rapid expansion of the power grid. Since project development timeframes for transmission projects (planning to commissioning) tend to be between 5-10 years, compared to 3-5 years for typical renewables projects, it is crucial that transmission projects are front-loaded in the transition. These may need some below-market rate capital terms (e.g. longer tenor). Building out transmission ensures renewables projects will be able to connect, eliminating “connection risk” for developers and thus helping to attract even more cost-competitive IPP bids for renewables projects. Every dollar invested in priority transmission projects can de-risk ~4x that in renewable energy capacity. Reinforcing the existing grid (both transmission and distribution) will help accommodate the overall increase in system capacity to serve projected growth in power demand:

- **Transmission:** Construct new, and reinforce existing, high voltage transmission lines. New build should occur largely within the five ‘Power Corridors’ previously identified for streamlined approvals processes, which serve to connect ‘Renewable Energy Development Zones’ (REDZ) into the grid network. Total investment estimated to be around \$25bn
- **Distribution:** Construct new and reinforce existing lower voltage lines to support the expanded power system, increased energy flows, and improve electricity access by reaching new underserved populations. The total investment requirement for distribution projects is estimated around \$25bn
- Beyond the requirements above, there will be an additional need to bolster **grid ancillary services** (e.g. grid-forming technology, synchronous condensers). The capital requirements are expected to be small relative to those for Transmission and Distribution – though not immaterial



Green industrialisation: Transforming the power system must be supported by localisation of certain portions of renewables supply chain in order to maximise long-term benefit to South Africa. By seeding these green industries and kickstarting growth of a high-skilled workforce, additional domestic opportunities could be developed (e.g., battery manufacturing, electric vehicle manufacturing and assembly, green hydrogen). The investment and spending that would be required to kickstart this green industrialisation is not covered here. Furthermore, additional support can be provided to existing industries that have a role to play in a green economy, such that they can meet rising demand. This includes the mining of Platinum Group Metals, critical to hydrogen technology, and other important minerals.



Early retirement of coal power stations with "coal off" by 2040: A steady decline of coal-based electricity generation towards a complete closure of all coal plants by 2040 is expected to result in almost 1.4Gt of cumulative

emissions reductions by 2050, relative to the least-cost pathway with 3.9Gt of cumulative emissions through 2050. A "coal off" by 2040 scenario guarantees a Paris-aligned pathway for South Africa's electricity system. The incremental cost (relative to the least-cost scenario) to Eskom of pursuing this pathway is estimated to be \$24bn which would need to come from concessional sources rather than private sector investment



Climate justice outcomes for workers and communities: The social costs of the transition include addressing the ~125,000 coal worker jobs put at risk (relocated, retrained, and/or otherwise compensated) and tackling issues surrounding health, education, youth employment, and environmental rehabilitation. Total compensation required is estimated to be up to \$10bn: including an initial \$1-2bn earmarked for workers, and over \$5bn for environmental rehabilitation. See the work of the Trade & Industrial Policy Strategies group for comprehensive analyses on the effects of the transition on employment, among other issues.



Exhibit 7: Case Study – Reflections after a visit to Mpumalanga following Dr. Nthabiseng Mohlakoana’s visit in February 2022

Most of the people living in KwaGuqa township at Emalaheni Local Municipality in the Nkangala District depend on coal value chain jobs. They are either employed in coal mines or Eskom power plants, such as the nearby Duvha, Kendal and Kusile power plants and Exxaro coal mines. Ex-coal value chain workers also live here, some of whom have come from other South African provinces and neighbouring countries.

Many of these ex-workers live in poverty and depend on the state pension for their livelihoods (around R1900/\$130 a month). Most of them received a worker-retirement payout at the end of their employment, but no longer receive additional funds. Due to the nature of their work, these ex-workers end up using their meagre



retirement funds to cover healthcare costs – often to treat respiratory diseases caused by exposure to pollutants while they were working in the mines and power plants.

It is not only workers who are at a health disadvantage. Individuals who live in the area experience adverse health effects due to their proximity to power plants and mines. This can affect their employment prospects too as they often “fail” any requisite health tests and therefore cannot obtain work in plants or mines. In March 2022, the work of several environmental groups – represented by the Centre for Environmental Rights (CER) - resulted in the Pretoria High Court recognising the poor air quality in Mpumalanga as a breach of the residents’ constitutional right to an environment not harmful to their health and wellbeing. Health-related challenges are not the only threat to financial security for the people of Mpumalanga. As power plants prepare for decommissioning and coal mines envisage reduced demand, new employees tend to be on short-term contracts with no benefits. Furthermore, cheaper contract workers are sometimes brought in from elsewhere, adding a strain to employment opportunities in the area.

South Africa’s energy transition must consider the situations of individuals like those living in KwaGuqa. The combination of financial instability, health concerns and lack of employment opportunities creates a vicious cycle that requires financial interventions and fresh opportunities to ensure the transition is just.

Exhibit 8: Deep Dive – Different types of capital are needed for different parts of the energy transition; private capital should seek “investable” opportunities; philanthropic & donor capital can support just transition costs



The majority of the \$250bn needed for South Africa’s just energy transition can be funded by private finance investing into scaling renewables and other enabling infrastructure. But about a third of the funding will be needed from capital providers with a mandate that is not entirely commercial to help de-risk and support the social costs of the transition:

