
**THE JUST TRANSITION
TRANSACTION:
A DEVELOPING COUNTRY
COAL POWER RETIREMENT
MECHANISM**

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All errors remain ours.

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LIST OF ABBREVIATIONS

CDM	Clean Development Mechanism
CIF	Climate Investment Funds
CO ₂	Carbon Dioxide
COP	Conference of the Parties
COSATU	Congress of South African Trade Unions
CSIR	Centre for Scientific and Industrial Research
DFFE	Department of Forestry, Fisheries and the Environment
DFCS	Debt for Climate Swaps
DFI	Development Finance Institution
DMRE	Department of Mineral Resources and Energy
GDP	Gross Domestic Product
GHG	Greenhouse Gases
Gt	Gigatonnes
IEA	International Energy Agency
IFIs	International Financial Institutions
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
ITSMO	Independent Transmission System and Market Operator
JETT	Just Energy Transition Transaction
JTF	Just Transition Fund
JTT	Just Transition Transaction
MIGA	Multilateral Investment Guarantee Agency
Mt	Megatonnes
NDC	Nationally Determined Contributions
NERSA	National Energy Regulator of South Africa
NGFS	Network for Greening the Financial System
t	Tonne
TIPS	Trade & Industrial Policy Strategies
RE	Renewable Energy
SOAF	South African Foreign Issued Government Bond
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
ZAR	South African Rands



1 THE JTT IN A NUTSHELL

The Just Transition Transaction (JTT) is a prototype, multi-lateral, ‘transition finance’, or ‘coal retirement’ mechanism. It aims to secure an accelerated, Paris¹-aligned, well-managed, affordable, and *just* energy transition for South Africa’s power sector and affected communities.

There are many ways that such a transaction for a highly coal-dependent middle-income country like South Africa could be constructed. Considerations include environmental, social, political, financial, economic, and technical factors of concern to the different parties to the transaction. This paper provides a summary of how such a proposed JTT could be put together. We have socialised this plan through extensive engagement across the South African government and society, and with potential developed country sponsors. This section of the document provides a high-level overview of our proposals. The background, context, further details and structuring options are explained in the remainder of the document.

THE PARTIES TO THE TRANSACTION

The primary counterparties to a JTT would be key developed country governments, on the one hand, and the South African government, on the other. It is envisaged that a respected, multi-lateral climate finance institution, such as the Climate Investment Funds (CIF) would act as a key financial intermediary and provide broad coordination support.

In terms of the transaction framework, South Africa will adopt an accelerated, Paris-aligned decarbonisation pathway for its power system, delivering measurable additionally mitigated tonnes (t) of carbon dioxide (CO₂) in comparison with its current policy and

decommissioning trajectory.² Such a pathway will enable the country to achieve the highest level of ambition expressed in its Nationally Determined Contribution (NDC), and put the net zero by 2050 aspiration of its Low Emissions Development Strategy (LEDS) within reach. In doing so South Africa will have to guide and mobilise society to overcome significant political, financial, technical and social challenges arising from its accelerated decarbonisation commitment.

To overcome these challenges, the South African government will receive a large, highly concessional,³ debt financing package, to be incrementally drawn down in tranches over several years. Without the level of support envisaged in this JTT proposal, South Africa is unlikely to deliver its full power sector decarbonisation potential.⁴

VALUING JTT MITIGATED CARBON

Central to the transaction is the agreement by the counterparties of a value (in \$/t) that will be granted to South Africa for its accelerated carbon mitigation achievements. The eventual total concessionality (support element) of the financing package will be determined by South Africa’s actual *delivery* of carbon mitigation.

South Africa will achieve this accelerated power sector decarbonisation pathway by implementing policy, market reform and procurement measures to: (a) steadily reduce coal plant operations and accelerate plant retirement; (b) cancel plans and processes to construct new coal plant (c) ensure that adequate renewable energy and associated infrastructure is constructed to meet demand;⁵ and (d) ensure the financing and execution for the necessary grid investments.

¹ UNFCCC, (2015) *The Paris Agreement*. United Nations. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

² *The current policy trajectory is set out in the 2019 Integrated Resource Plan (IRP 2019) published by the Department of Mineral Resources and Energy (DMRE, 2019)*

³ “Concessional” refers to the Net Present Value (NPV) of the concessional loan’s cash flows discounted at the market rate for equivalent financing. For the avoidance of doubt we rely on the OECD definition of “concessional” as, for instance, explained in (Scott, 2017).

⁴ *The transaction will be a leading example of the type of climate finance support envisaged under Article 9 of the Paris Agreement which provides a mechanism for coal-dependent developing countries to achieve more ambitious nationally determined contributions (NDCs) and Low Emission Development Strategies (LEDS) through power sector decarbonisation. (It is not envisaged that the transaction will entail the sale of carbon credits by South Africa as provided for in terms of Article 6 of the Paris Agreement.)*

⁵ *Due to the favourable economics of renewable energy projects in South Africa this construction programme can mostly be separately funded from the capital markets.*



DEALING WITH ESKOM DEBT

Approximately R200bn of Eskom's⁶ ~R400bn net debt is not serviceable from available revenues. This is due to large time and cost overruns on its power station construction programme, and regulated tariff increases that have consistently been too low to cover even prudently incurred costs. The South African government has for several years been required to provide ongoing fiscal injections to keep Eskom afloat,⁷ at great cost. This is crowding out other fiscal priorities, notably spending to address social objectives and economic recovery. The provision of a comprehensive fiscal debt relief package by government to Eskom is a necessary precondition to ensure that future Eskom entities emerging from the current unbundling and business turnaround process⁸ will be financially viable (the way in which this is implemented will have to be designed to resolve the potential moral hazard risks often associated with state-owned entity bailouts).⁹ This will be critical for affordable financing of the large grid and generation investments required to deliver the decarbonisation pathway envisaged by the JTT.

Without financially viable and independent Eskom entities that can act as credible power purchase counterparties, raise capital and rapidly invest in new transmission and distribution infrastructure, the required accelerated renewables programme simply will not happen. South Africa will then be forced to rely on coal-based power generation for longer, putting its climate mitigation aspirations out of reach.

THE CREATION OF FISCAL SPACE

In the context of South Africa's highly constrained fiscal situation, exacerbated by the impact of the Covid-19

pandemic, the net proceeds of the transaction will assist in creating new fiscal space for two purposes.

Firstly, it will provide the initial capitalisation for an appropriately governed South African Just Transition Fund, established by government to support affected coal mine and power station workers and to fund the green economic revitalisation of affected communities such as those in the Mpumalanga province.

Secondly, it will provide fiscal support to the South African government, as Eskom's shareholder and debt guarantor, to assist it to bear the cost of: (a) the reduced revenue resulting from the earlier retirement of coal-fired power stations;¹⁰ and (b) of recapitalising unbundled Eskom entities to reduce or eliminate the need for government guarantees and enable affordable financing of the large-scale generation, grid and other infrastructure required for accelerated decarbonisation.

UNLOCKING ACCELERATED DECARBONISATION

The JTT will be structured as a series of long-term (approximately 25-year) debt-financing tranches ultimately priced at a highly concessional interest rate.

Referencing the baseline (IRP 2019) emissions pathway, each successive loan tranche will commit South Africa to additional decarbonisation compared to the pathway established by the previous tranche. At the completion of the initial drawdown process, the power sector will be committed to a Paris-aligned decarbonisation pathway.

Realising additional mitigation requires the execution of a significantly *accelerated* (financially viable and

⁶ Eskom is South Africa's state-owned power utility. It currently generates more than 90% of South Africa's power, 84% of which comes from coal-fired power stations (Calitz & Wright, 2021; Eskom, 2021a).

⁷ Between 2008 and 2021, Eskom has received a total of R220 billion in bailouts from the state (Eberhard, 2021)

⁸ As announced by the Department of Public Enterprises, Eskom's vertically integrated structure is currently being unbundled to create at least four legally separated entities (for Eskom holdings; generation; transmission, power purchasing and system operations; and distribution). Transmission will be independently governed and operated.

⁹ It is well understood that state bailouts could create moral hazard problems whereby the pressure on management and policy makers to implement the necessary business turnaround decisions and market reforms can be reduced. However, the climate and economic cost to South Africa of not unlocking an accelerated transition, requires that both objectives be achieved. While it is beyond the scope of this paper, there are many ways in which Eskom debt relief can be structured to retain and even strengthen the required incentives for all stakeholders, and therefore also unlock the route to finance and implement an accelerated transition.

¹⁰ This cost will appear on Eskom's balance sheet as a loss in asset value (foregone future earnings) thereby stranding a portion of its debt funding.



separately funded) renewable energy programme compared to that anticipated by the IRP 2019.

Actual achieved mitigation only begins to accrue as this additional capacity is commissioned and displaces fossil fuel generation – an incremental process, involving procurement through a variety of public and private means, that gains momentum over a decade or more. This can be seen in Figure 1 which presents an example of an ambitious, but achievable mitigation pathway that reduces power sector emissions by one-third without compromising system adequacy.¹¹

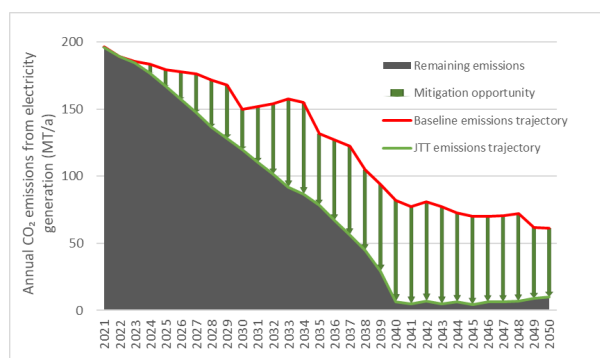


Figure 1: Additional mitigation achieved by the JTT relative to a 'baseline' emissions trajectory over time (Meridian Economics, 2020a)

FINANCIAL SUPPORT THROUGH A SIZEABLE CONCESSIONAL LOAN

The South African Treasury anticipates raising long-term dollar debt for between 9–15% of its requirements in the coming years. This creates an opportunity to include concessional JTT debt finance as part of South Africa's *existing plans* for foreign exchange debt issuances. Utilising a bespoke JTT loan framework, South Africa could take out loan finance nominally at the market rate (currently around 5.5%). However, instead of fixed annual interest payments, the interest payment profile could be shaped to match South Africa's ability to deliver CO₂ savings, as specified by the JTT trajectory (indicated by the green arrows in Figure 1). South Africa would have the right to credit the annual dollar-denominated value of its carbon

savings against (i.e. to reduce) its interest payment obligation in each year at a pre-determined \$/t deal price.

The \$/t deal price is co-determined with the quantum of financial support to be provided to South Africa if it fully delivers the JTT decarbonisation trajectory. In this specific example approximately \$7/t¹² yields R100bn (or about \$7bn) in net present value terms. This locks in a highly efficient \$/t rate for sponsoring countries over 25 years. It also delivers a net present value that responds commensurately to the need for further fiscal space to address the socio-political and financial barriers to unlocking accelerated power sector decarbonisation in South Africa.

In our example, this would be achieved through an overall loan valued at about \$16bn, drawn down in five annual tranches with matching end-of-term bullet repayments as illustrated in Figure 2.¹³ Structured in this way, the JTT will enable South Africa to, in effect, reduce the interest rate on such a loan from around 5.5% to a highly concessional ~1.5% by adhering to the agreed carbon-mitigation pathway.

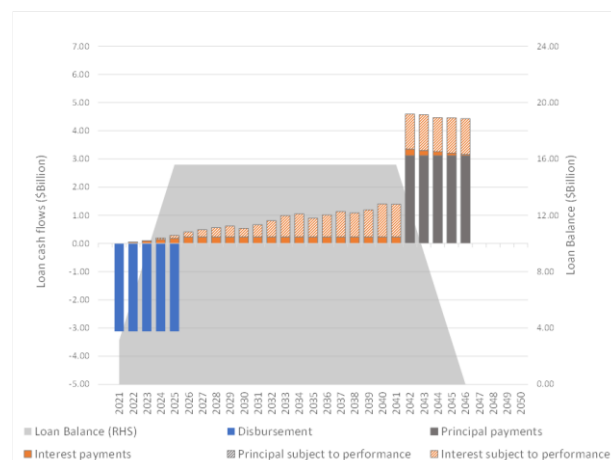


Figure 2: Dollar cash flows associated with a JTT in which concessional value is delivered through a concessional interest rate on a large tranching bullet loan (from Meridian modelling analysis)

¹¹Analysis drawn from Meridian Economics (2020) 'A Vital Ambition'. Available at: <https://meridianeconomics.co.za/wp-content/uploads/2020/07/Ambition.pdf>

¹² The deal price is assumed to escalate annually at 2.25% real in dollars. This aligns with the carbon shadow pricing assumptions used by multi-lateral development banks and is based on the work of Stiglitz & Stern, 2017; World Bank, 2017

¹³ Other financing options that achieve the same value transfer are discussed below, however, this structure allows for the lowest loan size without requiring capital concessions.



The interest cost saving opportunity provides a powerful incentive for South Africa to achieve its decarbonisation commitments as contained in the JTT.

As can be seen from Figure 2 it will take time for the renewables build to gain momentum, and therefore to ramp up the stream of additional mitigation. The JTT loan capital will be disbursed over an initial period during which the additional mitigation will still be very modest, even if South Africa is doing everything possible to ensure its compliance with the future committed trajectory.

To maintain credibility of the commitment during this initial period, prior to the bulk of the mitigation delivery, disbursement of capital tranches may be made conditional on relevant enabling milestones. These could include the implementation of the South African Just Transition Fund, Eskom unbundling and recapitalisation, and publication of an updated IRP aligned with the country's ambitious NDC commitments.¹⁴

INSTITUTIONAL STRUCTURE

The JTT will require careful institutional structuring to accommodate the range of parties that would be involved. Given that it would be (a) a multi-lateral transaction and (b) that parties will not have matching cash flow requirements, it is proposed that it be primarily intermediated by a dedicated facility established by a high-profile, multi-lateral climate finance entity. This entity can finance the initial drawdowns with long-term loans from participating multi- and bilateral development finance institutions, and capital market investors.

The participating sovereigns will support the facility by providing the financial value being transferred to South Africa (by means of the effective ~4 percentage point interest rate discount). This can be done either: (a) by guaranteeing the debt the facility issues, thereby reducing the cost of the financing (to approximate developed-country sovereign debt costs at about 1.5%); or (b) by means of compensating payments for the carbon mitigation value credited against South Africa's debt service payments. In the case of the latter

option the facility can raise the finance in ZAR in the domestic market, with the sponsor's compensation payments also preferably denominated in ZAR. This will deliver the entire concessional facility in ZAR.

