



PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Just Energy Transition Report to Commissioners on Power Recommendations Report

Quarterly Commissioners Meeting
2nd December 2022

CONTENTS

1

Progress Made

What have we done so far to support our current understanding

2

Short-Term Planning

What are the implications of our learnings for short-term planning

3

Long-Term Planning

How do carbon constraints impact long-term planning and how do we deal with uncertainty

4

Way Forward

What next on consultation and timing





PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Progress Made

Our conclusions are based on engagement and research

4

We have commissioned 4 research papers on the energy regulatory environment, the impact of potential air quality rulings on coal closure, an assessment of the 3 main South African net-zero energy modelling studies, and an investigation of early coal closure options.

7 + 1

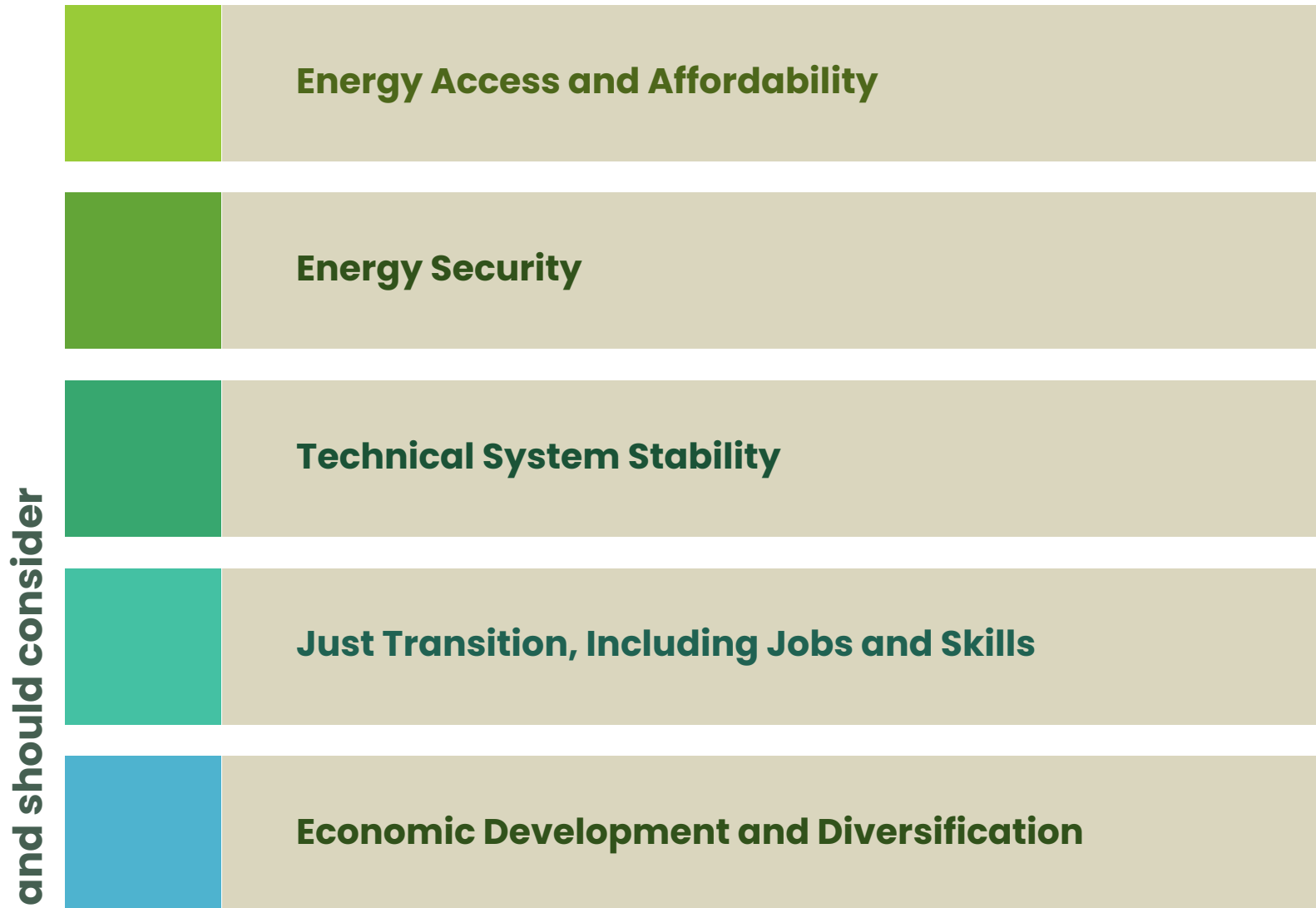
Commissioners hosted 7 public events discussing key elements of power transition with influential speakers drawn from important energy planning and decision-making bodies in South Africa. In addition, we hosted an event at COP27 with key international energy planners (IEA and World Bank) and local experts.

1

Commissioners coalesced the thinking so far in an Extended Net-Zero Working Group, guided by a set of invited energy, finance, governance and Just Transition thinkers.



All stakeholder insist energy planning be rooted in economy level Just Transition



In support of DMRE in updating the IRP, initial recommendations will focus on power, with energy later

Short-Term Power Planning



Solve for the urgent need for power

Considering realistic assumptions and the constraints that current infrastructure, finance and governance arrangements place on the system, what is immediately asked of us.



Detail the investment of the JET IP

How can the detailing and implementation of this short-term plan align with the investment plan released prior to COP27; and how can we enhance stakeholder engagement on both

Long-Term Power Planning



Align with our net-zero mandate

Green marketing is a practice whereby companies seek to go above and beyond traditional.



Consider the high degree of uncertainty

Green marketing is a practice whereby companies seek to go above and beyond traditional.