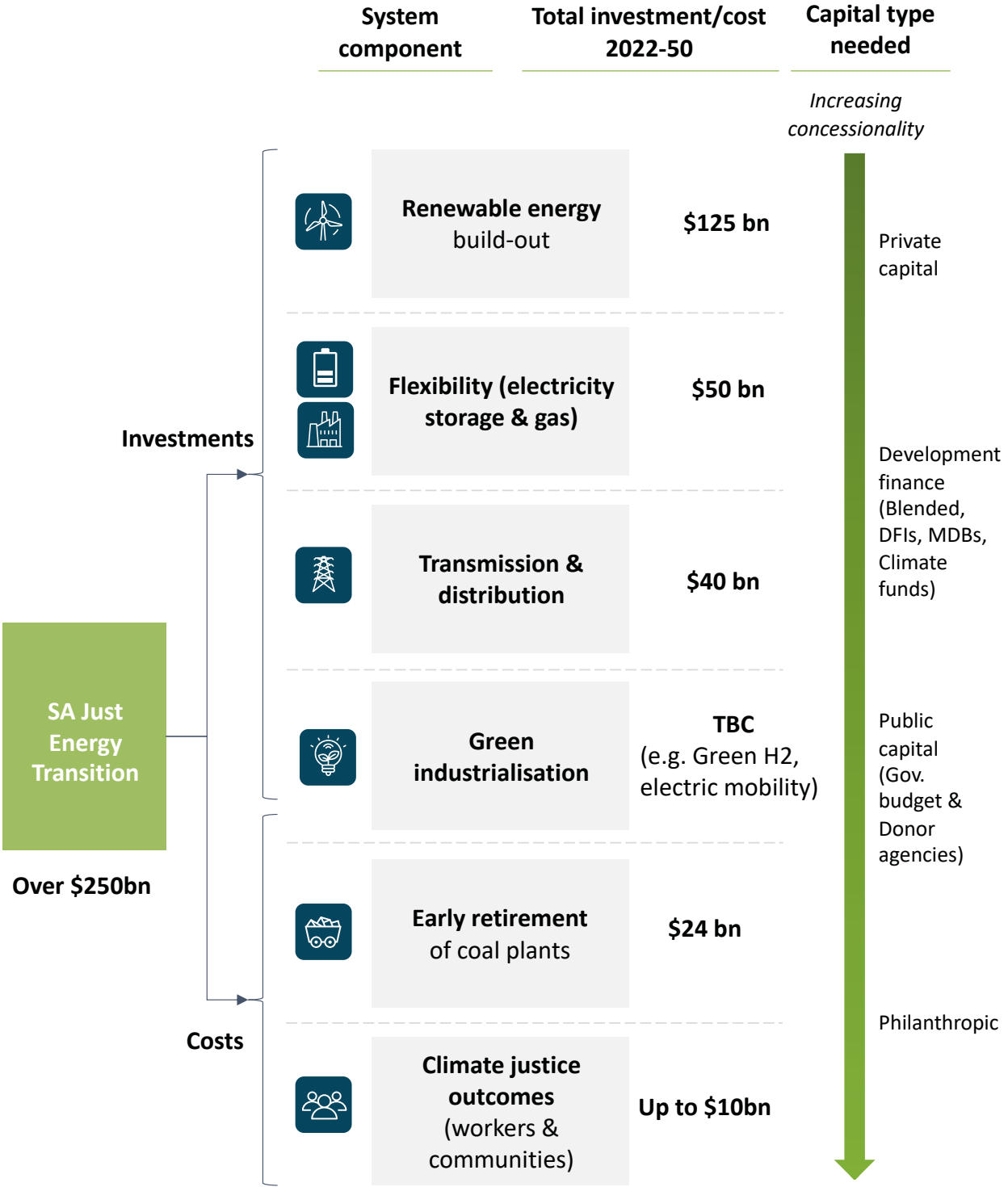
- **Private finance:** Capital at market rates seeking commercial returns. Providers include institutional investors (e.g., insurers, pension funds), asset managers, private equity/credit funds, investment banks and capital markets. Most of the infrastructure build-out for renewable energy should be funded commercially
- **Development finance:** Capital provided by government-backed financial institutions to promote public policy objectives. Capital

can be provided on more favourable terms (e.g. below-market rate or longer tenor debt) and is targeted towards projects or businesses that are aligned with the entity’s development, climate or policy outcomes. Development finance can include de-risking or catalytic capital such as guarantees or first loss equity and can be provided to companies, projects or sovereigns. Providers of this type of capital may include Multilateral Development Banks (MDBs), national Development Finance Institutions (DFIs – who often operate more like private sector institutions) and climate funds. These institutions should play a key role by coming in early to transactions as anchor investors (e.g. for transmission lines/grid infrastructure) or helping build pipeline and reducing the perception of risk for private capital

- **Public finance:** Capital that works to achieve national policy and development outcomes. It is provided by international governments through donor agencies or by central or local government entities or publicly-owned industries or corporations. This can fund a range of the system components required for a just energy transition, from infrastructure needs to grant-funded projects and programmes with a purely social outcome
- **Philanthropic capital:** Donations or grants that support targeted societal, economic, or technical outcomes, often in lieu of direct financial returns. Providers include, for example, philanthropic foundations. This type of capital should be deployed where others cannot, mainly towards high-impact social outcomes including worker retraining & relocation.

Exhibit 9: Transforming South Africa's energy system will require at least \$250bn over the next three decades - split across investments and costs

The Just Energy Transition requires a combination of investments into infrastructure and costs to transition away from coal. Together, these amount to over \$250bn over the next three decades¹



[1] The majority of catalytic capital will need to be frontloaded and so deployed in the first decade of the transition. Under an ambitious coal off by 2040 scenario, the majority of the renewable energy infrastructure will need to be in place before then.

3. The \$8.5bn pledge

Having contextualised the imperative and opportunity for South Africa's Just Energy Transition in Section 1, and looked at the \$250bn capital requirement for the transition in the previous section, we now turn to the \$8.5bn commitment. In **this section**, we summarise what is known about the commitment so far and turn to the key question of what a 'good' deal could look like, both in terms of a catalytic use of available instruments and of a potential allocation of funds.

What it is and what it isn't

At COP26 in Glasgow, a handful of donor governments pledged \$8.5bn for South Africa's Just Energy Transition. This commitment was built on an earlier Eskom proposal to launch a \$10bn sustainability-linked loan. Relative to the \$250bn+ needed to transform South Africa's energy system, this \$8.5bn pledge is a drop in the ocean, representing just over 3% of the total need. However, with the majority of the \$250bn to come from the private sector for low-carbon infrastructure and energy assets, the \$8.5bn can play a critical role provided it is structured to address some of the key transition costs, especially decommissioning coal quickly, investing in enabling grid infrastructure and supporting affected workers and communities. These require concessional/grant funding or other catalytic instruments like guarantees and currency hedging.

While the details of the \$8.5bn commitment are still being discussed, there are ongoing concerns about whether it will be "fit-for-purpose", i.e. whether it is matched to the unique needs and challenges in South Africa. Based on available information, a majority of the \$8.5bn pledge will either be sovereign debt channelled via different entities and multilateral trust funds or simply "mobilised" money from DFIs and private investors, with very little concessional/grant funding. This means that the total \$8.5bn will not be easily, or entirely, available or accessible on terms which create the right incentives and mechanisms to rapidly transition.

Donors should not use the excuse that there is no plan (or pipeline) to delay progress. There is both a plan and a list of projects urgently needing tailored transition funding. But there is also a need for project preparation funding and technical assistance – particularly in the areas that have received the least attention until now. Deploying these instruments in a targeted and coordinated manner will guarantee a robust pipeline beyond the near-term stages of the partnership.

Engagement with regional and local financial institutions and civil society also appears to be limited. This will create implementation and deployment gaps between finance and pipeline in areas where funding is most needed – especially for the social components of the transition.