A SYSTEM LEVEL INTERVENTION

Most other proposals for coal retirement mechanisms focus on individual plant closures at the entity level. However, the JTT is conceptualised as a power system level, a sovereign transaction with a primary focus on adherence to an agreed CO₂ mitigation pathway (delivering additional mitigation) in order to accommodate the real-world challenges of managing a decarbonising coal-based power system in South Africa.

In a power sector dominated by ageing, inflexible coal plant, the *exact* rate of coal plant capacity factor reductions, plant retirement, renewable energy construction, new supporting investments, etc. that will be required to ensure reliability of supply – while implementing rapid decarbonisation – is not known in advance. A workable coal-retirement mechanism needs to take account of this uncertainty and accommodate appropriate responses. While in some cases plant closures can be specified up front, it will be unrealistic, unnecessary, and ultimately counterproductive to expect South Africa to give up its system level flexibility to manage plant closures optimally, while it delivers the agreed mitigation outcomes.

The JTT therefore focuses on the outcomes that matter: (a) measured additional CO₂ mitigation; and (b) financial support to assist relevant stakeholders to overcome political, financial, and technical barriers to accelerated mitigation.

To protect the credibility of South Africa's mitigation commitment, which will be delivered over decades, it will be necessary to put in place an incentive mechanism that remains effective throughout the entire life of the agreement, linking realised concessionality to realised mitigation.¹⁵

It is beneficial that the sovereign level and power sector scope of the JTT is well aligned to, and can be readily supported by, the current design of South Africa's

¹⁴ The Integrated Resource Plan (IRP) is the formal government policy statement for the future development of the power sector.

¹⁵ The initial disbursement process can be structured in a way similar to the World Bank's Program-for-Results (<https://www.worldbank.org/en/programs/program-for-results-financing>) that is dependent upon achieving agreed milestones.



domestic climate mitigation policy suite – in particular the carbon tax, and the Sectoral Emissions Targets and company-level carbon budgets that will be introduced by the forthcoming Climate Act.

The commitments by the JTT counterparties will crowd in an accelerated and sustained renewables and grid infrastructure investment programme. This will form

the core of the post-Covid green industrialisation and economic recovery that South Africa so desperately needs. Ultimately the JTT offers a rare opportunity for South Africa to unlock the ability of a wide range of stakeholders to work together to move the country beyond its current energy policy impasse, along an ambitious, Paris-aligned, socially just, decarbonisation pathway.



THE JTT COMPARED AGAINST OTHER CLIMATE FINANCE PROPOSALS FOR SOUTH AFRICA

In principle the JTT can be implemented alongside elements of other climate finance proposals for South Africa on the assumption that mitigation is not double counted.

Eskom's proposed JET Transaction (JETT)

Eskom's JETT proposal¹ is essentially an entity-level, hybrid structure with its primary focus on green infrastructure finance, combined with modest accelerated coal retirement and just transition requirements. It is not designed to contribute to solving Eskom's debt problems but is rather aimed at enabling the financing of infrastructure despite the debt overhang. In contrast, the JTT is focussed on achieving Paris-aligned decarbonisation by means of a more ambitious, cohesive and singular coal-retirement mechanism that directly addresses the two systemic constraints to South Africa's decarbonisation: Eskom's financial weakness and the lack of an enabling policy and regulatory environment for a just transition to net zero.

Without a comprehensive solution to ensure that the unbundled Eskom entities are financially viable it will not be possible to accelerate decarbonisation without exacerbating the precarious state of the utility and the country's finances. This would likely lead to high levels of political fallout, pushback against climate ambition, and serious economic risks to growth and jobs in the country.

Until these issues are resolved, South Africa will remain tied to its historical coal-based path dependencies. The JTT is essentially a critical enabling intervention to create the circumstances that will allow the JETT and other green financing initiatives in the power sector (all renewable energy and associated infrastructure) to proceed at the speed, scale and (low) financing cost required for South Africa to achieve a Paris-aligned just energy transition.

Debt for Climate Swaps (DFCS)

DFCS proposals floated for South Africa² (Sguazzin & Cele, 2021) focus on existing sovereign debt, and on achieving *debt forgiveness* (i.e. the write off of principal debt) in return for accelerated coal plant closure. This seems to be achieved either by renegotiating existing debt or third parties buying up the debt and somehow retiring or handing it back to the issuer in return for coal plant closure. It is unclear what remedies are included if South Africa does not deliver the agreed plant closures once the debt has been forgiven.

In principle DFCS can have a similar mitigation and economic effect as the JTT. However, the proposals differ significantly in their practical approach. The JTT avoids the considerable additional complexity and risk of targeting existing sovereign debt in the context of a "debt forgiveness" paradigm. It also avoids causing loss of assets to funders whom South Africa needs further debt financing from. Instead, it focusses on the opportunity to feed concessional new finance into South Africa's debt issuances over the coming years. Furthermore, the JTT is designed to bolster the credibility of the mitigation commitment offered by South Africa (and therefore the value of the transaction to sponsoring countries) by tying the *realisation* of the financial support (net value transfer / "payment") to the *realisation* of additional carbon savings over the life of the agreement.

¹ Lungi, N. (2021) Eskom lays out US\$10 billion Green Energy transition plan, RenewAfrica. Available at: <https://renewafrica.biz/news/south-africa-news/eskom-lays-out-us10-billion-green-energy-transition-plan/>.

and Sguazzin, A. (2021) South Africa's Power Giant Lays Out Plan to Move Away From Coal, Bloomberg Green. Available at: <https://www.bloomberq.com/news/articles/2021-07-30/eskom-proposes-multi-lender-facility-to-fund-energy-transition> (Accessed: 15 September 2021).

² Sguazzin, A. and Cele, S. (2021) A \$15 Billion Trade for South Africa: Debt Relief for Climate, Bloomberg Green. Available at: <https://www.bloomberq.com/news/articles/2021-09-09/new-trade-idea-for-south-africa-is-debt-relief-for-climate-goals> (Accessed: 11 September 2021).



2 INTRODUCTION

Meridian Economics initiated the development of the Just Transition Transaction (JTT) proposal in 2018. The process has included extensive stakeholder engagement across the South African government and society, and with potential sponsor countries. These engagements have also included the South African power utility Eskom, which has recently proposed a different, but related ‘Just Energy Transition Transaction’ (JETT). After considering a wide range of possibilities in a rapidly developing context, we set out our favoured approach in this report.

Meridian is a think tank, and thus has no mandate or institutional ability to implement a JTT. Rather, our contribution draws on our experience, expertise and extensive research to present a detailed concept that develops and elucidates the Just Transition Transaction and its associated financial mechanisms. We understand that a real-world implementation could evolve as a hybrid drawing on both traditional green finance approaches and a coal retirement mechanism (The Eskom JETT falls into this category). However, our

aim is to contribute to this important process by highlighting the opportunity to structure a country-level coal retirement mechanism that places an entire country’s coal-dependent power system onto a 1.5 degree-aligned decarbonisation pathway as currently contemplated in South Africa. It is our hope that this work will both promote the opportunities that just transition transactions afford to fossil-dependent emerging economies, like that of South Africa, and their development partners, and supports ambitious transactions that both mitigate the impact of climate change and achieve a just transition that assists vulnerable communities.

As an intervention to address a highly complex set of problems, the multi-faceted JTT, engages across several different energy transition themes. Figure 3 demonstrates this and raises some of the questions that emerge under each. Additional papers and resources elaborating relevant aspects of the JTT are referenced and can be found on the [Meridian website](#). Future additions and updates are anticipated for each theme.

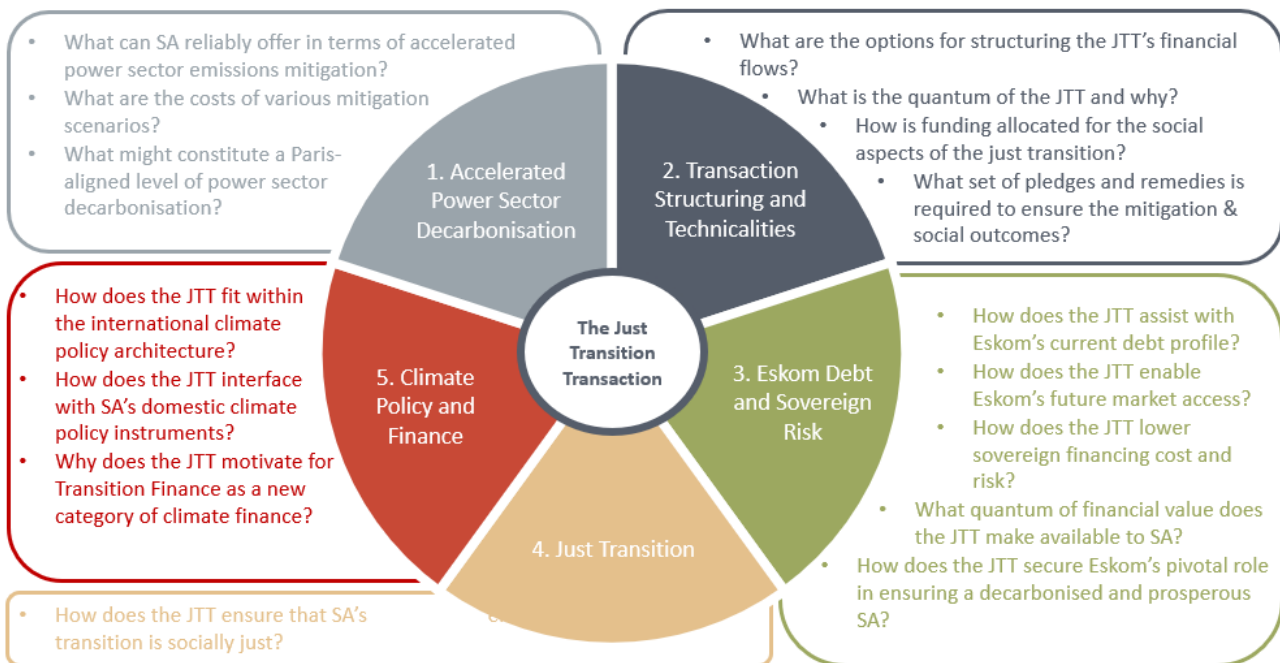


Figure 3: Thematic overview of the Just Transition Transaction

Since 2018, the JTT has been socialised broadly with South Africa’s government, the finance sector, labour, business and civil society. It was promoted by the 2019 Presidential Eskom Sustainability Task Team, and was

announced by President Ramaphosa (2019) in his statement to the United Nations Secretary General’s Climate Summit and by Eskom Chief Executive Officer, André de Ruyter, as a central part of the utility’s turn-



around strategy (Creamer, 2020). Meridian has worked with Eskom to explore the implications of the JTT for the utility's Just Energy Transition, with Eskom announcing its own version, the Just Energy Transition Transaction (JETT), at a Presidential Climate Change workshop in July 2021 (De Ruyter, 2021). Internationally, the JTT and JETT have been socialised with international finance institutions engaged in climate, and developed-country governments, with a number expressing their interest in both versions (Sgauzzin, 2021).

The JTT is considered a front runner within the emergent class of coal retirement mechanisms being developed to provide financial support to retire the global coal fleet and meet the timelines aligned with the Paris Agreement temperature goals (Blueprint Institute, 2020; Bodnar et al., 2020; Kanak, 2020; IEA, 2021a; Powering Past Coal Alliance, 2021).

In the sections that follow, the context for the JTT is discussed, the structure and components of the finance instrument as it is currently conceptualised are detailed and considered, and the benefits at both the domestic and global level are highlighted.



3 CONTEXT

3.1 SOUTH AFRICA'S ECONOMIC CHALLENGES

South Africa is classified as an upper middle-income country by the World Bank (World Bank, 2021), with a well-developed infrastructure base but high levels of inequality and poverty.

Today, the country faces near unprecedented economic challenges. After years of stagnant growth, a deteriorating fiscal position and the increasingly precarious finances of state-owned entities (SOEs), the pandemic shock has intensified South Africa's poor economic outlook. Towards the end of 2020, South Africa was downgraded to two levels sub-investment grade by Moody's with a negative outlook, and three levels sub-investment grade by S&P and Fitch (Moody's, 2020; Reuters, 2021). S&P and Fitch re-affirmed this rating in May 2021 (Stoddard, 2021).

South Africa has recently recorded a record-high official unemployment rate of 32.6% (StatsSA, 2021).¹⁶ It holds one of the highest Gini coefficients in the world (0.625) (World Population Review, 2021) and a full half of its population lives below the national poverty line (United Nations Development Programme & Oxford Poverty and Human Development Initiative, 2020).

Fiscal debt levels have grown exponentially in recent years, a situation exacerbated by the coronavirus pandemic. Gross national government debt is currently projected to rise from 80% of GDP in 2020/21 to 87% by 2023/24, and to stabilise at 89% in 2025/26. Debt service costs are projected to average 5.3% of GDP over the coming three-year period (National Treasury, 2021).

At this point in time, infrastructure investment and structural reforms to key sectors, including energy, could not be more critical to stimulate economic growth and job creation.

3.2 THE ESKOM CRISIS

South Africa's state-owned electricity utility, Eskom, currently presents one of the largest single threats to the country's financial and economic stability.

Most of Eskom's coal fleet, which the South African economy depended on for around 84% of its electricity in 2020 (Calitz & Wright, 2021), is aging and failing. Over the past 15 years many stations have not been adequately maintained and are increasingly challenging and expensive to operate, resulting in a lack of sufficient and reliable power generation. Furthermore, Eskom's coal megaproject build programme designed to bring replacement generation capacity online has been subject to large time and cost overruns, resulting in plants not performing to specification.

In addition to its escalating operational and capital expenses, Eskom has seen a steady decline in electricity sales over the last eleven years across all consumer categories. In 2021, there was an unprecedented drop in sales due to the Covid-19 pandemic (Eskom, 2021b). Compounding the sales losses, Eskom's tariffs are not cost reflective and do not allow the utility to recover its (even efficiently) incurred costs. The National Energy Regulator of South Africa (NERSA) is legally bound to allow tariff increases that enable Eskom to recover efficient costs. However, after years of mismanagement at the utility and with the aim of limiting tariff hikes for consumers, NERSA has repeatedly granted lower tariff increases than Eskom has applied for (Gosling, 2019).

Even with lower than cost-reflective tariffs, electricity costs for the consumer have risen roughly 300% over the past 13 years (Comins, 2021). Together with the declining reliability of power supplies, this has resulted in accelerated grid defection and lower demand, further limiting Eskom's revenue growth potential and resulting in a classic utility 'death spiral'. Meanwhile, arrear municipal debt for bulk Eskom power sales continues to escalate, totalling R35.3bn at the end of July 2021, adding to Eskom's liquidity pressure (Eskom, 2021c).

