Just Energy Transition

Job impacts and technology investment choices in energy transition

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30 July 2021

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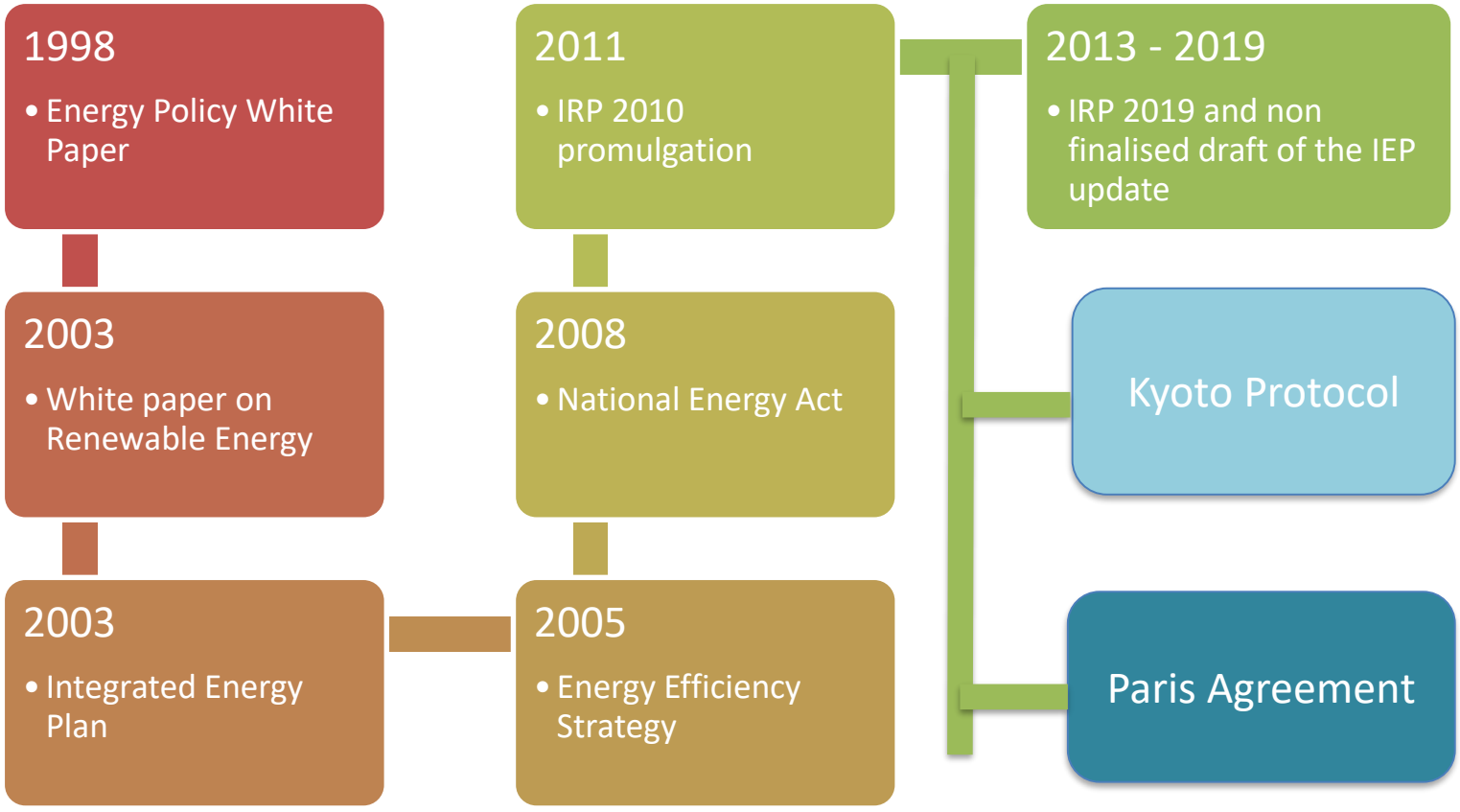
Outline

1. Context
2. Factors driving the energy transition
3. A transition to an accelerated renewable energy technologies roll-out
4. Implications of a coal phase-out in South Africa
5. The role of a just energy transition in addressing energy challenges in South Africa
6. The potential to optimise renewable energy benefits

Foundational policy landscape informing energy sector transition



Just energy transition enabler

	Coal	Coal Decommissioning	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas &diesel	Other (Distributed Generation, CoGen, Biomass, Landfill
Current Base	37149		1860	2100	2912	1474	1980	300	3830	499
2019	2155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap
2020	1433	-557				114	300			
2021	1433	-1403				300	818			
2022	711	-844			513	400 1000	1600			
2023	750	-555				1000	1600			500
2024			1860				1600		1000	500
2025						1000	1600			500
2026		-1219					1600			500
2027	750	-847					1600		1000	500
2028		-475				1000	1600			500
2029		-1694			1575	1000	1600			500
2030		-1050		2500		1000	1600			500
TOTAL INSTALLED CAPACITY by 2030	33364		1860	4600	5000	8288	17742	600	6380	
% Total installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
%Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

- Source: IRP (2019)

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JUST ENERGY TRANSITION IN SOUTH AFRICA

Presidential Climate Commission – Just Energy Transition
30 July 2021

Dr Stanley Semelane

CSIR
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Four drivers require a global energy transition: Natural resources are finite, CO_2 emissions need to be capped and energy poverty has to be resolved

Needs to be considered in our local context and the National Development Plan

75 YEAR ANNIVERSARY

Resources are finite

Coal

(140 to 300 yrs)

Gas

(60-100 yrs)