Despite being grouped together as the "International Partners Group" or IPG, donor alignment remains limited with regards to the type of capital offered (debt with or without concessionality, guarantees, grants) and priority areas for capital deployment. This adds significant transaction costs and takes up resources and capacity, especially for South Africa's 'Task Team' which has been set up to negotiate the terms of the \$8.5bn. An independent Secretariat has been established, which requires further resources in terms of funding (now provided by the Climate Investment Funds) and talent. Optimising this climate pledge requires efficient communication as well as a more innovative approach to development/climate finance.

What could good look like?

Increasing the proportion of grant funding in the \$8.5bn will be critical to tackling the non-investable parts of the transition (see **Exhibit 11** for a breakdown of how the \$8.5bn could be used more catalytically across the categories of investment needs and costs).

Grant funding is specifically needed for project preparation, coal decommissioning and climate justice outcomes, including worker retraining,



relocation, and compensation – with a focus on women, youth and local area rehabilitation (see more about categories of just transition funding in **Exhibit 14**). Support for coal workers and communities must support South Africa’s growth and development priorities, and be deployed in a complementary way to other pools of capital targeting a just transition, including philanthropy

Working together to streamline deployment and address South Africa’s most critical transition finance gaps could be multilateralism at its best. It will require a coordinated approach.

Returnable capital components of the \$8.5bn commitment (e.g. concessional or longer tenor debt) could be deployed to help create the right

market conditions for increased domestic and international capital investment. Extending the transmission grid are two examples where catalytic climate capital can help – provided it is deployed via the right (domestic) institutions (e.g. Eskom and/or a national DFI like the DBSA) and with corresponding risk management, especially to manage currency fluctuations.

Since project development timeframes for transmission projects (planning to commissioning) tend to be between 5-10 years, compared to 3-5 years for typical renewables projects, it is crucial that transmission projects are front-loaded in the transition. This may require below-market rate capital terms (e.g. longer tenor) to front-load an accelerated build-out of transmission infrastructure, thereby unlocking a scale-up in renewables development. Transmission projects may also have elevated regulatory, permitting and execution/implementation risks because of their large physical footprints, complex public consultation process and long construction times – again pointing to the need for catalytic funding to manage these risks. Given building out

transmission infrastructure ensures renewables projects will be able to come online, eliminating “connection risk” for developers and thus helping to attract even more cost-competitive IPP bids for renewables projects, Eskom’s shovel-ready pipeline of transmission projects should be a priority for this kind of funding.






As Eskom phases out its coal-fired power plants ahead of the baseline schedule, it also foregoes the profits that would otherwise have been generated. This should be partly offset by access to concessional capital under the \$8.5bn pledge to contribute to its operational viability and ability to implement the transition.

Other catalytic instruments can further reduce investor and execution risk, strengthen the enabling investment environment and accelerate the pace of the energy transition. These instruments include performance guarantees, currency hedging (foreign exchange cover), technical assistance grants to fund feasibility studies & environmental and socio-economic assessments (see **Exhibit 10**). Each address different risks or gaps in the system – for instance, guarantees can mitigate challenges of limited fiscal space and punitive borrowing costs associated with low credit ratings, whereas funding for project preparation or technical assistance can support the development of a robust project pipeline.

Exhibit 10: Catalytic instruments can mitigate certain investment risks to crowd in private capital

		RISKS											
		MACRO		COMMERCIAL			TECHNICAL		FINANCE	INFRA SPECIFIC			
		POLITICAL/ COUNTRY RISK	CURRENCY RISK	CREDIT RISK	LIQUIDITY RISK	DEMAND RISK	CONSTRUC- TION RISK	OPERATION RISK	ACCESS TO CAPITAL	LACK OF PIPELINE	OFF-TAKE RISK		
INSTRUMENTS	GUARANTEES												
	INSURANCE												
	HEDGING												
	JUNIOR/ SUBORDINATED CAP												
	SECURITISATION												
	CONTRACTUAL MECHANISMS												
	RESULTS-BASED INCENTIVES												
	Grants												

Exhibit 11: Well-deployed funding from donor governments can accelerate the Just Energy Transition

	System component	Total cost/investment 2022-2050 (US\$bn)	Entity to lead investment, and risk/return profile	Potential use of \$8.5bn and its impact										
	Renewable energy build-out	\$125 bn	<ul style="list-style-type: none"> • IPPs financed by private capital • Commercial risk/return, earned via long-term contract with system operator (ITSMO/Eskom) 	<ul style="list-style-type: none"> • None – these should be financed by private capital through IPPs • Limited exception where Eskom repowering old coal sites as RE, though still contentious 										
Flexibility	Battery & pumped hydro storage	\$30 bn	<ul style="list-style-type: none"> • IPPs <u>OR</u> Eskom Transmission • Commercial return <u>OR</u> regulated return 	<ul style="list-style-type: none"> • Possible – if Eskom constructing • Adds critical flexibility to help de-risk RE build out; can also help reduce load shedding 										
	Gas plants	\$20 bn	<ul style="list-style-type: none"> • IPPs financed by private capital • Commercial risk/return, earned via capacity contracts with system operator (ITSMO/Eskom) 	<ul style="list-style-type: none"> • None – these should be financed by private capital through IPPs • Even if Eskom, unlikely to attract \$8.5bn 										
	Transmission & distribution	Total = \$40 bn <ul style="list-style-type: none"> • Transmission = c. \$25 bn • Distribution = c. \$15 bn 	<ul style="list-style-type: none"> • Owned & delivered by Eskom Transmission • Regulated return with cost recovered through electricity tariffs; limited risk 	<ul style="list-style-type: none"> • Priority for concessional loans with a focus on Tx extensions² to REDZ³ to de-risk RE build out • Value derived from concessional loan should roughly align with costs of early retirement 										
	Green industrialisation (e.g. Green H2, electric mobility)	TBC	<ul style="list-style-type: none"> • Projects led by private sector, with DFI support inc. concessional debt, first-loss equity, TA 	<ul style="list-style-type: none"> • Yes – donor govts. to support seeding of green industries, according to SA prioritisation 										
	Early retirement of coal plants	<table border="1"> <thead> <tr> <th>Pathway (Gt¹ 2020-50)</th> <th>Add'l system cost</th> </tr> </thead> <tbody> <tr> <td>3.9Gt (least cost)</td> <td>baseline</td> </tr> <tr> <td>3.5 Gt</td> <td>+\$5 bn</td> </tr> <tr> <td>3.0 Gt</td> <td>+\$18 bn</td> </tr> <tr> <td>2.5 Gt</td> <td>+\$24 bn</td> </tr> </tbody> </table>	Pathway (Gt ¹ 2020-50)	Add'l system cost	3.9Gt (least cost)	baseline	3.5 Gt	+\$5 bn	3.0 Gt	+\$18 bn	2.5 Gt	+\$24 bn	<ul style="list-style-type: none"> • Cost will be borne by Eskom Generation as these plants forego marginal profits • No return: values required to make Eskom Generation financially whole v. 4Gt path • Risk relates to delivery of emissions outcomes 	<ul style="list-style-type: none"> • Possibly suitable grant funding, however should be prioritised to climate justice outcomes • Indirectly, value gained from concessional loans (e.g., for T&D) should align, as both are under Eskom's B/S
Pathway (Gt ¹ 2020-50)	Add'l system cost													
3.9Gt (least cost)	baseline													
3.5 Gt	+\$5 bn													
3.0 Gt	+\$18 bn													
2.5 Gt	+\$24 bn													
	Climate justice outcomes	Up to \$10 bn	<ul style="list-style-type: none"> • Grant capital & micro-loans via local organisations & philanthropies 	<ul style="list-style-type: none"> • Yes – priority for grant funding within \$8.5bn to support workers in coal value chain 										