¹⁶Unemployment according to the expanded definition, which includes people who were available for work but not looking for a job, has risen to 44.4%.



The resulting financial position is that Eskom currently faces a net debt¹⁷ burden of R400bn and expected debt servicing costs of R71bn for the 2022 financial year (FY) (Eskom, 2021b). For the reasons outlined, the utility is unable to generate sufficient revenue to service this debt, necessitating substantial government support to remain solvent.¹⁸ This has compelled National Treasury to commit to large bailouts for Eskom: R56bn for FY2021, and between R21bn and R33bn per year for the next five years, targeted at enabling the utility to meet its short-term debt service costs.¹⁹

A major cause for concern, however, is that the drip-feed that is the current bailout package is *not sufficient* to reduce Eskom's debt to a level that can be serviced from revenues. This is due both to the size of Eskom's current debt burden, as well as the nature of compounding debt. The longer the timeframe until a full debt solution is provided (for example spreading debt relief over five years with final debt relief in 2026, versus a large upfront debt-relief intervention in 2022), the larger Eskom's debt hole grows, and the larger the inevitable total fiscal support package becomes.

In the meantime, Eskom's credit rating will remain weak. This results in a downward spiral for the financial health of the utility. The long-lived nature (40-50-year operational lifespans) of coal generation plant is not well matched to the much shorter and decreasing average tenor of Eskom's debt. This exposes Eskom to substantial refinancing risk and a steadily increasing cost of debt as its low-cost longer-term debt is replaced with expensive shorter-term loans. R150bn of Eskom's debt will come up for re-financing over the next five years. Each time this long-term debt is re-financed with short term loans, the utility's financial situation will worsen.

However, Eskom's ratings weakness has implications far beyond the financial health of Eskom itself. Given its central role in the power sector as the financial counterparty to most of the sector's investments, Eskom's predicament will increase the cost and difficulty of financing the very large infrastructure

investment programme required to provide South Africa with adequate and affordable power while meeting its decarbonisation commitments. Currently the sovereign must guarantee most of Eskom's financing and its power purchase agreements with Independent Power Producers (IPPs). Given the sovereign's own escalating debt challenges it will not be able to provide this support in future. Without an adequate intervention, critically required network expansion and strengthening and investment in generation assets (by IPPs, Eskom, or third-parties), will remain difficult, expensive and ultimately too slow to meet South Africa's economic and climate objectives.

Further, Eskom's financial crisis poses a significant risk to the cost of South Africa's fiscal borrowings. As the shareholder and guarantor of more than 77% of Eskom's debt (National Treasury, 2020), the sovereign is exposed to Eskom's current operational and financial risk, impacting the sovereign credit rating and in turn increasing South Africa's borrowing costs.

It is therefore vital for the South African government to take further steps to ensure that the balance sheets of the entities emerging from the Eskom unbundling (see 3.4 below) are recapitalised and that they are operationally and financially viable.

3.3 THE COMPETITIVENESS OF RENEWABLE ENERGY VERSUS COAL POWER IN SOUTH AFRICA

South Africa is endowed with some of the world's best solar and wind resources (Bofinger et al., 2016). This places the country in a prime position to capitalise on the rapid, disruptive decline in the cost of renewables witnessed globally over the past decade, and expected to continue for the foreseeable future (He et al., 2020; Bogdanov et al., 2021; Xiao et al., 2021).

The fundamental driver of this disruption is the steep 'learning curves' that emergent renewable technologies are following – with the increased deployment of the technology resulting in

¹⁷ Net debt is calculated by adjusting gross debt for related payments made in advance, derivatives held for risk management, financial trading instruments and cash and cash equivalents. In FY2021, Eskom had a net debt-to-equity ratio of 1.8.

¹⁸ Eskom's debt service cover ratio was 0.3 in FY2021 (operating cash flows / (interest + debt repaid))

¹⁹ This follows on from the total of R164 billion (R220bn - R56bn) in bailouts Eskom received from the state between FY2008 and FY2020 (Eberhard, 2021)



exponentially falling costs²⁰ (Grafström & Poudineh, 2021). These curves are no longer witnessed in so-called ‘mature’ technologies such as nuclear, gas and coal with no further cost declines expected in these technologies (Roser, 2020).

It is no surprise then, that South Africa’s least-cost power system development pathway has shifted away from a coal-dominated system. Cost-optimised power system modelling studies repeatedly show (climate considerations aside) that the least-cost pathway for the future development of South Africa’s power sector is based on renewable energy supported by appropriate peaking and storage resources (Wright, Calitz & Ntuli, 2018; Mccall et al., 2019; Meridian Economics, 2020a; National Business Initiative, 2021).²¹

Furthermore, recent analysis demonstrates that in 2020, it was already cheaper to *build new* renewable energy capacity with storage than to *continue operating* 39% of existing coal plants globally – this share is expected to reach 60% by 2022 and 73% by 2025 (Bodnar et al., 2020). This holds true for several Eskom power stations, which are now at the point where the cheapest option is to close them and procure new renewable energy and supporting system resources in their place (Steyn, Burton & Steenkamp, 2017).

3.4 A POWER SECTOR NO LONGER FIT FOR PURPOSE

The market and regulatory design of the South African power system is informed by the paradigm which holds that cheap power can be obtained through ever greater economies of scale in the form of large, centralised coal and nuclear plants. To finance these power projects the state-owned monopoly, Eskom, was protected by the state’s regulatory framework.

The new era of low-cost, decentralised renewable power technologies (described in 3.3), which reach economies of scale at project sizes an order of magnitude smaller, has fundamentally disrupted this

paradigm. Over the past two decades, many countries across the world have undertaken or embarked on fundamental power sector reform processes to respond to this disruption. These include the introduction of competitive markets for power generation, and system operation services, and more recently the widespread adoption of low-cost clean energy and storage technologies.

South Africa has lagged in adapting to these changes and exploiting the economic benefits they bring. This is evidenced by the stagnation of procurement processes for renewable energy and the palpable resistance to market and regulatory reforms that would enable the increased uptake of decentralised power technologies and stimulate competition in the sector to keep electricity affordable.

Ultimately, the combination of Eskom’s underperforming coal fleet, a stifling regulatory regime in the power sector and a hiatus in the procurement of new power generation capacity until this year, has led to a critical capacity and energy shortfall in South Africa. This has resulted in chronic loadshedding which continues to cripple the country’s post-Covid economic recovery prospects.

That said, there are signs of slow progress to secure the construction of new generation capacity and the market reform of South Africa’s power sector. The controversial Risk Mitigation Independent Power Producer Programme (RMIPPP) aimed at procuring approximately 2000MW of dispatchable power was launched in July 2020 (DMRE, 2020). Bid Window 5 of South Africa’s Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) opened in April 2021. Furthermore, an amendment to Schedule 2 of the Electricity Regulation Act (No. 4 of 2006), recently gazetted by the Minister of Mineral Resources and Energy, exempts generation projects up to 100MW from the need to obtain a generation licence from NERSA. While the 100MW exemption has potentially profound implications for competition in South Africa’s

²⁰ For each doubling of cumulative installed capacity, the cost of the technology decreases by a certain percentage – in the case of solar PV this is between 30-40% (Naam, 2020).

²¹ It is important to note here that a critical component of the power system modelling framework includes imposing stringent ‘system adequacy’ checks. These checks ensure that any power system development pathway produced by the model is able to meet South Africa’s electricity demand **adequately and reliably**: in every modelling scenario, demand is met on an hourly, daily, and seasonal basis (i.e. no loadshedding is allowed by the model).



power sector, many complementary market reforms are still required for its potential to be fully realised.

Another critical reform process currently underway is the unbundling of Eskom into three separate entities for generation, transmission, and distribution. This will help to stimulate competition within the power generation market by facilitating non-discriminatory access to the grid through the establishment of the Independent Transmission System and Market Operator (ITSMO). The unbundling process has implications for Eskom's finances and debt allocation across the three entities, both during the unbundling process and once completed. It is likely that this process will unfold in stages over the next two to five years.

Fundamental tariff reform processes will also need to be implemented to reflect the differentiated costs of providing the various services associated with grid power provision. These include wheeling, storage, capacity and flexibility. Appropriate allocation of these costs will enhance efficient investment within the sector, and electricity affordability.

A further bottleneck for urgent attention is the need to expand and upgrade the transmission and distribution grids to accommodate large-scale renewable generation projects.

3.5 THE MPUMALANGA COAL REGION

Eskom uses around 60% of the coal South Africa produces, and its utilisation of lower-grade coal in particular has underpinned the historic economic success of the country's coal sector, including its exports (Makgetla & Patel, 2021). This is because South Africa's coal industry has been structured for coal mines to sell their lower-grade coal or 'middlings' to Eskom, whose power stations were predominantly designed to utilise low-grade coal, and channel higher-grade coal into the export market at higher prices (Eberhard, 2011; Burton & Winkler, 2014). High export prices in turn helped artificially suppress domestic coal prices, resulting in cheap coal for Eskom.

However, recent external shifts in export demand for coal – from higher quality (and thus value) to lower quality coal as demanded by Asian markets – have exposed vulnerabilities in the symbiotic relationship

between Eskom's use of coal and South Africa's coal exports (Burton & Winkler, 2014).

The coal sector is a significant employer in the province of Mpumalanga, with around 12,000 workers employed in Eskom's power stations and 80,000 in coal mining for exports, industries and power generation (TIPS, 2020). Mpumalanga has unemployment levels above the national average, and unionised Eskom and mineworkers have resisted job losses in the coal sector for many years (Creamer Media, 2020; Eyaaz, 2020). Retrenchments however are now commonplace in the province, exacerbated by the financial strain experienced by companies during the Covid-19 pandemic.

South Africa has committed to a just transition for coal workers, communities and the Mpumalanga province in multiple policy fora, but a comprehensive and funded transition plan is yet to be developed. The public funding requirements of such a plan include both provision of transition support to coal workers and affected communities, and soft and hard infrastructure for the development of an alternative economy for Mpumalanga in the long term (Meridian Economics, 2021a).

At the same time, the Mpumalanga highveld is a global air pollution hotspot, generating dangerously high levels of sulphur dioxide, nitrous oxide and particulate matter, severely impacting the health of local populations (Greenpeace, 2019; Williams, 2020). For this reason, and due to the negative environmental impact of mining activities on water, soil and agriculture in the province, community activist and non-governmental organisations have agitated to close coal power stations for decades (GroundWork, 2018). However, others including organised labour take the opposite view, arguing that there are no immediate equivalent work opportunities available.

The resulting tension between civil society and labour plays out on the national political stage, where the Congress of South African Trade Unions (Cosatu) is a member of the powerful Tripartite Alliance, together with the governing African National Congress (ANC).



3.6 A GROWING GLOBAL FOCUS ON EMISSIONS

The challenges that face South Africa’s electricity sector are severely exacerbated by the external pressures arising from the global climate change agenda.

Internationally, there has been an upswell of national and company-level commitments to achieve net zero global emissions by 2050. This requires rapid and far-reaching change across all levels of society (IPCC, 2018). Notably, the International Energy Agency’s latest global report (IEA, 2021b) holds that, for the world to reach net zero by 2050, there should be no new coal, oil or gas investment from 2021 onwards, and that there should be no unabated coal use in the power sectors of emerging economies after 2040. Pressure is thus building on carbon-intensive companies and countries to transform their policies, strategies and business models to align with the emissions reductions required to achieve this climate goal.

South Africa’s emissions profile is dominated by energy, in particular electricity generation, which is responsible for 42% of national greenhouse gas emissions (see Figure 4).

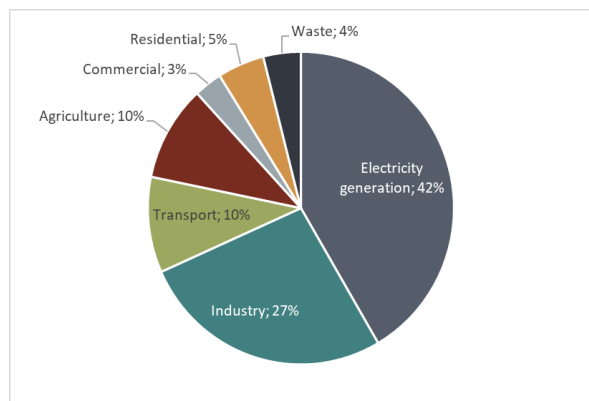


Figure 4: Proportion of national greenhouse gas emissions per economic sector (Department of Environment, Forestry and Fisheries, 2020)

In many countries, fossil-based power projects and related activities find it difficult to raise finance due to the rapid uptake of divestment pledges by domestic and international financial institutions. Large asset managers, sovereign wealth funds, domestic and international commercial banks, and development

finance institutions are withdrawing funds from coal, oil and gas (Institute for Energy Economics and Financial Analysis, 2019a). Many of Eskom’s lenders are increasingly unable to finance large CO₂ emitters, compounding Eskom’s precarious financial situation in which it already struggles to raise finance (Attard Montalto, 2021). Given the utility’s central role in South Africa’s economy this situation is further threatening both Eskom and the country’s financing risk profile.

Similarly, South Africa’s highly carbon-intensive economy presents one of the largest risks to trade and competitiveness. South Africa’s export profile is dominated by commodities and products with large amounts of embodied carbon and is therefore threatened by carbon border tax adjustments anticipated by some of the country’s main trading partners (Montmasson-Clair, 2020).

3.7 THE ROLE OF THE POWER SECTOR IN DECARBONISING SOUTH AFRICA

South Africa is a party to the UNFCCC, and a signatory to the Paris Agreement. As such, the country made commitments to decarbonise in both its first NDC,²² and in its LEDS which aspires to a net zero by 2050 target.

The electricity sector has a key role to play in both enhancing the ambition of the first NDC (which has an implementation timeframe of 2020-2030) and placing a net zero carbon emissions target for South Africa within reach. This is both because the power sector contains the country’s least-cost mitigation options, and because hard-to-abate sectors will rely on sufficient additional electrification being available to decarbonise. Meridian Economics (2020b), has argued that a power sector carbon budget of between 2Gt and 3.4Gt will likely be required for South Africa to align with the Paris temperature goals. The Integrated Resource Plan (IRP) 2019, implies a carbon budget of around 4Gt (Meridian Economics, 2020c), which is likely insufficient. The same study finds that achieving up to 1.5Gt of additional emissions reductions relative to the

²² An update of South Africa’s first NDC was approved by Cabinet on 14 September 2021, with targets deemed 1.5 degree compatible by Climate Action Tracker. (See: <https://climateactiontracker.org/blog/south-africas-presidential-climate-commission-recommends-stronger-mitigation-target-range-for-updated-ndc-close-to-15c-compatible/>)



IRP does not come at a materially increased power system cost.