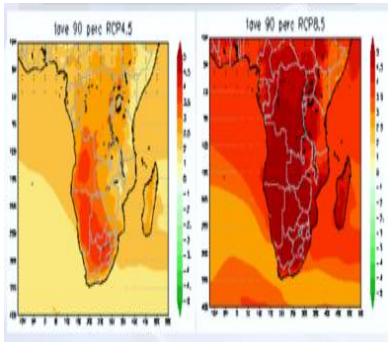
Oil

(40 – 60 yrs)

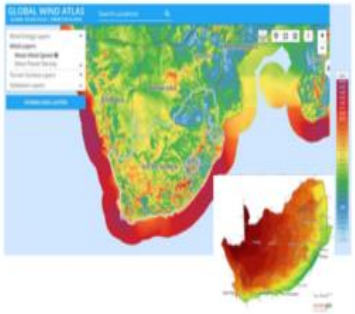
Reserves

Resources

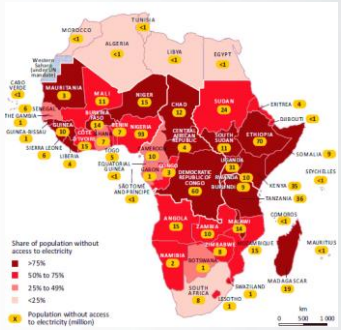
CO_2 emissions reduction



Wind and solar resource



Energy poverty



300 yrs

Price pressure — **Today** — **Regulatory/policy pressure**

NDP Vision 2030

- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change
- Social Equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households
- Reliable and efficient energy service at competitive rates, while supporting economic growth through job creation

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Sources: WEC; BCG; CSIR analysis, National Development Plan

A just energy transition is critically important

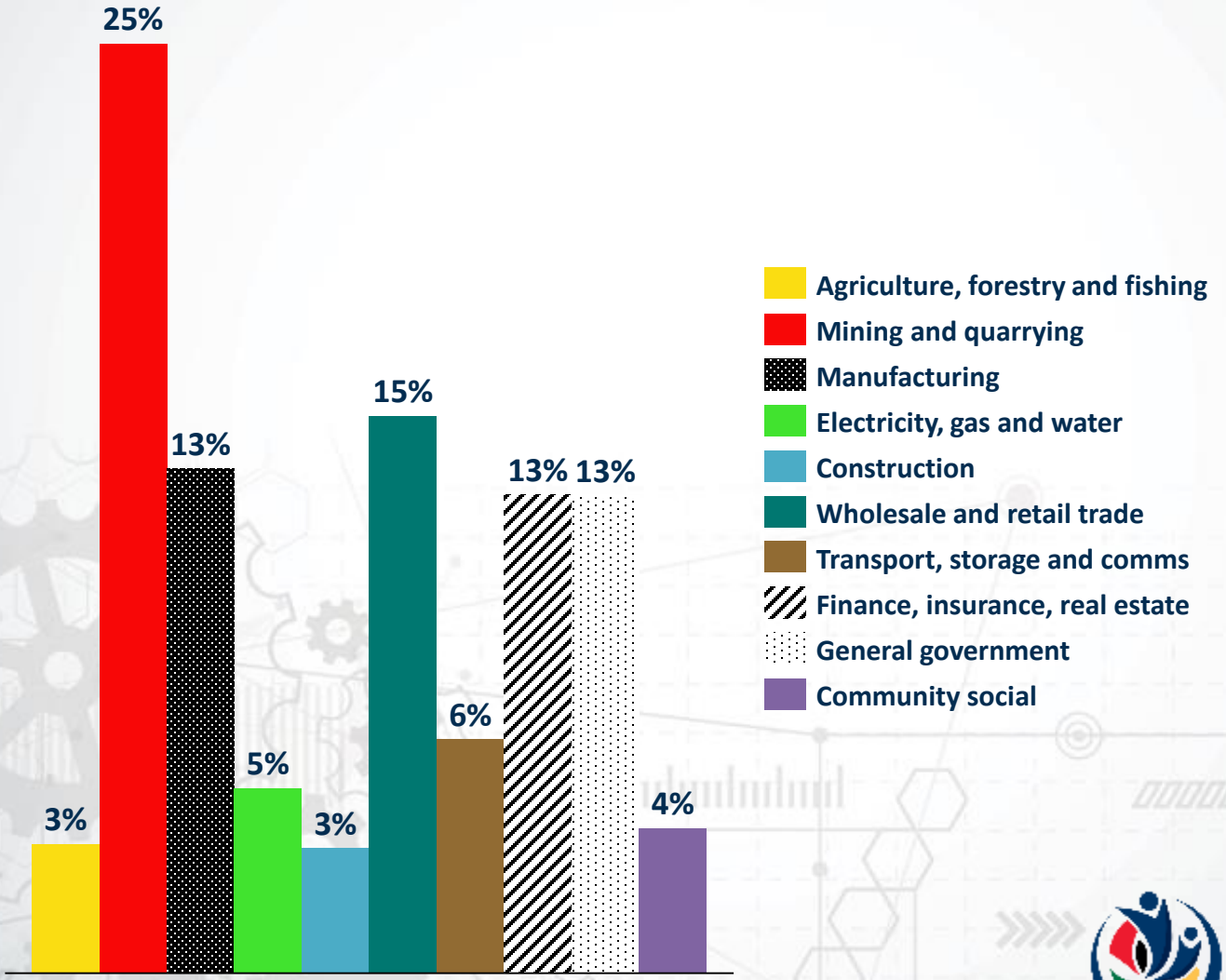
Key considerations for South Africa

- The coal sector is the largest mining contributor to gross domestic product (GDP) and the third-largest employer when compared with other domestic mining activities (Mining Review Africa, 2018).
- The country's coal sector has about 92 000 direct employees with earnings of approximately R22 billion (Minerals Council South Africa, 2020) and approximately R129 billion (Mining Review Africa, 2018) in sales in 2017 (28% of the country's total mineral sales)
- 170 000 indirect jobs are created by the coal sector (Mining Review Africa, 2018).
- Approximately 120,000 jobs (direct + indirect) are threatened by the South African energy transition (i.e. coal sector phase-out).
- South Africa has an unemployment rate of 32.6% (Stats SA, 2021), therefore, it is important that the South African just energy transition be considered within this context.