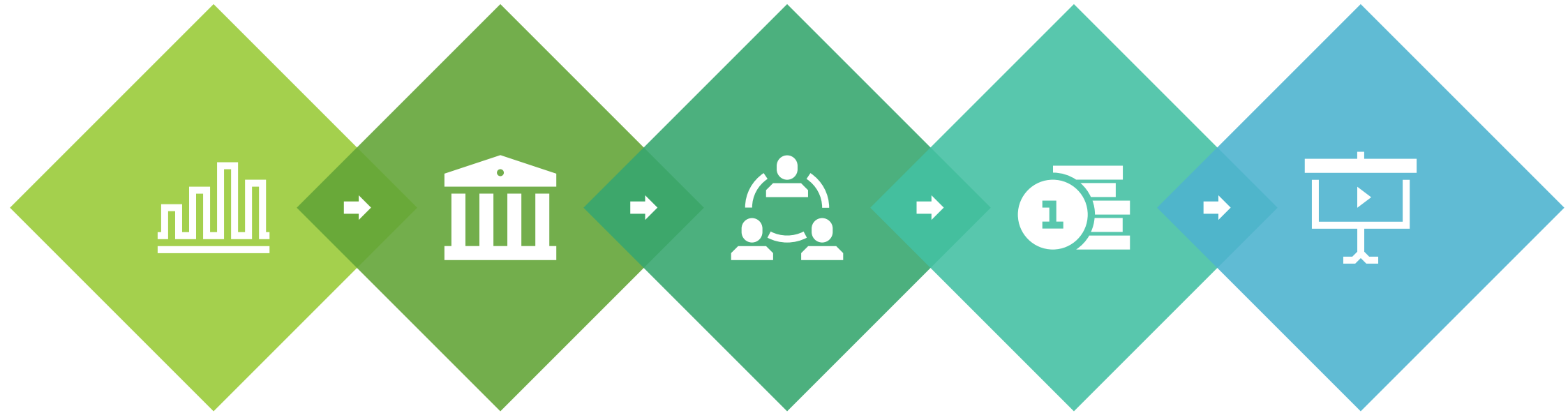




PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Short-Term Planning

Short-term planning is not fraught with technical debate, all options are no regret long-term actions



Realism of Assumptions

Planning must be done acknowledging Eskom EAF cannot be returned to as high as mooted

Constrained Grid

The primary issue is the constrained grid; while we upgrade the grid, which will take time, we need to maximize existing grid capability

Least Cost

Renewable energy is the least cost energy generation option and will not cause unsolved grid stability issues in this time horizon

Build Time

Renewables, storage and gas are the only technologies that can be constructed in short-term time frames

Collective Funding and Tariffs

Eskom and public sector balance sheets, even with the support of the JET-IP, cannot support this expansion. Market structure and private sector involvement are critical; as is a review of tariffs



There are other steps that must complement energy infrastructure planning



Energy Efficiency



Demand Side Management



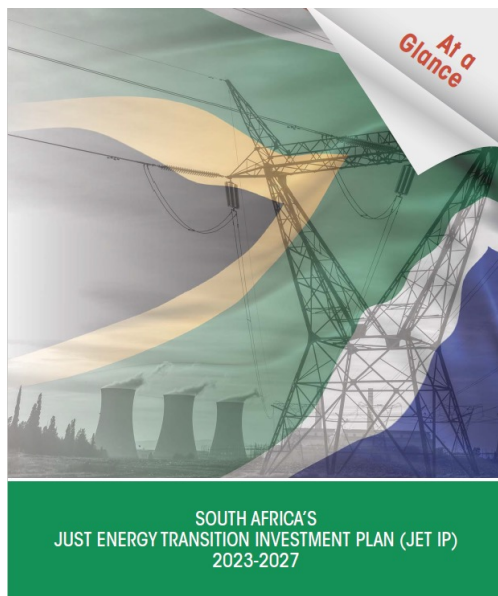
Physical Security



Just Transition and Capacity Building



The JET-IP is aligned with the full suite of intentions but needs more detail



THE PRESIDENCY
REPUBLIC OF SOUTH AFRICA

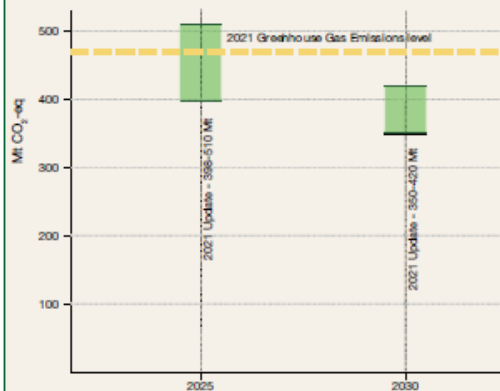


NDP

Building a pathway towards a low carbon and climate resilient society

To decarbonise the economy to within the target range by 2030

350-420 Mt CO₂ eq



requires initial funding of

~ ZAR 1.5 trillion
over five years 2023-2027

from multiple sources

- Developed countries
- Private sector investors
- Development Finance Institutions
- Government
- Philanthropies
- Multilateral Development Banks

in three priority sectors



Electricity



New Energy Vehicles



Green Hydrogen

and two cross-cutting areas



Skills development



Municipalities

through a Just Energy Transition that



Protects vulnerable workers and communities



Builds energy security



Expands energy access



Promotes industrial development



Drives innovation



Develops sustainable livelihoods



Enables economic diversification



Spurs inclusive economic growth

in alignment with South Africa's



National Development Plan



Just Transition Framework

There is an opportunity to further develop the JET-IP into a short-term (2027) spatial plan



This could drive investment in specific locations that maximises grid capacity. Co-location of renewable generation and storage can help manage congestion on the grid. This can be complemented by demand side efforts, including battery storage at city scale.