[1] Gigatonnes cumulative emissions from South Africa's power sector 2020-2050. Note: current emissions c.200Mt per annum; [2] Transmission extension projects will open up areas for renewable generation projects. Transmission replacements / reinforcement work should be financed outside the \$8.5bn by Eskom as a matter of course of maintaining the network; [3] REDZ = Renewable Energy Development Zones; Transmission lines built to areas of high renewable resource can de-risk connection risk, and enable many GWs of renewable energy development; **Sources**: Meridian, Eskom, Jobs studies

Note: Green denotes highest priority areas

4. Climate capital should be fit-for-purpose

Having looked at the context for South Africa's Just Energy Transition in Section 1, and the associated capital requirements in Section 2, we turned to the \$8.5bn commitment in Section 3 and what a fit-for-purpose deal might look like. Using the \$8.5bn commitment in South Africa as a case study and pioneering example, **this section** suggests a set of principles that donors should follow when making climate finance commitments - in South Africa and around the world.

There is much work to do to ensure the \$8.5bn is fit-for-purpose, matching the unique needs and challenges in South Africa. Endorsing and implementing seven core donor principles (see **Exhibit 12**) will help ensure the commitment is additional, fit-for-purpose and demand-driven to respond to South Africa's transition costs and challenges. These principles work to provide a high-level roadmap for how to ensure that the South African "deal" is not only catalytic, but also can become a global blueprint for other countries.

Exhibit 12: Donor principles



Embed transparency & accountability into climate pledges, specifying the source and type of funds and establishing disclosure & reporting requirements



Establish donor coordination & standardisation mechanisms to reduce transaction costs and streamline deployment, avoiding unnecessary burdens on South African counterparts



Make greater use of catalytic instruments to ensure pledges are fit for purpose to solve the challenges at hand, which include just transition funding, debt sustainability, capacity building to strengthen the enabling environment, and mobilisation of private capital



Deploy donor funding in a way that is complementary and coordinated with other catalytic capital, including philanthropic funds, to deliver scale and accelerate just transition outcomes



Ensure funding allocation is demand-driven, responding to domestic market and political structures. Take a whole-of-society approach, fostering multi-sectoral engagement, prioritising local partnerships and capital mobilisation, and engaging communities as engines for lasting social impact



Shift decision-making power in the development finance system, establishing robust and inclusive principles of cooperation and capital deployment



Integrate environmental and social objectives, acknowledging that both are necessary to achieve a sustainable and inclusive transition

Applying the donor principles to South Africa's \$8.5bn climate commitment



Embed transparency & accountability into climate pledges, specifying

the source and type of funds and establishing disclosure & reporting requirements

- Disclose the source of funds and whether they are new/additional (not repurposed from existing commitments)
- Explain the terms on which the funds are offered, including any conditionality
- Set clear milestones and timelines for deployment of capital – embedding accountability and enforcement mechanisms into deal terms
- Include appropriate measurement and reporting mechanisms, identifying key performance indicators and addressing any unintended adverse effects of the funding



Establish donor coordination & standardisation mechanisms to reduce

transaction costs and streamline deployment, avoiding unnecessary burdens on South African counterparts

- Designate a central project management office/secretariat to coordinate efforts between donor governments and the relevant South African agencies, institutions and stakeholders, particularly the Presidential Climate Finance Task Team. In South Africa, this has taken shape in the form of the Secretariat, supporting the Presidential Climate Finance Task Team and the International Partners' Group
- Clarify governance of decision-making especially when informal leadership structures arise (e.g. Climate Investment Fund (CIF) is seen as most likely to act as donor secretariat but has not been formally appointment on behalf of all donors)



Make greater use of catalytic instruments to ensure pledges are fit for

purpose to solve the challenges at hand, which include just transition funding, debt sustainability, capacity building to strengthen the enabling environment, and mobilisation of private capital

- Review chosen financial instruments – if the pledge is largely market-rate debt (or close), then the South African government has no incentive to participate as it can seek funding from capital markets at lower transaction costs
- Tackle the decommissioning and social costs requires grant/concessional capital as these activities are not investable
- Type of finance needed should be determined largely by national government, local implementation partners and relevant experts and practitioners – with raised ambition for the grant component. With a debt over GDP ratio of 80% – projected to rise to 89% by 2025 – the government's fiscal space is limited, so a catalytic use of instruments such as guarantees should be a priority



Deploy donor funding in a way that is complementary and coordinated with other catalytic capital, including philanthropic funds, to deliver scale and accelerate just transition outcomes

- Map complementary pools of capital and their targets e.g. worker compensation, retraining, relocation, and upskilling, which should be agreed upon in negotiation with affected groups
- Create open dialogue and active engagement with philanthropic capital and its recipients, to ensure complementarity of programmes
- Ensure funding does not crowd out other capital providers, particularly the private sector. To do so, there must be a robust understanding of domestic market dynamics and requirements



Ensure funding allocation is demand-driven,

responding to domestic market and political structures. Take a whole-of-society approach, fostering multi-sectoral engagement, prioritising local partnerships and capital mobilisation, and engaging communities as engines for lasting social impact

- Place South African investors, corporates, utilities, and civil society at the heart of the transition
- Tailor implementation approaches to the relevant country-specific situations, structures and capital providers, to ensure successful partnerships for development
- Direct investments in line with the national growth and development priorities laid out by the South African Government and seek to mobilise domestic pools of capital, including the large institutional investors and pension funds like GEPP (see **Exhibit 5**)
- Engage the domestic business community and engage local procurement, with the goal of spurring truly sustainable and equitable growth



Shift decision-making power in the development finance system,

establishing robust and inclusive principles of cooperation and capital deployment.