Sources: Bloomberg, 2021, MCSA, 2020

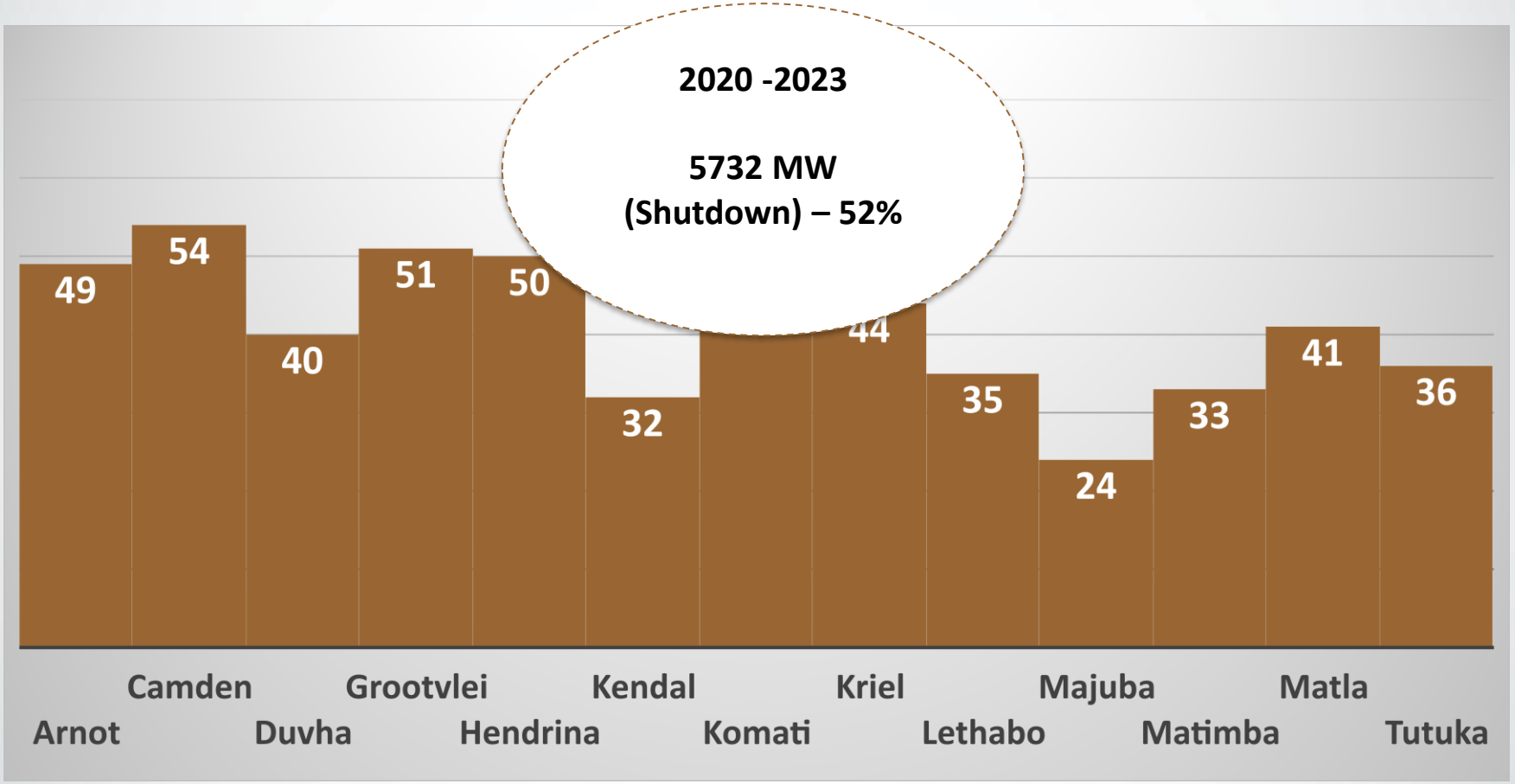
Project background - Mpumalanga will be directly impacted due to the current economic structure