National electricity sector's infrastructure investment needs	ZAR billion
Coal plant decommissioning	4.1
Transmission	131.8
Distribution	13.8
New solar photovoltaic (PV)	233.2
New wind	241.7
New batteries	23.1
TOTAL	647.7

Electricity sector's just transition investment needs	ZAR billion
Manufacturing and localising the clean energy value chain	1.60
Piloting social ownership models	1.65
TOTAL	3.25

Source: JET-IP, 2022

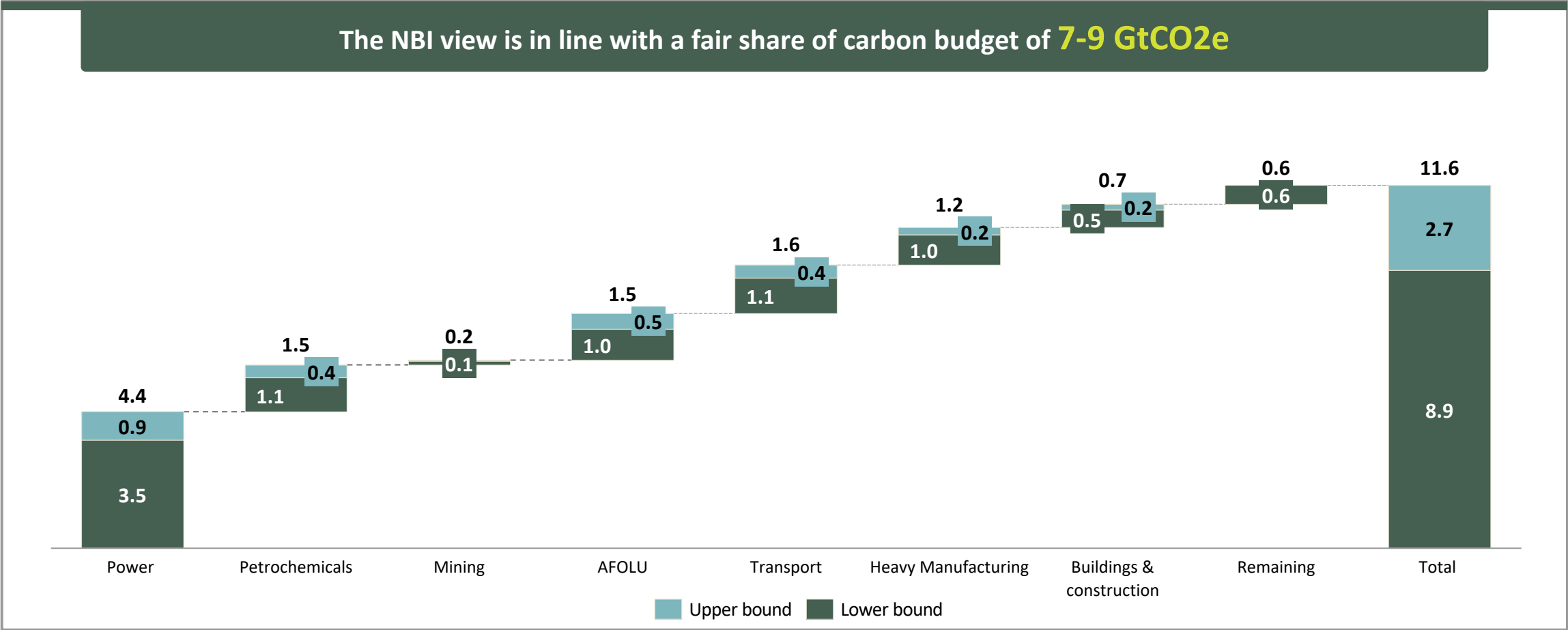




PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Long-Term Planning

Long-term planning outputs is dependent on how you view a carbon budget



UCT model a range of scenarios
CSIR-Meridian go as low as 2.5 Gt



There are several local and international long-term model runs dealing with carbon constraints