The political declaration made at COP26 speaks to ambitions beyond the deployment of capital, notably the establishment of a long-term partnership with the South African government

- Development priorities should not be mandated by international institutions, as has often been the case until now
- The just energy transition must remain country-led and country-owned so that it can achieve long-term, sustainable outcomes



Integrate environmental and social objectives,

acknowledging that both are necessary to achieve a sustainable and inclusive transition

- To-date, environmental objectives have generally taken precedence when discussing energy transitions globally
- However, South Africa has long been a leader in recognising the importance of social outcomes, making justice a central component to all discussions on the transition
- The G7 Impact Taskforce's findings¹² point to three critical drivers of a Just Transition: (1) advance climate and environmental action, (2) improve socio-economic distribution and equity, and (3) increase community voice
- International partners must recognise this and prioritise these objectives equally in their capital allocation decisions

These seven principles are strongly aligned with, and echo, the OECD's Blended Finance Principles.¹³ We strongly support increased alignment among initiatives aimed at making climate finance fit-for-purpose and welcome all engagement on this topic.

¹² 'Mobilising institutional capital towards the SDGs and a Just Transition', G7 Impact Taskforce (2021)

¹³ 'OECD DAC Blended Finance Principles for Unlocking Commercial Finance for the Sustainable Development Goals', OECD (2018)

Exhibit 13: Case Study – A similar deal in Indonesia?

Many are calling to ‘replicate’ the South Africa \$8.5bn transaction in other coal-dependent middle-income countries like Indonesia and Vietnam. As the potential global blueprint, it is even more important that the South Africa climate commitment is transparent, catalytic and reflects the needs of the country and communities. **Indonesia seems most likely to be the next “deal”,** not least because of its position as G20 President in 2022, but also because it has been actively ramping up discussions on energy transition finance solutions and investment opportunities over the past 12 months. Like South Africa, Indonesia is economically reliant on fossil fuels (coal & natural gas; these two commodities represent a similar proportion of Indonesia’s GDP to coal in South Africa). Despite a slight dip in production due to COVID-19 and a temporary export ban in 2022, Indonesia is still one of the largest coal exporters in the world and has a pipeline of new coal under construction. In 2021, it delivered 315 Mt of coal, which contributed to ~2% of Indonesia’s GDP. While there is growing investment in solar, hydro and geothermal solutions too, the regulatory environment especially on licencing, tariffs and local content requirements can make it more challenging for investors and developers.

In 2021, the Government of Indonesia announced its commitment to reach net zero by 2060, pushing forward its previous target of 2070 paving the way for a similar transition finance deal to South Africa. However, State Owned Enterprises – operators of energy production and distribution (PLN – the Eskom equivalent, PGN and Pertamina) have so far maintained growth ambitions in oil, natural gas and coal for at least the next decade. As in South Africa, the delivery of net zero ambitions will need to take place in close partnership with these institutions, who are key agents in the necessary system change and are a critical part of an accelerated decommissioning schedule. The private sector – including through bodies like KADIN, Indonesia’s Chamber of Commerce – will also be instrumental in supporting enabling regulation for low-carbon solutions.

Aligning on an ambitious yet implementable national energy pathway that accounts for the role of the multiple stakeholders, including PLN, will be critical to meeting net zero.

Mobilising large-scale finance to support the implementation of Indonesia’s ambitions is also key. Estimates of investment requirements range from \$10-150bn per annum – like in South Africa, a portion of this will necessarily need to be concessional to decommission coal and tackle some of the social costs. Unlike in South Africa, Indonesia has a lot more “new” coal meaning that the financial costs of early closure are greater and will need to be managed.

Clearly another climate deal could help. But for that, there needs to be a credible blueprint. There is a risk that donors replicate the announcement without taking the learnings from South Africa into account. Worse than that, there is a risk that Indonesia, and other transitioning countries, receive another offer that is not fit-for-purpose and comes with higher transaction costs, lower impact and slower outcomes. Future pledges, as well as the South Africa deal, should adhere to a set of climate finance principles (see Exhibit 11) which include linking capital commitments to concrete deployment mechanisms designed in partnership with domestic implementing institutions. In Indonesia, that means working closely with the Ministry of Finance’s infrastructure finance unit, PT SMI, PLN and OJK, the financial services regulator.

As in South Africa, Indonesia has a complex landscape of decision-makers. Multi-stakeholder platforms will be critical to delivering on net zero ambitions and can build on Indonesia’s previous successes in setting up inter-governmental commissions to tackle cross-sectoral issues. Using lessons learned from South Africa’s PCC and new Task Team set up to negotiate the \$8.5bn, Indonesia can short circuit many of the challenges and hopefully cut straight to a fit-for-purpose deal.

Exhibit 14: Deep Dive - Funding the Just Transition



Over half a million people stand to be affected by the transition away from coal in South Africa. The coal value chain is a major source of employment, with ~125,000 people directly employed across the coal value chain – representing 1% of formal employment. However, this is not just about direct employees; one coal worker supports on average another three dependants. The livelihoods of these dependants, as well as individuals whose livelihoods are indirectly linked to the coal value chain, also need to be accounted for in the transition to a cleaner energy system.

The cost to transition existing workers will be at least \$1.5bn (R25bn); this looks more like \$10bn if the scope is broadened to local communities. This includes compensation, retraining, relocation and rehabilitation of regions and communities under an accelerated decommissioning schedule:

1. **Compensation:** The existing workforce is young, semi-skilled and relatively well-paid compared to other industries, such as agriculture. For example, coal miners have a median age of around 38 and gross monthly salaries of R23,000 (~\$1,600) – compared to R20,000 (~\$1,400) for jobs in the nascent green economy. This entails a compensation cost for lost income as workers transition to lower-paying jobs e.g. ~R180,000 (~\$12,300) per worker to compensate for lost income over 5 years
2. **Retraining:** The skills distribution in the existing workforce must be taken into account, with 74% of workers classifying as semi-skilled and only 9% as highly skilled. This has implications on retraining costs and the types of jobs available to workers,

even when upskilled. Retraining costs per worker can range between ~R20,000-180,000 (~\$1,000-12,000), depending on the workers' highest formal qualification (that is, whether they have matriculated or not, as this also dictates the trainings for which they can qualify) and the skills they have already gained over their working life

3. Relocation: As we consider this displacement and migration challenge, it is important that affected workers and communities are presented with fair choices and opportunities. They should also have decision-making power over what these choices look like. Relocation for employment may be an option for some workers, especially those that are not originally from the Mpumalanga Province or other coal-dependent areas. But relocation will not be a viable option for all and should only be offered in cases where it is appropriate, with lessons learned from other countries which have seen forced transmigration for employment (e.g. palm oil plantations in Indonesia). An estimated relocation cost per worker is an additional R15,000 (\$1,000)

