FINANCIAL SUPPORT NEEDS FOR MPUMALANGA'S ECONOMIC TRANSITION: A SCOPING STUDY

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STUDY PURPOSE AND VALUE

This study has been undertaken to:

- Conceptualise the key elements of a Just Transition programme for Mpumalanga, for costing purposes;
- and to propose methodologies that might be used to undertake this costing.

As such, it contributes to the current South African just transition discussion by:

- Providing an initial approach for considering the financial support requirements for a just transition in Mpumalanga;
- Proposing a systematic method to estimate the employment implications of electricity sector transition;
- Exploring the likely cost implications of accelerating the pace of transition from that which is currently planned;
- Contributing to the growing research agenda of questions that need answering around just transition and development planning and financing, and methodological approaches to costing and modelling transition impacts.

KEY TAKE-AWAYS

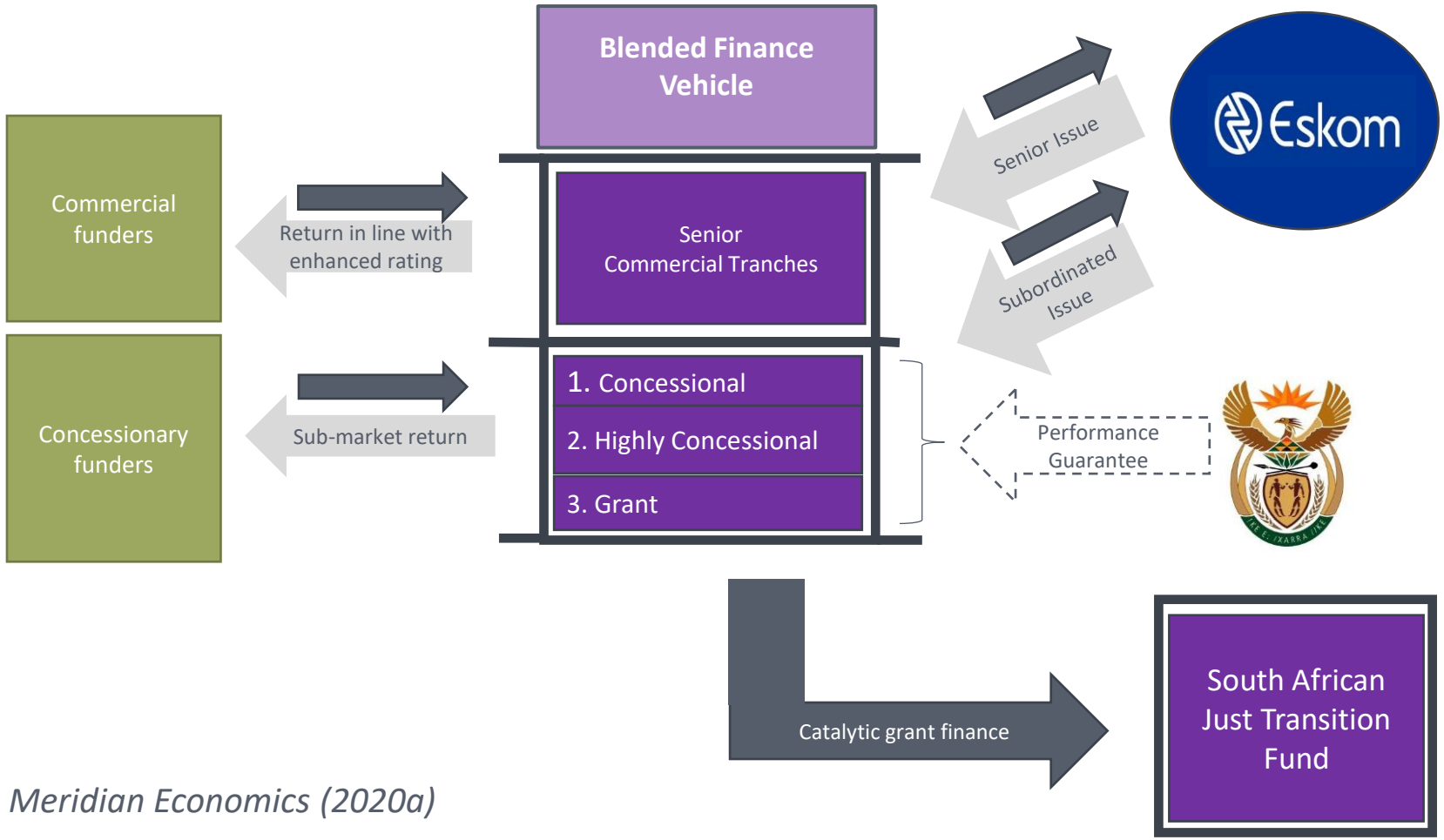
- At first pass, the **foundational costs for ensuring a just transition appear very manageable** relative to others in the development and power sector space.
- This small spend, however, may be key to unlocking a **thriving future for the Mpumalanga region.**
- The **pace of acceleration away from coal** in the power sector has direct implications for the cost of worker transition support.
- However, accelerating the transition will **unlock new regional economic opportunities.**
- **An accelerated transition will also create access to international finance** to support a just transition and social development.
- There is **a need for additional data and analysis to confirm and extend these findings**, and therefore to guide the support of South Africa's just transition.
- Financial support is only one aspect of ensuring a just transition

CONTEXT AND HISTORY OF THIS WORK

BORNE OUT OF THE JUST TRANSITION TRANSACTION CONCEPT

- Since 2018 Meridian Economics has been incubating a concept called the Just Transition Transaction (JTT) which is currently being developed by Eskom. The JTT aims to:
  - Assist in addressing the debt burden of South Africa's national electricity utility (Eskom) through enabling access to green finance, upon Eskom's commitment to substantial carbon emissions reductions over and above SA's current policy trajectory,
  - Provide catalytic financing for a **'Just Transition Fund'** to support coal workers and affected communities and assist in developing an alternative economy for Mpumalanga coal province.
- The Just Transition Fund component of the transaction requires an elaboration of what the funds raised through the JTT could be used for, so Meridian embarked on a scoping exercise to explore this.
- During this process, key framing and methodological questions emerged – complex ones! Therefore, the end result is on the one hand, **a high-level scope of funding needs**, and on the other hand, **a research agenda** which raises questions that need answering and methodological and data red flags. This work aims to capture the field-building aspect of this work by including 'question-boxes' throughout.

THE JUST TRANSITION TRANSACTION PROVIDES ANNUITY INCOME TO A JUST TRANSITION FUND



Source: Meridian Economics (2020a)

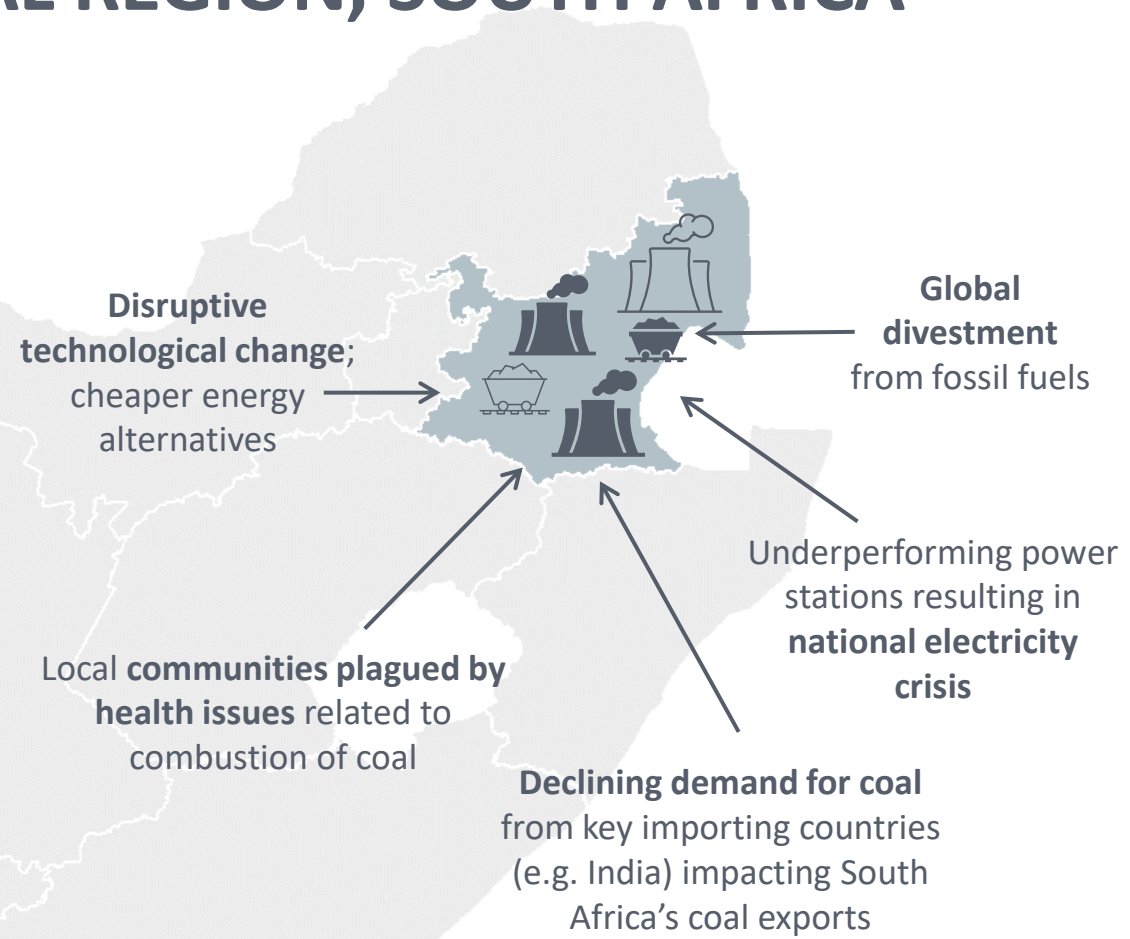
Motivation for this scoping study:
*What could the **Just Transition Fund**, fund?*
How big does it need to be?

INTERNATIONALLY, COUNTRIES ARE ALLOCATING BUDGETS TO THE JUST TRANSITION

REGION	ALLOCATION	SCOPE	TARGET
Germany	49,3 Bn [EUR]	German Government allocation through 'Coal Exit Law' to accompany phase out of 43 GW coal-fired power by 2038.	Worker and business support mechanisms (Wettengel, 2020; Agora Energiewende & Aurora, 2019)
Spain	250 Mn [EUR]	Spanish Government allocation through 'Plan del Carbon' – phasing out all non-economical mines by 2023.	Early retirement, redundancy payments, social aid and retraining for 1 677 workers, additional funds for mining land regeneration (IndustriAll, 2018; Powell et al, 2018)
Australia	266 Mn [AUD]	Victorian Government allocation to Latrobe Valley Authority.	Worker and community support (Gordon and Preiss, 2016)
Canada	35 Mn [CAD] + 150 Mn [CAD]	Allocations recommended by Canadian Just Transition Task Force for key components of phasing out coal-fired power.	Funding for local worker transition centres + infrastructure fund for affected coal regions (3000 workers in coal mining and coal fired power) (Government of Alberta, 2020)
Mexico	To be finalised	New Mexico's Energy Transition Act (2019) stipulates an Economic Development Assistance Fund and a Displaced Worker Assistance Fund.	Worker support and regional economic diversification in San Juan region (State of New Mexico, 2019)
European Union	100 Bn [EUR]	Just Transition Fund – blended structure including government commitments and private sector.	Supporting workers and citizens from 2021 – 2027 in coal, oil and gas, other polluting sectors through job creation and green investments. (European Commission, 2020)
Poland	3.5 Bn [EUR]	Poland receives 20% of total EU Just Transition Fund pool. Half of the total allocation (EUR 1.75 billion) will be dependent on Poland's consent to the EU's climate neutrality target by 2050.	Supporting workers and communities in coal-dependent regions. (Cyzak et al, 2020)

CONTEXT: MPUMALANGA COAL REGION, SOUTH AFRICA

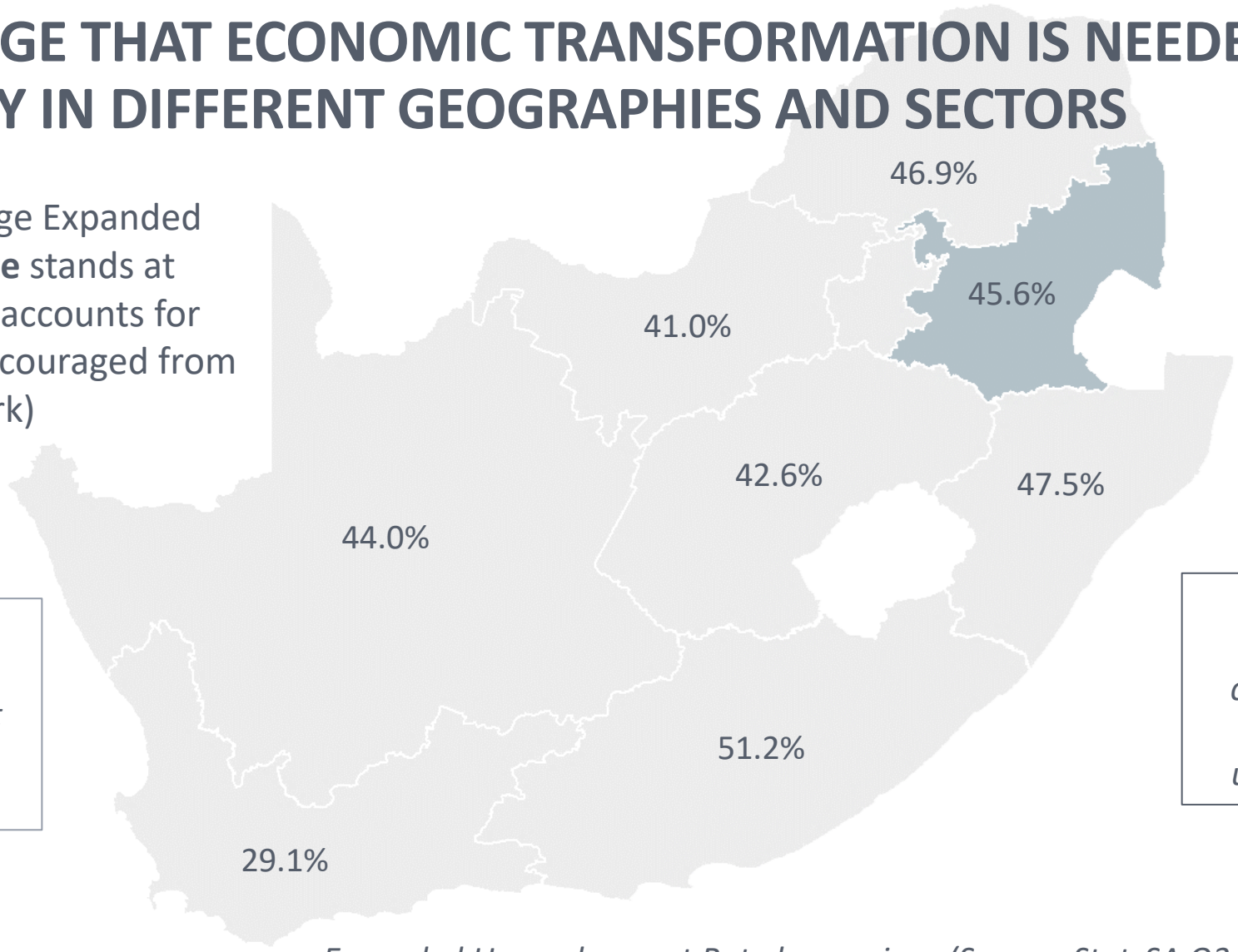
- A myriad of **domestic and international drivers** are placing pressure on South Africa's coal industry (Huxham et al, 2019; IEEFA, 2019).
- The **negative impacts of coal decline are concentrated in Mpumalanga** Province which hosts 12 coal-fired power stations and a large share of South Africa's coal mines.
- 4 municipalities are particularly at risk due to their **high economic dependence on coal production**, these municipalities already experience high levels of poverty and unemployment (TIPS, 2020).
- Strategic planning/mapping is already underway in SA under the **Just Energy Transition** framework – a key focus is to support workers and regional economies through a transition from coal in the context of the power sector.



What other coal transition drivers exist?