It is important to note that this mitigation accrues over time and the transition is not immediate. The modelling shows that even if South Africa commits to a highly ambitious power sector decarbonisation pathway at least some of the coal fleet will continue to run for the next 20 years and maintain its role (albeit declining) in sustaining system adequacy and stability. This highlights the importance of continuing to finance these coal assets even as they are phased down in an accelerated decarbonisation pathway, and to mitigate the negative economic, employment and social impacts of the transition from coal.

However, as discussed in 3.4, despite the economic rationale of moving rapidly towards a renewable power dominated electricity system, strong political and institutional path dependencies continue to present barriers to the adoption of such a pathway.

3.8 THE NEED FOR A CLEAR ORGANISING VISION FOR SA'S POWER SECTOR

A combination of domestic electricity sector crises, external climate stressors, political and institutional path dependencies, plus the absence of a clear and credible plan to address these, has placed South Africa in position 110 of the 115 countries on the World Economic Forum's 2021 Energy Transition Readiness Index (WEF, 2021).

South Africa urgently needs a clear organising vision for the power sector that responds to the many dimensions of its power sector crisis. These include the need for a just transition for coal workers, communities, and regions; meeting South Africa's decarbonisation commitments and aspirations; the need to modernise the sector's institutional and market structure for least-cost clean generation capacity to come online rapidly; an adequate response to loadshedding; the ability to attract domestic and international investment; and a plan to stabilise Eskom financially and chart a sustainable path forward for the entities that will emerge from the current Eskom structure.



4 THE EFFECT OF THE JTT ON INVESTMENT IN THE SOUTH AFRICAN POWER SECTOR

The overarching objective of the JTT is to enable South Africa to secure an accelerated, affordable, and just electricity transition. Currently, the lack of a clear organising vision for the South African power sector, the Eskom financial crisis, an outdated sector structure, and the absence of a social plan has immobilised South Africa within its fossil fuel legacy. Together this severely constrains the transformative change required to decarbonise at the pace required by the Paris Agreement.

Securing an accelerated, affordable, managed and just electricity transition depends on: (a) achieving broad social and political support – a “social licence”; and (b) de-risking the sector’s financing environment for sustained, large-scale renewable energy, and associated large grid, storage, and flexibility investments. The JTT supports the achievement of (a) by providing catalytic funding for a South African Just Transition Fund (discussed in 5.2 below). To achieve Paris alignment in its power sector, South Africa requires an urgent, large and sustained renewable energy build-out programme, providing 5-6GW capacity per annum (Meridian Economics, 2020a). This represents infrastructure investment of at least R450bn over the next 10 years, almost double that envisaged by the current IRP 2019. A further ~R200bn is required for transmission and distribution grid expansions over this period.

To unlock these investments and crowd in the required financing, the financing environment must be de-risked. Government guarantees for successive REIPPPP rounds have played this role for the incremental rollout undertaken to date, but government’s guarantee ceiling is rapidly approaching, and the scale of guarantee required for a Paris-aligned decarbonisation trajectory makes this approach neither viable nor sensible when an alternative industry structure can carry its own commitments.

Continuing to unbundle Eskom into separate transmission, generation and distribution entities,

together with an ITSMO is imperative to realise a fit-for-purpose power sector structure, with the ITSMO critical to achieving a level playing field, competitive procurement and transparency. Tariff and market access reforms will support this process. However, without also recapitalising the institutions emerging from the Eskom unbundling process, adequate de-risking of the operating and financing environment will not be achieved.

As Eskom’s shareholder and the guarantor of its debt, the South African government must put in place a credible roadmap for recapitalising the unbundling Eskom entities.

Figure 5 outlines the need for recapitalisation of the unbundling Eskom entities. Eskom’s net financing portfolio is indicated by the red stack on the left. Allowance has been made for the backlog in critical grid and other capital investments. The grey block indicates the portion of this that is serviceable by future revenues from the unbundled entities in a reformed power sector structure. The remainder of the state bail-out pledges, in the brown blocks, cover some of the remaining gap, but the final stretch must be met by further state-provided debt relief.

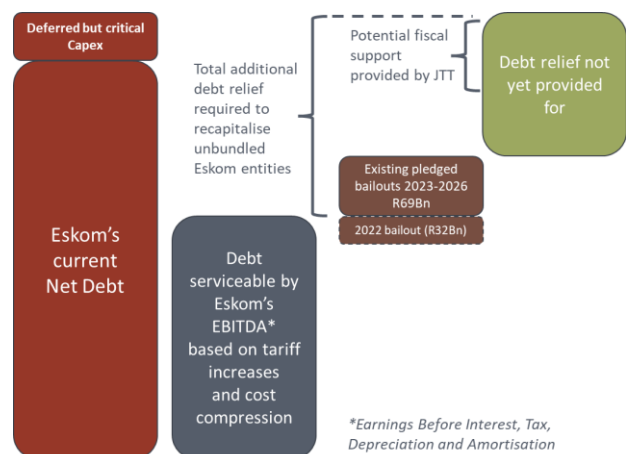


Figure 5: The need for a high-level comprehensive Eskom debt solution and the role of the JTT

Once achieved, Eskom Transmission and Eskom Distribution, both vital to the power sector transition, will be able to raise finance in the capital markets and from development finance institutions.

However, given the real moral hazard risks associated with bailing out SOEs, National Treasury have thus far refrained from setting out a roadmap for recapitalisation. This concern is well founded. Eskom



has already received a total of R220bn in bailouts from the state between 2008 and 2021 (Eberhard, 2021) and is still not able to carry half of the debt on its balance sheet. Similar problems are experienced with other SOEs. The recapitalisation of the unbundling Eskom entities must be executed in a way that drastically reduces the very real risk of perverse outcomes.

The JTT concessional support can play an important role in persuading National Treasury to commit to a comprehensive recapitalisation solution for the unbundling Eskom entities. It can provide fiscal space

(concessional value) to support the recapitalisation, and include conditions, supported by National Treasury, to resolve moral hazard concerns, such as comprehensive unbundling, reform of natural monopoly regulation and facilitation of competition in the power sector – all of which will place further pressure on the unbundled entities to contain costs.

These structural reforms, business turnaround, and recapitalisation will unlock the capacity for capital markets to finance the large-scale renewable and grid investments required for a Paris-aligned transition.



5 THE DESIGN OF THE JTT

The JTT was conceptualised and designed in response to the context presented in section 3. The overarching objective of the JTT is to enable South Africa to secure an accelerated, affordable, managed and just electricity transition.

The primary metrics of success for developed country counterparties are the tonnes of carbon mitigation achieved, the low relative cost of this mitigation, and the social development related to a just transition. For South Africa, success will be measured through securing both financial access and financial value to enable the country's electricity sector to support a managed, just, Paris-aligned development pathway.

South Africa's poor energy transition readiness is multi-causal, and a suite of interventions are required to respond to this. The JTT should be understood in this context: it will bolster action together with a number of sector reforms, financing interventions and policy and planning updates already in motion, including: Eskom's unbundling and business turnaround, tariff reform, acceleration and regular recalibration of South Africa's IRP, ongoing regulatory reform, a grid expansion programme, inclusion of the power sector in the carbon tax and Sector Emissions Target regimes, regular NDC updates, and the adoption and implementation of a dedicated just transition programme for Mpumalanga's coal region.

5.1 HIGH-LEVEL TRANSACTION COMPONENTS

The JTT is a transaction: South Africa offers globally desirable additional greenhouse gas mitigation and social outcomes, in return for highly concessional loan finance. As such, it comprises three broad transaction pillars:

1. **Ambition:** The South African government articulates a bold electricity sector decarbonisation ambition and integrates this into energy and climate policy.
2. **Financial support:** Concessional loan finance is provided by sponsoring sovereigns and potentially other financiers to support the implementation of this ambition.
3. **Incentive:** Financial and carbon incentives incentivise decarbonisation performance.

The transaction's primary mechanism is a concessional debt instrument backed by a consortium of developed country governments and provided to the South African government. The facility could be provided in either ZAR or USD. For instance, the South African Treasury anticipates raising long-term dollar debt for between 9-15% of its total requirements in the coming years (current government debt is approximately R4trillion – thus existing plans anticipate a foreign-denominated balance in the region of R600bn) (National Treasury, 2021). With existing foreign debt in the region of R400bn (National Treasury, 2021), and \$12-13bn in SOAF maturities due between now and 2030, there is ample space to accommodate a JTT loan within existing planned debt exposure. This means that even if the entire JTT loan were to be raised in dollars, it would not increase South Africa's future foreign debt obligation beyond that already planned. The JTT could similarly be absorbed as part of South Africa's domestic borrowing programme, should it be issued in ZAR.

The loan is repaid by South Africa with a mixture of carbon mitigation performance and cash, the extent of the financial concession is dependent on the extent to which South Africa achieves its agreed decarbonisation ambition. The high-level flow of funds and institutional arrangements of the JTT are demonstrated in Figure 6.



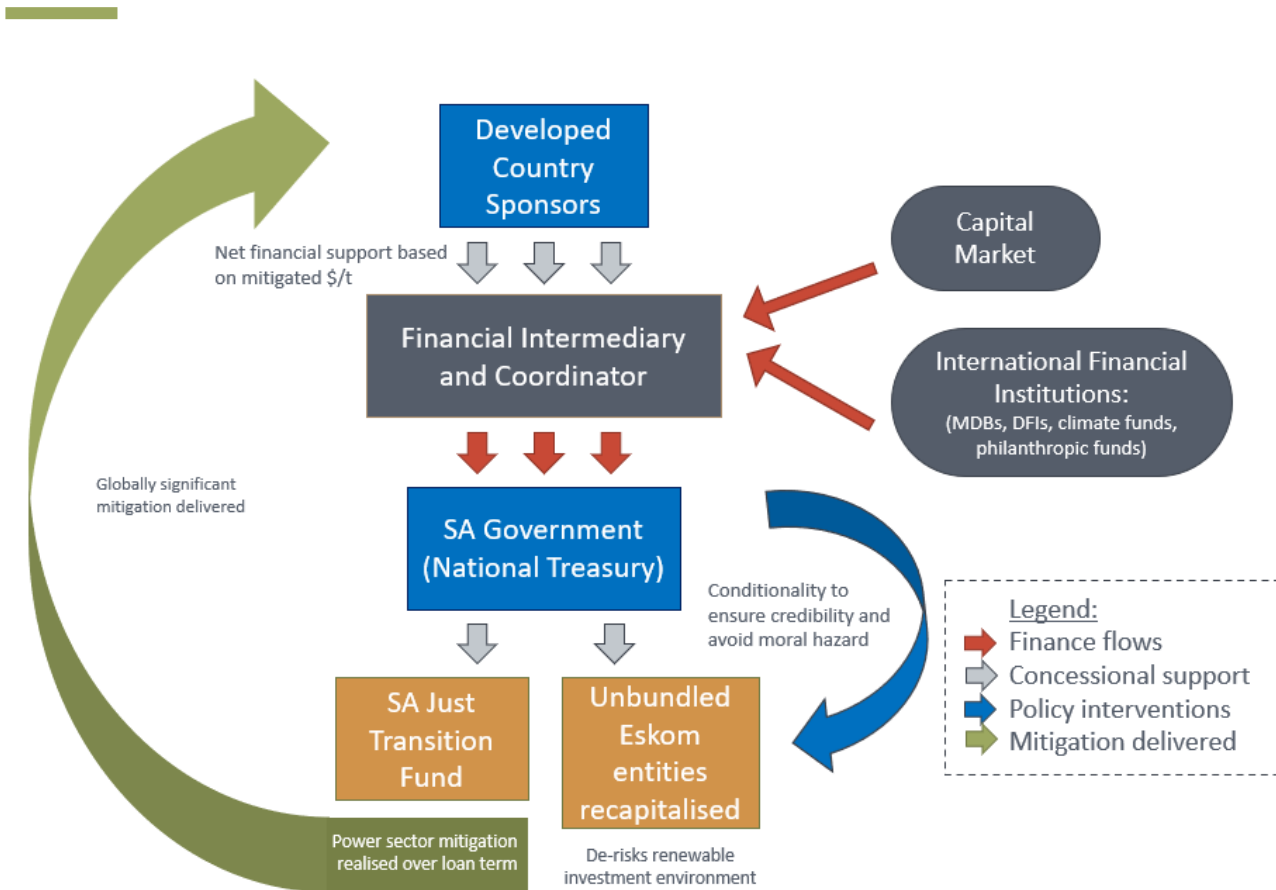


Figure 6: JTT Institutional structure and flow of funds

The consortium of developed country governments therefore underwrites the financial value of South Africa’s carbon mitigation performance (to the extent that it is achieved) as part of their climate finance commitment under Article 9 of the Paris Agreement. The transaction is facilitated by an international financial institution, such as the Climate Investment Funds (CIF).

Conceptually, the JTT can be understood to offer both a loan / financing element, and a concessional element or climate support opportunity for the developed (“sponsor”) country consortium – that of supporting an ambitious South African Paris-aligned just transition. Whilst this conceptual separation is useful to understand the transaction, in reality, these elements will be combined into one concessional finance structure.

JTT loan element: The JTT comprises a sovereign loan raised on commercial terms by South Africa as part of the routine international borrowings by the fiscus. It therefore represents an alternative source of finance, as opposed to an overall increase to South Africa’s national debt. Whilst a consortium of developed country climate finance sponsors are essential

counterparties due to the climate concessional element discussed below, the bulk of the finance could be offered by a variety of potential lenders (sovereign, International Financial Institutions, and capital markets).

JTT climate concession element: Embedded in the sovereign loan is a climate concession element which transfers support to South Africa to enable the country’s power sector decarbonisation.

Future, Paris-aligned power sector systems for South Africa imply a radical departure from existing electricity sector pathways (comprised of relationships, supply chains, assets, institutions, policy and regulation) established in anticipation of recovering the investment and achieving economic returns from the operation of this infrastructure for its full economic life. The current power sector risk profile for the renewable energy investors of the future is therefore highly unfavourable; for example, Eskom as a vertically integrated monopoly does not offer a level playing field, Eskom is an unattractive offtake counterparty given its financial crisis, and the regulatory environment is not conducive to new entrants. The result is that the incumbent fossil fuel interests and



legacy will persist, with negative consequences for both climate and economic development.

Following the UNFCCC principle of Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC) and Article 9 of the Paris Agreement, South Africa is eligible for financial support to re-orientate its power sector and decarbonise, putting the country on a Paris-aligned power sector trajectory. This financial support is realised in the climate concessional element of the JTT. The JTT does not consider creating a carbon asset and trading it, as provided for by Article 6 of the Paris Agreement (see Meridian Economics, 2021b for more on this).