4. Rehabilitation: Refers to the restoration efforts required for land and communities, all while promoting the emergence of new industries and regional development as a whole. These efforts will mostly target communities and local economies that have played key roles in South Africa's coal-based economy. This final component is the hardest to estimate due to a lack of relevant data. Nevertheless, it includes costs based on average investments in Special Economic Zones (SEZs) and estimates from other countries. The real total is likely to be much higher due to a multiplicity of factors, including the contextual cost implications that are characteristic of such a broad undertaking

Workers between 45-65 years old are expected to retire naturally over the considered time period, and it is assumed here that they would be paid full pensions from the relevant funds (an assumption which does not always hold as employers increasingly opt for contract workers as they prepare for the decommissioning process. Therefore, newly employed workers increasingly cannot rely on pension contributions or other benefits).

However, for workers forced to retire early, full annual salaries should be paid until the end of their working life e.g. a 60-year-old worker receiving their full salary over 5 years could expect R1.4mn (\$93k). Though these costs will be spread out over the next three decades, the bulk of these will be frontloaded. Early retirement and decommissioning will accelerate job losses, creating an urgent need for compensation, retraining, and relocation programmes to be established early on. Furthermore, the rehabilitation of local areas and support to communities requires a commitment of patient and long-term funding, with visible benefits taking many years to materialise. These costs do not include coal-reliant production industries (e.g. steel); and do not yet fully account for the costs already incurred by workers and communities e.g. existing health issues; existing environmental damage. Further work is required to size the magnitude of these interconnected challenges.



5. Conclusion

The \$8.5bn climate finance commitment made at COP26 could be the catalyst for a global just energy transition - or a nail in the coffin for the social compact between rich countries and the rest of the world.

If it works, the \$8.5bn pledge can help create a blueprint for what “good” looks like – a transparent deal that provides the type of capital needed to tackle the key transition challenges of decommissioning coal while supporting communities and spurring green growth.

If it doesn't, it will be another announcement without follow-through, confirming that development finance cannot – or *will* not – respond to the needs of climate-vulnerable countries, including those with ambitious plans to transition.

Now is the time for donors to raise their ambition and prioritise delivery. Clarity is needed on the scale, sources and types of capital being made available. Courageous decision-making would review the composition of the pledge in its totality and push for sufficient concessionality and more localised deployment mechanisms.

Stronger coordination amongst donors to reduce fragmentation of capacity in South Africa is key. So is active engagement with domestic development finance institutions, investors and coalitions to ensure climate finance is allocated where it is most needed and through the most effective implementation partners.

While transforming South Africa's energy system will take over \$250bn over the next 30 years, most of this can come from the private sector. That means the \$8.5bn must target areas that are not “investable” for purely commercial players. This can include concessional funding to tackle certain risks (both real and perceived e.g. currency, regulatory, technology, political, counterparty) that can unlock investment into enabling infrastructure (e.g. transmission lines/grid) and help accelerate development of the market.

We should not make the mistake of assuming that South Africa doesn't have a plan – or a pipeline.

The majority of concessional capital, however, is needed to alleviate major transition costs, especially decommissioning coal and supporting workers and communities who will be disproportionately disadvantaged by (i) the closure of mines & plants; (ii) shifting supply chains and employment opportunities; and (iii) the historical impacts of a high-carbon energy system – especially on human health.

The \$8.5bn commitment made at COP26 can and should deliver on these outcomes. But it will require a fundamental rethink of the donor coordination process, a higher-integrity approach to declaring what capital is available and the willingness to listen to South African institutions and rethink the offer if it is not fit-for-purpose.

Donors should not make the mistake of assuming that South Africa doesn't have a plan – or a pipeline. It is clear from the work of Eskom's JET team, the Presidential Climate Finance Task Team, the Presidential Climate Commission and counterparts in government that the plan is already on the table. What is lacking is sufficient and coordinated catalytic capital, particularly to address the social costs which underpin the entire energy transition. Without solving the jobs challenge, then there can be no transition in South Africa.

By applying seven core principles of climate finance, donors can take a higher-integrity approach, acknowledging that simply offering additional debt to countries (unless on significantly concessional terms to absorb key transition and transaction costs) is not going to cut it. Similarly, pledging already committed capital goes directly against the principles underpinning the commitment.

Implementing a meaningful climate deal will require donors to take a more collaborative and transparent approach, engaging with the range of organisations instrumental to delivery. Rather than forcing bilateral engagements, they can develop standardised frameworks to deploy capital, to mobilise private co-finance, to measure and report on impact and to replicate transactions. They must work with civil society and leading philanthropies focused on the just transition to avoid cannibalisation. We need the whole to be greater than the sum of its parts.

This deal has consequences beyond South Africa. A meaningful deployment of the \$8.5bn commitment will act as a blueprint for other countries currently negotiating their own climate “deals” ahead of G20 and COP27. The South Africa pledge and the broader concept of using targeted, catalytic climate funds from donor countries to accelerate just energy transitions in coal-dependent countries is still alive. Done well,

this can be foundation for repairing trust with rich nations who need the South Africas, Indonesias and Indias of the world to decarbonise faster than planned to keep the world inhabitable. Nevertheless, the Just Energy Transition Partnership is not yet a leading example – and we must ensure it does not become a cautionary tale. Donor governments should act in a transparent, coordinated and timely manner – demonstrating that meaningful action is not just a priority, but a matter of survival.

This deal has consequences beyond South Africa. A meaningful deployment of the \$8.5bn commitment can act as a blueprint for other countries.



Annex 1: Capital requirements – Underlying data

The total investment requirements and costs as presented in this paper are intended to provide reasonable estimates of the scale and timing of financing required to progress the energy transition in line with a 'coal off by 2040' scenario. The figures presented are based primarily on integrating information from other sources and adapting, as necessary, for the context of this paper. Additional analysis is necessary to test the accuracy of these figures and improve their precision. With this in mind, the figures presented herein should be construed as indicative estimates to help guide discussions and inform decision makers, while deeper analysis becomes available over time.