THIS STUDY HAS A *POWER SECTOR* AND *MPUMALANGA* FOCUS, BUT WE ACKNOWLEDGE THAT ECONOMIC TRANSFORMATION IS NEEDED ACROSS THE COUNTRY IN DIFFERENT GEOGRAPHIES AND SECTORS

South African average Expanded **Unemployment Rate** stands at **43.1%** (this statistic accounts for workers that are discouraged from actively seeking work)

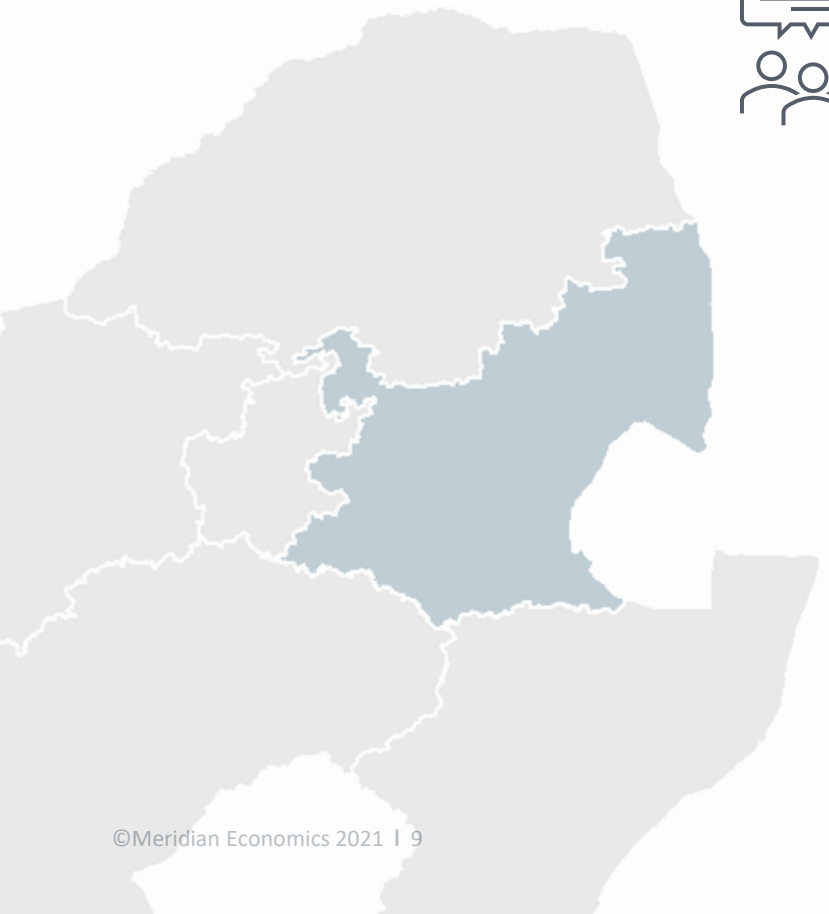


What other sectors/geographical locations could benefit from Just Transition thinking?

A reliable electricity supply is likely to be critically important in addressing SA's unemployment issue.

Expanded Unemployment Rate by province (Source: StatsSA Q3 QLFS 2020)

DRAWING FROM CURRENT DIALOGUE PROCESSES, WE PROPOSE THAT THERE ARE AT LEAST 3 KEY JUST TRANSITION SUPPORT FOCUS AREAS FOR THE MPUMALANGA COAL REGION



1. Transition management – developing an institutional structure responsible for coordinating stakeholder engagement and implementation processes

2. Coal worker support mechanisms –providing compensation, retraining and employability support

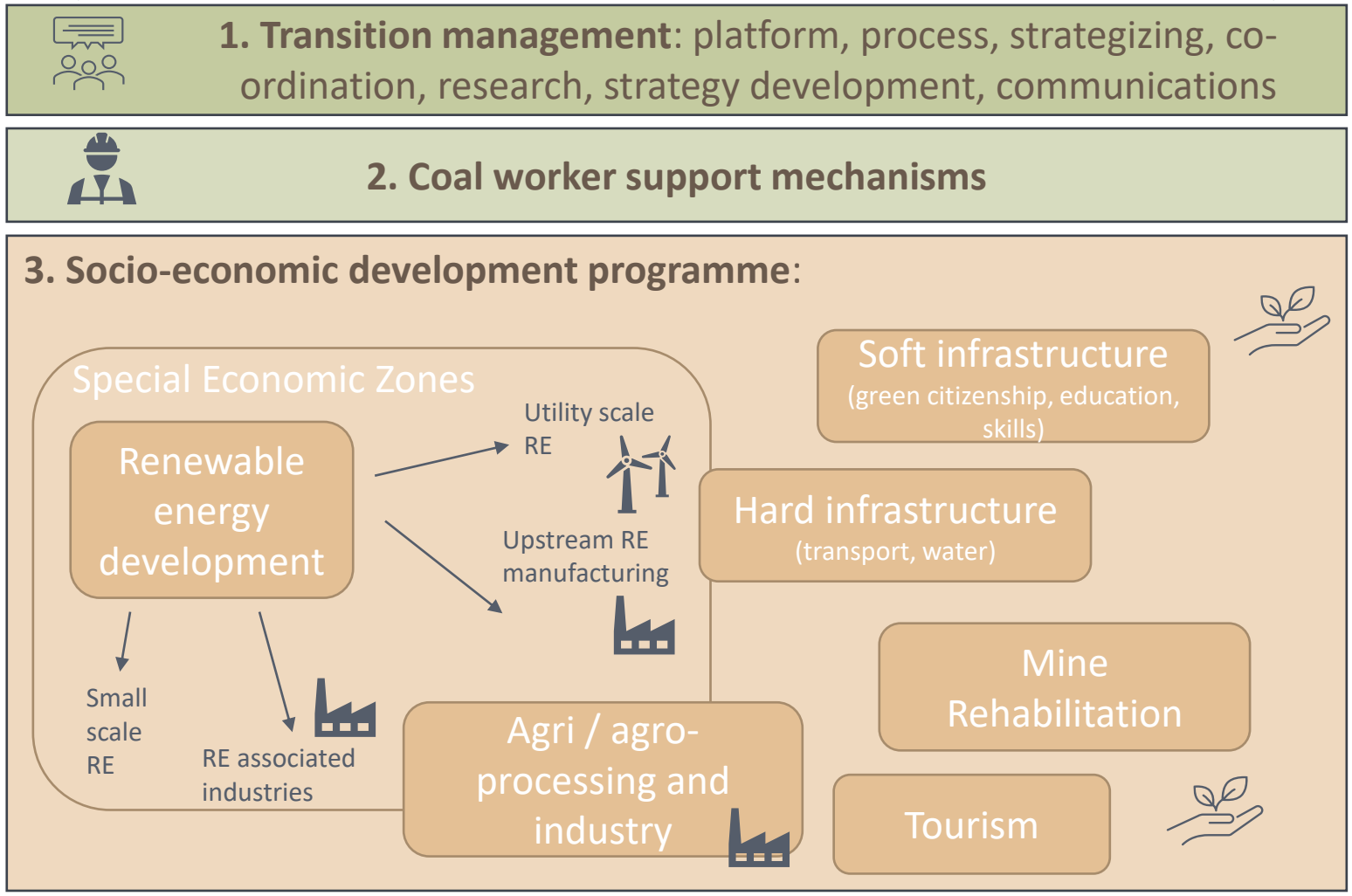
3. Holistic, regional socio-economic development programme

- Establishing skills development and other educational infrastructure in the region
- Establishing the basic infrastructure for Special Economic Zones
- Upgrading general public infrastructure
- Embarking on land rehabilitation initiatives

IN THIS STUDY, WE EXPLORE A 'STRAW-DOG' JUST TRANSITION PROGRAMME FOR MPUMALANGA…

- Research on international experience shows that **providing financial support** to coal workers and communities plus **a comprehensive regional socio-economic transition package** are critical to managing the negative impacts of transition.
- **Key lessons can be drawn from this work for Mpumalanga, including the need to:**
  - Plan with labour unions,
  - Sufficiently resource retraining programmes,
  - Harness the role of renewable energy and environmental restoration to stimulate economic activity and
  - Maintain consistent engagement with local agents in tune with local needs.

What other elements should be included in such a programme?

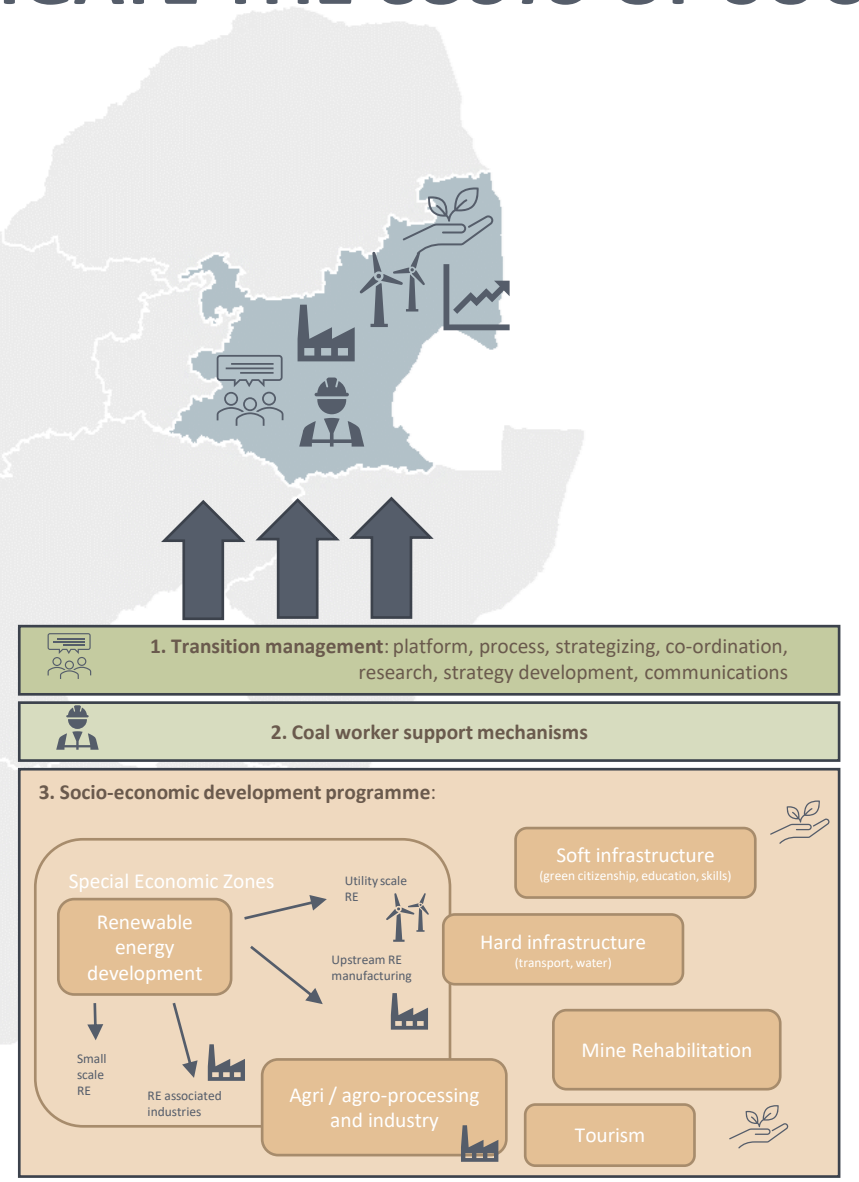


THE AIM OF THIS STUDY IS TO INVESTIGATE THE *COSTS* OF SUCH A JUST TRANSITION PROGRAMME

- This study is undertaken at a high-level, and aims to:

  a. conceptualise **core elements** of *a straw-dog* Just Transition programme for Mpumalanga.

  b. put indicative numbers to such a programme's key *costs,* thereby **scoping some financial support needs which may be associated with a Just Transition for the power sector**.



CONCEPTUAL CLARITY: WHAT DO WE MEAN BY PROGRAMME *COSTS* HERE*?*

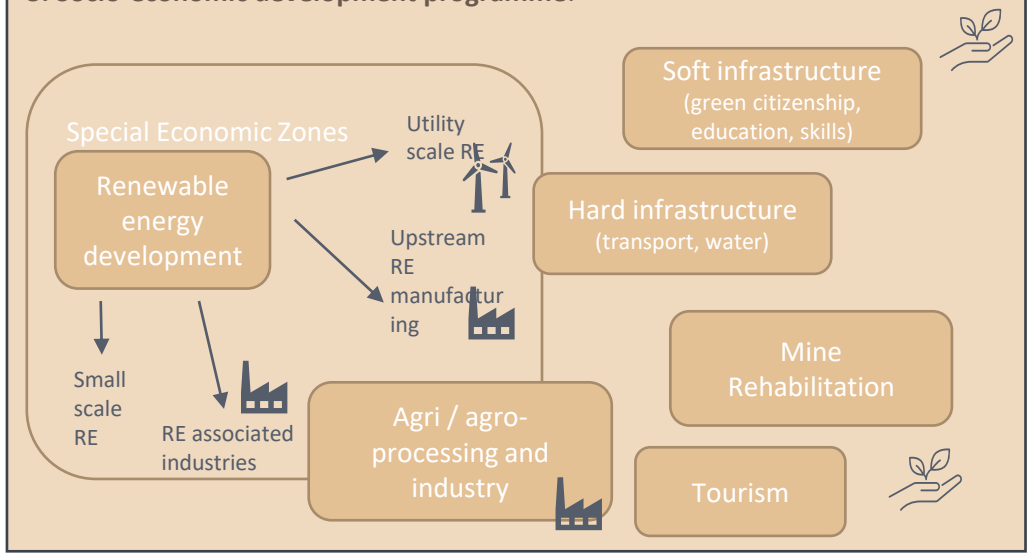
Costs is used here to indicate public costs, with a particular focus on:

1. Cost of establishing a JT coordinating body
2. Cost of worker transition support
3. Cost of creating an enabling environment for a holistic, regional socio-economic development programme

1. Transition management: platform, process, strategizing, co-ordination, research, strategy development, communications

2. Coal worker support mechanisms

3. Socio-economic development programme:



There are far more costs (and benefits) that can be associated with South Africa's energy transition (e.g. health and pollution). Here, we have focused on a subset of costs that is easily quantified and recognised by policymakers.

WE ARGUE THAT THE *PACE OF ACCELERATION* AWAY FROM COAL IN THE POWER SECTOR HAS DIRECT IMPLICATIONS FOR THE COST OF WORKER TRANSITION SUPPORT

- ***How fast does coal decline?***
- ***How many workers are impacted?***
- ***Over what time period?***

1. Transition management: platform, process, strategizing, co-ordination, research, strategy development, communications

2. Coal worker support mechanisms

3. Socio-economic development programme:

Special Economic Zones

Renewable energy development

Utility scale RE

Upstream RE manufacturing

Small scale RE

RE associated industries

Soft infrastructure (green citizenship, education, skills)

Hard infrastructure (transport, water)

Mine Rehabilitation

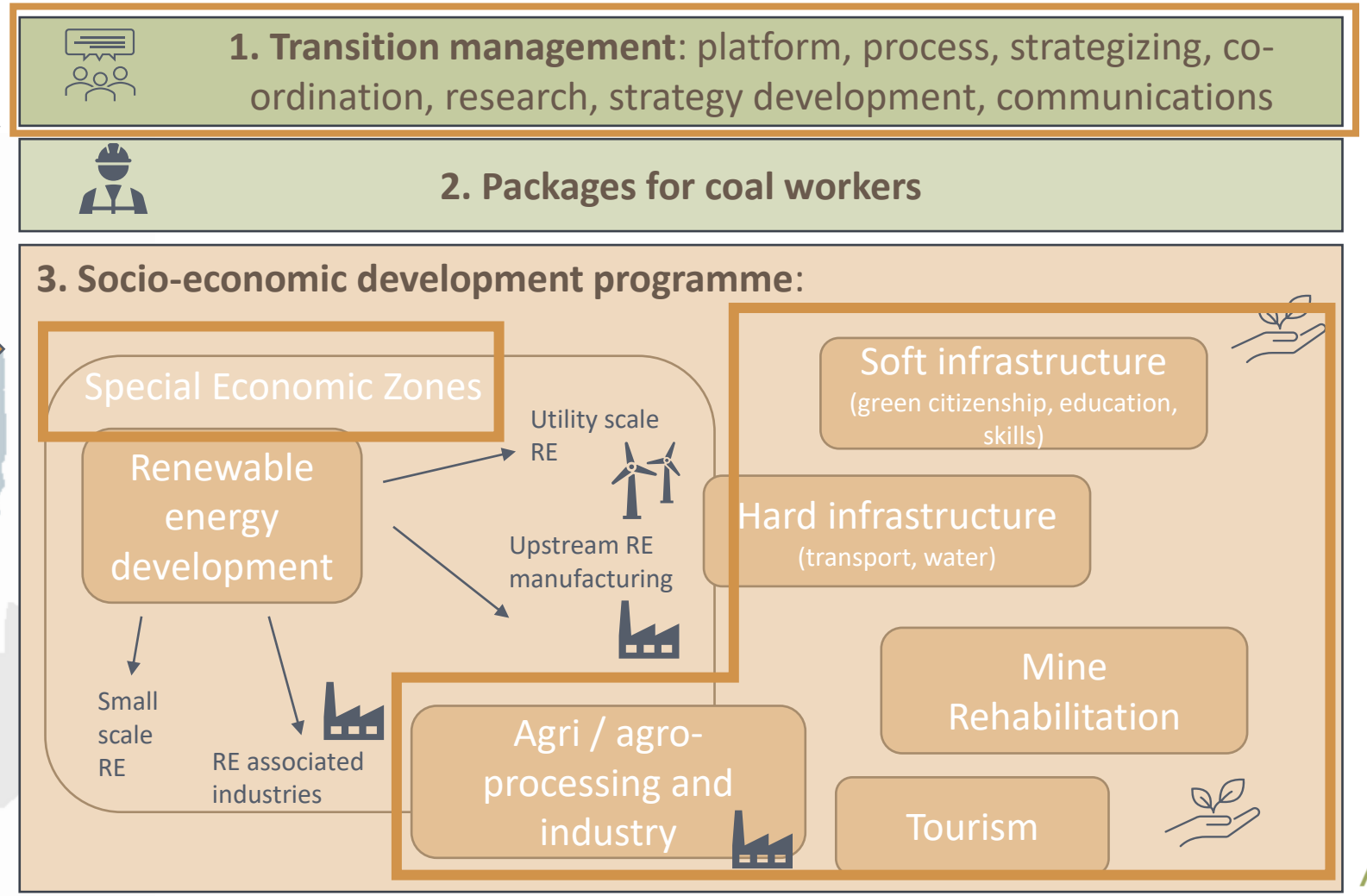
Agri / agro-processing and industry

Tourism

WHILE THE OTHER ELEMENTS ARE LESS CLEARLY DEPENDENT ON THE PACE OF TRANSITION, BUT ARE CRITICAL COMPONENTS OF A JUST TRANSITION PROGRAMME

What are the costs of establishing a transition management structure?