The coal mining sector is a major contributor to the local economy



Sources: Stats SA, Quantec

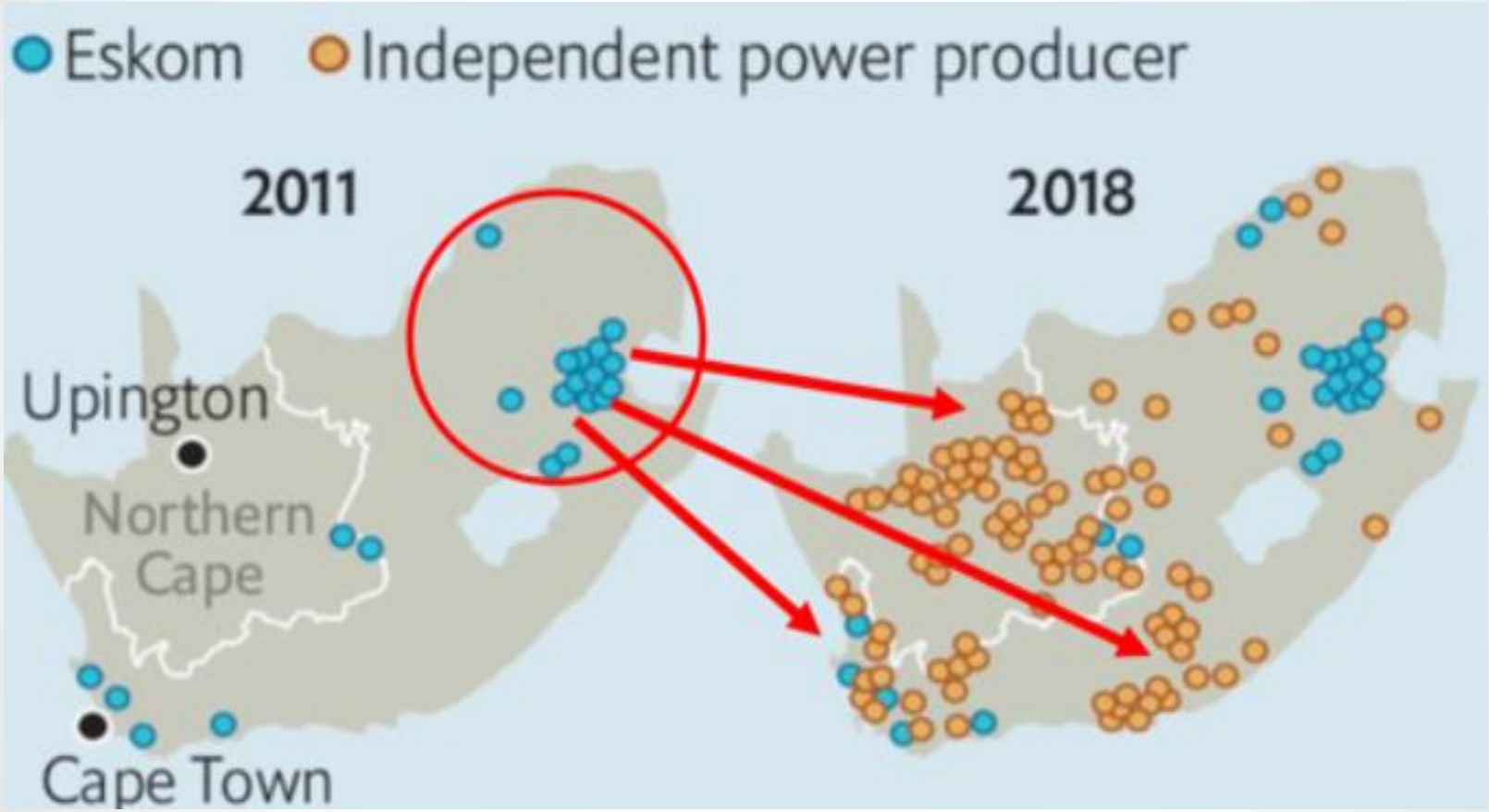
Lifespan of our coal power stations (42.38 years on average)



Sources: IRP 2019 CSIR analysis, IRP, 2019

Realistic opportunities for renewable energy deployment of coal phase-out regions

JET need to support construction and operation of new pant



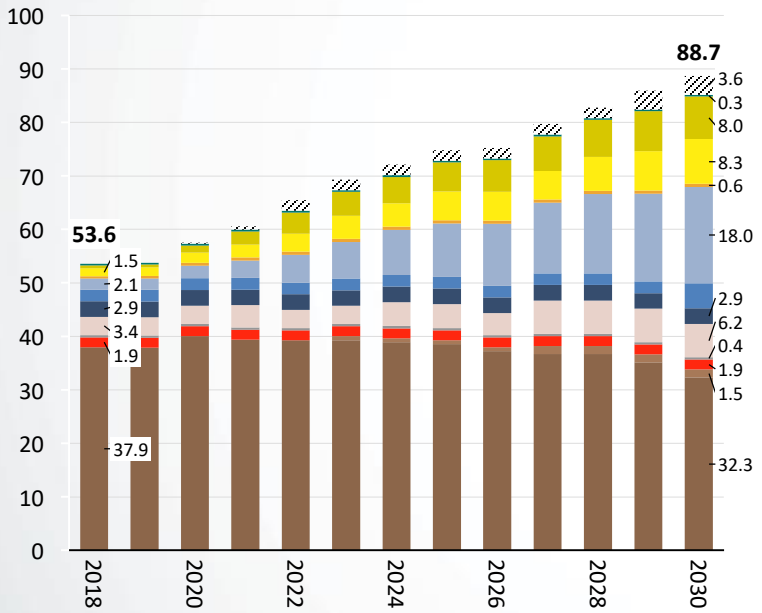
Sources: The Economist, 2019

Existing policy indicates an increasingly diversified energy mix away from coal predominantly towards solar PV, wind and flexibility

IRP 2019 (DMRE)

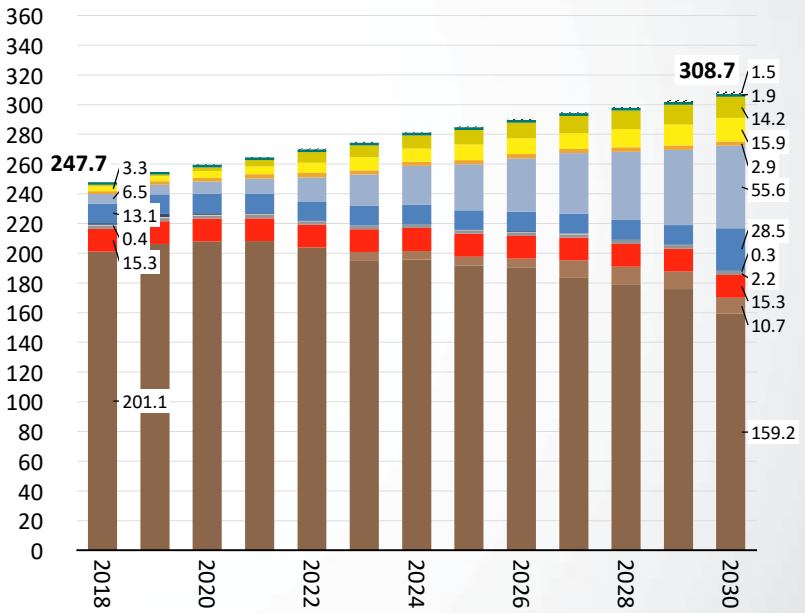
Installed capacity

Total installed capacity (net) [GW]