Below, we present the key data, assumptions, and sources underpinning our estimates in four sections:

1. New power generation and storage, which includes capacities and costs for:
 - a. Renewable energy buildout; and,
 - b. Flexibility infrastructure buildout (electricity storage and gas)
2. Power transmission and distribution infrastructure
3. Early retirement of coal power plants
4. Climate justice outcomes

1. New power generation and storage

Data underlying our estimates of new power generation buildout requirements (capacities and unit capex costs) for renewables and gas as well as power storage were sourced from Meridian Economics, "A Vital Ambition", 2020. The analysis carried out by Meridian Economics was centred on a national energy system model that calculated average System Costs per unit of electricity generated (ZAR/kWh) under various scenarios. For each scenario, the model optimised for least cost operating profiles / generation mixes, coal decommissioning schedules, and renewables build rates and flexibility infrastructure build rates. The System Costs calculated by the model include:

- Energy generation cost:
 - The capital cost of new capacity
 - Fixed and Variable Operation and Maintenance costs of both existing and new capacity
 - Fuel cost
 - Start up and Shutdown cost
- The cost of maintaining reserve capacity, which is required to maintain system adequacy
- The cost of unserved energy which refers to the opportunity cost to electricity consumers (and the economy) of electricity supply interruptions

For the 'coal off by 2040' scenario, the model determined the least cost system requirements with the constraint that all coal plants are fully offline by 2040. Under this scenario, the model determined that new power generation and storage capacities are required as shown in Table 1.

Table 1. Assumptions for new power generation and storage capacities aligned with the coal off by 2040 scenario.

New capacity built (MW)	2022-2030	2031-2040	2041-2050	Total
Wind	17,950	36,650	32,600	87,200
Solar PV	28,500	20,000	15,000	63,500
Solar CSP	0	0	0	0
SSEG	8,000	3,500	2,500	14,000
Battery Storage	4,500	12,000	17,000	33,500
Pumped Storage	0	4,500	0	4,500
Hydro	0	0	0	0
Biofuel	1,500	0	0	1,500
Gas	2,000	24,500	3,500	30,000
Total	62,450	101,150	70,600	234,200

Overnight capital costs as of 2019 were sourced from page 13 of Meridian Economics, "A Vital Ambition", 2020. Assumptions for future capital cost declines of renewables and power storage technologies were obtained from page 14 of the same report. These cost declines represent exploitation of industry learning and economies of scale that have been observed for renewables historically and are broadly accepted as continuing into the future. Due to the maturity of gas plants no significant real cost declines were assumed in our estimates.

The resulting unit capex costs for each relevant technology are presented in Table 2 after applying learning rates and averaging over the c.10-year periods shown (weighted by annual capacity deployment).

Table 2. Assumptions for overnight capital expenditure costs aligned with the coal off by 2040 scenario.

Average Overnight CapEx ('000 ZAR/MW) ¹	2022-2030	2031-2040	2041-2050
Wind	14,731	13,503	12,563
Solar PV	9,104	7,523	6,482
Solar CSP	n/a	n/a	n/a
SSEG	13,541	13,541	13,541
Battery Storage	11,129	8,314	7,234
Pumped Storage	n/a	27,148	n/a
Hydro	n/a	n/a	n/a
Biofuel	21,415	n/a	n/a
Gas	11,017	11,171	11,325
Total	n/a	n/a	n/a

¹ Currency presented is January 2022 ZAR after applying cumulative inflation of 10% for January 2019 to January 2022¹⁴ to the values presented by Meridian Economics as January 2019 ZAR.

¹⁴ <https://www.in2013dollars.com/south-africa/inflation/2019?amount=1>

Table 3. Total capex required for new power generation and storage buildout (Jan 2022 ZAR)

Cost of new build (million ZAR)	2022-2030	2031-2040	2041-2050	Total
Wind	264,417	494,868	409,559	1,168,844
Solar PV	259,464	150,467	97,228	507,160
Solar CSP	n/a	n/a	n/a	0
SSEG	108,328	47,394	33,853	189,574
Battery Storage	50,079	99,766	122,983	272,829
Pumped Storage	n/a	122,166	n/a	122,166
Hydro	n/a	n/a	n/a	0
Biofuel	32,122	n/a	n/a	32,122
Gas	22,033	273,685	39,638	335,356
Total	736,444	1,188,346	703,261	2,628,050

Table 4 presents total investment requirements in US dollars by applying an exchange rate of 15.2 USD/ZAR

Table 4. Total capex required for new power generation and storage buildout (Jan 2022 USD)

Cost of new build (million USD)	2022-2030	2031-2040	2041-2050	Total
Wind	17,442	32,643	27,016	77,101
Solar PV	17,115	9,925	6,413	33,454
Solar CSP	0	0	0	0
SSEG	7,146	3,126	2,233	12,505
Battery Storage	3,303	6,581	8,112	17,997
Pumped Storage	0	8,058	0	8,058
Hydro	0	0	0	0
Biofuel	2,119	0	0	2,119
Gas	1,453	18,053	2,615	22,121
Total	48,578	78,387	46,389	173,354

2. Power transmission and distribution

Generating estimates of the required investment in power transmission and distribution infrastructure for a Coal Off by 2040 scenario is currently challenging due to limited availability of publicly available data and analysis for such a scenario. Therefore, in order to produce our estimates several simplifying assumptions were made, as outlined below.

Based on page 15 of Meridian Economics report, “The Just Transition Transaction: A Developing Country Coal Power Retirement Mechanism”, 2021, approximately ZAR 200 billion is required for transmission grid expansion by 2031 in a Paris-aligned scenario, which has similar implications in terms of renewable energy buildout as the Coal Off by 2040 scenario.

An expert interview with Eskom indicated that under a ‘coal off by 2040’ scenario investment requirements for distribution infrastructure would roughly match investment requirements for

transmission infrastructure. Distribution investment requirements are driven by the need for robust local networks to connect more distributed generation sources.¹⁵

Another simplifying assumption was applied to estimate transmission and distribution grid investment requirements for the period 2032-2040. The ZAR 200 bn figure for the preceding period was scaled by the renewable energy buildout of the two periods (i.e., ZAR 200 bn x 50 GW / 54 GW = ZAR 185 bn).

Table 5. Total capex required for transmission and distribution infrastructure (approx. Jan 2022 ZAR)

Period	RE Build (GW)	Tx Costs (bn ZAR)	Dx Costs (bn ZAR)	Total Investment (bn ZAR)
2022-2031	54	200	200	400
2032-2040	50	185	185	370
Total	105	385	385	770

Table 6 presents total investment requirements in US dollars by applying an exchange rate of 15.2 USD/ZAR.

Table 6. Total capex required for transmission and distribution infrastructure (approx. Jan 2022 USD)

Period	RE Build (GW)	Tx Costs (bn USD)	Dx Costs (bn USD)	Total Investment (bn USD)
2022-2031	54	13	13	26
2032-2040	50	12	12	24
Total	105	25	25	50

The expert interview with Eskom indicated that beyond the transmission and distribution investment requirements accounted for above, there may be additional requirements to bolster grid ancillary services (e.g., grid-forming tech, synchronous condensers) that would be small relative to the total calculated above, but not immaterial. Therefore, The figure estimated here should likely be seen as a lower-end estimate of investment needs in T&D.