What is the cost of creating an enabling environment for a socio-economic development programme?



RESPONDING TO COAL TRANSITION DRIVERS: WHERE IS SOUTH AFRICA CURRENTLY?

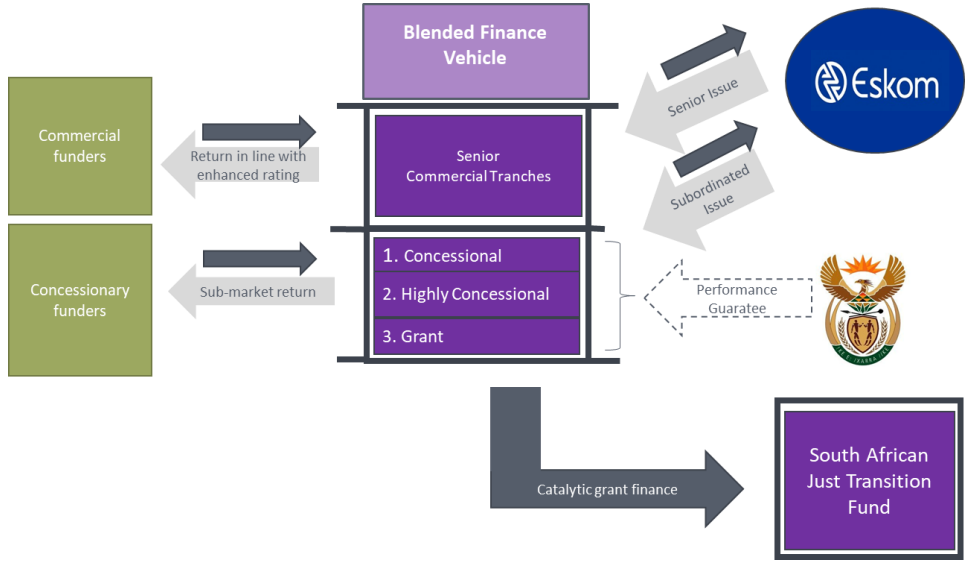
What are the implications of an unmanaged transition?

- South Africa has recognised the inevitability of an energy transition:
  - The IRP 2019 incorporates a coal phase down;
  - The Presidential Climate Change Co-Ordinating Commission has been established with a mandate to 'coordinate and oversee a just transition';
  - The South African Renewable Energy Masterplan is under development;
  - Eskom has established its own Just Energy Transition Office;
- However, the IRP 2019 is already behind schedule and **there remains a lack of consolidated planning at the national level to finance a Just Transition programme for Mpumalanga coal region.**
  - There is the possibility that the transition drivers identified earlier in this deck will cause coal production to decline even faster than is currently anticipated.
  - **Without a pro-active response to manage such a coal transition**, SA and the Mpumalanga region in particular face large socio-economic risks.

RESPONDING TO COAL TRANSITION DRIVERS: WHAT AGENCY DOES SOUTH AFRICA HAVE?

What are the benefits of decarbonising sooner? How do we unlock funding to smooth the transition and provide the necessary support?

- **International funding is available to support the country transition** and mitigate the negative implications of an un-managed transition.
- Access to this funding will likely be predicated on South Africa committing to:
  a) **A Just Transition strategy or programme** which targets supporting workers and communities that will be directly affected by a power sector transition.
  b) **An accelerated decarbonisation plan,** over and above current IRP2019 which enables electricity sector to do the 'heavy lifting' in terms of SA aligning with the Paris Agreement.



The Just Transition Transaction (Source: Meridian Economics, 2020a)

SCOPING STUDY OUTLINE

This study proceeds to first **quantify the costs of a 'straw-dog' Just Transition programme** that are dependent on the *pace* of the energy transition, i.e. coal worker financial support needs. Secondly, this study scopes some of the costs related to the *remaining elements* of an overall programme including establishing an **institutional structure, and an enabling environment for economic activity in Mpumalanga**.

This scoping study is divided into the following sections:

1. Introducing two power sector transition scenarios[1] (one based on South Africa's current policy trajectory and one an 'accelerated' transition) and their implications for coal decline;
2. Drawing implications of coal decline for Mpumalanga coal region;
3. Methodological approach of the study;
4. Quantifying coal worker support needs under two contrasting power sector transition scenarios;
5. Indicative costing of key outstanding components of a Just Transition programme;
6. Implications and key take-aways from this study.

[1] *Power sector transition scenarios are drawn from* Meridian Economics (2020) "A Vital Ambition: Determining the cost of additional CO2 mitigation in the South African power system."

01

INTRODUCING THE MERIDIAN ECONOMICS / CSIR 'AMBITIONS' SCENARIOS

POSSIBILITIES FOR SA'S POWER SYSTEM TRANSITION

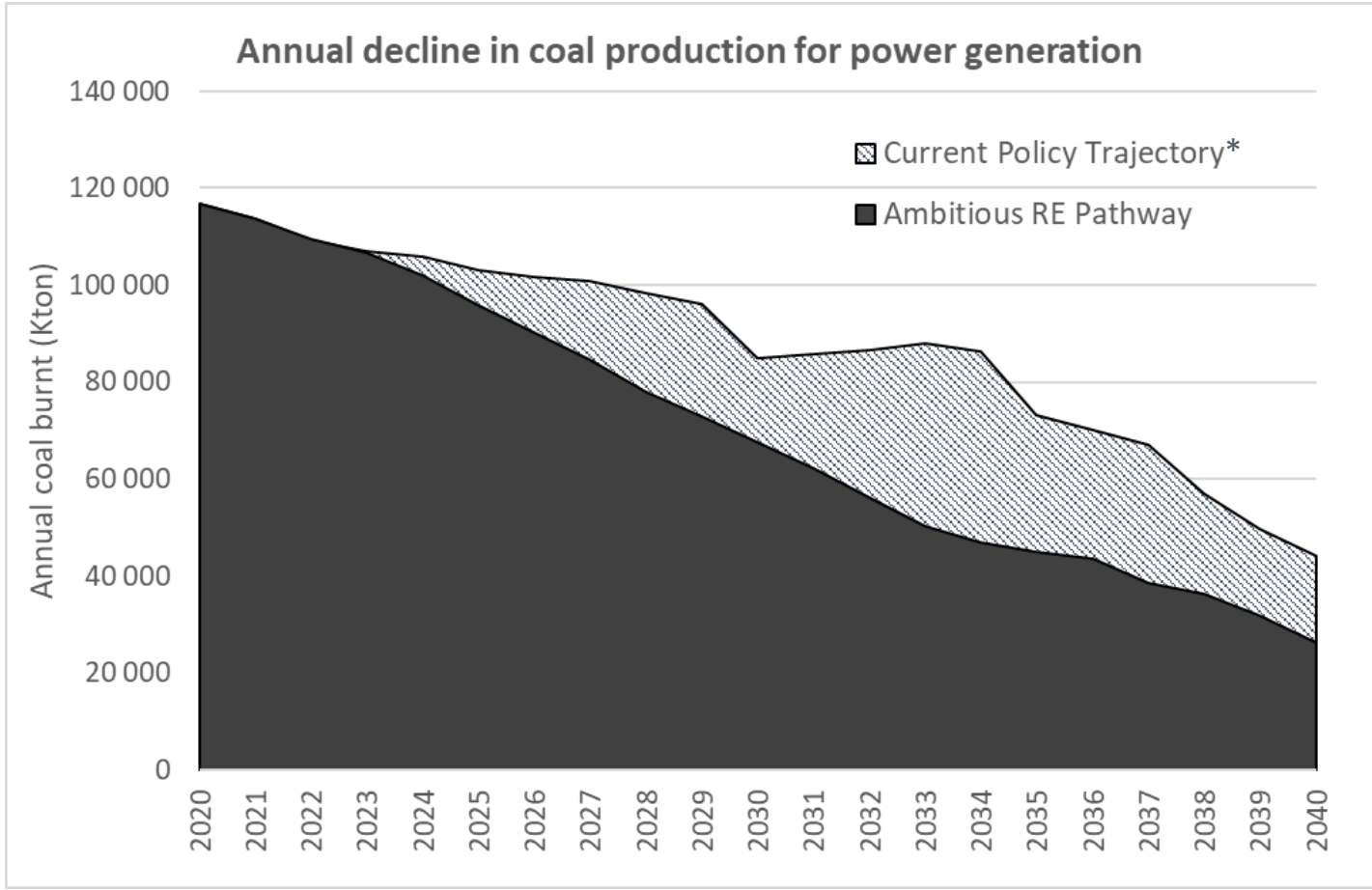
BASED ON MERIDIAN ECONOMICS – CSIR VITAL AMBITIONS PROJECT

- Published in August 2020, the *'Ambitions'* study considered the electricity system cost of various South African power system transition scenarios.
- We found that **accelerated transition scenarios** (i.e. moving more quickly from coal to renewables than envisaged by the IRP2019) **added very little to overall system cost**, but bring about significant economic and environmental benefits at a national level in the form of investment and job opportunities, and reducing power sector greenhouse gas emissions, thereby enabling economic decarbonisation.
- However, both the IRP2019 transition – and the scenario of intentionally accelerating it – **have implications for coal workers, communities and regions.**
- Here we reflect on those findings from the perspective of the social costs of transition, specifically **the cost of transitioning power sector coal workers, and the implications for the South African coal region, Mpumalanga.**
- Two scenarios from the *Ambitions* study are used by way of example:
  - the **"Current Policy Trajectory"** (a modelled projection of the IRP2019) as an example of the transition pathway SA is currently intending,
  - and a significantly accelerated transition scenario, the **"Ambitious RE (Renewable Energy) pathway",** which is likely to align South Africa's power sector with its climate mitigation obligations under the Paris Agreement, and which will almost certainly be required if South Africa is to reach net zero by 2050.

COAL POWER GENERATION WILL SEE INEVITABLE DECLINE OVER THE NEXT 20 YEARS, BUT THERE ARE DIFFERENT WAYS THIS COULD PLAY OUT

- The two example scenarios considered here have **different implications for tonnes of coal burnt** for power generation to 2040.
- The Ambitious RE pathway sees an earlier (and greater overall) decline in the amount of coal burnt relative to our Current Policy Trajectory.

**The Current Policy Trajectory is based on South Africa's Integrated Resource Plan (2019) until 2030, with a 'least-cost' optimised pathway followed from 2030 onwards.*

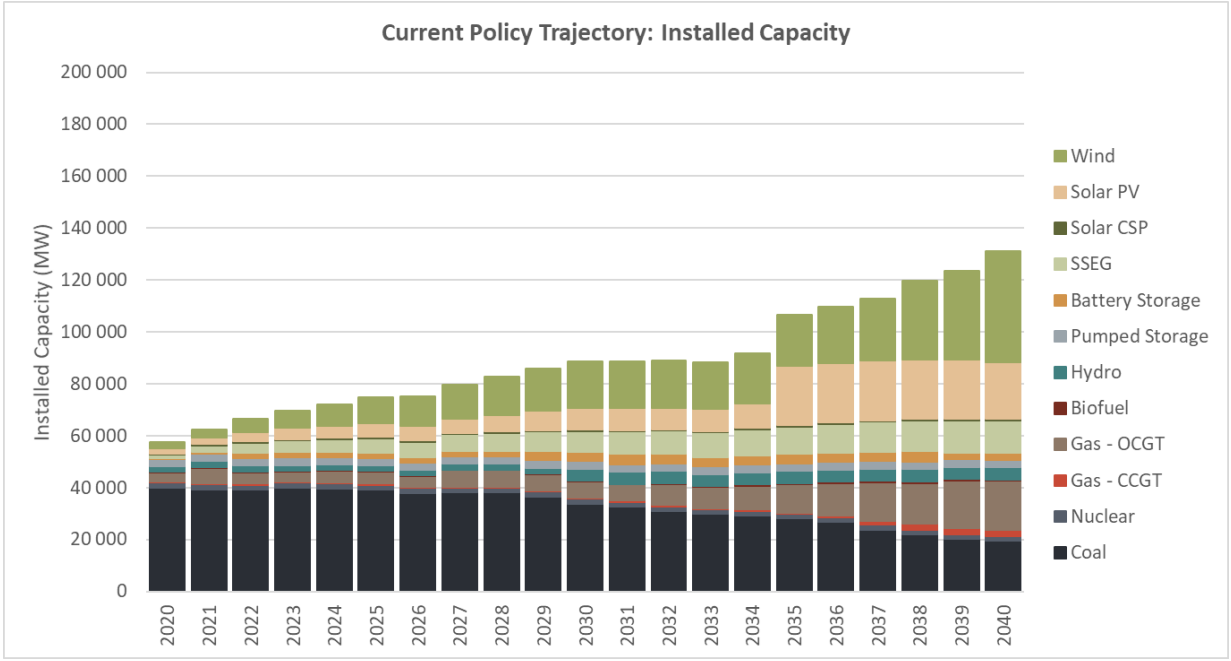


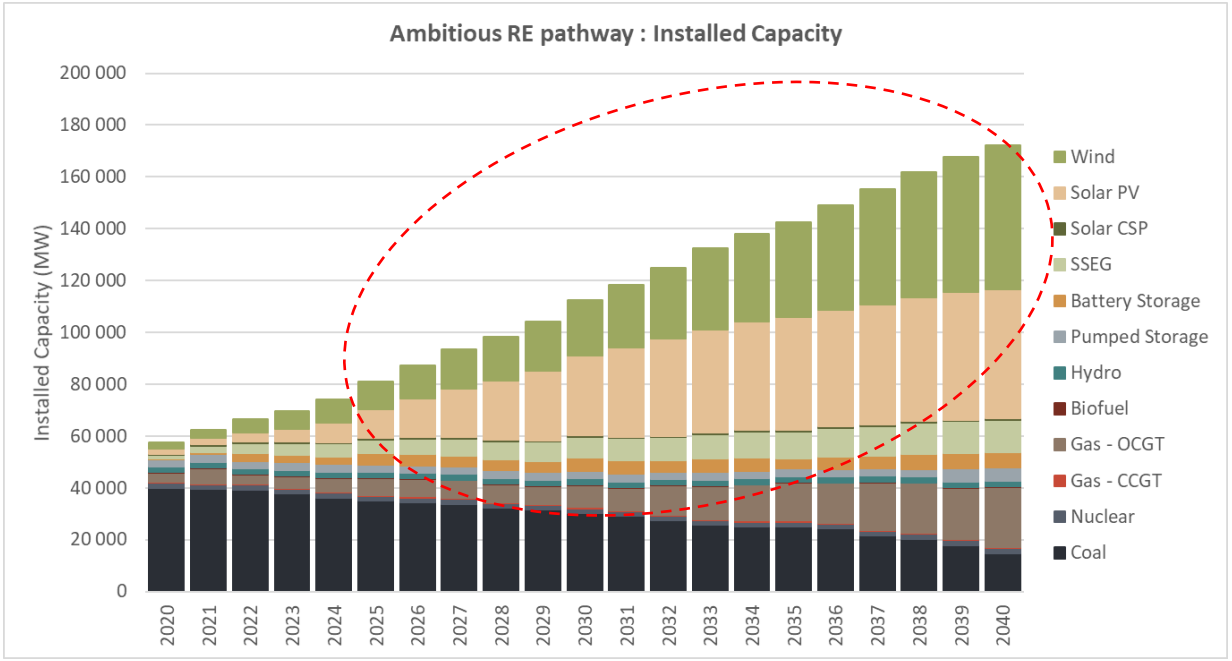
Source: Meridian Economics (2020b), Meridian Analysis

TO MEET ENERGY DEMAND RELIABLY AS COAL DECLINES IN EACH SCENARIO, ALTERNATIVE TECHNOLOGIES ARE BUILT

- Similarly, the two example *Ambitions* scenarios have different associated build outs of alternative energy generation technology options to replace coal.
- The Ambitious RE pathway sees an accelerated deployment of solar PV, wind, battery storage and peaking power, which replaces generation from coal-fired power stations.