The concessional support element accrues to South Africa over the transaction's lifetime through concessionary interest rates tied to mitigation performance. Therefore, the climate concession element is itself financed upfront, and realised over time, based on South Africa's mitigation performance.

In reality, the concessional support element of the JTT will not be ring-fenced, but made available to the fiscus as part of its suite of financing activities; a 'use of proceeds', or costs to which the climate concessional element responds can be identified as follows:

1. Defraying the cost of a socio-economic programme to support the just transition in the Mpumalanga coal region (Meridian Economics, 2021a), through the provision of a capital grant to a Just Transition Fund. This fund will catalyse and crowd in further funding for a just transition focused on Mpumalanga's coal economy (see 5.2).
2. Supporting the South African government to absorb the loss of the asset value through closing coal plants earlier than the period over which the investment would have been amortised and recapitalising the emerging Eskom entities to establish a viable basis for the large-scale grid and renewables financing required.²³

At a high level, the following components are used to operationalise the loan mechanism:

- A baseline emissions trajectory – what would most likely happen in the absence of the transaction.
- A 'JTT trajectory', representing a Paris-aligned level of mitigation relative to the baseline over the lifetime of the transaction.
- An agreed value per tonne of carbon mitigated in the transaction: the 'deal price', expressed in \$/t.
- A timeframe, for both the financing and the attribution of mitigation.
- An incentive mechanism whereby the financial value of mitigation performance, based on the agreed carbon value (\$/t), can be credited against the debt service payments.
- A consortia of developed country governments providing the agreed financial value of mitigation performance as it is credited against South Africa's debt service obligations.

These components and their effects are elaborated in this section, bearing in mind that they can interact in particular ways to deliver several specific modelled design options for the transaction (see 5.5).

The **value of the JTT concessional element**, if the full mitigation performance is achieved, is calculated as the cumulative emissions difference between the emissions baseline and the JTT trajectory, multiplied by the agreed value per tonne of carbon (deal price). Figure 7 demonstrates this.

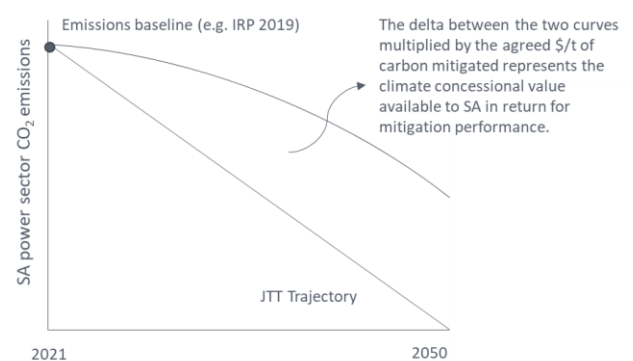


Figure 7: The value of the concessional element in the JTT

The **deal price (\$/t mitigation)** of the JTT must reflect both the cost efficiency of the mitigation opportunity,

²³ As in many other jurisdictions, Eskom holds a regulatory asset – the right to recover the investment in productive assets (its “regulatory asset base”) over their economic life from the tariffs it charges.



compared to paying for the more marginal mitigation opportunities existing within developed countries, and the cost in South Africa of unlocking an accelerated transition.

In modelling the transaction, different deal prices (2021 \$/t) are co-determined with interest rates, carbon price escalation, and different values for the concessional element of the JTT. Table 1 presents a sensitivity analysis of the present value of the deal (the concessional element in Rbn) to the 2021 carbon deal price in \$/t, and associated escalation above US inflation.²⁴

Figure 8 shows examples of the projected cost of carbon mitigation (shadow carbon prices) in real 2021 values, including those employed by multi-lateral development banks, the prices identified by the High-level Commission on Carbon Prices, and most recently, the prices used by the International Energy Agency in its analysis of a global net zero compliant energy system. The lowest of these starts at \$25/t in 2021, with the IEA anticipating \$200/t by 2050.

	Annual real increase in agreed \$/tonne value ->			
	0.00%	1.00%	2.00%	3.00%
\$1.00	R10	R12	R14	R16
\$2.00	R20	R24	R28	R32
\$3.00	R31	R36	R42	R49
\$4.00	R41	R48	R56	R65
\$5.00	R51	R60	R69	R81
\$6.00	R61	R71	R83	R97
\$7.00	R72	R83	R97	R114
\$8.00	R82	R95	R111	R130
\$9.00	R92	R107	R125	R146
\$10.00	R102	R119	R139	R162
\$11.00	R112	R131	R153	R179
\$12.00	R123	R143	R167	R195
\$13.00	R133	R155	R181	R211
\$14.00	R143	R167	R194	R227
\$15.00	R153	R179	R208	R243
\$16.00	R164	R190	R222	R260
\$17.00	R174	R202	R236	R276
\$18.00	R184	R214	R250	R292
\$19.00	R194	R226	R264	R308
\$20.00	R204	R238	R278	R325

Table 1: Value (PV) of the JTT in Rbn depending on different starting values and agreed escalation.

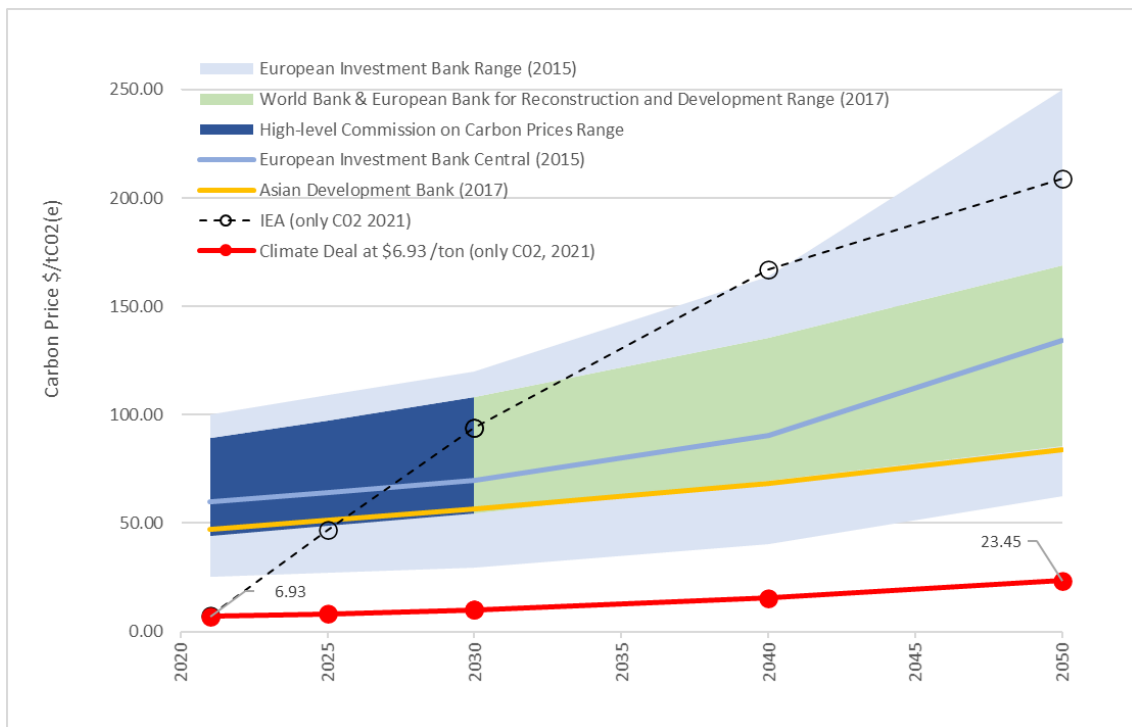


Figure 8: Shadow carbon prices (adapted from WWF 2019 Carbon Pricing and the Multilateral Development Banks: Comparative Analysis and Recommendations (Stiglitz & Stern, 2017; World Bank, 2017))

²⁴ The set of financial assumptions from which this range is generated is set out in 5.5.



The deal prices presented in the sensitivity range above are far lower than those shown in the international comparison in Figure 8. In fact, we do not even tabulate a deal at the lowest international price (\$25/t), emphasising the inherent economic mitigation value in the South African opportunity relative to others internationally. Pragmatically though, the concessional value that more comparable carbon prices would drive would be untenable in the current political and institutional climate finance landscape. We believe the range in Table 1 is a realistic one for negotiating a transaction of the JTT-type.

A deal price of approximately \$7/t which yields R100bn (or about \$7bn) in net present value terms is the main example in this paper. This locks in a highly efficient \$/t rate for sponsoring countries over 25 years. It also delivers a net present value that responds commensurately to the need for further fiscal space to address the socio-political and financial barriers to unlocking accelerated power sector decarbonisation in South Africa. The \$7/t deal price trajectory is located against the international price trajectories in red in the figure.²⁵

Drawdown of the financing will likely occur over an initial period, for example five years, in tranches to spread risk and capital outlay and build confidence in the mechanism. Further – or alternative to – the use of tranches for the capital drawdown, it may be that the financing is secured incrementally, as a succession of debt instruments within an overarching framework, rather than one mega-transaction agreed in year one. These instruments could differ from one another depending on the requirements of particular funders. A tranced JTT is demonstrated conceptually in Figure 9. Each successive tranche will commit South Africa to additional decarbonisation compared to the pathway established by the previous tranches. At the completion of the drawdown process, the power sector will be committed to a Paris-aligned decarbonisation pathway.

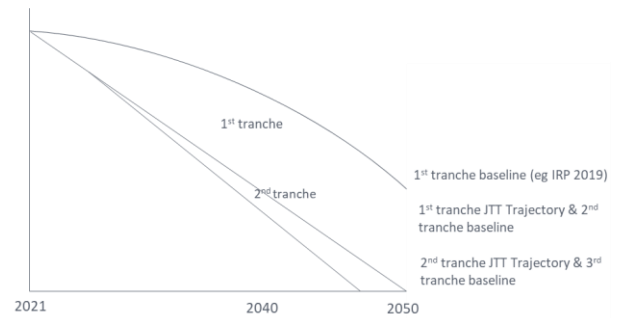


Figure 9: Successive JTT tranches

The use of tranches provides further opportunity to incorporate ‘scaffolding’ conditionality in the design. Each successive tranche could be dependent on key policy or regulatory milestones being met. Examples include the regular updating of the IRP, the timely release of REIPPPP bid rounds, the adoption of a recapitalisation plan for Eskom with associated progress on business turnaround, restructuring and unbundling, and a commitment to no further coal power capacity within South African borders. Further, early tranches can include remedies (see below) if a full Paris-aligned mitigation coal phasedown is not contracted within a stipulated timeframe.

The incentive mechanism enables the transfer of the JTT’s climate concessional value to South Africa and drives the mitigation performance. The concessional value of the transaction is firmly bound to mitigation performance²⁶ in any year, at the agreed \$/t price. Significant underperformance by South Africa in achieving the JTT mitigation trajectory in any particular period could involve:

- Concessional value of the loan becoming unavailable.
- Contagion to, or even loss of, other tranches if an incremental structure has been used, including loan acceleration.²⁷
- Revision of the future JTT trajectory and milestones, or imposition of additional milestones.

²⁵ The deal price is assumed to escalate annually at 2.25% real in dollars. This aligns with the carbon shadow pricing assumptions used by multi-lateral development banks and is based on the work of Stiglitz & Stern, 2017; World Bank, 2017

²⁶ Contracting around a Paris-aligned decarbonisation pathway, as opposed to mitigation of such a pathway relative to a baseline trajectory could provide a further opportunity to embed powerful ‘stick and carrot’ incentives. An agreed deal price in \$/t could be applied to unwind concessional credit if emissions exceed the trajectory in any year, whilst a higher aspirational price could be applied to the extent emissions fall below the trajectory in a year providing a ‘bonus’ payment.

²⁷ Loan acceleration is when the borrower has to repay all outstanding capital and interest before the term of the loan concludes.



It will be important to include a degree of flexibility in the incentive mechanism to allow for fluctuations due to variations in demand, issues with the coal fleet or temporary delays in renewables deployment. The South African climate mitigation policy instruments will manage this through the five-year rolling Sectoral Emissions Targets (SETs) / carbon budgets anticipated in the Climate Bill currently before Parliament. Whilst five years may be too infrequent for the JTT, something similar and aligned to the electricity sector SET could be considered. A key design objective for the incentive mechanism is to incentivise adherence to the JTT trajectory, not to raise interest rates (at the cost of mitigation), and not to result in a cycle of non-performance.

The socio-economic aspects of the JTT (described in 5.2) could be incorporated in the incentive structure, although it is more likely that these will be separately governed. Creating a reinforcing feedback loop between mitigation and its socio-economic aspects would strengthen the JTT's ambition and implementation.

The Institutional Structure within which the JTT financing mechanism is housed is critical to its success. Considering the size of funds, counterparties involved need to provide some asset/liability matching capability and it is proposed that it be primarily intermediated by a dedicated facility established by a high-profile, multi-lateral climate finance entity. This entity can finance the initial drawdowns with long-term loans from participating multi- and bilateral development finance institutions, and capital market investors.

The participating sovereigns will support the facility to ensure that the facility can make debt service payments to its funders when payments to it from South Africa are reduced by the credited mitigation under the JTT agreement. They can provide this support by either (a) guaranteeing²⁸ the debt the facility issues, thereby reducing the cost of the financing (to approximate developed country sovereign debt costs at about 1.5%); or (b) by means of compensating cash payments for the

carbon mitigation value credited against South Africa's debt service payments as and when they arise.

In the case of the first option, the facility would raise debt at approximately 1.5% under the guarantee from the participating sovereigns. This debt would be passed through to the South African government at 5.5%, with the addition of suitable provisions to allow for achieved mitigation to be credited against the debt service obligations to the facility. Failure to achieve the pledged mitigation would result in additional interest payment amounts that would accrue to the participating sovereigns.

In the case of the second option, the facility would raise debt on behalf of the JTT at interest rates commensurate with South Africa's credit risk. This debt and its associated payment obligations would be passed through to the South African government, with the addition of suitable provisions to allow for achieved mitigation to be credited against the debt service obligations to the facility. The participating sovereigns would pay the facility any amounts that South Africa was not obliged to pay in respect of achieved mitigation.

In the case of this second option the facility could raise the finance in dollars or (likely to be far preferable for South Africa) in ZAR in the domestic market, eliminating the exchange rate risk. The participating sovereigns' compensation payments could also be denominated in dollars or rands or some combination of the two. This would effectively entail the specification of a deal price for carbon in dollars or rands or both, with appropriate escalations over the life of the deal. It would thus be possible to tailor the currency exposure of the deal and of the ensuing mitigation stream in a manner that suits all parties to the transaction.