Energy mix

Electricity production [TWh/yr]



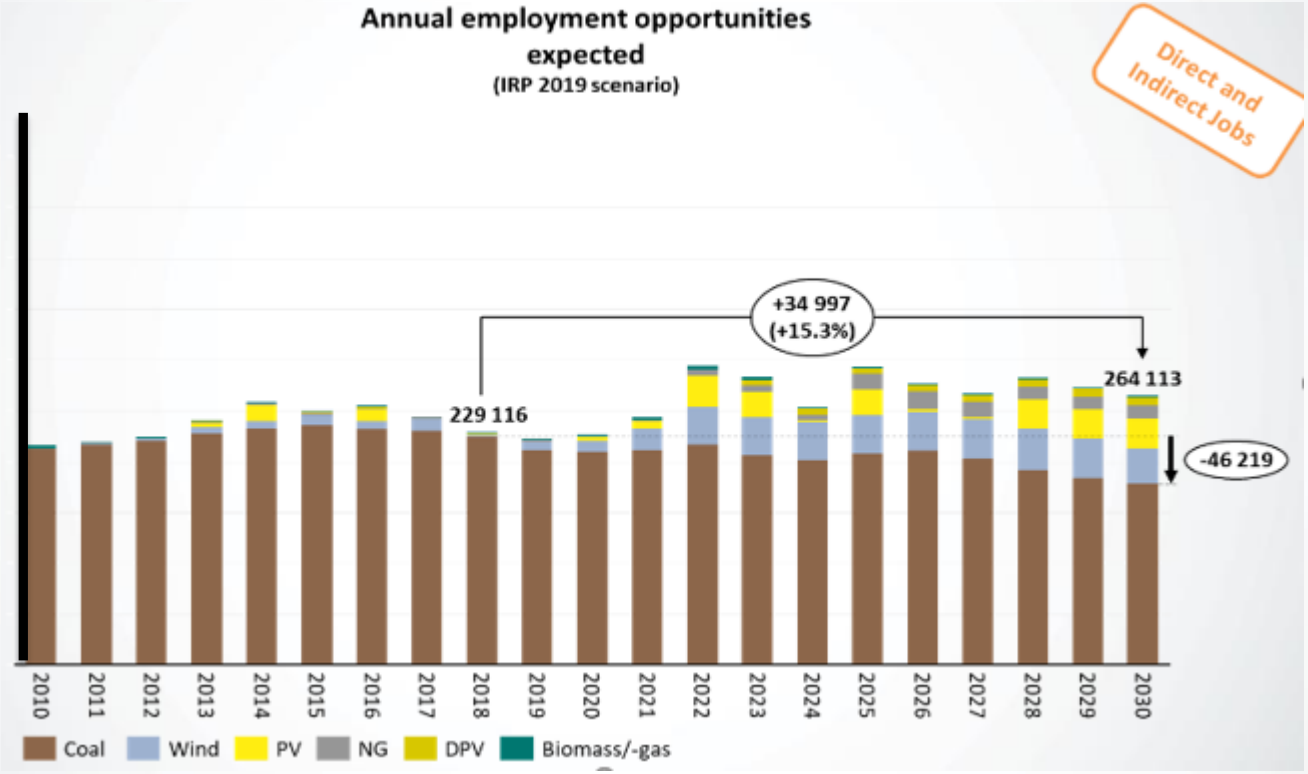
Other Storage | DG | CSP | Hydro | Peaking | Nuclear (new) | Coal (New)
Biomass/-gas | Solar PV | Wind | PS | Gas | Nuclear | Coal

First new-builds:

Wind (2022)	*1.6 GW*
PV (2022)	*1.0 GW*
Storage (2022)	*0.5 GW*
Coal (2023)	*0.75 GW*
Gas (2024)	*1.0 GW*