If coal transition drivers accelerate, might remaining in coal longer become more risky for the South African electricity system?





02

INTRODUCING THE DECK FOCUS: PROVIDING FINANCIAL SUPPORT TO COAL WORKERS AND THE MPUMALANGA REGION

MOVING FROM THE NATIONAL POWER GENERATION SYSTEM TO A REGIONAL AND COAL SECTOR SPECIFIC FOCUS

- The *Ambitions* study was a power sector study at the national level, considering the system costs of electricity generation for various scenarios.
- The study argued in favour of an accelerated RE scenario from a system cost and adequacy perspective, and given the national economy level benefits of investment, net job creation, export opportunities and decarbonization, as well as enabling alignment with climate commitments.
- It cited the likely net benefits for the Mpumalanga region in transitioning away from coal (reduced local air pollution, RE-based regional investment), but did not explore these in detail.
- Significantly, the *Ambitions* study did not draw implications for employment loss in coal which clearly has significant social consequences in the coal area of Mpumalanga.
- In order to achieve the aims of this current scoping study, we define two tasks:
  1. To **understand the implications for Mpumalanga and coal workers of the two contrasting *Ambitions* energy transition scenarios,**
  2. To conduct **a high-level scoping exercise of the (public) funding requirements for a Just Transition programme for Mpumalanga.**

SCOPE OF WORK

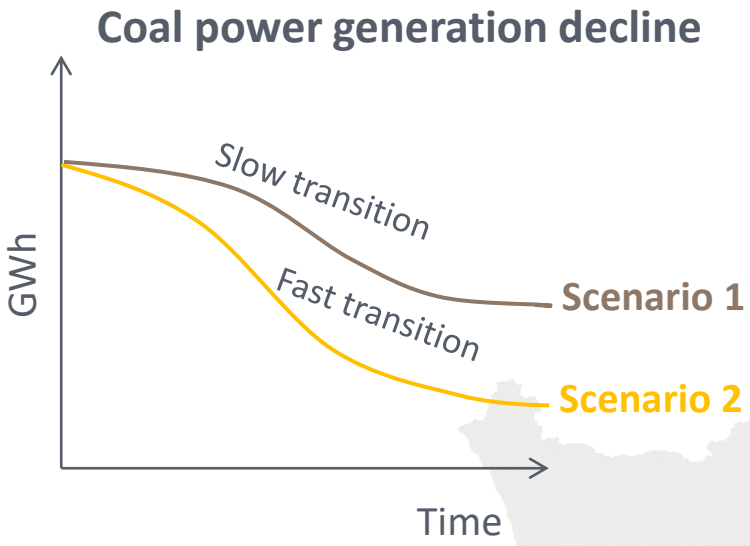
Task 1: Understanding the implications of both a 'Current Policy' and an 'Ambitious' energy transition scenario for Mpumalanga and coal workers

1) Estimate the impact of the two contrasting scenarios on employment in coal mining and in Eskom.
2) Elaborate this impact in terms of the skills and age profiles of the coal mining and Eskom workforce.
3) Associate appropriate coal worker support packages and scope a high-level 'cost' estimate for the worker support component of a Just Transition programme.

Task 2: Conduct a high-level scoping exercise of the (public) funding requirements for a Just Transition programme for Mpumalanga

4) Indicative costing of a full package of remaining components of a Just Transition programme which includes socio-economic development support and industrialisation in the Mpumalanga region.

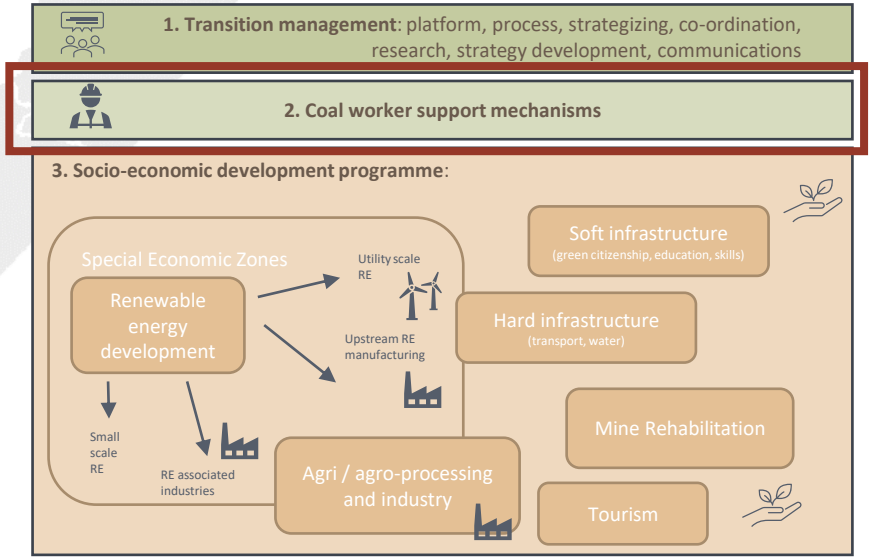
TASK 1: 'TRANSITION PACE'-DEPENDENT COSTS



Quantifying implications for coal workers

Quantifying financial support needs

*What do the different future energy mixes (**Scenario 1** vs **Scenario 2**) mean for Mpumalanga? And for South Africa as a whole?*



TASK 2: BROADER HIGH-LEVEL (PUBLIC) FUNDING REQUIREMENTS FOR JUST TRANSITION PROGRAMME

Cost of establishing a JT coordinating body?

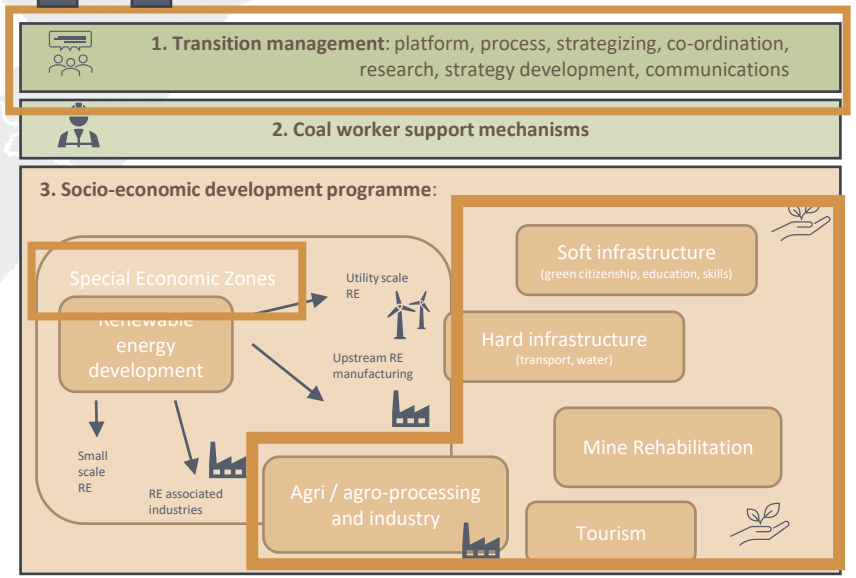
+

Cost of creating an enabling environment for local industrialisation?

+

Cost of land rehabilitation initiatives and upgrading public infrastructure?

What other cost components could be included here?



03

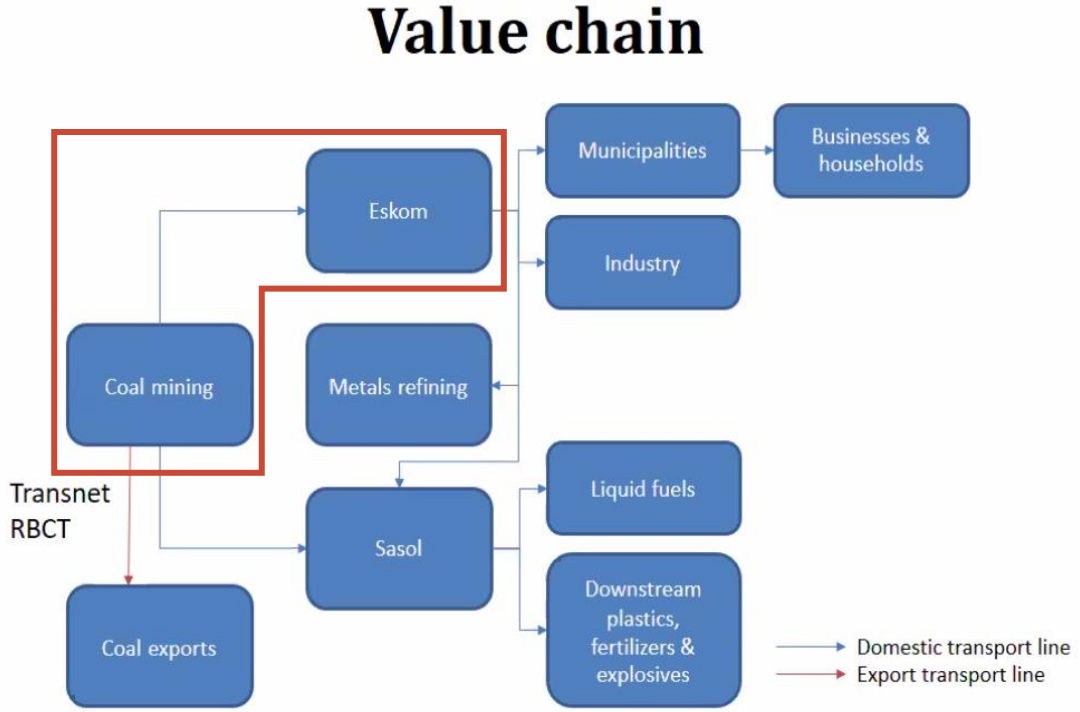
METHODOLOGICAL APPROACH

WHAT THIS STUDY CAN AND CANNOT SAY ABOUT EMPLOYMENT IN MPUMALANGA

- This study builds on the set of the existing literature in energy employment space, both methods and data, to propose a systematic method to explore the employment implications of the Current Policy Scenario versus an Ambitious RE pathway scenario.
- The analysis considers 5-year periods to 2030, and then the decade to 2040. This is done in order to most truly reflect the outputs of the Ambitions modelling process.
- This is not a macro-economic study. A macro-economic study considering two power generation scenarios would give a more systemic view, but at a national economy level (we are aware of this type of analysis having been done by the UCT energy systems modelling group, and currently being undertaken by the Bureau of Economic Research at Stellenbosch).
- It would be very valuable to have a labour economist view on the method used here, and alternative methods to consider the impact on Mpumalanga. **In reality, the number of job losses is likely higher or lower depending on labour and industry dynamics. Granular analysis should be done at a mining company / Eskom level to identify the actual number of workers that may be impacted.**
- The following two slides assist with positioning the study – clarifying what portion of the coal value chain is being considered, and distinguishing types of jobs:

STUDY FOCUS: COAL SECTOR EMPLOYMENT FOR POWER GENERATION

- This study only investigates employment implications for the coal value chain segment related to power generation (i.e. coal mining for power generation and those employed in power generation at Eskom)
- Hence, coal employment estimates are determined based on the reduction of coal use for power generation **only**
  - This study does not include other drivers such as reduced exports, or a domestic switch from coal in other industries due to carbon intensity concerns (Huxham et al, 2019; IEEFA, 2019).
  - These dynamics need to be better understood to fully assess the direction of employment in the coal sector.



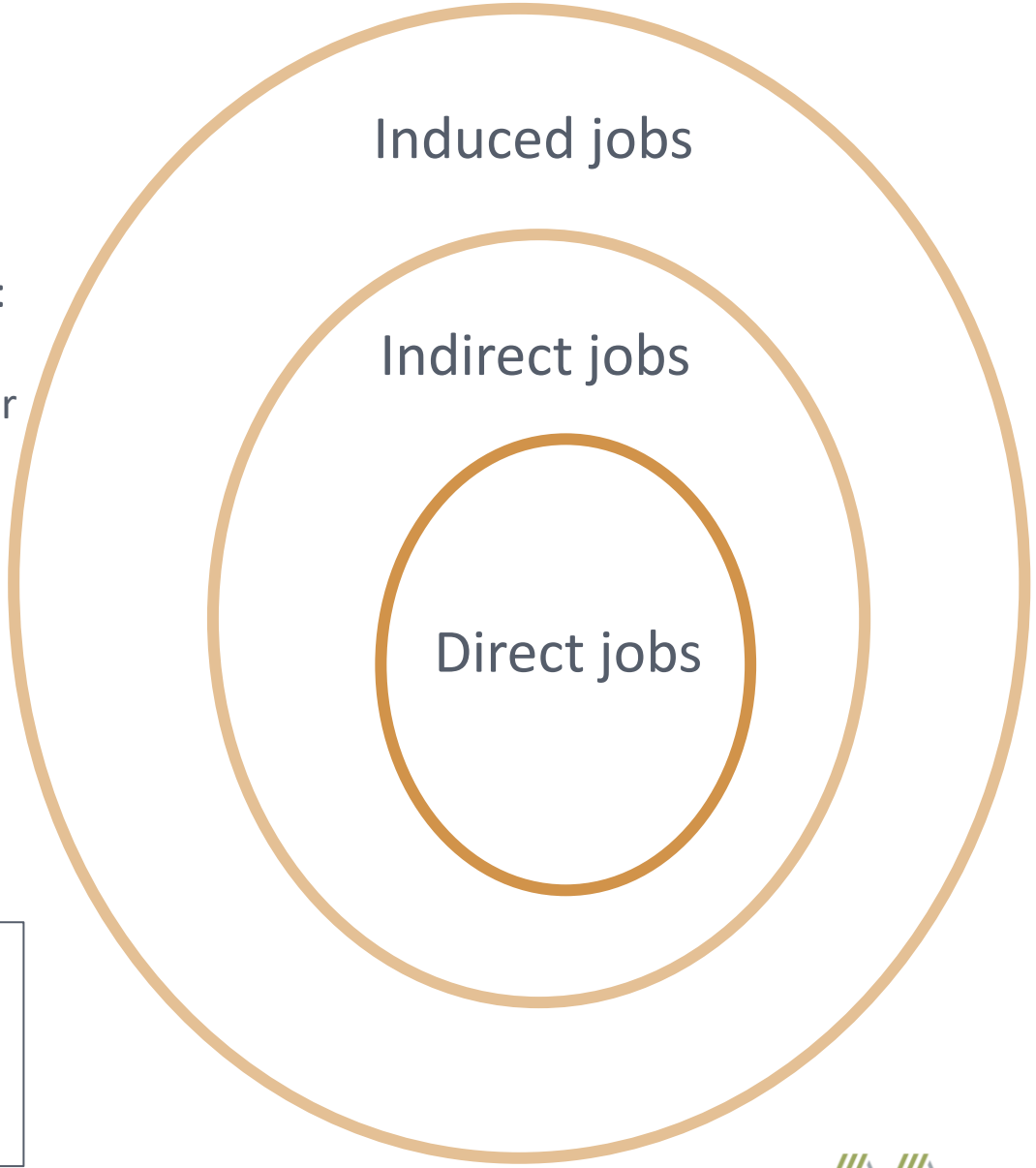
A NOTE: *QUANTIFYING POWER GENERATION JOBS FOR THIS STUDY*

Power generation jobs can be classified as follows (Tyler & Steyn, 2018):
Direct: People employed by the power generation project itself
Indirect: People employed by supplying goods and services to the power generation project
Induced: Those employed to provide goods and services to meet consumption demands of directly and indirectly employed workers

Given the study scope and the classification above, **we quantify the following jobs in this study:**
Direct: Coal power generation jobs
Indirect: Coal mining for coal power generation

A job is defined as a Full Time Equivalent (FTE) position for one year

What other sectors need to be explored? Goods and services to mines? Transport?



A NOTE ON DATA AND ASSUMPTIONS USED IN THE STUDY

ALL DATA NEED STRESS TESTING AND IMPROVING.