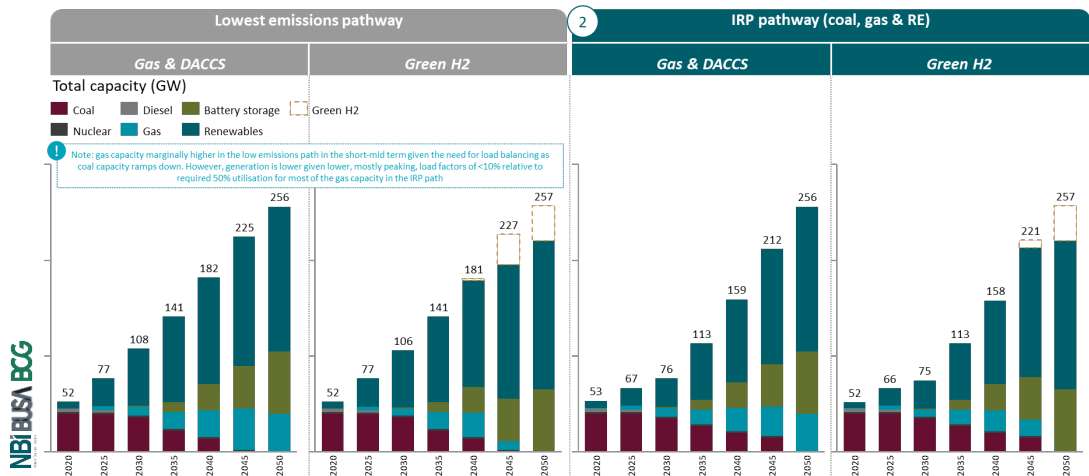
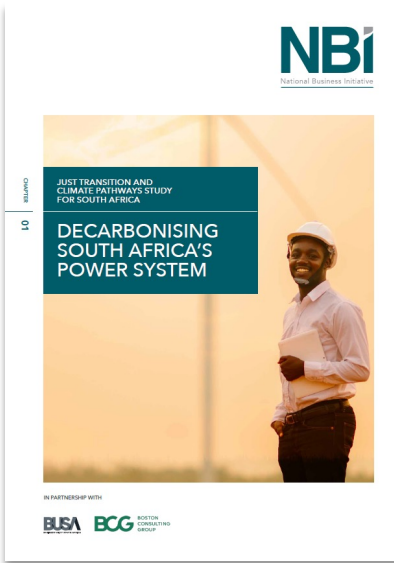
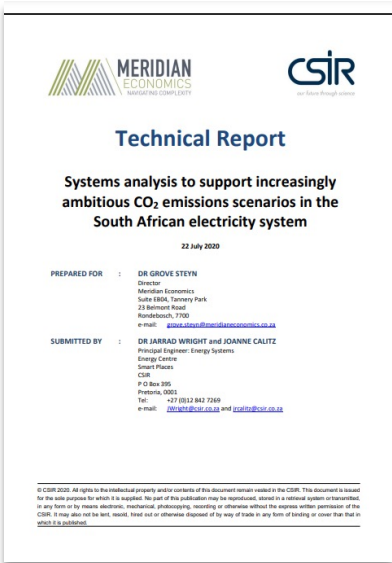
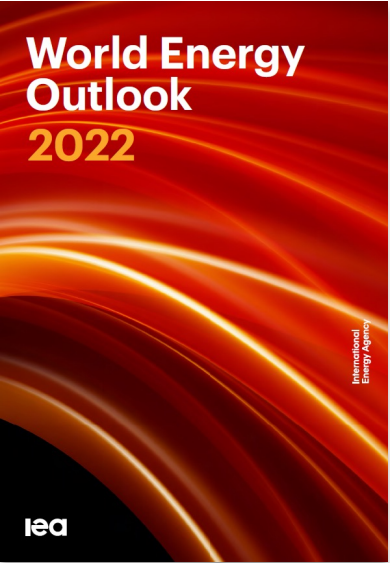
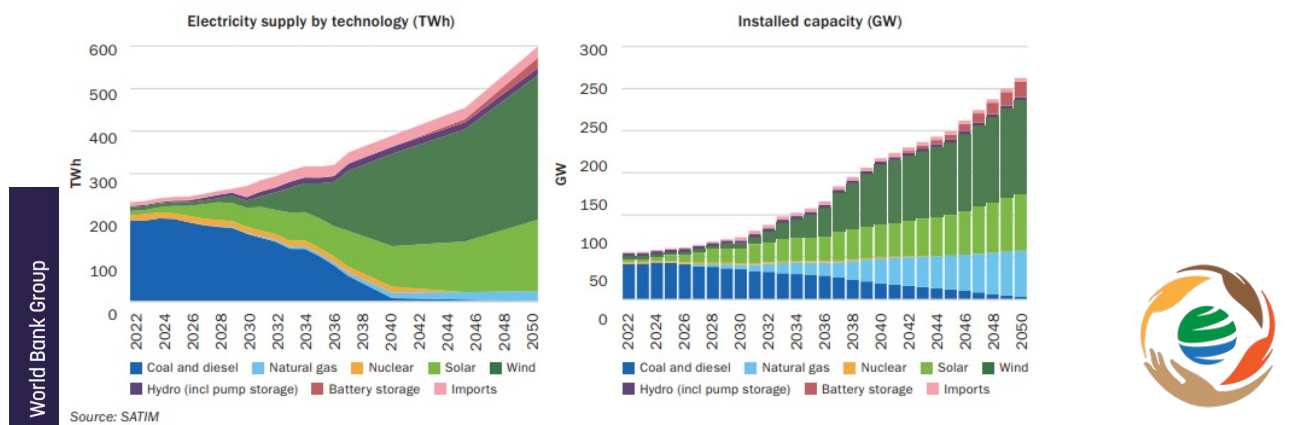
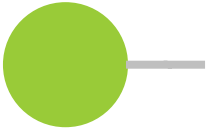


Figure 6: Net-zero reference scenario: Power sector generation and installed capacity by technology



The various model runs from different organisations produce the same energy mix; the CO2 budget drives speed of implementation

		SYSTEM-IQ ENERGY CARBON BUDGET ~2.5 GT	NBI ENERGY CARBON BUDGET ~3.5 GT	UCT ENERGY CARBON BUDGET
Renewable Energy Generation		US\$ 40 Bn	US\$ 18.2 billion	US\$ 10.8 billion
Storage (battery and pumped hydro)		US\$ 4 Bn	US\$ 0 billion	US\$ 0 billion
Gas Plants		US\$ 2 Bn	US\$ 4.7 billion	US\$ 4.5 billion
Transmission and Distribution		US\$ 25 Bn	US\$ 9.8 billion	US\$ 7.8 billion



There remain some risks and uncertainties but also some emerging next steps



Emerging Next Steps

- Finalise a short term spatial energy plan, and identify specific projects in specific geographic locations
- Reform governance such that generation companies bid for specific packets
- Invest in the long term grid to enable future connections
- Drive energy efficiency hard
- Collocate batteries with generation to spread out supply and maximize grid utilisation
- Enable corporate level generation
- Aggregate consumer systems in cities to drive additional generation and storage



Risk and Uncertainties

- At what marginal abatement cost is it worth arguing for a higher share of the global emissions budget
- What do we do if things don't go according to plan and how does this change energy decision making:
 - Can't get affordable gas
 - Can't build RE fast enough
 - Add note from Thabang



A technology and risk decision tree





PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Way Forward

We will continue engagement ahead of a specific consultation on draft documents

Feb 2023

6

Specific stakeholder engagement sessions sharing initial views and seeking input. Engagement will be with business, government, labour, civil society, the youth, and interfaith-movements. These engagements will complement/combine with engagements on the JET-IP.