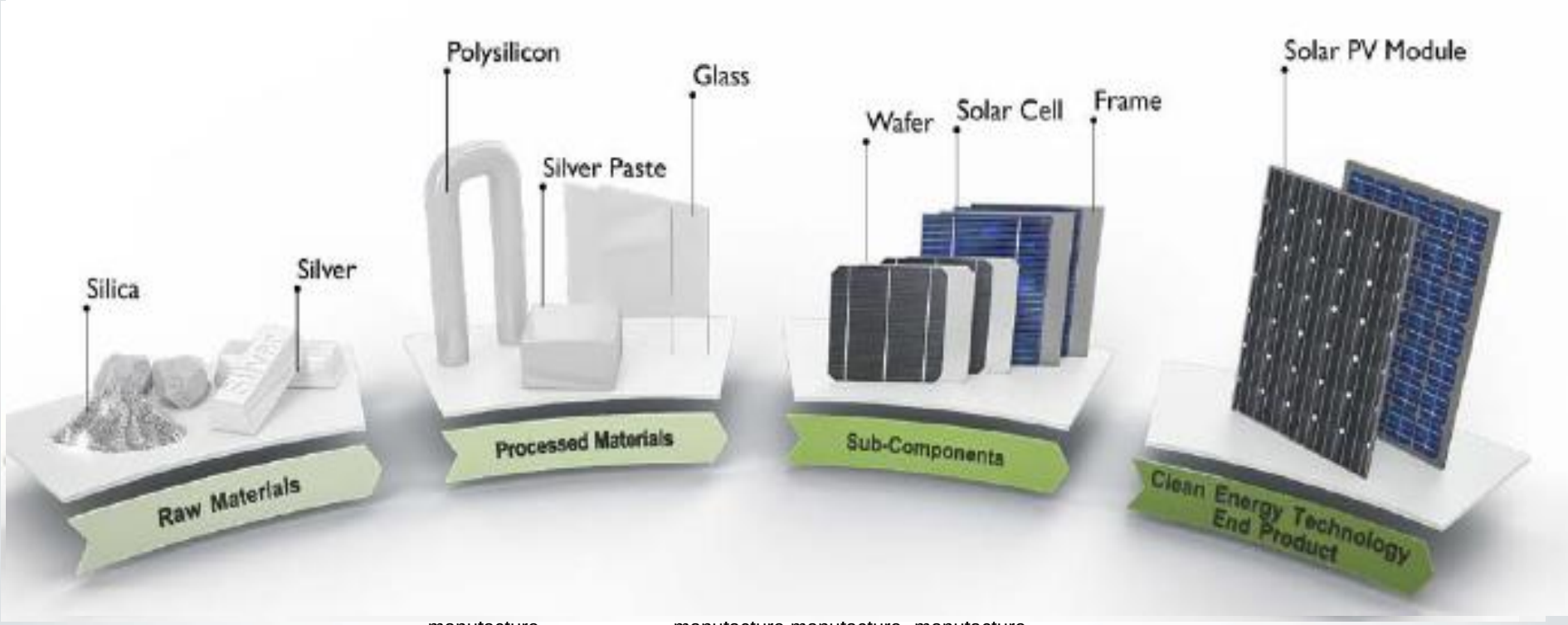
DG = Distributed Generation; PS = Pumped Storage
NOTE: Energy share is a best estimate based on available data)
Sources: IRP 2019. CSIR Energy Centre analysis

Despite the challenges, an appropriately planned just transition will likely increase net jobs in South Africa



Sources: CSIR Analysis

Possible solution: The localisation of renewable energy technologies and value chains - an important part of a just transition



manufacture manufacture manufacture manufacture

Manufacturing capabilities

Sources: NREL, 2018, United Nations, 2017

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How does the South African decarbonisation agenda address the energy challenges

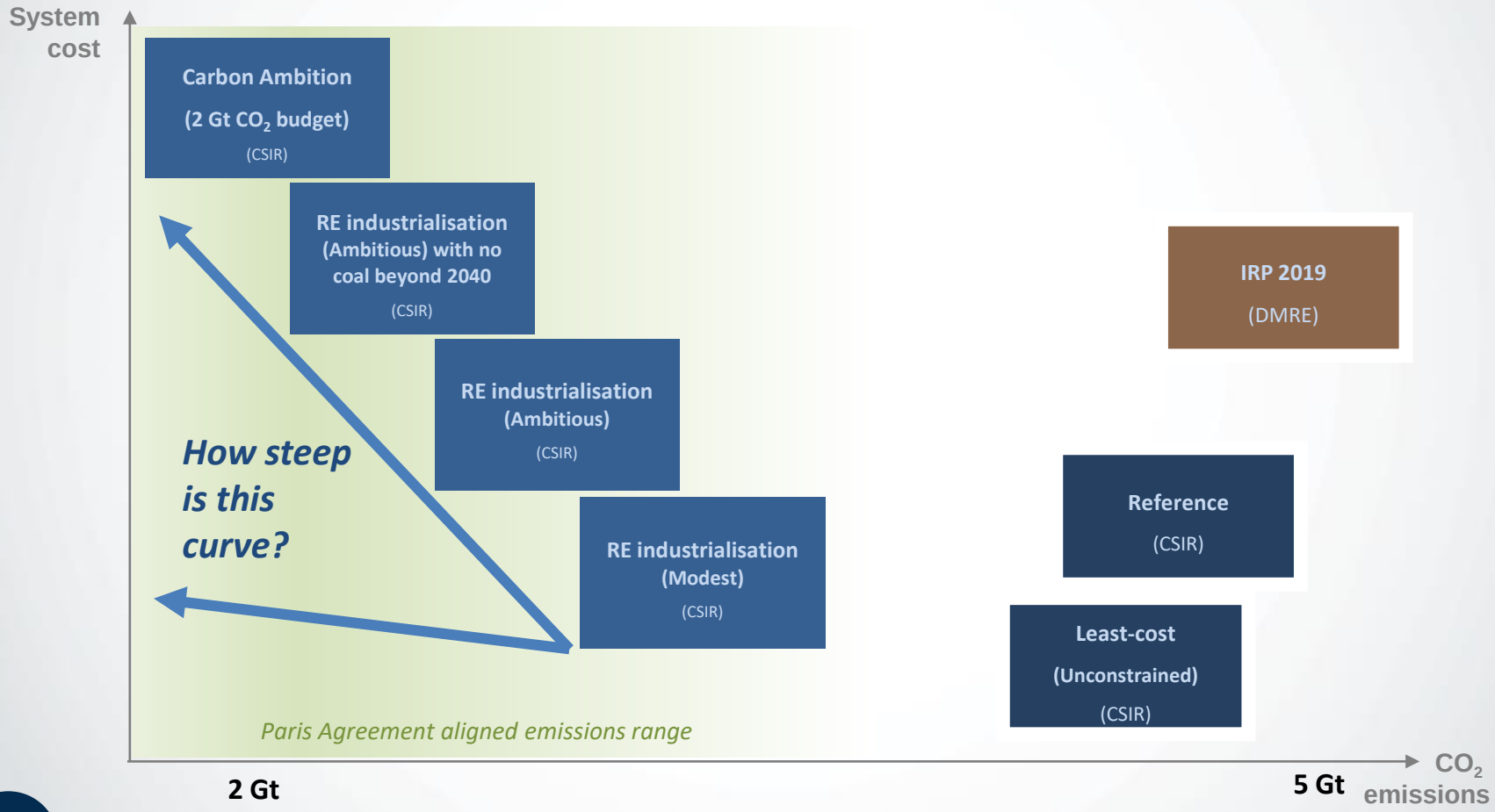
The Energy Challenges

- Demand exceeds supply
- Eskom Energy Availability Factor below <70%
- Maintenance backlog , several plants due for decommissioning
- **LOAD SHEDDING**