5.2 THE JUST TRANSITION FUND

Embedded in the JTT design is the earmarking of a portion of the value raised for a Just Transition Fund (JTF). A proportion of the concessional value is allocated to this fund as an annuity over the loan term, providing catalytic funding to crowd in other public and private sources of finance to support coal workers and

²⁸ Participating sovereigns could carry the guarantee risk on their own balance sheets or potentially pool the risk and use an instrument purchased through, for example, the Multilateral Investment Guarantee Agency (MIGA) to address it. MIGA could also be used to address currency risk in the transaction if this were cost effective.



affected communities and assist in developing an alternative economy for Mpumalanga. The annuity is dependent on the mitigation being achieved, hard-wiring mitigation and social aspects in a virtuous

feedback loop. The availability of long-term Just Transition funding is anticipated to act as a forcing function for the establishment of just transition programme co-ordination and governance bodies.

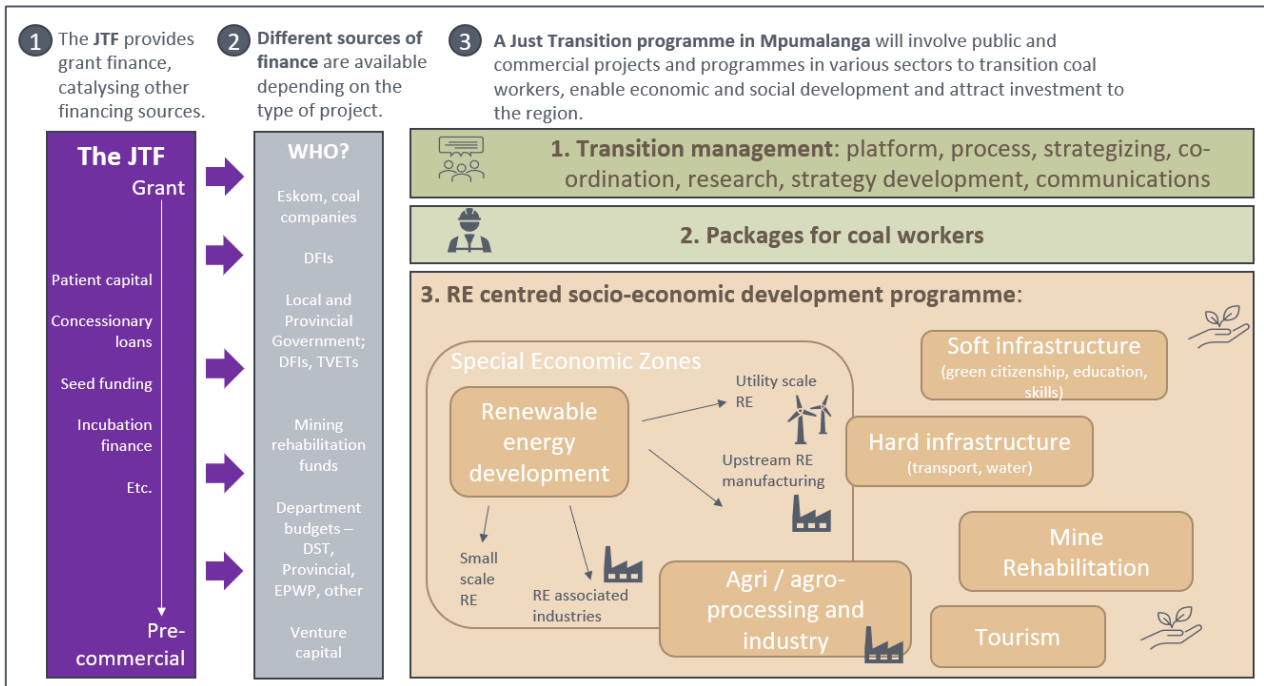


Figure 10: Types of finance which could be crowded in by the Just Transition Fund, contributing to efforts in three just transition focus areas

A high-level conceptual view of the operation of this fund and application of its resources is demonstrated in Figure 10. The fund’s capital is blended with other sources of finance to provide appropriate financing for the public funding needs associated with key components of a just transition programme: including establishing and resourcing an inclusive transition management institutional structure, targeted financial and skills development support mechanisms for impacted coal workers, as well as funding for broader local industrialisation, educational and regional upliftment initiatives (Meridian Economics, 2021a). The governance of the fund will require careful consideration.

To further support the Mpumalanga region, a portion of the renewables build programme could be specified to occur in this province, which is favourable due to the

province’s close proximity to existing grid capacity and large-scale transmission infrastructure.²⁹ This investment would provide an anchor to stimulate a wealth of new opportunities in value chain activities related to a new, greener economy. The accelerated transition away from coal will also provide environmental and health benefits for affected households and communities.

5.3 EMISSIONS SCOPE

The mitigation opportunity provided by the JTT (Figure 11) is attributed to emissions reductions achieved by the existing Eskom coal fleet under an ambitious, Paris-aligned mitigation scenario (Meridian Economics, 2020a). This scenario mitigates close to 1.5Gt of CO₂ emissions by 2050, compared to South Africa’s ‘baseline’ emissions trajectory which is based on the IRP 2019.

²⁹ This will have to be traded off against the higher cost of renewable energy in this area due to the lower wind and solar resource compared to South Africa’s best renewable resource locations.



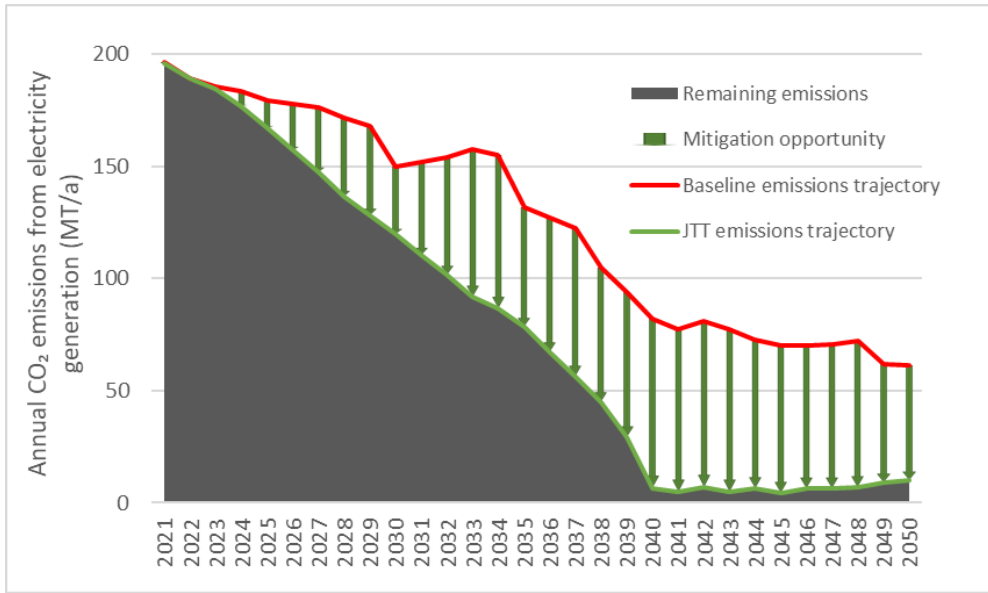


Figure 11: Mitigation potential of the coal fleet versus all grid emissions in a feasible Paris-aligned mitigation scenario (Meridian analysis based on Meridian Economics (2020a))

A clear JTT emissions scope is required to monitor, measure and report the impact of the JTT on emissions. Figure 12 demonstrates options for this, starting with the narrowest (just the Eskom coal fleet), and moving towards the most expansive, incorporating all power generation in South Africa.

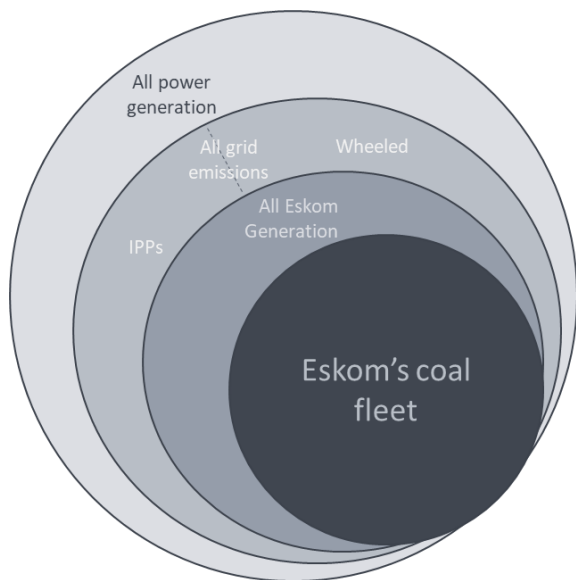


Figure 12: Possible emissions scope options for the JTT

Whilst the JTT's focus is on mitigating the direct emissions from Eskom's existing coal fleet, for a number of reasons a more expansive emissions scope –

likely that at least covering all grid emissions – is probably required.

First and foremost is the danger of leakage.³⁰ Within the power sector this could occur through a ramp up of non-coal fossil fuel use, particularly to allow for the flexibility required by a large renewables fleet. Emissions from a Paris-aligned South African power sector are highly constrained even without the coal (Meridian Economics, 2020b). *Outside* of the power sector, one leakage concern often raised is the coal export sector. Whilst the likelihood that coal exports would rise as a result of the Eskom fleet phasing down seems unlikely (given the lack of physical investment in supply, constraints on export infrastructure including rail, and the potential for decline in global coal markets into the future) (Institute for Energy Economics and Financial Analysis, 2019b), this might nevertheless require further investigation and the establishment of counteracting mechanisms if necessary.

As a government-led transaction, a near-sectoral scope for the JTT is advantageous in that this would align closely with the domestic mitigation policy instrument of the Sectoral Emissions Target (SET), envisioned by the Department of Forestry, Fisheries and Environment (DFFE) (Department of Environmental Affairs, 2011). As currently considered, the SET provides the upper bound

³⁰ Emissions leakage is where climate interventions in one area (project, sector or country) result in or allow an unintended increase in emissions in another.



of emissions from the power sector, in a five-year rolling budget. The path and quantum of this sector budget could then be aligned with the JTT trajectory (for further discussion of how the JTT could align with the domestic policy environment see (Meridian Economics, 2021c, forthcoming)).

Another reason for a scope larger than the Eskom coal fleet is that while electricity provision in South Africa is currently dominated by Eskom, with only 6.2% of energy provided by IPPs (Eskom, 2021a), market reforms in the power sector and Eskom's financial vulnerabilities imply that future energy supplies will be provided by a much more diverse market, including IPPs, own generation, municipalities, communities and more.

In determining the scope and boundaries of mitigation initiatives, a balance must be struck between complexity and credibility. An 'all grid emissions' scope, supported by policy to manage emissions from off-grid power (such as a South African commitment to no new coal-fired power generation within its borders), would appear to strike a good balance between these opposing considerations.

There are many resources that can ultimately be drawn on to determine the JTT emissions scope, including the Greenhouse Gas Protocol (entity focused), the Clean Development Mechanism architecture (project focused), and initial work on Nationally Appropriate Mitigation Actions (NAMAs) and NDC implementation financing (programme, sector and sub-sector focused). Which is used will largely depend on the requirements of the developed country counterparties and their financial intermediaries together with integration with greenhouse gas inventories and reporting systems on the South African side. The JTT mitigation would likely be monitored by the DFFE which will house the South African Climate Change Monitoring and Evaluation system, already at an advanced stage of development.

5.4 MITIGATION PROFILE

The JTT is based on a Paris-aligned emissions trajectory for the South African power sector. An example of such a trajectory (the Ambitious RE scenario with all coal off

by 2040 emanating from the Meridian Economics – Council for Scientific and Industrial Research study, a Vital Ambition (Meridian Economics, 2020a)) underpins the financial detail and design of all the options considered in this paper.³¹

Whilst the JTT can be undertaken through a series of tranches, the overall design nevertheless assumes a Paris-aligned trajectory is contracted within the first five years. We believe this to be important to the credibility of the transaction, given that it is a first-of-its kind application of public concessional climate finance to coal phasedown. Transition finance and coal retirement mechanisms are newcomers to the world of climate finance, and rightly subject to significant scrutiny lest they represent 'greenwashing', or the financing of mitigation efforts that would have taken place anyway. It is therefore particularly important that the JTT itself can be identified as the cause of mitigation that would not otherwise take place.

To achieve Paris alignment, the timing of the mitigation is important. Figure 11 demonstrates that the bulk of the total quantum of mitigation will be delivered after 2030. What the figure does not show is the modelling finding that it is the action taken in the 2020s that will determine the level of mitigation that is ultimately achievable. An ambitious renewables build with an *increasing* floor on annual new capacity built is necessary in the current decade to enable the pace of coal phasedown required by 2040. In addition, the mitigation that is achieved through accelerating coal phasedown in the 2020s is critical, despite being limited. There is simply not an opportunity to mitigate sufficient emissions in the 2030s and 2040s to align with the Paris goals. This finding is supported by the Presidential Climate Commission's comment on South Africa's draft NDC (Presidential Climate Commission, 2021), and in the international context (Carbon Brief, 2020). This underpins the importance of urgent and vigorous action to orientate the South African power system towards decarbonisation.

When considering the scale of mitigation attributable to the JTT, timeframes are therefore relevant. The example in Figure 11 considers mitigation profiles to

³¹ *Determining Paris-alignment in the context of a mechanism like the JTT is complex, as it involves political, ethical, scientific, economic and technological assumptions and judgements. Nevertheless, methods are being developed to approach this (for example Meridian Economics, 2020b), theoretically enabling the identification of an appropriate Paris-aligned 'JTT trajectory'.*



2050 (almost 1.5Gt CO₂), given the importance of this date in climate mitigation policy development. However, in view of the mitigation performance being linked to the servicing of the JTT loan(s), a timeframe equal to the tenor of the loans is appropriate (25 years) for purposes of the transaction.³²

Ultimately, a very large and rapid renewable energy programme is needed to drive South Africa’s ability to meet its mitigation commitments whilst continuing to provide adequate and affordable power to the economy during the transition period (Meridian Economics, 2020a). However, the financial structuring of a transaction that creates the enabling environment for this has to account for the unavoidable real-world gradual ramp up of the actual mitigation performance.

5.5 FINANCIAL DETAIL AND SPECIFIC DESIGN OPTIONS

In this section we provide further detail on the operation and calculation of the important transaction parameters contained in the financial modelling of the JTT, and our underlying financial, economic and power system assumptions. In so doing, we offer a number of potential JTT financial design options for consideration.

The value of the concessional element of the JTT – generated in dollars – drives the transaction’s overall design and value. We begin, therefore, by considering how this value relates to other key assumptions in the model.