- Given the complexity of matching the data with the scope of the study, we needed to make a number of simplifying assumptions:
  - Whilst coal mining and Eskom coal power jobs are not all in Mpumalanga, these are concentrated there and all need to be considered in terms of transitional support.
  - We make the conservative assumption that all power generation jobs (in Eskom) are related to coal fired power.
  - More specific assumptions are provided as the analysis proceeds.
- Data on coal sector employment in SA is patchy and subject to very different classifications, making it difficult to use generally.
- **The resulting numbers in this study are indicative only,** demonstrating trends and high-level differences between the scenarios.
- The primary value of this work is considered therefore to be for the framing we apply, and the methods we construct.

What type of research is required to achieve reliable data on the number, age and skills profiles of coal workers? Surveys? Granular analysis at coal mine company level?

04

COSTING COAL WORKER SUPPORT UNDER TWO CONTRASTING ENERGY TRANSITION SCENARIOS

Section Outline:

1) Estimate the impact of the two contrasting scenarios on employment in coal mining and in Eskom.
2) Elaborate this impact in terms of the skills and age profiles of the coal mining and Eskom workforce.
3) Associate appropriate coal worker support packages and scope a high-level 'cost' estimate for the worker support component of a Just Transition programme.

COAL EMPLOYMENT IN POWER GENERATION: WHAT BASELINE?

What portion of Eskom power generation workers can be attributed to coal power?

- In SA, granular coal sector employment data remains sparse and/or outside the public domain.
- TIPS Coal Sector Jobs Resilience Plan (2020) identifies high-level estimates for:
  - Eskom power generation **12 000 jobs;** and coal mining **80 000 jobs** (which includes coal for exports and domestic industries as well as for power generation)
- Given our focus here on coal employment in power generation, the coal mining figure requires disaggregation:
  - The only data point we could find for this is that of the Minerals Council (2019) which reported that there were **37 834 jobs** in coal mining for coal fired power generation in 2017. This figure can be corroborated through two methods:

    *1) Eskom uses 45% of coal production (Minerals Council, 2020), therefore 45% of 80 000 (number of total workers in coal mining sector) produces another crude datapoint of **36 000 coal mining jobs.***

    *2) Burton et al (2018) assume a labour productivity factor of 3200 tonnes of coal mined per worker per year. Applying this labour productivity assumption to the ME Ambitions report fuel offtake data for the year 2020 (where Eskom coal-fired power fleet burned 116Mt coal) implies ~**36 500 coal mining jobs***
  - **We use a figure of 36 500 as the starting point for coal mining jobs, and 12 000 for power generation jobs.**

REVIEW OF LITERATURE ON POTENTIAL COAL SECTOR EMPLOYMENT IMPLICATIONS OF A COAL TRANSITION

A few studies have focused broadly on impacts of energy transition on coal workers and/or the coal value chain, which form important contributions to this under-researched area and provide some insight into implications for the coal workforce. These projections are very sensitive to difference in scope and assumptions and are not necessarily comparable.

Table 1: *Review of South African coal employment projections (Source: Meridian Analysis)*

Study	Number of coal workers (baseline year)	Scope	Scenarios	Timeframe	Employment implications
Schers, Burton and Bagilet (forthcoming)	~80 000 (2019)	Energy sector	1. 'Reference' scenario	25 years	~14 000 forced losses (assumed direct)
			2. 'Paris-Adjusted' scenario	25 years	~ 36 000 forced losses (assumed direct)
Cruywagen et al (2020)	~80 000 (2019)	Power sector	1. 'High attrition' scenario	20 years	~ 6 600 forced losses (assumed direct)
			2. 'IRP Decommissioning' scenario	20 years	~ 33 000 forced losses (assumed direct)
Minerals Council (2019)	~37 800 (2017)	Power sector	IRP implementation	20 years	~ 17 000 *total* losses (assumed direct)
CSIR (2020)	~220 000 (2020)	Power sector	IRP implementation	10 years	~ 46 000 **direct and indirect** *total* losses

COAL EMPLOYMENT IMPLICATIONS OF AMBITIONS SCENARIOS: ASSUMPTIONS AND METHOD

What might happen to coal mining jobs?

- In this study, the trend in coal mining for power generation jobs is calculated by applying a labour productivity factor of 3200 t/worker/year* used by Burton et al (2018) to the *tonnes of coal burnt for power generation over the 20-yr period in each scenario,* an output of the Ambitions modelling. The total employment losses for each period (first 5yrs, second 5yrs, last 10yrs) to 2040 can thus be determined. (NB: this method assumes a constant labour productivity over the period which we believe is highly conservative)
- An indicative age profile (QLFS, 2018) is then used to determine the % of workers retiring in each of these periods, and therefore the forced job losses in each period – i.e., those that will not reach retirement age (method drawn from Schers, Burton and Bagilet (forthcoming) – the method assumes a hiring stop in 2020 and a retirement age of 65)
- An indicative skills profile (QLFS, 2018) is used to understand the retraining needs of those that are forced to stop working before retirement age, and as such a coal worker support package is determined (method drawn from Cruywagen et al., 2020).

What might happen to coal power generation jobs?

- The decline in coal power generation jobs is linearly associated with the *reduction in installed capacity* of coal-fired power over the 20-year period, an output of the Ambitions modelling.
- An Eskom age profile is applied (Eskom, 2020) to determine the % of workers retiring over the period, and hence forced job losses.

**See next slide for triangulation of labour productivity factor*

COAL MINING ANNUAL REPORTS, TRIANGULATION EXERCISE

- Table 2 shows Eskom's top 10 coal suppliers for 2019.
- Table 3 shows employment and coal production data gathered for 5 of these companies from annual reports. Together the mines in Table 3 provide over 70% of Eskom's coal supply. Average labour productivity is around 3200 t/worker/a.

What if labour productivity is, in reality, lower or higher?

Table 2: *Eskom coal suppliers (Eskom, 2019)*

Our top 10 coal suppliers have remained largely the same as the prior year.

Supplier	Contract type
Exxaro Coal	Mix of cost-plus and fixed price
Seriti Coal	Cost-plus
South32	Mix of cost-plus and fixed price
African Exploration Mining (new)	Fixed price
Universal Coal	Fixed price
Iyanga Mining	Fixed price
Keaton Mining	Fixed price
Shanduka Coal: Graspan Colliery (new)	Fixed price
Umsimbithi Mining	Fixed price
Tshedza Mining Resources	Fixed price

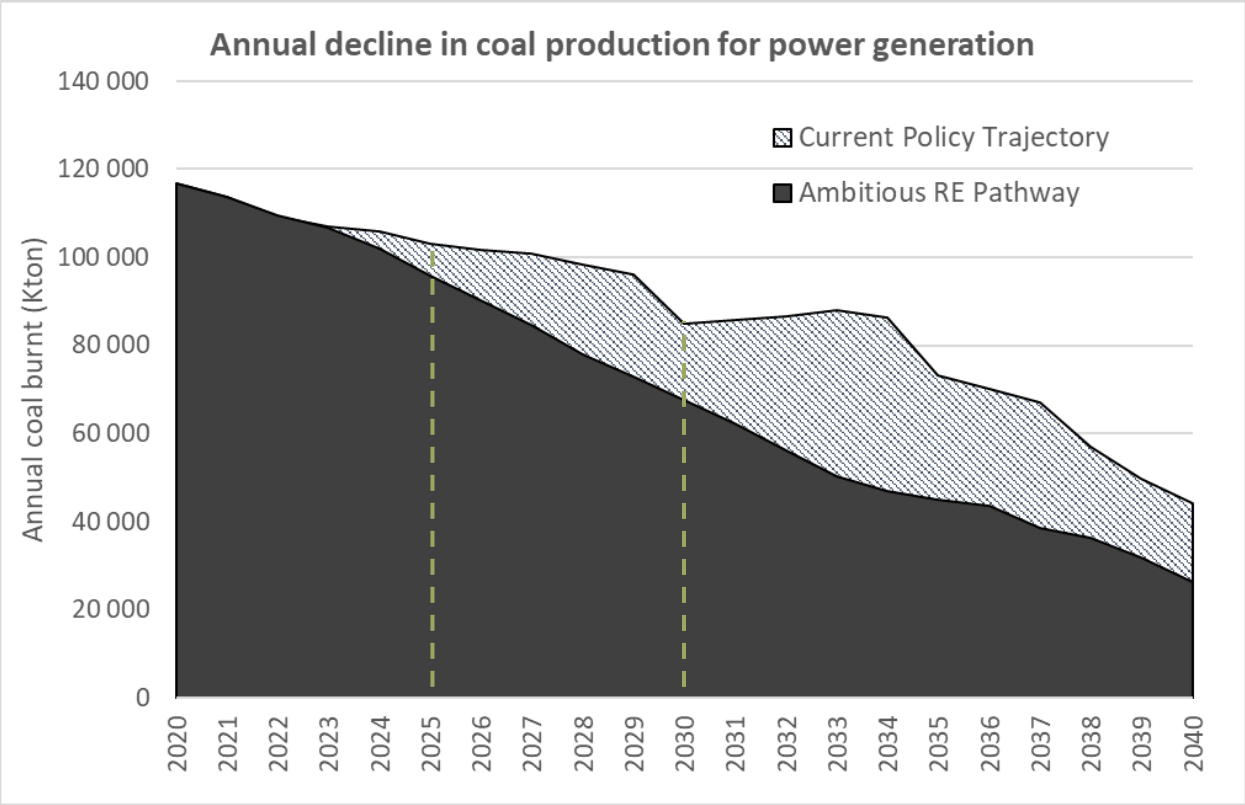
Table 3: *Coal mining labour productivity*

Mine	Employees	Contractors	Coal production (Mtpa)	Labour productivity (t/worker/a)
Exxaro Coal	6812	13330	79.2	3932
Seriti Coal	3000	3000	24	4000
Wescoal (formerly Keaton)	155	1725	5.9	3138
African Exploration Mining	285	-	0.53	1856
Universal Coal Mining	218	2648	8.9	3105
			Average	3206

Sources: Exxaro Integrated Annual Report (2019); Seriti Coal website (2020); Wescoal Holdings Integrated Annual Report; AEMFC Audited Annual Report (2019); Universal Coal Annual Report (2019). Meridian Analysis.

1) EMPLOYMENT LOSS IN COAL MINING FOR POWER GENERATION

- Coal production declines at a different rate for each trajectory, with a corresponding difference in job losses



Source: Meridian Economics (2020b), Meridian Analysis

Table 4. *Estimated total number of job losses in coal mining for power generation, for each trajectory.*

Time period	**Current Policy Trajectory** Total number of job losses (x 000)	**Ambitious RE pathway** Total number of job losses (x 000)
2020-2025	4.3	6.5
2026-2030	5.7	8.9
2031-2040	12.7	12.9
Total	**22.7**	**28.3**

1) ESKOM EMPLOYMENT DECLINE

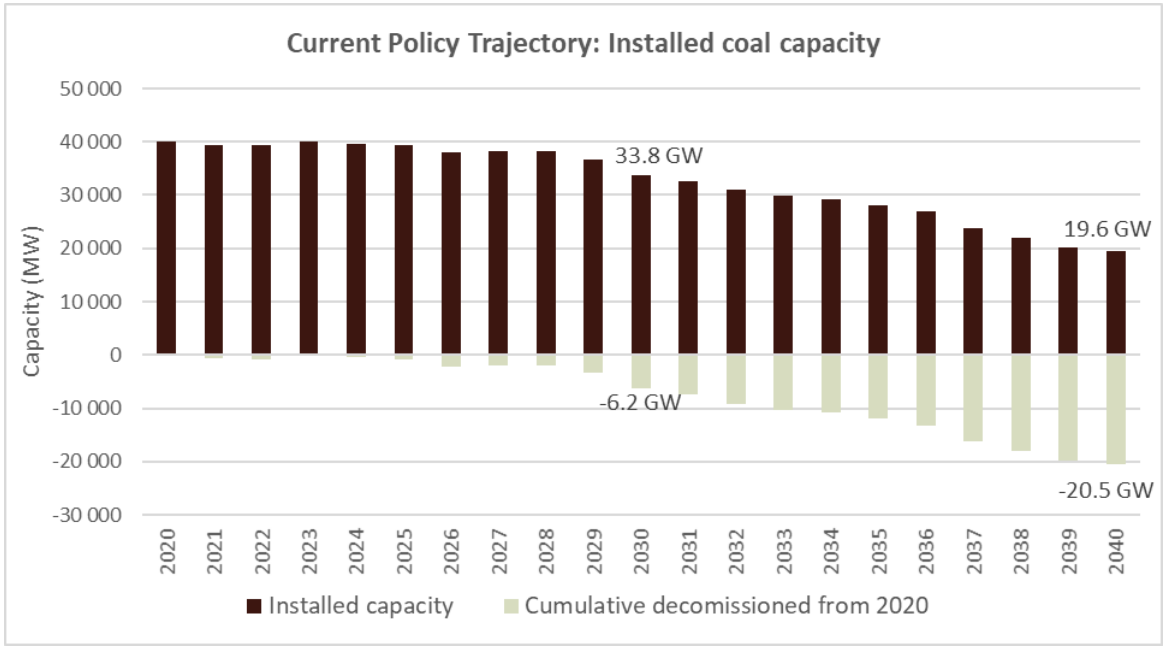
- Reduction of installed coal fired power capacity is used as an index to estimate Eskom employment losses.

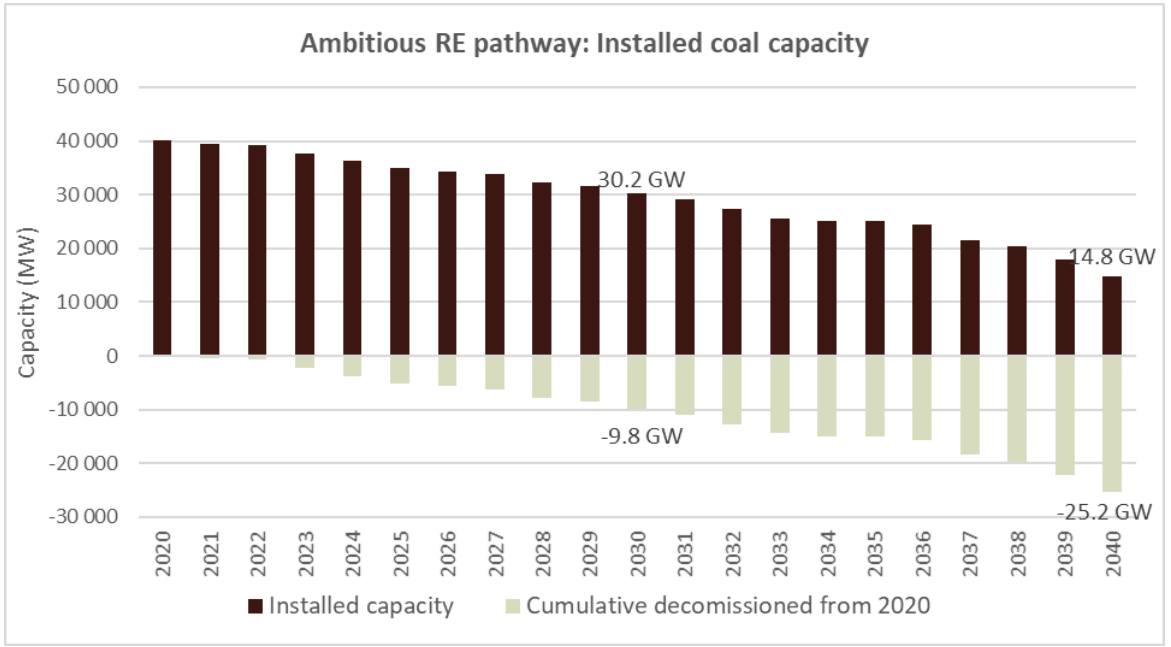
- Some early decommissioning of the coal fleet (50-year life) is expected in an accelerated scenario which has a higher renewable energy build out.