Mar 2023

1

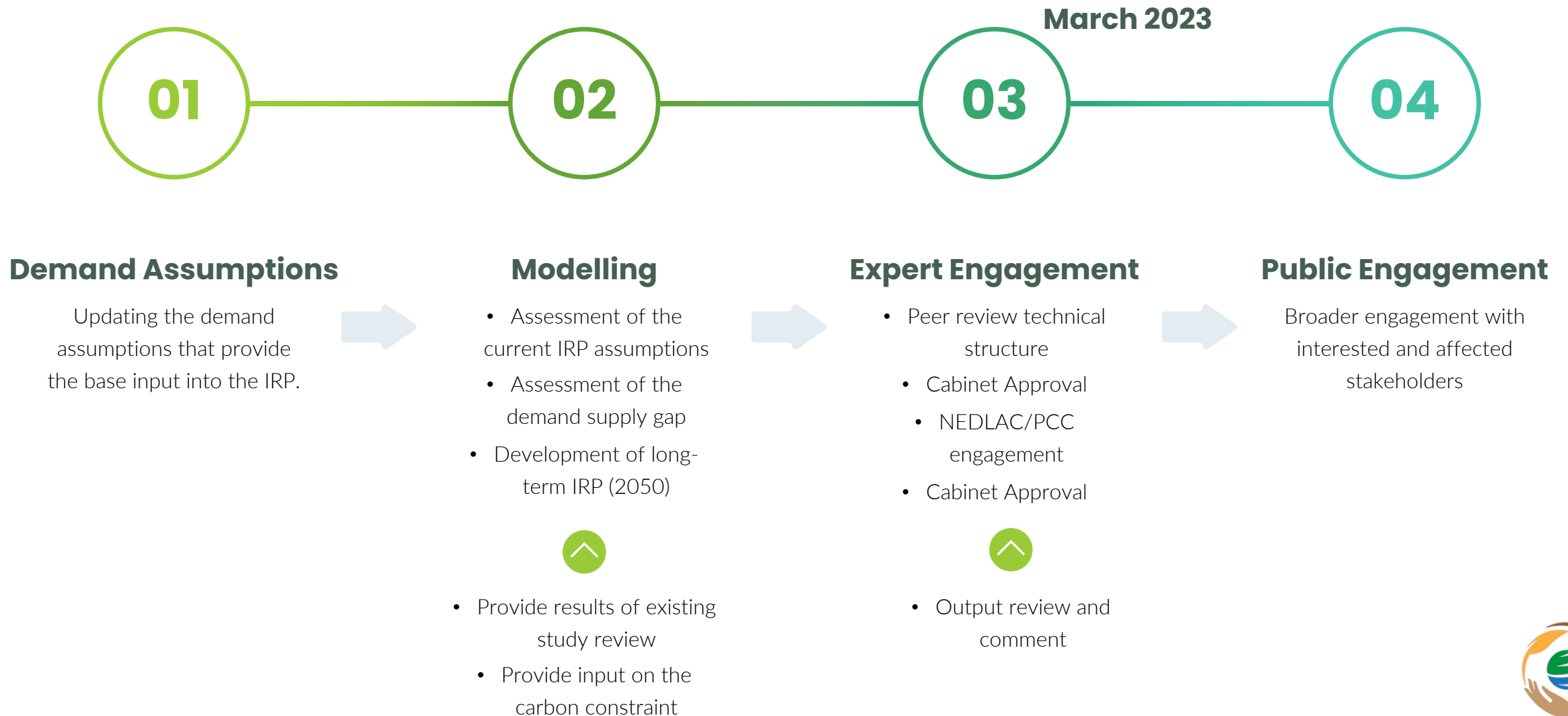
We will host one large public engagement to share findings.

~

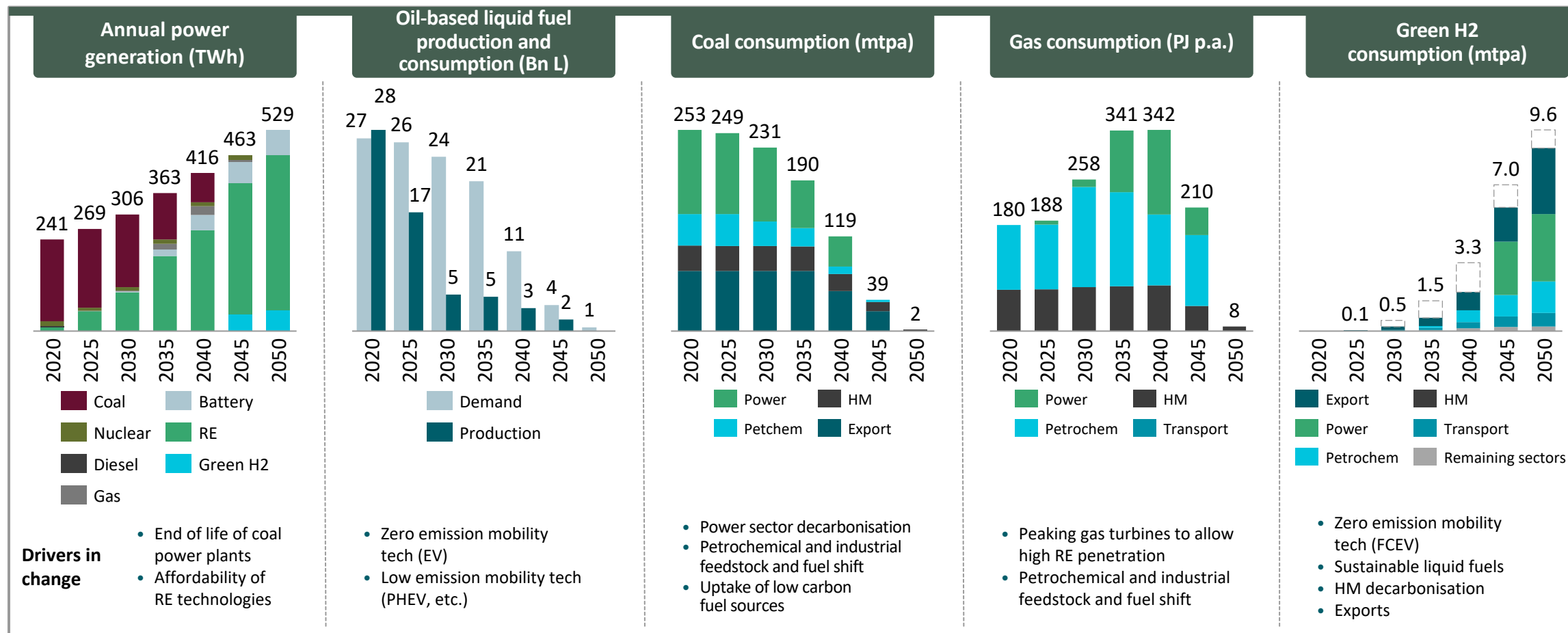
Ongoing engagement with the DMRE as they complete their IRP draft; as well as ongoing engagement with experts.