Government Commitments to Resolve Energy Challenges

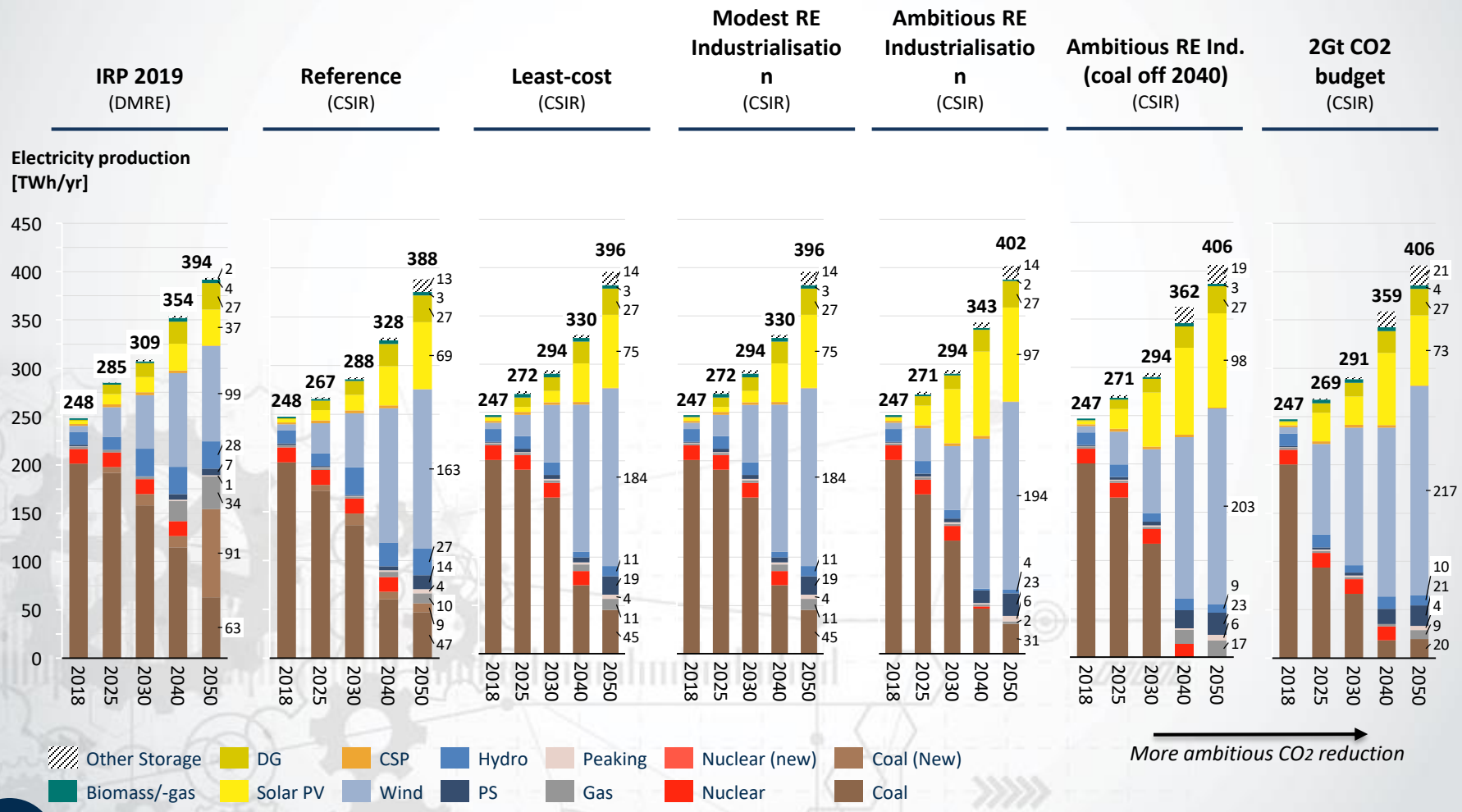
- Issuing of Section 34 Determination to enable procurement of new generation capacity
- procurement of emergency power from projects that can deliver electricity into the grid within three to 12 months from approval
- Fast-tracking of Small Scale Embedded Generation applications by the Regulator
- Opening of bid window 5 of the renewable energy Independent Power Producers (IPPs) Procurement Programme
- We will negotiate supplementary power purchase agreements to acquire additional capacity from existing wind and solar plants
- Put in place measures to enable municipalities in good financial standing to procure their own power from IPPs
- Fast-tracking of l applications by commercial and industrial users to produce electricity for own use above 1MW
- accelerating the completion of bid window 4 RE projects
- 100 MW License exemption

Case study example – A long-term view, how expensive would it be to decarbonise beyond least-cost?



Notes: All scenarios include immediate customer response at scale (mostly embedded/distributed solar PV, storage) and other short-term risk mitigation capacity to ensure adequacy gap is met (portfolio of technologies/options). RE – Renewable CSIR Energy Centre analysis; Meridian Economics energy; IRP – Integrated Resource Plan. Graph not to scale, illustration purposes only.
Sources: CSIR Energy Centre analysis; Meridian Economics

Case study – What would an accelerated renewables roll-out mean for CO2 emissions and cost?