Table 5. *Estimated total number of job losses in coal fired power generation.*

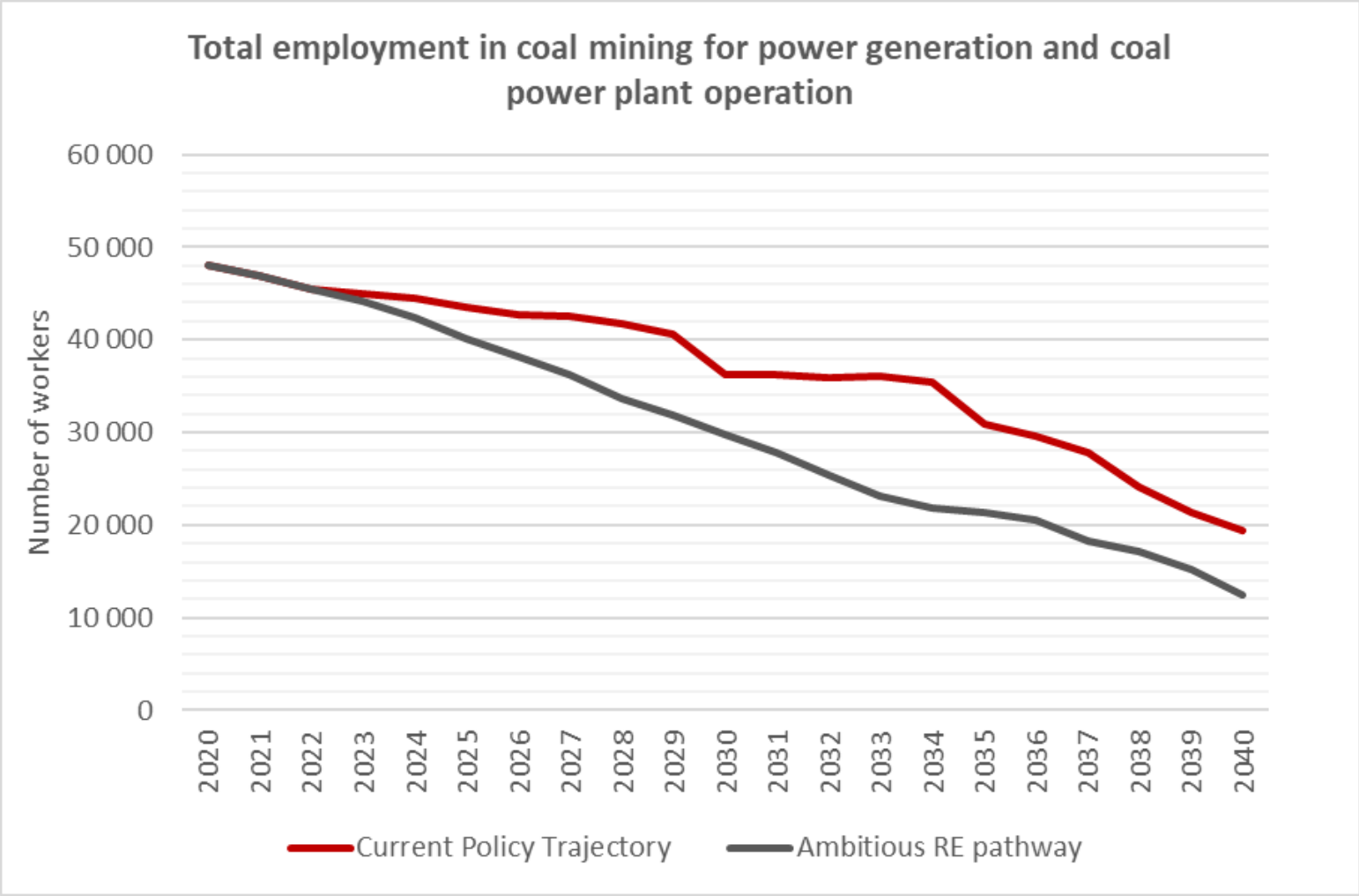
Time period	Current Policy Trajectory Total number of job losses (x 000)	Ambitious RE pathway Total number of job losses (x 000)
2020-2025	0.2	1.5
2026-2030	1.6	1.4
2031-2040	4.4	4.4
Total	**6.2**	**7.3**

Source: Meridian Economics (2020b), Meridian Analysis





1) TOTAL REDUCTION IN COAL POWER SECTOR JOBS TO 2040

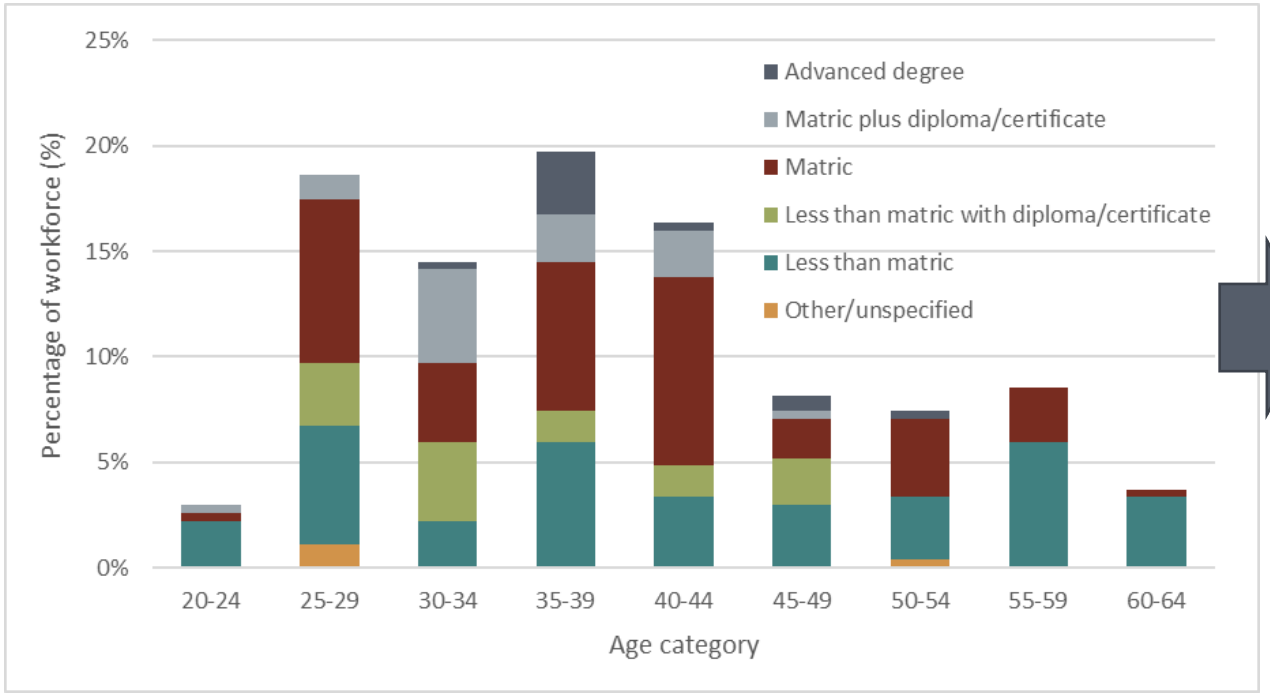


But how many of these are forced job losses (will not naturally retire)?

Source: Meridian Economics (2020b), Meridian Analysis.

1) COAL MINING AGE & SKILLS PROFILE, & FORCED JOB LOSSES

- Assuming a static age profile (Labour Market Dynamics, 2018 published 2020) as an indicative sample* and a retirement age of 65, the number of workers that may reach retirement age within each 5-year period can be estimated. From this, the number of forced losses can be estimated.
- QLFS data suggests that around 70% of the current coal mining workforce is below the age of 45, and at least 58% has a matric or above – however studies are not conclusive on skill levels



Source: Statistics South Africa. Labour Market Dynamics 2018. Electronic dataset. Downloaded from DataFirst Facility at www.datafirst.uct.ac.za on 4 September 2020. Meridian Analysis.

Table 6. *Estimating the number of forced job losses in mining for coal fired power generation.*

Current Policy Trajectory (coal mining for power generation)			
Time period	**Total number of job losses (x 000)**	**Number of workers retiring (x 000)**	**Number of forced job losses (x 000)**
2020-2025	4.3	1.4	2.9
2026-2030	5.7	3.1	2.5
2031-2040	12.7	5.7	7.0
Total	**22.7**	**10.2**	**12.5**

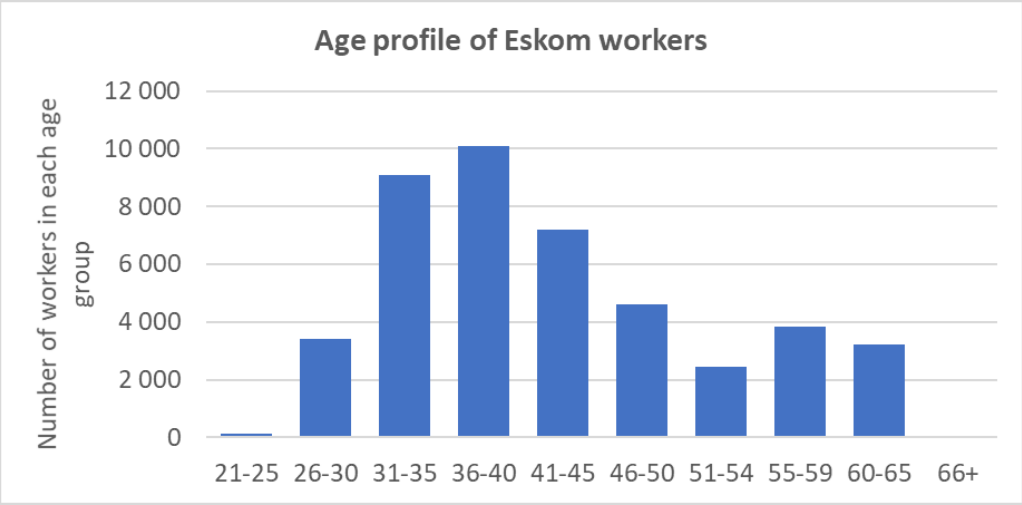
Ambitious RE pathway (coal mining for power generation)			
Time period	**Total number of job losses (x 000)**	**Number of workers retiring (x 000)**	**Number of forced job losses (x 000)**
2020-2025	6.5	1.4	5.2
2026-2030	8.9	3.1	5.7
2031-2040	12.9	5.7	7.2
Total	**28.3**	**10.2**	**18.1**

Source: Method drawn from Cruywagen et al (2020) and Schers and Burton et al (forthcoming). Meridian Analysis.

*One needs to be cautious when using small sample in Labour Market Dynamics survey as fully representative, further work/ granular analysis needs to be done in this area.

2) ESKOM AGE PROFILE

Assuming a static age profile (Eskom SCOPA, 2020) as an indicative sample and a retirement age of 65, the number of workers that may reach retirement within each 5-year period can be estimated. From this, the number of forced losses can be estimated. Eskom data suggests around 68% of its current workforce is below age of 45 with varying levels of skills.



Source: Eskom submission to the Standing Committee on Appropriations (2020). Meridian Analysis.

Table 7. *Estimating the number of forced job losses in coal fired power generation.*

Current Policy Trajectory (Eskom power generation)			
Time period	**Total number of job losses (x 000)**	**Number of workers retiring (x 000)**	**Number of forced job losses (x 000)**
2020-2025	0.2	0.8	0.0
2026-2030	1.6	1.0	0.6
2031-2040	4.4	1.9	2.6
Total	**6.2**	**3.7**	**3.2**

Ambitious RE pathway (Eskom power generation)			
Time period	**Total number of job losses (x 000)**	**Number of workers retiring (x 000)**	**Number of forced job losses (x 000)**
2020-2025	1.5	0.8	0.6
2026-2030	1.4	1.0	0.4
2031-2040	4.4	1.9	2.6
Total	**7.3**	**3.7**	**3.6**

2) COMPARING FORCED COAL JOB LOSSES IN EACH SCENARIO

- Both the Current Policy Trajectory and an accelerated scenario see forced job losses over the next 20-year period.
- The accelerated scenario sees approximately double the forced losses in the first decade, whilst the second decade is fairly similar to the Current Policy Trajectory.

Table 8. *Estimated forced job losses in each scenario over each time period.*

Time period	**Current Policy Trajectory** Estimated number of forced job losses (x 000)	**Ambitious RE pathway** Estimated number of forced job losses (x 000)
2020-2025	2.9	5.8
2026-2030	3.1	6.1
2031-2040	9.6	9.8
Total	**15.6**	**21.7**

How can the data and method to estimate forced job losses be improved? What 'reality checks' need to be undertaken?

3) TOWARDS IDENTIFYING A COAL WORKER SUPPORT PACKAGE

- Worker support may include a blend of salary compensation, retraining and reskilling aid, and/or early retirement payments which should ideally cater for the specific age and skills profile of the workforce.
- Herewith we illustrate an idea of what worker support packages might look like (from literature and other examples) for:
  - **(1) Coal mining workers:** provides retraining and employability support (our method assumes that older workers* retire naturally, the support package is aimed at supporting younger forced losses through reskilling)
  - **(2) Eskom power generation workers:** provides salary compensation (Eskom workers are assumed to be relatively well skilled – from engineering and electrical disciplines – with less specific skills retraining needs)

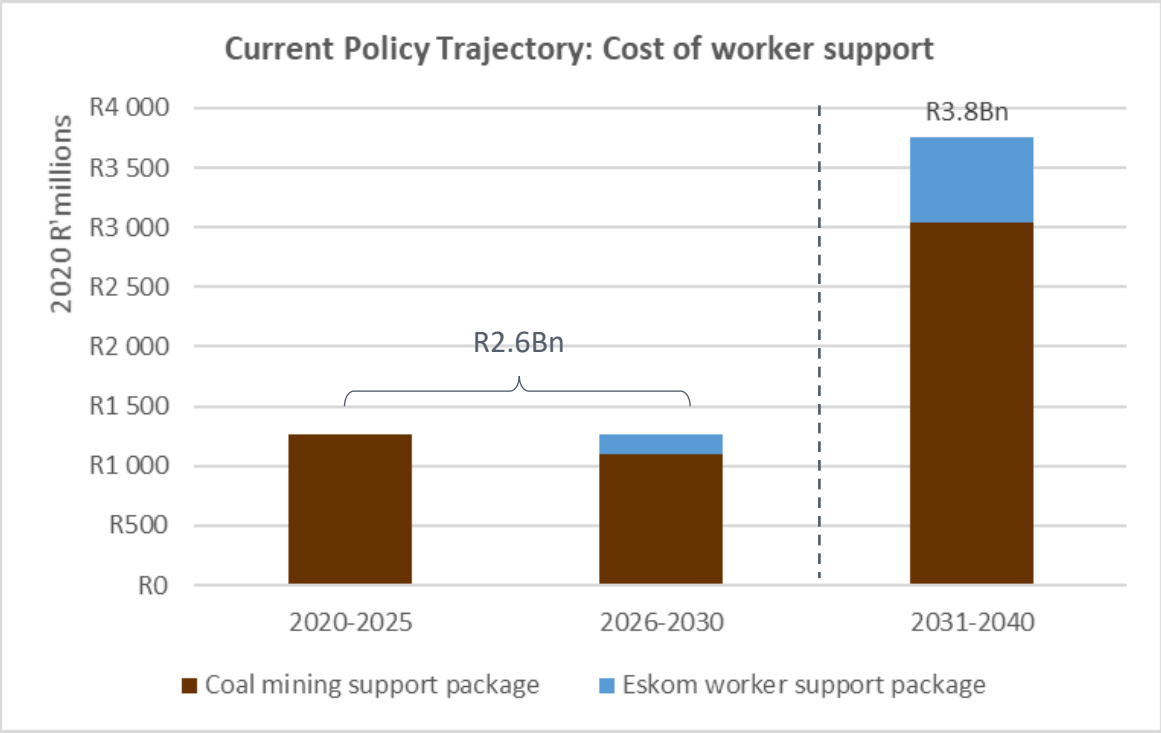
(1) Coal mining worker support package**	Payment per forced loss	Source
Severance payment	R50 000	Coal wage agreement (Chamber of Mines, 2019)
Bridge to re-employment (75% of salary for 52 weeks)	R262 500	Alberta Coal Workforce Transition Programme (2020); Salary from Stats SA (2020) and PayScale (2020)
Retraining aid	R80 000	Cruywagen et al (2020)
Relocation allowance	R20 000	Cruywagen et al (2020)
Worker placement assistance scheme	R20 000	NBI 'Harambee' employability scheme (https://harambee.co.za)