There are several important touchpoints with our understanding of the DMRE IRP update process



Then on to thinking about energy planning as a whole





PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Thank you and Questions

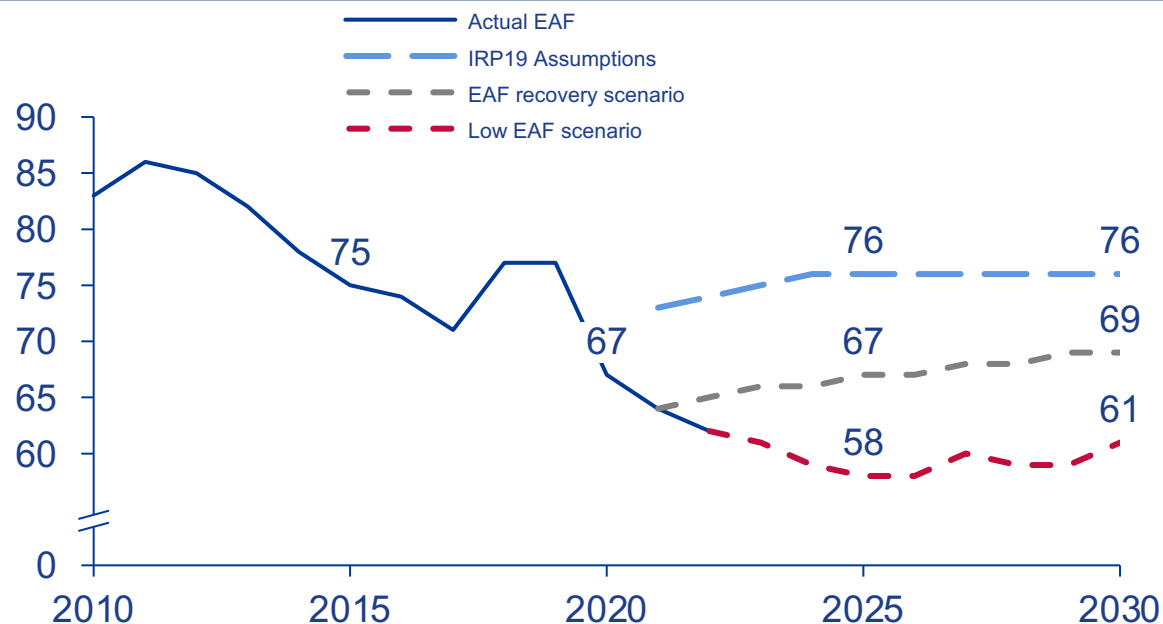


PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Support Slides

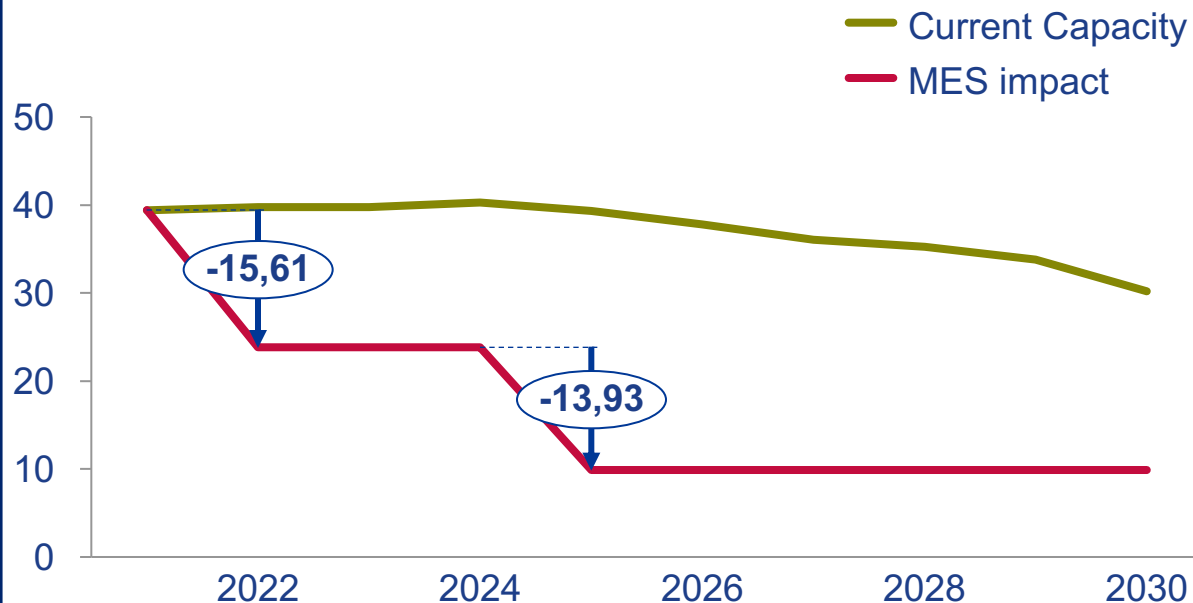
Assumptions that informed the IRP 2019 have changed significantly – immediate no regret actions need to be taken

Declining Eskom Generation EAF trajectory



- IRP 2019 assumes an EAF which is higher than current and projected performance, resulting in **~6 500MW gap**
- Over **50% of the stations older than 40 years** due for decommissioning by and around 2030
- Maintenance **initiatives not yielding expected benefits**, resulting in an additional gap than projected by 2025
- Koeberg's life extension delay risk resulting in **~1 860MW less baseload capacity**

Risk of MES decision on coal capacity¹



- DFFE decision puts **15GW capacity at risk immediately and 30GW by 2025**
- Eskom has appealed the decision allowing it to continue to legally operate
- Emission reduction projects underway, but **further legal indulgence is required to mitigate the impact**
- At least **R 300 bn** is required to achieve full compliance and **will take ~ 10 years to complete**