Table 2, a numerical detail of Figure 11, shows examples drawn from the modelling work in (Meridian Economics, 2020a) of the emissions baseline (the Current Policy Pathway) and JTT Trajectory (here the Ambitious RE pathway with all coal retired by 2040). The latter is a feasible, Paris-aligned pathway for the power system that results in substantially reduced emissions whilst maintaining system adequacy. The annual difference between these emissions trajectories is used to determine the annual tonnes of mitigation that could be delivered by the JTT (Meridian Economics, 2020a).

To determine the annual value of the mitigation that will be applied to debt service obligations in respect of

the transaction it is necessary to calculate the value of carbon in \$/t applicable in each year. This is determined using the following assumptions (which are held as standard for all financial calculations in this paper):

Mitigation crediting period:	25 years
Dollar interest rate (SOAF):	5.50%
Dollar inflation:	2.0%
Annual real increase in \$/t:	2.25% ³³
2021 R/\$ exchange rate:	R14.50
Rand interest rate:	10.0%
Required present value of the climate concessional element assumed:	R100bn

Exchange rate depreciation is modelled annually at the differential between South African sovereign debt issued in rands (10.0%) and in dollars (5.50%). No hedge cost is taken into account as we assume that the South African government would absorb the exchange rate risk for all dollar payment obligations, in line with existing policy on foreign debt exposure.

By specifying the required present value of the climate concessional element of the deal in rand terms at R100bn, the 2021 carbon deal price in \$/t is determined to be approximately \$7/t (see Table 2).

³² Mitigation over the loan term of 25 years sums to 1.2GT. In all the examples we only attribute this much mitigation to the transaction.

³³ Stiglitz & Stern, 2017; World Bank, 2017



Annual CO ₂ emissions (Megatonnes)			
	Example emissions baseline (Current Policy Pathway)	Example JTT Trajectory (Ambitious RE pathway with all coal retired by 2040)	Annual Mitigation Opportunity
2021	196.2	196.2	0.0
2022	189.3	189.2	0.1
2023	185.5	184.5	1.0
2024	183.7	176.8	6.9
2025	179.4	167.0	12.4
2026	177.6	157.3	20.3
2027	176.0	147.2	28.8
2028	171.7	136.6	35.1
2029	168.2	128.2	40.0
2030	149.9	119.6	30.3
2031	151.7	110.7	41.1
2032	154.2	101.8	52.4
2033	157.4	92.0	65.4
2034	154.9	86.6	68.3
2035	131.6	78.5	53.2
2036	126.9	67.2	59.7
2037	122.6	56.0	66.5
2038	104.9	44.8	60.1
2039	94.2	29.3	64.8
2040	82.1	6.4	75.7
2041	77.3	4.9	72.3
2042	81.2	6.8	74.3
2043	77.1	4.6	72.5
2044	72.9	6.4	66.5
2045	70.2	4.5	65.8
2046	70.2	6.2	64.0
2047	70.7	6.2	64.5
2048	71.9	6.9	65.0
2049	61.9	8.8	53.1
2050	61.4	10.0	51.4

Table 2: Emissions associated with the current policy pathway and the mitigation opportunity

With the carbon deal price determined - \$7/t in our example of a transaction that releases R100bn in value to South Africa - it is possible to calculate and compare debt financing options that would all deliver the same R100bn in present value terms according to alternative different designs. Each requires a different overall loan size to deliver the same R100bn in present value.

Before doing so, we introduce one further concept, that of a loan interest repayment profile sculpted to match the mitigation profile resulting from the difference

between the emissions baseline and the JTT Trajectory. Loan sculpting is standard in financing for instances where there are specific cashflow timing requirements. Instead of fixed annual interest payments, the interest payment profile of such a loan is sculpted to match South Africa's ability to deliver CO₂ savings, i.e. the annual mitigation opportunity shown in Table 2. This enables the transfer of value in the JTT – the climate concessional element – to occur in response to possible and performed mitigation.

We proceed to examine a number of potential financial structuring options below, exploring combinations of mechanisms that transfer concessional value through interest rate concessions, principal repayment concessions or both, and varying loan types and profiles, including bullet or amortising loans, and sculpted repayments. For brevity we include examples of structures in which the debt is raised and paid in dollars (with the exception of the fourth example in which no cash payments are required provided mitigation is achieved as pledged). As explained in 5.1, if participating sovereigns provide support through cash payments, it is possible to structure equivalent deals denominated in rands or a combination of rands and dollars.

As with any concept document of this kind it is impossible to capture the full complexity of implementing any of the proposed loan structures. We have modelled the debt as fixed-rate term loans, but of course these could well be based on floating rates. In all likelihood a transaction of this nature would have a positive impact on the borrower's credit rating and therefore the cost of debt and associated spread above the participating sovereigns. This would have the effect of reducing the value of the deal to South Africa unless credit quality improvements were specifically structured in. One way of accommodating such dynamics is to make provision for future release of further capital from the JTT facility with the present value of the deal preserved under a narrowing of the South African spread over developed country sovereigns. We have not modelled this complexity.

5.5.1 Market rate bullet loan with mitigation-sculpted interest payments

In this financing option (the example reflected in section 5 thus far), concessional value is transferred



from funders through a concession on interest rate alone – all principal is returned in five bullet payments 21 years after each of five successive annual disbursement tranches (total term is 25 years). Our assumption is that funders will have scope to provide an interest rate concession off the South African market rate (of 5.50% in dollars), but the limit of this concession would be a rate equal to their own cost of

capital (plus appropriate arrangement fees). We assume this all in ‘cost’ rate to be 1.50% in dollars. The interest concession is thus the spread from 5.50% to 1.50% in dollars (10% to 5.83% in rands). The loan is sized such that this interest rate concession over the life of the loan results in a present value benefit of R100bn in the hands of the borrower.³⁴

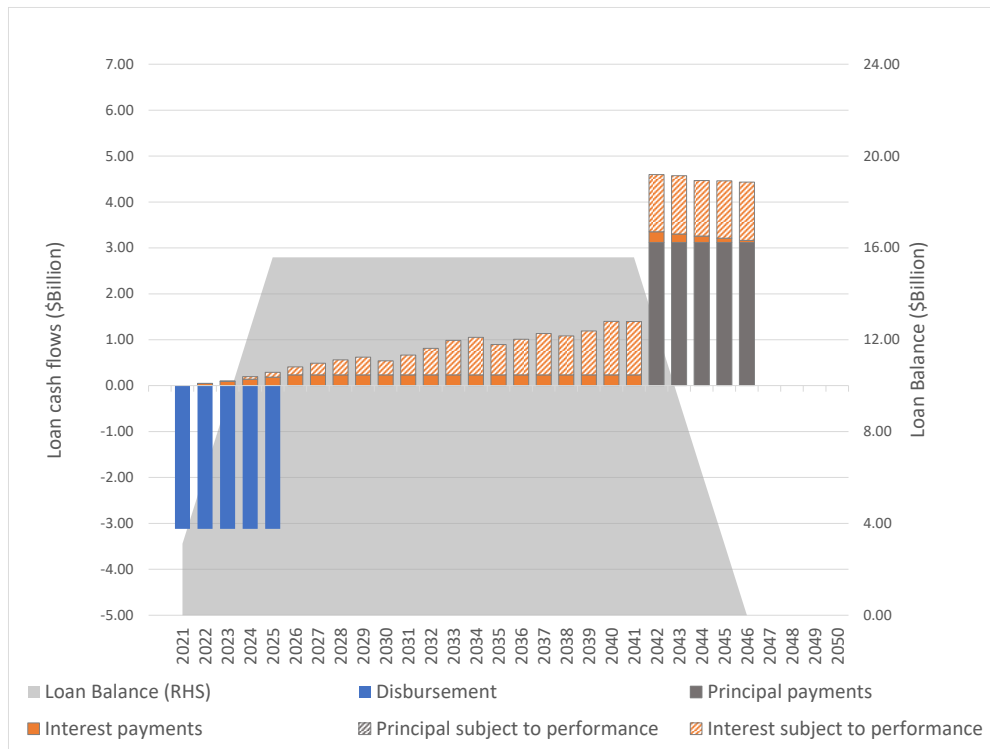


Figure 13: Dollar cash flows associated with a JTT in which concessional value is delivered through a large tranching bullet loan with sculpted market interest payments and a matching profile of performance-based concessions

The nominal size of the sum of the five loan disbursements that achieve this is \$16bn. In Figure 13 the solid blue, orange and black bars represent contracted disbursements, interest and principal payments respectively that will provide funders with a yield of 1.50% in dollars. These are the payments that funders will receive if the mitigation achieved by South Africa exactly matches the pledged annual mitigation agreed to in the deal per Table 2. South Africa contracts to make sculpted interest payments that include the additional amounts illustrated by the hatched bars. These payments are crafted such that over the loan lifetime the effective interest rate is the market rate of 5.50%. South Africa is incentivised to perform according

to its pledged mitigation trajectory to reduce the annual contracted interest payments by the amount of mitigation achieved in the year at the agreed deal price in \$/tonne, thereby reducing the interest rate to 1.50%. The hatched bars in Figure 13 represent the full extent of the mitigation value pledged in the deal and can thus be avoided entirely through the achievement of the mitigation. In the event that no mitigation is achieved at all relative to the current policy trajectory, the sculpted interest payments (i.e. the hashed red bars) would become due and, over the life of the loan, result in the elimination of the interest rate concession. Under this eventuality the loan would devolve to a loan at the market interest rate of 5.50%. This mechanism

³⁴ Mathematically this means the disbursement, interest, and repayment cash flows when discounted at 5.50% yield a net present value of R100bn or ~\$7bn dollars when discounted at 5.50%.



provides a powerful incentive for South Africa to achieve the pledged mitigation.

This structuring option can be implemented through either guarantees or cash payments to the facility from participating sovereigns and thus could be structured in either dollars or rands.

5.5.2 Market rate bullet loan with mitigation performance concession

This option is structurally similar to the previous one, where the mitigation performance also reduces the required debt service payments as mitigation is achieved (Figure 14). However, in this case the gross interest payments are fixed (not sculpted to match the mitigation profile) as in a standard loan. The performance concession is calculated on exactly the same basis for the same pledged mitigation profile and overall this loan structure delivers the same R100bn in concessional present value.

Despite delivering the same concessional value over the full term, this option has pros and cons for the

borrower and lender. Firstly, the required loan capital is higher at \$19bn in order to deliver the same benefit to the borrower in present value terms – this is due to the profile of interest payments, with higher payments due in the earlier years. The loan is provided at market rates until, and to the extent, that actual mitigation is delivered. This may be attractive to funders seeking visible climate outcomes in concert with the manifestation of the concession and provides a direct performance incentive. However, given the time that will be necessary to set in motion the accelerated renewable rollout to actually achieve mitigation, the borrower sees no material benefit from the concession for the first ten years at least. The majority of the concession is back-loaded – once mitigation is in full swing. This will be less valuable to South Africa seeking to reduce its current debt service obligations.

In this structuring option the facility would issue debt at 5.50%, requiring cash support from participating sovereigns once South Africa’s mitigation performance obtains.

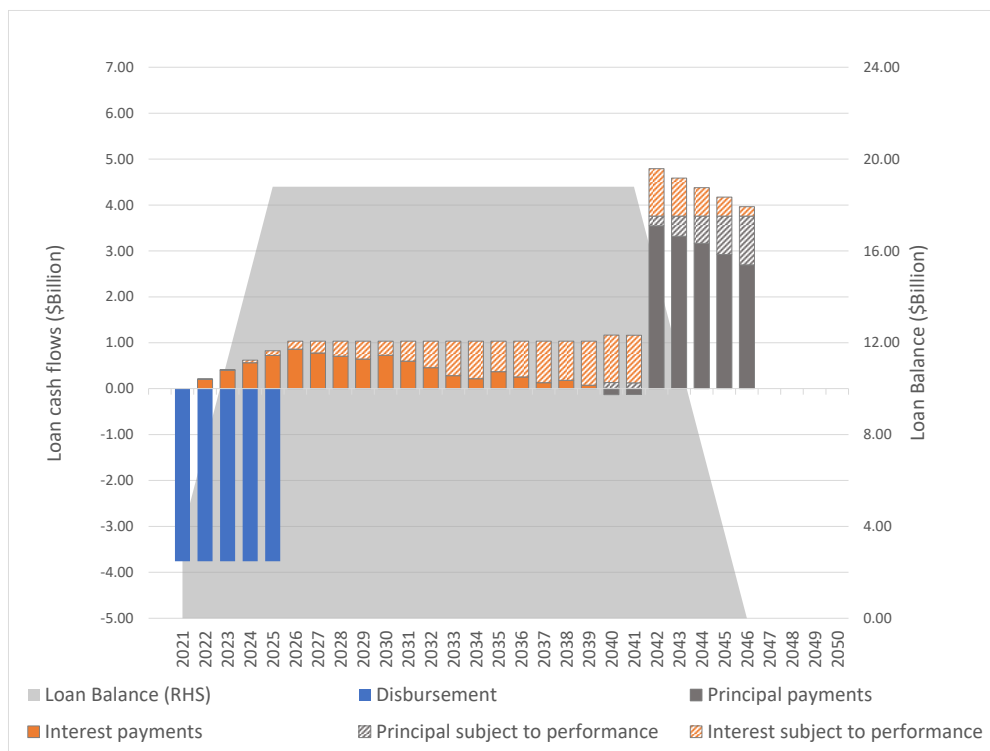


Figure 14: Dollar cash flows associated with a JTT in which concessional value is delivered through a large tranchet bullet loan at fixed market interest payments and a performance-based concession

5.5.3 Amortising loan with mitigation-sculpted interest payments

The previous two options contemplate a bullet-type loan profile, this being of greatest value to South Africa

given its current debt obligations. Here we evaluate a large concessional loan based on an amortising profile, with the same mitigation-sculpted structure overlay applied to payments as in 5.5.1.



Figure 15 illustrates the cash flows associated with this option. As before, the solid orange and black bars show respectively the interest and principal payment obligations arising if the full pledged mitigation is achieved in each year. The hatched bars represent the interest payment profile that South Africa would contract to pay but could avoid paying through delivery of mitigation performance.

Whilst the amortising profile may be attractive to some funders from a risk management perspective, it will of course be less attractive to South Africa given the size of the debt service obligation that commences in year six with principal payments due. A further significant detraction from this option is the size of the loan that is required to deliver the same R100bn present value as

the other two options - \$22bn. This is required due to the front-loaded repayment profile which, at the SOAF interest rate, results in less present value benefit to the borrower than the long-dated bullet payments. Given that the bullet payment options are far more efficient at transferring concessional value from the funders, and that the participating counterparties are likely able to offer these terms, it is unlikely that an amortising loan structure will be appropriate.