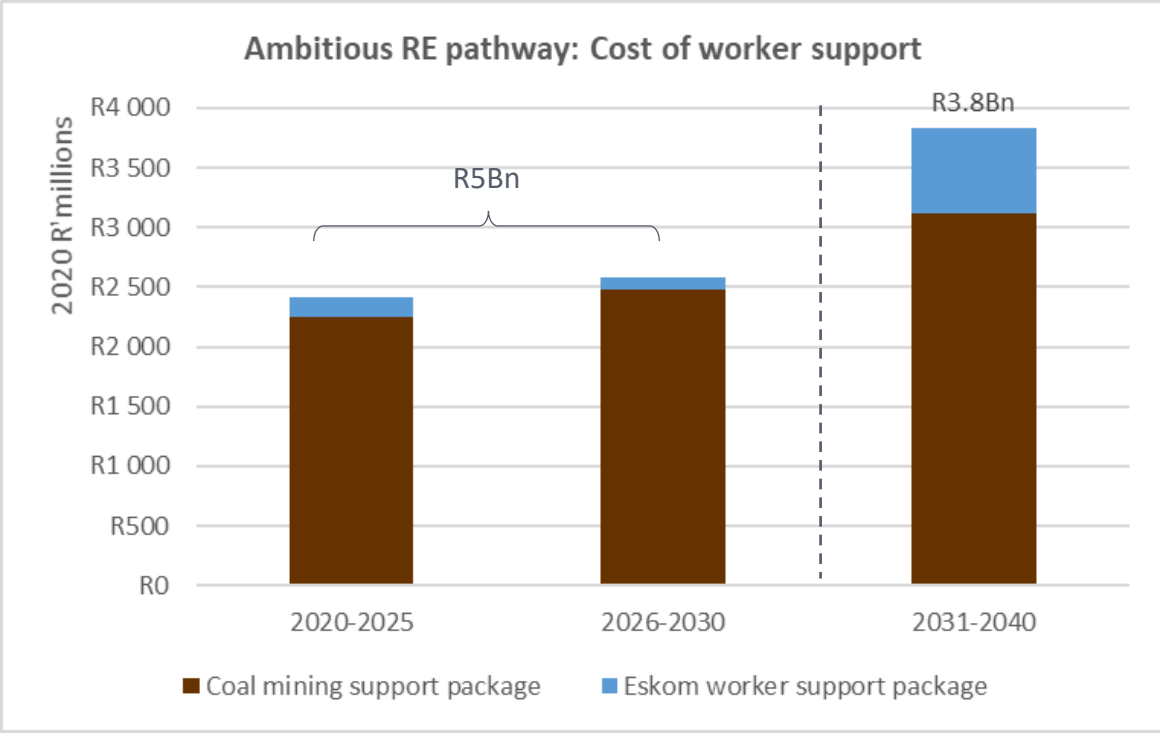
(2) Eskom worker support package	Payment per forced loss	Source
Gratuity payment	R75 000	BusinessTech (2020)
Bridge to re-employment payment (75% of salary for 26 weeks)	R202 500	Alberta Coal Workforce Transition Programme (2020); Salary from Stats SA (2020)

** TIPS (2020) finds that most coal mining workers have pension savings which will strengthen financial security during retirement.*
***We build on Cruywagen et al (2020) method which includes some of these support mechanism components.*

3) ESTIMATING THE COST OF SUPPORTING WORKERS THROUGH TRANSITION

- The cost of a worker support package is applied to the estimated number of forced losses associated with each scenario – **it is clear that both scenarios will need worker transition support.**
- The Ambitious scenario sees more support needed in first decade as there is a more rapid decline in coal production, but over second decade support needs are similar.





CONTEXTUALISING THE COST OF SUPPORTING WORKERS THROUGH TRANSITION

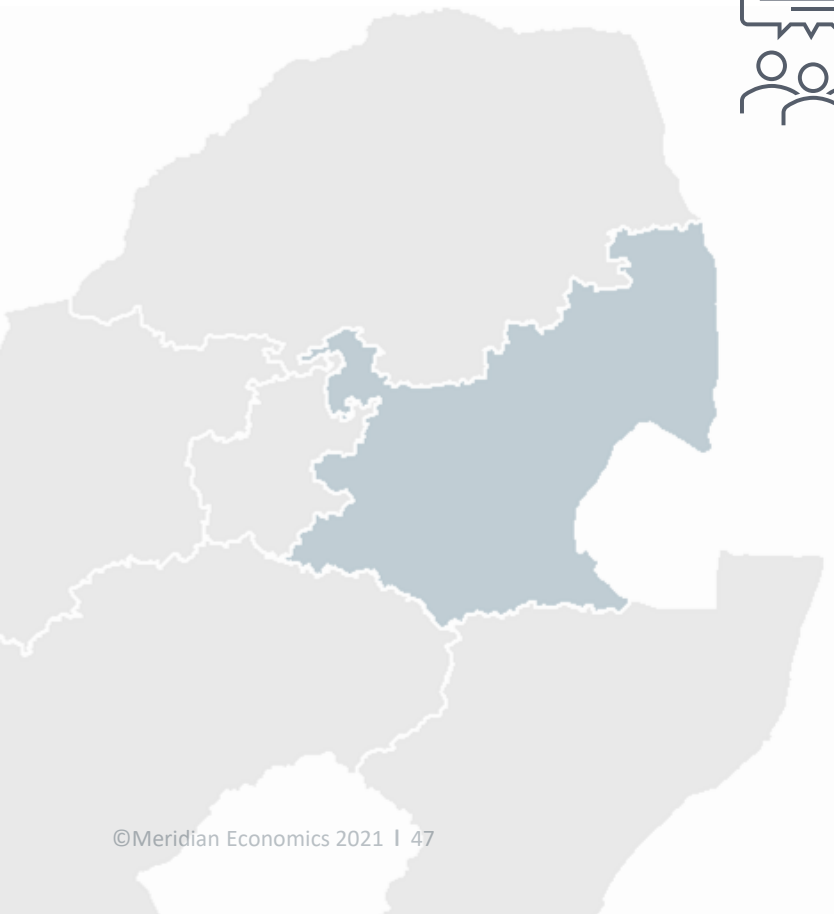
- We have suggested then that the cost of support coal workers ranges from **R2.6 – R5Bn** this decade, and then R3.8Bn the following decade.

- These numbers can be contextualised against:
  - The total social grant expenditure for Mpumalanga Province for FY 2018/19 of **R12.8Bn** (SASSA Finance Branch, 2020)
  - The fiscal bail out committed to Eskom, standing currently at **R230Bn** this decade.

06

INDICATIVE COSTING OF KEY OUTSTANDING COMPONENTS OF A JUST TRANSITION PROGRAMME

DRAWING FROM CURRENT DIALOGUE PROCESSES, WE PROPOSE THAT THERE ARE AT LEAST 3 KEY JUST TRANSITION FOCUS AREAS FOR THE MPUMALANGA COAL REGION



1. Transition management – developing an institutional structure responsible for coordinating stakeholder engagement and implementation processes

2. Coal worker support mechanisms –providing compensation, retraining and employability support

3. Holistic, regional socio-economic development programme

- Establishing skills development and other educational infrastructure in the region
- Establishing the basic infrastructure for Special Economic Zones
- Upgrading general public infrastructure
- Embarking on land rehabilitation initiatives

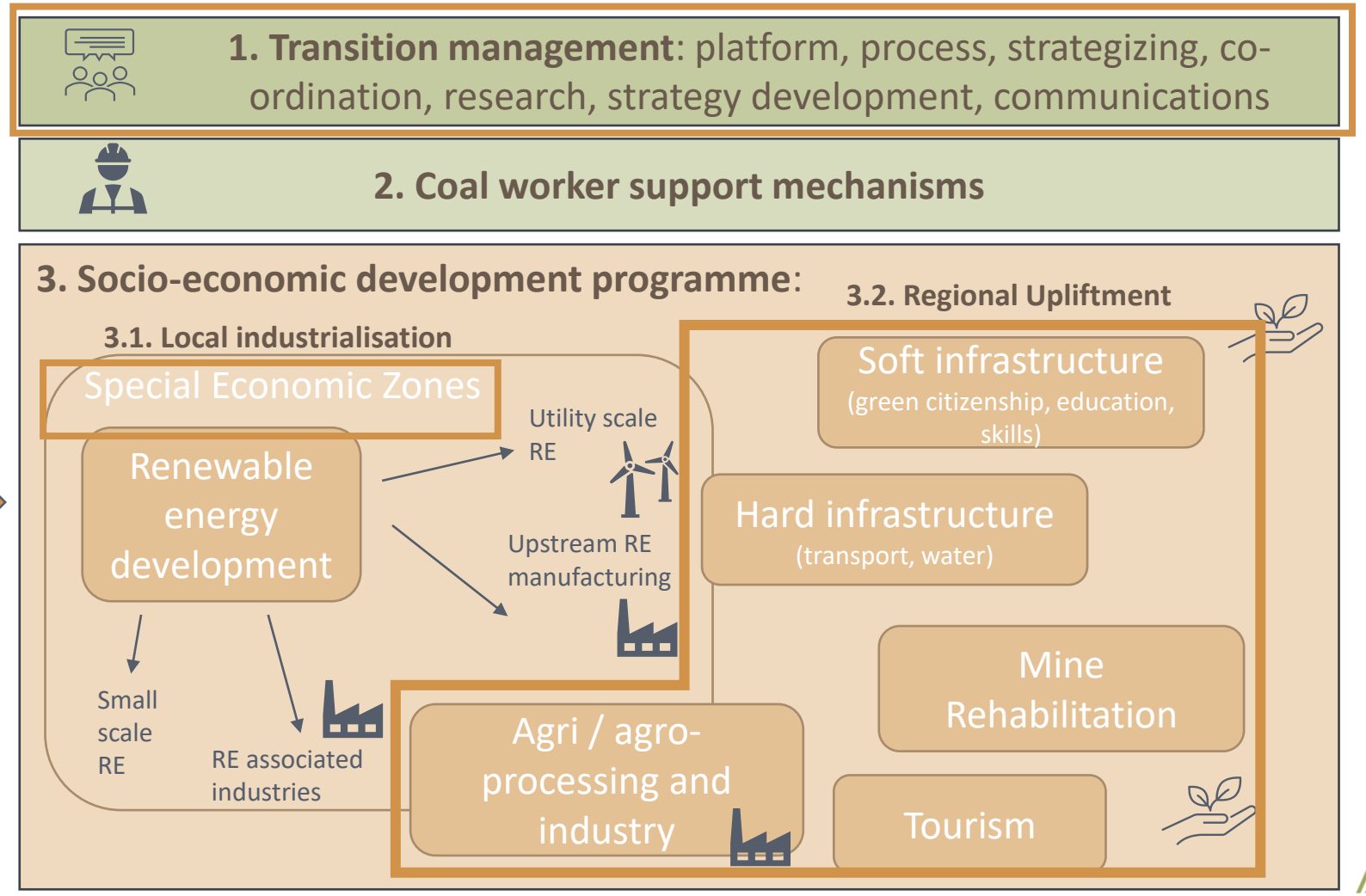
CRITICAL COMPONENTS OF A JT PROGRAMME THAT ARE LESS CLEARLY DEPENDENT ON THE PACE OF TRANSITION

We now turn our attention to the remaining components (1) and (3), providing some initial quantification indicators, independently of any particular power generation scenario.

(1) What are the costs of establishing a transition management structure?

(3) What is the cost of creating an enabling environment for a socio-economic development programme?

We use a bottom-up approach to identify available costs, which whilst not fully comprehensive, poses questions as to what may be feasible.



1. TRANSITION MANAGEMENT: INSTITUTIONAL STRUCTURES FOR JUST TRANSITION ACTIVITIES

- Several countries have set up/proposed institutional structures with specific functions for supporting 'just transition' activities
  - **Canadian Just Transition Task Force** – funded by government, includes 2 chairs and 9 members
  - **Scottish Just Transition Commission** – funded by government, includes 1 chair and 11 members
- A **representative, well-resourced** engagement and implementation structure has been identified as critical to coordinating a 'just transition' in South Africa.
  - **Core *proposed* functions of an institutional structure to coordinate a Just Transition in the South African context include*:**
    1. Ongoing stakeholder engagement
    2. Addressing technical research needs
    3. Coordinating local transition support centres
    4. Channelling resources and funding
    5. Transition management through coordination of activities

** Collated from National Planning Commission (2019) South African Renewable Energy Masterplan (2020), various NGOs including Project90by2030, AICD, Burton et al (2019) Climate Transparency Initiative, Eskom Sustainability Task Team, and other actors.*

1. TRANSITION MANAGEMENT: FUNCTIONS OF A WELL-RESOURCED JT COORDINATING BODY

The functions of well-resourced institutional structure to initiate, coordinate and establish change management processes in Mpumalanga may include:

- **Transition management function** (a small lead-member group and chair) for coordinating activities, actor groups, and establishing a treasury function for channelling funding resources.
- **Contracting of key local parties** (+/-10) embedded in local networks to coordinate transition support, e.g. from local educational institutions (TVET colleges), existing community centres and community networks and trade unions to guide transition process.
- **Conducting stakeholder engagements** through 50 local and provincial consensus building meetings and 80 stakeholder dialogue meetings hosted in 4 most affected municipalities.
- **Contracting research reference group** entities for key pieces of research work relevant to transition specific needs.

The next slide demonstrates an illustrative budget for a Just Transition (JT) coordinating body:

1. TRANSITION MANAGEMENT: ILLUSTRATIVE BUDGET FOR A JT COORDINATING BODY

***Table 9**. Illustrative budget of Just Transition Coordinating Body for 5-year initiating period (Source: Meridian Analysis)*

Institutional component	Units (per year)	Cost/unit (R'000)	Units (5-year period)	Total cost for 5-year period (R'000)
*Lead-member group**	*10*	100	*50*	5,000
Treasury function for resource channelling	*1*	1,000	*5*	5,000
Contracting key local parties in local networks	*10*	200	*50*	10,000
Consensus building meetings	*10*	10	*50*	500
Dialogues	*15*	90	*80*	6,750
Contracting key researchers/institutions	*10*	120	*50*	6,000
			Total (R'000)	**33,250**

- *What does this look like?*
- *How does this complement existing social development programmes?*
- ***Who should be involved?** At what stages?*
- *Would this be housed within the PCCCC?*
- *How does the institution facilitate skills development and transferability ?*

*Some of the lead members may chose to volunteer their time

3.1 LOCAL INDUSTRIALISATION: SETTING UP A SPECIAL ECONOMIC ZONE (SEZ) IN MPUMALANGA

- **Special Economic Zones (SEZs)** are policy tools utilised by the South African government to meet national objectives of industrialisation, regional development and employment creation (DTI, 2020).
- **Atlantis SEZ** situated in the Western Cape is South Africa's first 'green tech' hub, hosting a number of renewable energy-related and green textile industries (see https://atlantissez.com/)
- **South African Renewable Energy Masterplan (SAREM)** process is investigating industrialisation potential for renewable energy. (SAREM Interim research summary report, 2020)
- **Mpumalanga Economic Growth Agency (MEGA)** manages 3 large industrial parks including Ekandustria (145 properties) and Siyabuswa (27 factories), both situated along the 'Maputo Corridor', an important national trading link. These host a mix of manufacturing, production and engineering operations, but have dilapidated in recent years (MEGA, 2020). Highveld Industrial Park is situated in Emalahleni ('heart of coal') which is privately run. (see http://www.highveldindustrialpark.co.za/)

What do we know about the challenges of SEZs to achieve industrialisation?

Are there opportunities to pivot existing industrial parks to be geared towards new industries?

3.1 LOCAL INDUSTRIALISATION: SETTING UP A SPECIAL ECONOMIC ZONE (SEZ) IN MPUMALANGA

Table 10. *Illustrative budget for Industrial park revitalisation and establishment of basic infrastructure for SEZ in Mpumalanga (Source: Meridian Analysis)*

Local industrialisation support	Outline	Units	Cost/unit (R'000)	Total cost (R'000)
Revitalisation of industrial park	Includes upgrading basic infrastructure and services such as security and wastewater treatment (based on DTI 'Revitalisation of Industrial Parks' Programme, 2020)	2	50,000	100,000
Establishment of basic infrastructure for Special Economic Zone (SEZ)	Includes roads, water, electricity, basic infrastructure for initial functioning of the SEZ (DTI, 2020; Nedbank Project List, 2020)	1	1,500,000	1,500,000
			Total (R'000)	**1,600,000**

3.1 LOCAL INDUSTRIALISATION: TYPES OF PROJECTS THAT COULD BE CROWDED IN WITH SEZ INCENTIVES*

Table 11. *Types of projects that could form part of Special Economic Zone (Source: Meridian Analysis)*

Industry	Project	Size or capacity per year	Investment (R'000)	Type of funding
Agricultural cooperatives	Mmaesha Agricultural cooperative, Limpopo[1]	Small-scale	6,300	Public
	Zamasli Agricultural cooperative, Steve Tshwete[1]	Small-scale	1,100	Public
Renewable Energy Related Industries	Atlantis SEZ 'Resolux' wind tower internals manufacturing facility[2]	450-750 MW/year	25,000	Private
	Atlantis SEZ 'GRI' wind tower manufacturing facility[2]	450-750 MW/year	475,000	Private
	East London SEZ solar water heater manufacturer[3]	30 000 units/year	60,000	Private
	Coega SEZ 'DCD Wind Energy' tower manufacturing facility[3]	Large-scale (20 000m^2)	300,000	Private
	Thin-film PV module manufacturing facility[3]	30 MW/year	760,000	Private
	Jinko solar module manufacturing facility[3]	120 MW/year	80,000	Private
Other manufacturing and/or production opportunities	Coega SEZ multi-user agro-processing facility[3]	Large-scale (7 800m^2)	86,000	Public
	PEGAS nonwovens fabric manufacturing facility (local materials)[3]	-	1,300,000	Private
	Green Material Corporation (green fibre production)[3]	-	25,000	Private

*SEZ Act (No. 16 of 2014) provides a range of incentives targeted at attracting foreign and local investment, these include reduced corporate tax, building allowances and employment tax incentives (DTI, 2020).