3. Early retirement of coal power plants

For the 'coal off by 2040' scenario, the energy system modelling analysis completed by Meridian Economics as reflected in their paper, "A Vital Ambition", 2020, determined the least cost energy system requirements for South Africa with the constraint that all coal plants are fully offline by 2040. The model determined that under this scenario, average system costs for 2020-2050 would be approximately ZAR 0.748/kWh, which compares to the ZAR 0.711/kWh for the Least Cost Scenario (where coal plants are assumed to come offline when it is economically rational to do so with no mandated closure schedule). Therefore, there would be an average unit cost increase of approximately ZAR 0.037/kWh for the South African power generation system for 2020-2050.

The Meridian Economics model also shows an average annual power generation requirement of 325,000 GWh/year (250,000 GWh in 2020 and increasing approximately linearly to 400,000 GWh in 2050).¹⁶

¹⁵ Note: this information was provided as general guidance

¹⁶ See chart "Least cost: Annual Electricity Production" p.26 of "A Vital Ambition", 2020, Meridian Economics.

As a result, the total additional system cost associated with the Coal Off by 2040 scenario relative to the Least Cost Scenario can be roughly estimated to be ZAR 0.037/kWh x 325,000 GWh/year x 30 years x 10⁶ kWh/GWh = ZAR 361bn. Applying an exchange rate of 15.2 USD/ZAR, this is equivalent to approximately USD 24bn.

The figure USD 24bn represents profit foregone by Eskom generation due to early closure of its coal plants as this value is now attributed elsewhere in the power system. This figure is referred to as a 'cost' as opposed to an 'investment' since there is no revenue or returns associated with the cash outflow.

4. Climate justice outcomes

The cost estimates associated with climate justice outcomes over the next three decades are arguably the area where the most extrapolation has been needed for the purposes of this paper. Though analysis exists on specific components of this problem, we have encountered few estimates broad enough to encompass the varied issues that are captured under the umbrella of 'climate justice', including health, education, youth unemployment and environmental rehabilitation. We welcome any engagement on this topic and encourage additional research.

The key assumptions underpinning the cost estimate are:

- 125,000 workers directly employed in the coal value chain (National Employment Vulnerability Assessment, Trade and Industrial Policy Strategies, 2019)
- Coal off by 2040, meaning 100% job losses in that period – this is a conservative assumption but can be justified as we present the cost estimates over three decades, so the estimates hold even if job losses occur more gradually through 2050
- 35% of workers between the ages of 45-65, extrapolated from the demographics of coal miners (Cruywagen, Davies & Swilling, 'Estimating the cost of a just transition in South Africa's coal sector: protecting workers, stimulating regional development and accelerating a low-carbon transition', 2019)

Climate justice component	Cost estimate (\$, mn)	Sources and assumptions
Retraining	330	<ul style="list-style-type: none"> ▪ Skills distribution among workers: 9% skilled, 72% semi-skilled, 19% low-skilled (National Employment Vulnerability Assessment) ▪ Retraining cost according to skill level sourced from CST research
Relocation	82	<ul style="list-style-type: none"> ▪ Relocation cost per worker: R15,198 (Cruywagen, Davies & Swilling)
Compensation	989	<ul style="list-style-type: none"> ▪ Compensation cost per worker: R182,375 - 5 year compensation package based on difference between 'green job' and coal mining job (Cruywagen, Davies & Swilling)
Regional development and environmental rehabilitation	4,966	<ul style="list-style-type: none"> ▪ Includes cost for regional development based on investment in Special Economic Zones (Cruywagen, Davies & Swilling) and rehabilitation of coal mines (CER, 2018) <p><i>Note: no estimate was found for the repurposing and rehabilitation of power plants</i></p>



BLENDED FINANCE TASKFORCE

- Brings together **leaders** from public, private and philanthropic with capital diverse membership
- Tackles barriers **across the financial system** to fundamentally change how we invest in the SDGs
- Works with **private capital champions** to unlock capital for the transition to net zero and develop proof points that can be replicated and scaled
- Proven **track record** with investors and governments; has helped mobilise over \$10bn for high impact projects in emerging markets over the past 4 years
- Partners with **existing initiatives**, to ensure efforts are complementary and coordinated.



Origin: Launched by the Business & Sustainable Development Commission in 2017; the secretariat sits within system-change firm SYSTEMIQ



Mission: To unlock barriers to investing in the SDGs by modernising the development finance system, optimising the use of blended finance and mobilising private capital for emerging markets



2022 priority: To mobilise transition finance for a net zero, nature-positive, more equitable economy



Additionally: Takes a private sector lease; works closely with other blended finance initiatives to avoid duplication and fragmentation



Implementation: Works with governments, project developers, investors and other stakeholders to deliver tangible outcomes and act as an accelerator for local activities



Unique peer network: Support committed “champions” deliver work streams, implement recommendations, share learnings and replicate proven models, driver operational synergies to reduce transaction cost and accelerate access to capital and pipeline



Impact: Four years at the forefront of thought leadership & policy dialogue, convening and matching investors, mobilising billions of dollars for the SDGs and launching/scaling new blended finance vehicles

KEY RESEARCH AREAS

- 1 Energy Transitions
- 2 Complexity
- 3 Transdisciplinarity
- 4 Social-Ecological Systems (SES) and Resilience
- 5 The Living Cell

The Centre for Sustainability Transitions at Stellenbosch University is a world-class research and teaching hub. It combines cutting-edge research with transformative, place-based learning to produce the kind of knowledge, capacities, and people required to advance sustainability transitions across a wide range of fields within the South African, broader African, and global contexts.

The CST is built on a strong legacy of research into complexity and sustainability at Stellenbosch University.

The CST has developed an inter- and trans-disciplinary research and postgraduate training centre that brings together insights from different disciplines to advance understanding of the interlinked social, economic, institutional, political, and ecological dimensions of environmental and social sustainability, and to address issues of deeper systemic transformation, specifically in an African context. A common binding thread across all projects is a deep commitment to high impact transformative research inspired by complex adaptive systems thinking, transdisciplinary research approaches, and recognition of the deep interconnections between the environment and society.

The CST collaborates with a wide range of partners within Stellenbosch University, academia, policy, and practice across South Africa, as well as internationally.

The Centre's five-year review – providing more detail on its work and impact – can be downloaded from www0.sun.ac.za/cst/wp-content/uploads/2022/03/CST-2021-report-25.11.pdf



With thanks to