DG = Distributed Generation; PS = Pumped Storage
Sources: CSIR Energy Centre analysis

A just transition will have substantive positive impact if it is implemented in an inclusive manner

Deliberate choices will enable South Africa to transition and support the NDP objectives

Impact	Social	Economic	Enviro
Net **increase in jobs**	✓	✓	✓
Reduced emissions and water consumption	✓		
Creation of new industries (Gas, Renewables, Electric Vehicles, Batteries)	✓		
Lowest cost energy – longer term strategic advantage	✓	✓	
Should contributes to an inclusive just energy transition	✓	✓	
Increased energy security	✓	✓	
Support universal access to energy	✓		
Flexibility to respond to changing economic growth and energy demand		✓	

Source: Just energy transition CSIR analysis,

Key enablers

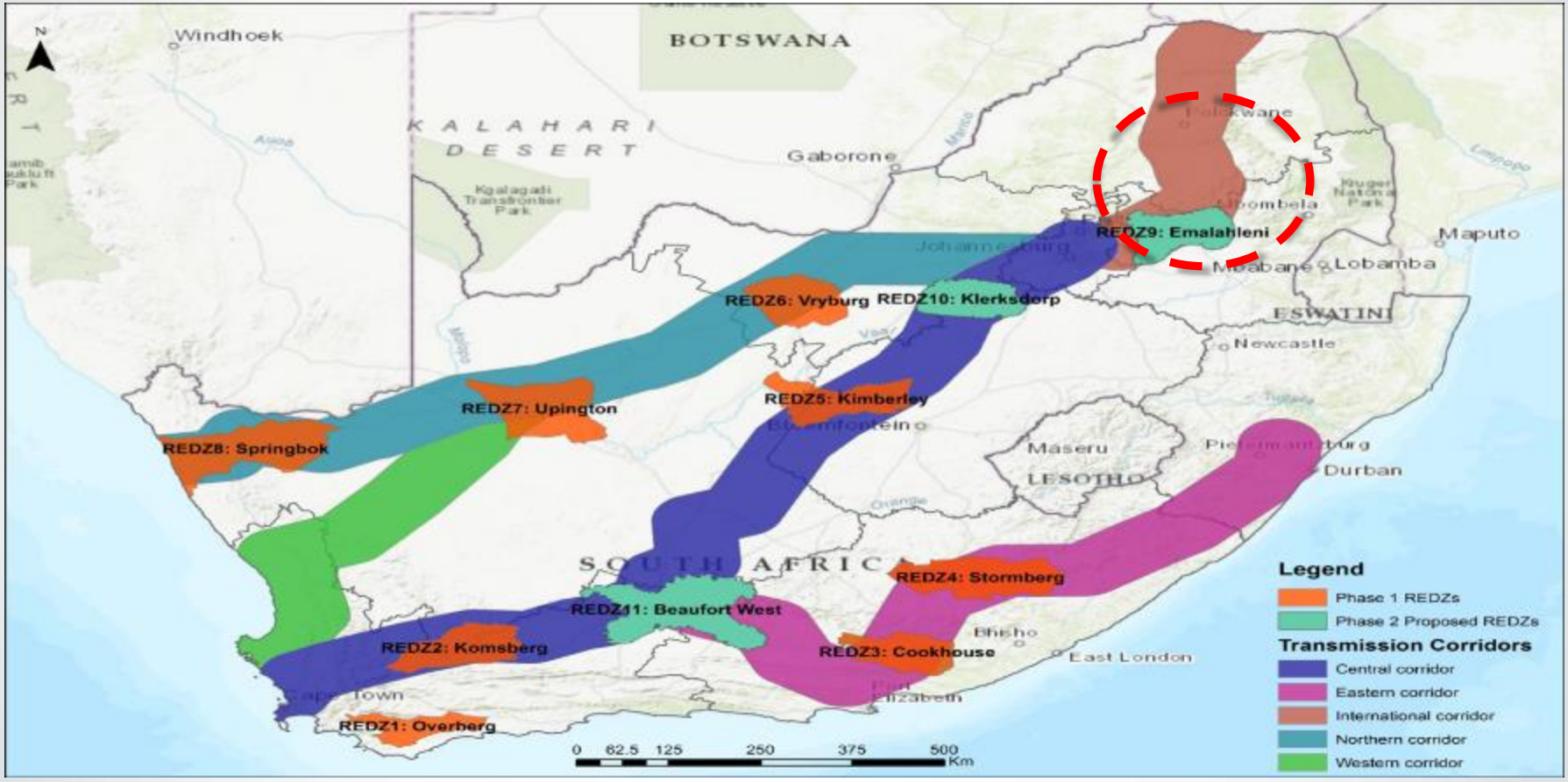
What needs to be done to achieve a just energy transition?

- Mapping the just energy transition planning framework for South Africa's power sector
- Establish partnerships and social dialogue between government, local municipalities, enterprises and labour unions to guarantee a just energy transition
- Social protection that will secure salaries, pension rights, healthcare benefits, cash transfers for early retirement packages for coal sector employees
- Investment in infrastructure, skills and reskilling for the affected workforce as well as the formation of alternative industries that will mitigate the impacts of coal phase-out
- Localise renewable energy technologies and implement procurement models that drive and support local ownership and manufacturing
- Understand the trade-offs of the energy transition as well as the implication of coal consumption and production change on the GDP
- Deploy evidence-based decision support using techno-economic techniques and credible data with organisations with no vested interested in the outcome

Source: Just energy transition CSIR analysis,

Questions and discussions

Back-up: Renewable Energy Development Zones (REDZ)



Source: CSIR, 2018

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