[1] https://vulekamali.gov.za/infrastructure-projects/
[2] GreenCape (2020)
[3] Nedbank Project List (2020)

3.2 REGIONAL UPLIFTMENT: SKILLS DEVELOPMENT, UPGRADING PUBLIC INFRASTRUCTURE & REHABILITATION

- The following table outlines a dedicated funding package targeting regional upliftment in 4 local municipalities which have been identified as most vulnerable to a coal transition (Emalahleni, Steve Tshwete, Msukaligwa and Govan Mbeki). (TIPS, 2020)

Table 12. *Illustrative budget for regional upliftment initiatives in 4 Mpumalanga Municipalities (Source: Meridian Analysis)*

Category	Type	Unit	Cost/unit (R'000)	Total cost (R'000)
Education/ skills development / knowledge economy	New skills training centre[1]	1	100,000	100,000
	Upgrading Technical Vocational Education and Training (TVET) colleges[2]	4	60,000	240,000
	Fortune 40 Youth Programme[3]	1	80,000	80,000
	Early childhood development centre[2]	4	5,300	21,200
	Municipal library[2]	4	13,500	54,000
Healthcare	Community health centre[2]	4	15,000	60,000
Rehabilitation	Mining land rehabilitation/agricultural development pilot project[4]	15	30,000	450,000
Other infrastructure development	National allocation to province to support infrastructure development in distressed mining communities (transport, housing…)[2]	4	120,000	480,000
			Total (R'000)	**1,485,200**

[1] Nedbank Project List (2020)

[2] https://vulekamali.gov.za/infrastructure-projects/full/

[3] https://www.vukuzenzele.gov.za/book/export/html/2922

[4] See next slide

3.2 REGIONAL UPLIFTMENT: LAND REHABILITATION AND POST-MINING ECONOMY INITIATIVES

Which of these are pilot-ready? How can they be funded? How can mining companies be engaged as part of the process?

Status Quo: declining mining region

- Roughly 125 coal mines in Mpumalanga (DMRE, 2020).
- Coal mines supplying Eskom are already experiencing lower demand from Eskom (Business Day, 2020).
- Rehabilitation of degraded mining land is a huge issue in Mpumalanga, lack of transparency on how rehabilitation funds are directed.

Post-mining economy

1. **The Green Engine Project** (Mine Water Coordinating Body) *creating self-sustaining agri-industrial hubs on mining impacted land, focused on serving local communities*
2. **Bioenergy Toolkit** (Promethium Carbon) *facilitating rehabilitation and production of low-carbon energy*
3. **Fibrous Futures Initiative** (UCT 'resilient futures cluster') *cultivating bio-fibrous crops on mining impacted land for job creation and industry value chain*
4. **Fly ash beneficiation project** (UWC, CPUT) *utilisation of fly ash for lower cost building materials*

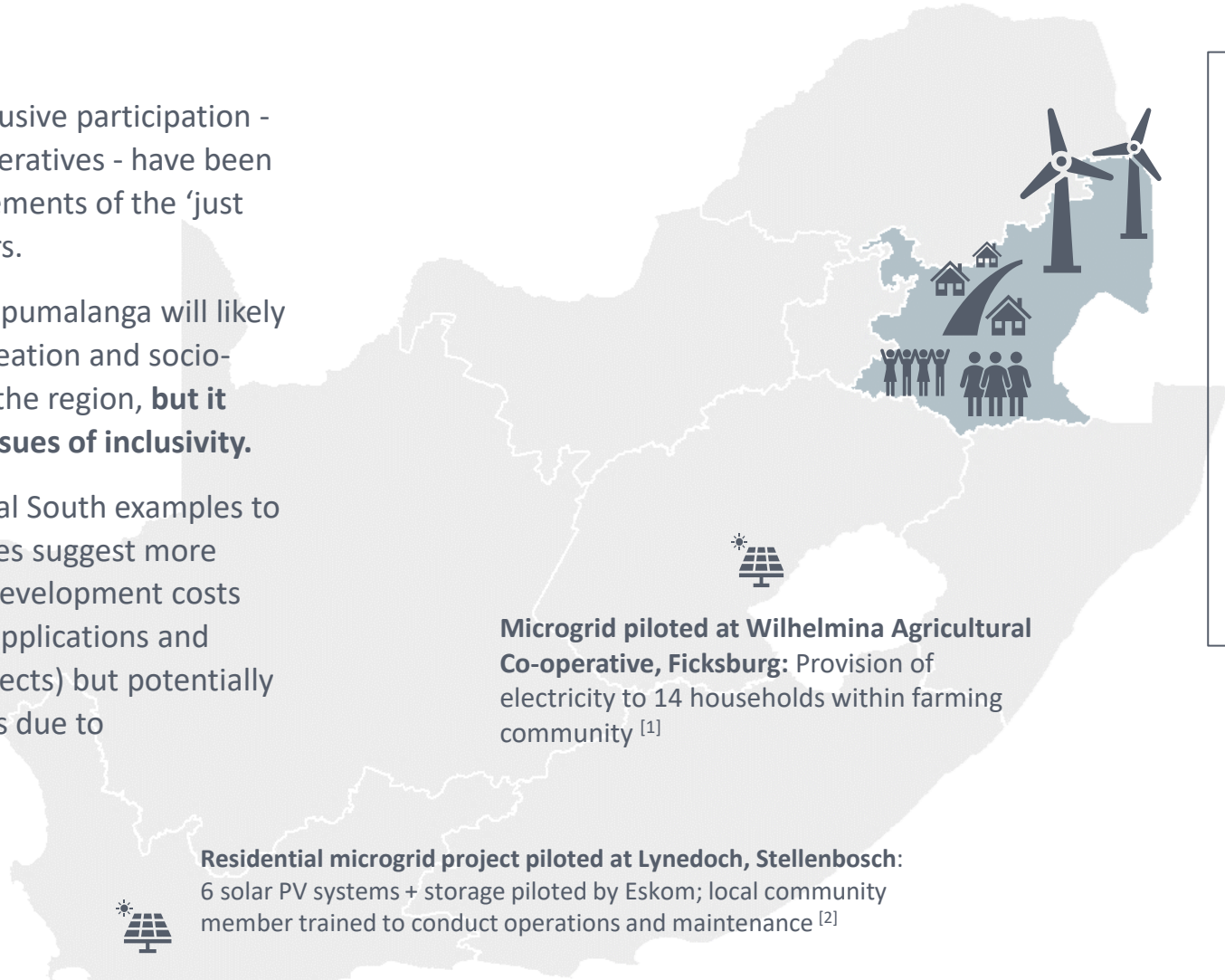
Table 13. *Types of mining land rehabilitation/agricultural projects (Source: Meridian Analysis)*

Project category	Example project	Investment (R'000)	Status	Outline
Environmental rehabilitation	Harmony gold mine rehabilitation plan (Nedbank, 2020; Promethium Carbon, 2020)	45,000	Complete	Converting mining land to carbon sinks by planting sorghum, sugar beet and giant king grass (high carbon sequestration), gain carbon credits; harvest crops for biogas, generate 400 direct and indirect job opportunities
	Hendrina Agricultural Garden Project, Mpumalanga	700	Budgeted	Sudor Coal SLP contributions to Steve Tshwete Local Municipality Integrated Development Plan projects (2019/2020)
	Grootvlei Gold Mine biological treatment process (Rhodes BioSure) for acid mine drainage	15,000	Complete	Primary sewage sludge sourced from local municipal wastewater treatment plant, used to neutralise sulphates in mine water
Agricultural	Kriel Colliery Agricultural Production Project	~ 4,000	Complete	400ha of rehabilitated mining land repurposed for maize and soya bean production, sold in conventional agricultural markets
Water treatment	Hessequa Municipality solar-powered reverse osmosis water treatment plant	16,500[1]	Complete	Solar-powered reverse osmosis unit produces 100m3 freshwater per day, co-funded by the French Treasury and the Province of the Western Cape, developed by Turnkey Water Solutions and Mascara Renewable Water

[1] *At 16.5 USD/ZAR exchange rate.*

INCLUSIVE PARTICIPATION IN INFRASTRUCTURE INVESTMENT

- Community-ownership and inclusive participation - for example not-for-profit cooperatives - have been raised as key transformative elements of the 'just transition' by many stakeholders.
- A rollout of utility-scale RE in Mpumalanga will likely have benefits in terms of job creation and socio-economic development within the region, **but it does not necessarily address issues of inclusivity.**
- Whilst there are not many global South examples to reference, global North examples suggest more inclusive projects have higher development costs (longer timelines due to grant applications and more collaboration around projects) but potentially similar/lower construction costs due to cheaper/grant finance.



Microgrid piloted at Wilhelmina Agricultural Co-operative, Ficksburg: Provision of electricity to 14 households within farming community [1]

Residential microgrid project piloted at Lynedoch, Stellenbosch: 6 solar PV systems + storage piloted by Eskom; local community member trained to conduct operations and maintenance [2]

1. *What are the catalysts for stimulating inclusive participation in South Africa's power sector transition?*
2. *What does 'Just Transition' really mean? Justice for whom?*
3. *How do we avoid the new energy paradigm perpetuating existing societal injustices?*
4. *What examples / pilot projects exist?*

[1] EE publishers (2018). "Rural microgrid project improves people's lives."
[2] Sustainability Institute (n.d.) "Eskom's first smart embedded residential microgrid project piloted at Lynedoch."

07

IMPLICATIONS AND CONCLUSION

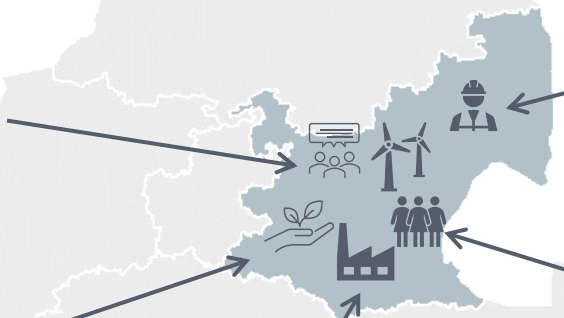
THIS STUDY PROVIDES AN INITIAL APPROACH TO THINKING ABOUT FINANCING A MPUMALANGA JUST TRANSITION PROGRAMME

- Much progress is being made on plans and strategies for the 'just transition' and 'just energy transition' in SA.
- **But there is still limited research on financing needs associated with these plans**, and very few pilot projects to reference.
- Wherever JT programme financing eventually comes from, it will be important to have an idea of how it will be spent.
- This study has developed a framework approach to thinking about costing projects and initiatives that *could* form part of a **Just Transition Fund** for Mpumalanga, building on the work of numerous actors in this space, both domestic and international.
- In this final section we offer some key take-aways from our experience of developing this**.**

AT FIRST GLANCE, IT APPEARS THE FOUNDATIONAL COSTS FOR A MPUMALANGA TRANSITION PROGRAMME ARE RELATIVELY SMALL

Where should this funding come from? How could this best be coordinated? Which stakeholders need to be involved?

~R 33 Mn to fund a JT coordinating body for 5-year initiating period



~R8.8 bn to finance worker support mechanisms over 20-year transition

~? Funding for mining rehabilitation and new value chain pilot projects

R1.6 Bn to finance the establishment of a renewable energy SEZ in Mpumalanga and revitalise existing industrial parks, to attract a mixture of private as well as cooperative, community-led local industries.

R1.5 Bn to fund enabling infrastructure for skills development, land rehabilitation and other basic public infrastructure in 4 most affected municipalities.

- ***These costs of catalysing a comprehensive transition programme are small:***
  - when compared to the costs associated with not-transitioning in a pro-active manner (Eskom bail outs, provincial social grants etc).
  - when compared to international transition financing we believe could be generated under an Ambitious scenario.
- ***These costs are non-exhaustive, however, they give some indication of the costs of foundational components of a transition programme.***

A PRO-ACTIVELY MANAGED, ACCELERATED TRANSITION HAS NUMEROUS BENEFITS

- The financial costs of the transition in either scenario appear small relative to others in the development and power sector space.
- There are numerous benefits to committing to an accelerated transition scenario:
  - Such a commitment is anticipated to **significantly increase the extent to which international finance can be accessed** to fund the social costs.
  - The commitment will provide a focal point for work on a **proactive, government endorsed strategy** for socio-economic development and industrialisation support in the Mpumalanga region
  - Such a strategy is also likely to provide localised benefits to mitigate transition risks (e.g. focussed job creation across a range of economic sectors), **which stands in contrast to the threat posed by an unmanaged strategy without adequate transition support measures in place.**
  - An accelerated transition will be required if South Africa is to achieve its **Paris Agreement commitments, including the net zero by 2050 target** under consideration, and a **decarbonised power sector will be the cornerstone of a competitive, twenty-first century economy.**

An ambitious transition is more likely to harness the required financial resources to provide transition support.

What happens if SA fails to grasp the opportunity?

A JUST TRANSITION FUND CAN BE BROADLY DESCRIBED

1. A Just Transition in Mpumalanga will involve public and commercial projects and programmes in various sectors to transition coal workers, enable economic and social development and attract investment to the region

1. Transition management: platform, process, strategizing, co-ordination, research, strategy development, communications

2. Packages for coal workers

3. RE centred socio-economic development programme:

- Special Economic Zones
  - Renewable energy development
    - Utility scale RE
    - Upstream RE manufacturing
    - Small scale RE
    - RE associated industries
- Soft infrastructure (green citizenship, education, skills)
- Hard infrastructure (transport, water)
- Agri / agro-processing and industry
- Mine Rehabilitation
- Tourism

2. Different sources of finance are available depending on the type of project

3. The **JTF** provides grant finance, catalysing other financing sources.

WHO?	The JTF
Eskom, coal companies	Grant
DFIs	Patient capital
Local and Provincial Government; DFIs, TVETs	Concessionary loans
	Seed funding
Mining rehabilitation funds	Incubation finance
	Etc.
Department budgets – DST, Provincial, EPWP, other	
Venture capital	Pre-commercial
Commercial	

CONTRIBUTING TO A GROWING RESEARCH AGENDA…

- As we have seen, there is a lot that we do not know. Here are some proposed priority research areas:
- A detailed audit of coal workforce, numbers and positions in value chain.
- More thorough modelling of transition impacts and the relationship between the reduction of coal generation and employment (for example using macro-economic models)
- More granular analyses on the best blend of support mechanisms, these must be mapped to age and skills profiles of the workforce.
- Investigations and case studies into what this may look like in the real world? We need to test quantitative assumptions against actual on-the-ground realities – this should include consultation with key stakeholders: unions, workers, mining houses.
- Analyses of what type of funding is best suited to the various needs.
- Investigating how specifications in the Human Resource Development Plan contained in Social Labour Plans (of mining houses) and are aligned to supporting workers through a transition, e.g., provisions for upskilling.
- Investigating current educational institution capacity, and the feasibility of existing institutions becoming training hubs.
- Tracking emergent research on international examples / best practices – particularly those emerging from global South context, high levels of inequality and poverty will provide insights.
- A deep dive into what the future Mpumalanga economy could look like, taking into account existing and realistic developments in skill sets, infrastructure etc.

KEY CONSIDERATIONS RAISED IN A "PEER REVIEW" WORKSHOP

- A version of this slide deck was used as the basis for discussion with a small group of peers in January 2021, yielding valuable framing and methodological questions and comments. These contributed to a revision of the deck, with some highlights below:
  - Our peers emphasized the movement of the political narrative towards an economy-wide perspective, even at a regional scale, as opposed to a close focus on transition dynamics within the power sector.
  - Suggestions were raised around exploring a "do-nothing" scenario - What if no interventions are put in place to address the transition?
    - This may help to define the benefits of a pro-actively managed transition, and the costs of doing nothing.
  - Who will and should pay for the transition?
  - How can this type of work interface with the way Government budgets?
  - The Just Transition should be managed and driven cross-sectorally. Where should this responsibility for co-ordination ultimately lie, and what could it look like?
  - Regarding the methodology, it was noted that there may be variation in the coal productivity rate (national tons/worker/year) due to lower productivity smaller mines, lower volumes at cost, amongst other changing variables.
  - Looking at the wider net of costs and benefits would be useful.
  - It was suggested that using a system dynamics view of costing the transition would be helpful, as feedback loops could help quantify the resulting opportunity, benefit and impact of a transition for driving shifts in industrialisation, for example in Renewable Energy.

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