The mitigation-sculpted interest profile allows for this option to be implemented through either guarantees or cash payments to the facility from participating sovereigns and thus could be structured in either dollars or rands.

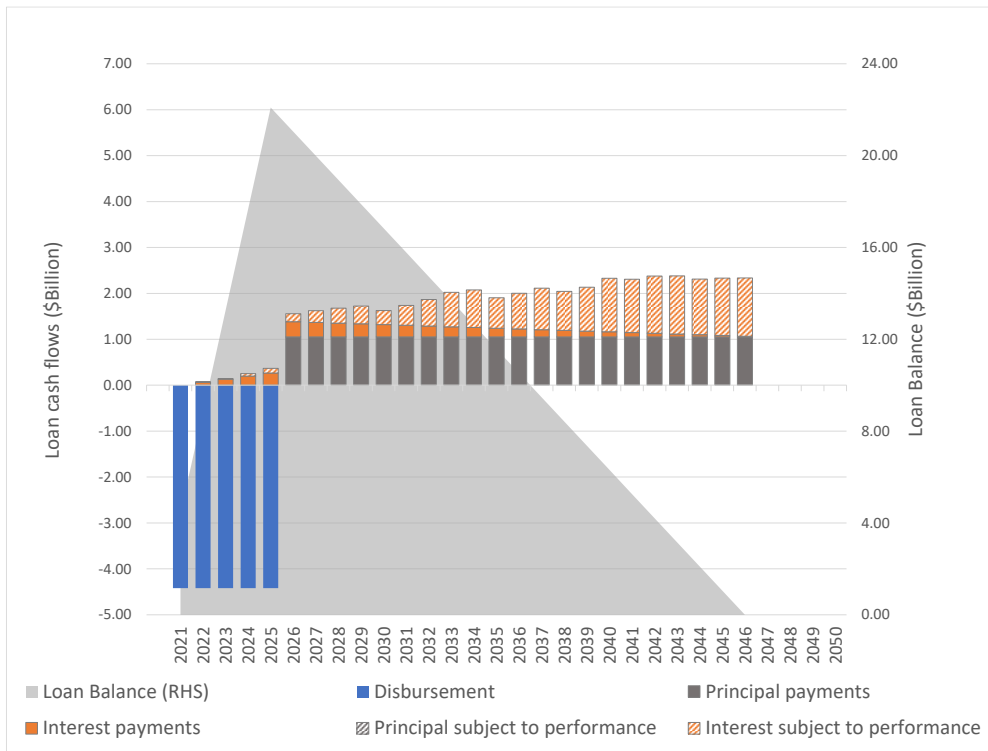


Figure 15: Dollar cash flows associated with a JTT in which concessional value is delivered through a large tranching amortising loan with sculpted market interest payments and a matching profile of performance-based concessions delivering a concessional interest rate

5.5.4 Mitigation-sculpted loan concession

This structure starts out as a loan with full capital and interest obligations and is then incrementally conceded (granted) as mitigation is delivered. If mitigation is delivered as contracted, the entire capital and interest amount is conceded. If actual mitigation performance is aligned to that pledged there will be *no cash debt service obligations*. Principal as well as interest repayments are sculpted to align with the flow of value

arising from the agreed value of annual mitigation realised (Figure 16). Principal payments are sculpted to absorb the remaining mitigation value in each year after interest costs have been serviced. Interest payments that exceed the mitigation credit in any of the early years are capitalised. The sculpting of the principal payments is a standard method in project finance and results in the principal being paid in the years when sufficient mitigation credit is generated, over the 25-year loan term. The loan quantum (in



dollars) is determined such that the present value of the five disbursement tranches is equal to the required present value of the deal (in rands R100bn), at the exchange rate assumption of R14.50/\$. In this option there is *no exchange rate risk carried by either party* to the transaction after the last disbursement tranche. The South African government carries the exchange rate risk during the five-year drawdown period, after

which there are no cash flows in respect of the loan provided performance on the mitigation commitment is achieved. The carbon deal price is the same as the other structuring options at \$7/tonne.

Participating sovereigns would need to support this option with cash payments to the facility and it could thus be concluded in either rands or dollars.

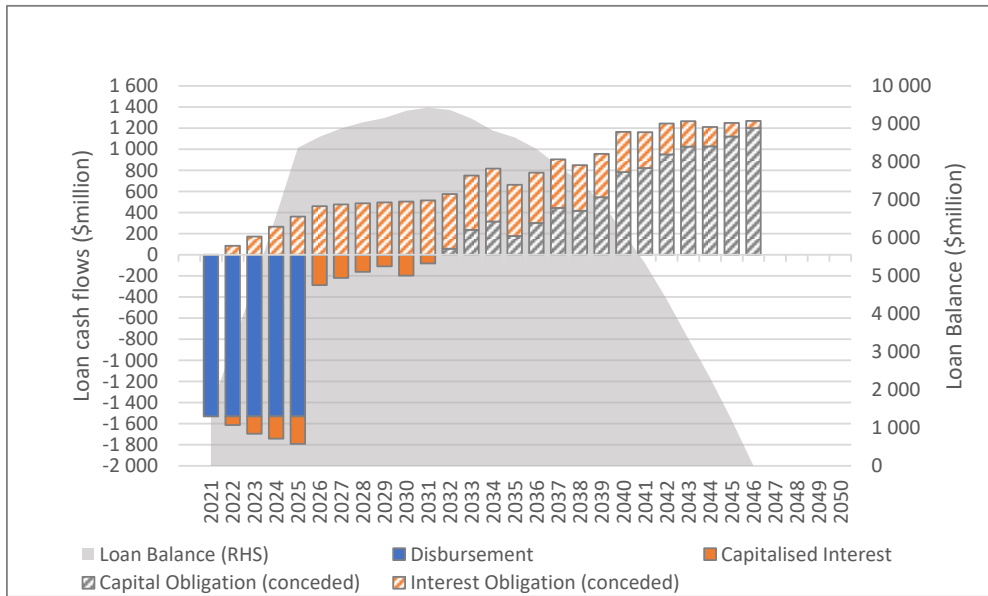


Figure 16: Dollar cash flows associated with a JTT in which all debt service obligations are matched by mitigation value credits delivered

5.5.5 Summary and comparison of design options

All options are designed to deliver ZAR100bn of concessional net present value, from a Paris-aligned mitigation trajectory and carbon deal price of near \$7/t.

The following tables summarise the major differences between the design options explored.

	Market rate bullet loan with mitigation sculpted interest payments	Market rate bullet loan with mitigation performance concession	Amortising loan with mitigation-sculpted interest payments	Mitigation-sculpted loan concession
Loan size	\$16Bn R230Bn	\$18Bn R260Bn	\$22Bn R320Bn	\$7.65Bn R110Bn
Cash flow relief for South Africa	Good	OK	Bad	Best
Principal repayment profile	Bullet	Bullet	Amortising	Sculpted, escalating
Principal concession required	None	Yes, small	None	All

Table 3: Differences in loan size, servicing profile and treatment of the principal across the options



Loan Currency	Mitigation credit currency	Sponsors provide	Deal Price for carbon		Market rate bullet loan with mitigation-sculpted interest payments	Market rate bullet loan with mitigation performance concession	Amortising loan with mitigation-sculpted interest payments	Mitigation-sculpted loan concession
\$	\$	Guarantee	X \$/ton	Facility Issues Paper at	1.50%	N/A	1.50%	N/A
\$	R	Guarantee	Y R/ton		1.50%	N/A	1.50%	N/A
\$	\$	Cash	X \$/ton		5.50%	5.50%	5.50%	5.50%
R	R	Cash	Y R/ton		10.00%	10.00%	10.00%	10.00%
\$	\$	Guarantee	X \$/ton	RSA Gov pays initial interest at	1.50%	N/A	1.50%	N/A
\$	R	Guarantee	Y R/ton		1.50%	N/A	1.50%	N/A
\$	\$	Cash	X \$/ton		1.50%	5.50%	1.50%	None
R	R	Cash	Y R/ton		5.83%	10.00%	5.83%	None
\$	\$	Guarantee	X \$/ton	Exchange Rate Risk borne by	RSA	N/A	RSA	N/A
\$	R	Guarantee	Y R/ton		RSA/Sovereigns	N/A	RSA/Sovereigns	N/A
\$	\$	Cash	X \$/ton		RSA	RSA	RSA	None. (RSA if underperform)
R	R	Cash	Y R/ton		Facility Investors/ Sovereigns	Facility Investors/ Sovereigns	Facility Investors/ Sovereigns	None. (RSA if underperform)

Table 4: Differences in the treatment of interest and exchange rates across the options

6 FURTHER DOMESTIC AND GLOBAL BENEFITS OF THE JTT

The JTT acts as a bridge for South Africa’s transition from its old coal path-dependent landscape to a new low-carbon economy. From a sovereign perspective, the sizeable financial incentive offered by the JTT provides an organising focus around which just energy transition policy and sustainable financial planning for Eskom can coalesce.

The JTT supports a sustainable financial solution for Eskom, by: Providing concessional value to the sovereign with an agreement that the state will recapitalise the unbundled Eskom entities to enable the ITSMO to act as a viable counterparty to PPAs (as necessary) and finance a large grid expansion programme – all without government guarantees; Accelerating the phasedown of its aging and increasingly expensive and risky coal fleet, potentially avoiding expensive coal plant refurbishments and air quality retrofits; Supporting business turn-around and market reforms that allow for a fundable business model for the unbundled entities.

A sustainable financial solution for Eskom will in turn end Eskom’s burden on the state, improve South Africa’s credit rating, reduce borrowing costs and free up budget for domestic policy priorities. This will also unlock large-scale low-cost commercial green finance (with state guarantees) for the power sector and beyond, providing liquidity to the green finance market in South Africa.

The JTT incentivises (and requires) bold policy and regulatory action in the energy sector, including: An updated IRP to reflect the commitment to a scaled-up build-out of low-cost renewable energy and flexible generation; Regulatory reforms to establish a favourable environment to expand decentralised renewable projects and allow unbundled, cost reflective tariffs for Eskom and (deregulated) market pricing for competitively procured energy and grid services; and the expedited establishment of a strong and capable ITSMO to promote grid expansion, development of power markets, and the rapid uptake of new renewable energy onto South Africa’s grid system. These reforms are the shortest route to restoring power system reliability (i.e. ending South Africa’s chronic power shortages and loadshedding) and are the fastest route to new energy generation capacity through decentralised renewables.

The JTT funds a just transition programme for Mpumalanga: There is currently no comprehensive programme to address Mpumalanga’s inevitable transition away from coal. The JTT will secure long-term, annual catalytic funding for Mpumalanga’s transition programme, through a Just Transition Fund. The JTT thus enables an organising vision for a just transition for Mpumalanga’s coal region.

The JTT catalyses a huge green investment and employment stimulus: Over the next ten years, a rapid transition to renewable energy and storage technologies will crowd in significant capital investment without placing pressure on the national fiscus, with commensurate nation-wide job creation opportunities. If South Africa develops further localisation policies and initiatives on the back of the large renewables build



programme, the industrialisation potential will be significant. However, after the recent interruptions in South Africa's renewables build programme and subsequent bankruptcies of local associated manufacturing facilities it is clear that value chain investors will be slow to invest in local manufacturing facilities unless the expectation of long-term demand is de-risked. This is what the JTT achieves.

A just energy transition for South Africa will *mitigate the country's carbon intensity* risk and create additional green opportunities in non-power sectors by scaling up renewable energy supply for new industries including electric vehicle production and green hydrogen.

The JTT will enable South Africa to achieve its long-term Paris commitments: Power sector decarbonisation in the current decade is key to the country achieving its long-term (2050) mitigation commitments under the Paris Agreement (Presidential Climate Commission, 2021), both in terms of reducing emissions through an accelerated coal phasedown and with an early start in building sufficient renewable capacity (Meridian Economics, 2021b).

Internationally, the JTT offers benefits in areas of global significance.

The JTT delivers *high-impact, low-cost mitigation*. Power sector mitigation is systemic, in that it leads to further abatement opportunities in other sectors (such as the electrification of hard-to-abate sectors and electric vehicles). By pioneering the JTT, *South Africa signals its bold political leadership* on coal phasedown and decarbonisation. This is very valuable in the context of the UNFCCC negotiation process and the Conference of the Parties (COP26) in particular. The JTT has been termed the *prototype of the power sector transition finance and-coal retirement mechanisms* required to support global coal fleet phase out by 2040. As such, it offers options, structures, principles and experience to meet the global challenge of financing coal phasedown in emerging fossil fuel dependent economies and beyond.

Fossil fuel divestment can happen much faster than power systems can be reconfigured for clean energy. Rapid and indiscriminate divestment from systemically critical, but carbon-intensive legacy assets in transition could cause unprecedented economic damage at both the sectoral and national scale. The *JTT motivates for a*

new form of climate finance – 'transition finance' – to act as a catalyst and support mechanism to enable the rapid movement from a legacy carbon-intensive system to a self-sustaining, low carbon future (Meridian Economics, 2021b).

7 CONCLUSION

The world is at a critical juncture when it comes to phasing down coal power plants in time to meet the Paris Agreement's temperature goals. In emerging economies in particular, the next few years will prove decisive.

This paper offers an example of how an innovative financial mechanism – the South African Just Transition Transaction – responds to complex domestic institutional, political, social and technical circumstances to accelerate coal phasedown and support a just energy transition for the country.

The long-term financial commitments by the JTT sponsor-country counterparties will crowd in an accelerated and sustained renewables and grid infrastructure investment programme. This will form the core of the post-Covid green industrialisation and economic recovery that South Africa so desperately needs. In return, South Africa offers the world a sizeable and highly cost-efficient mitigation opportunity. The JTT offers a rare opportunity for the country to unlock the ability of a wide range of stakeholders to work together to move the country beyond its current energy policy impasse, along an ambitious, Paris-aligned, socially just, decarbonisation pathway.

The JTT concept has been developed over a number of years by Meridian Economics, including through extensive domestic and international stakeholder engagement. The design principles and options described in the paper are intended to set out how a transaction of this nature can be negotiated to deliver fair and meaningful value to all parties. Given the complexity of South Africa's energy transition and the variety of interests involved, it is anticipated that different stakeholders will see different opportunities and challenges within the various options presented.

Whilst the JTT has emerged from the uniquely South African context, we believe that its design principles



and options will find resonance across the spectrum of emerging economies grappling with how to finance coal phasedowns, just energy transitions, and even the phasedown of other emitting activities. The proposals that underpin the JTT are bold and ambitious. We acknowledge that implementing them will change the

way developed country sovereigns and their financial intermediaries consider and disburse climate finance. However, we believe that this is achievable and manageable. Innovation and ambition are the essential pre-requisites if we are to rise to the global challenge of a timely coal phasedown.



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