Grid connection capacity constraints

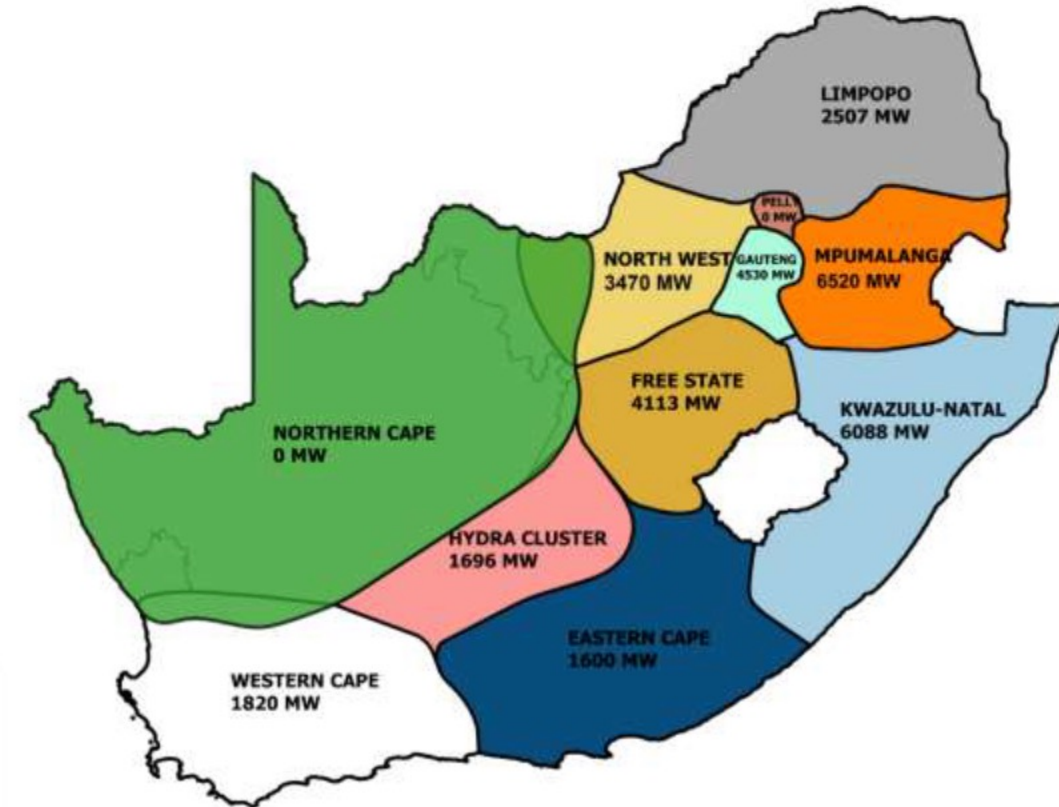
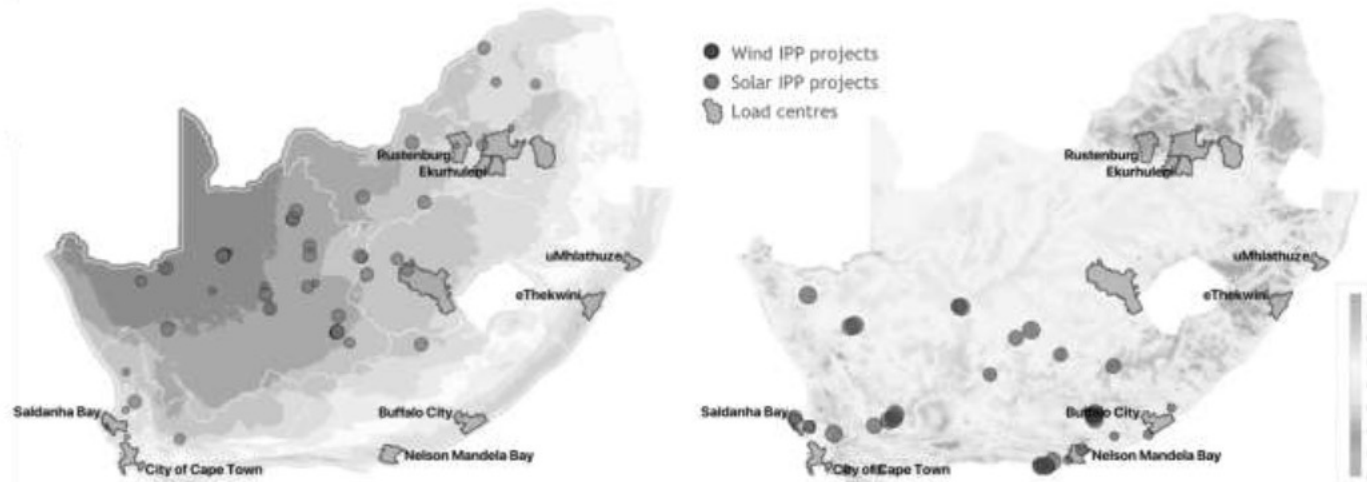
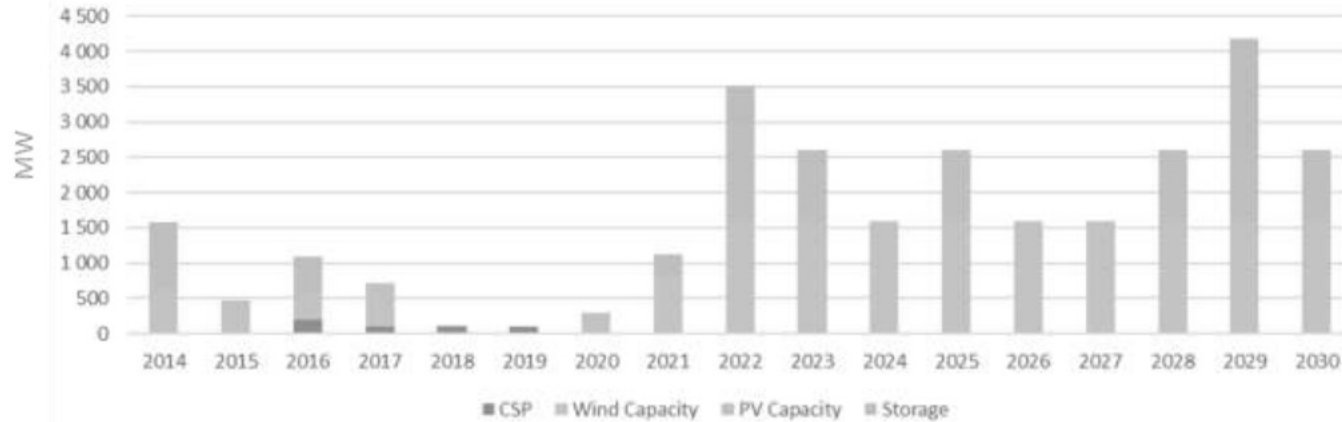
The elephant in the room



Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

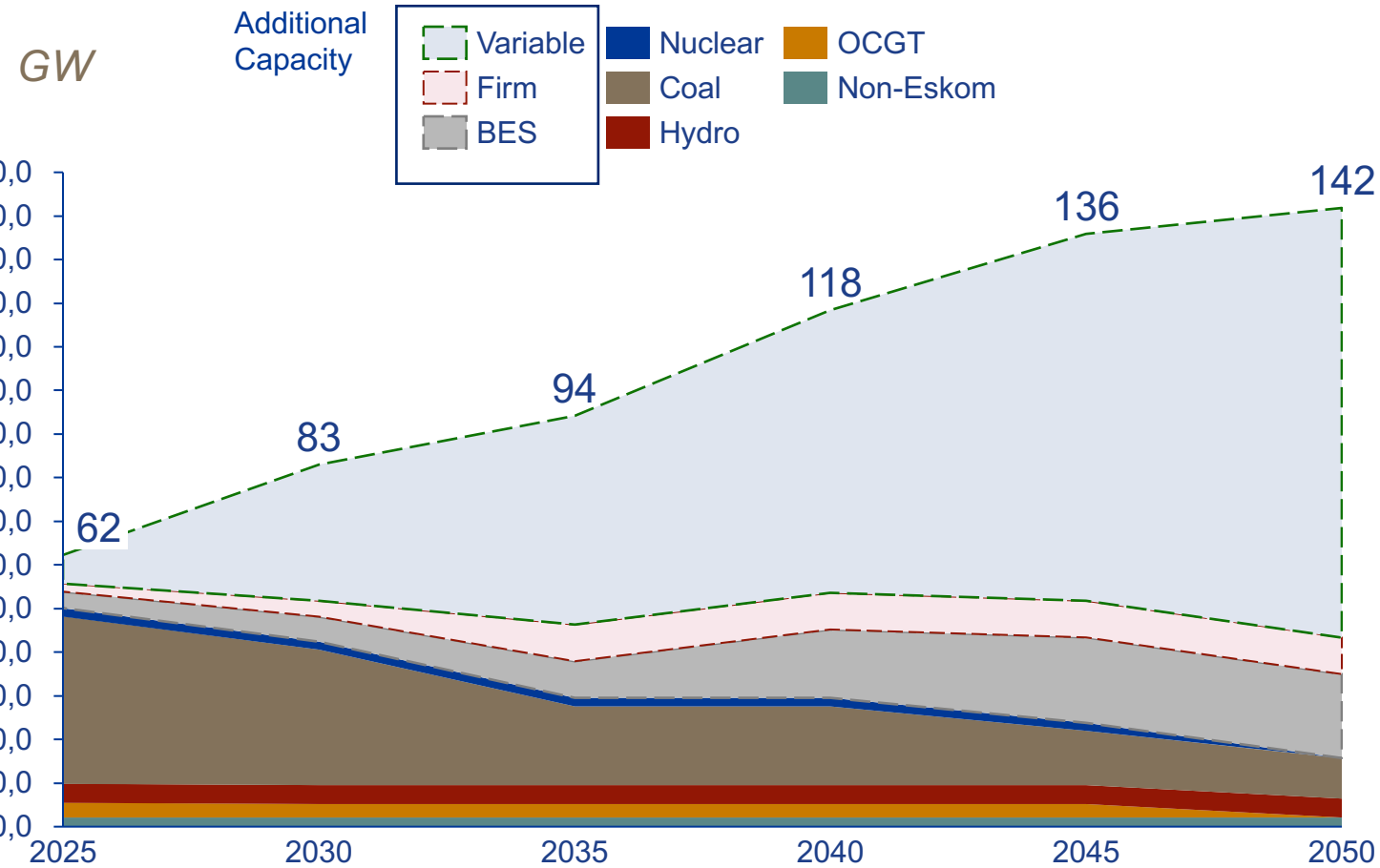
forward together
sonke siya phambili
saam vorentoe

New RE capacity installed and projected (IRP2019)



Investment is required to counter Eskom's existing generation capacity ramping down in 10 – 15 years

Existing plant and new capacity required to 2050



- Existing fleet generation will ramp down from ~50GW to ~15GW by 2050
- By 2030, 50-60 GW renewable capacity will need to be added, even if there is no incremental demand from economic growth
- This requirement doubles (~120GW) by 2030 when a 5% increase in demand growth is assumed

Current capacity crisis will be worsened by the need to comply to DFFE decision on MES compliance

Investing in new clean capacity vs retrofitting old coal fleet is the best economical and environmental decision



Emissions

~50% reduction in CO₂,
66% reduction in SO₂
emissions; 58% for PM



Generation capacity

22 GW of coal gen.
replaced, & >7GW more
from new green energy



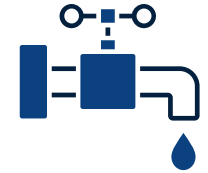
Jobs & the economy

~300 000 net new jobs
(after coal shutdowns);
reduced loadshedding



Transmission & Distribution

~15 500 km of new
transmission &
distribution lines



Water scarcity

40bn litre reduction in
water consumption from
plant refits/shutdowns



JET impact ('35)

MES impact

Will immediately restrict
harmful emissions



Immediate loss of 16 GW
30GW loss by 2025



~100 000 job losses;
significant loadshedding



Added financial pressure
(~R300bn investment)
precludes investment



Requires >16bn more
litres of water per year



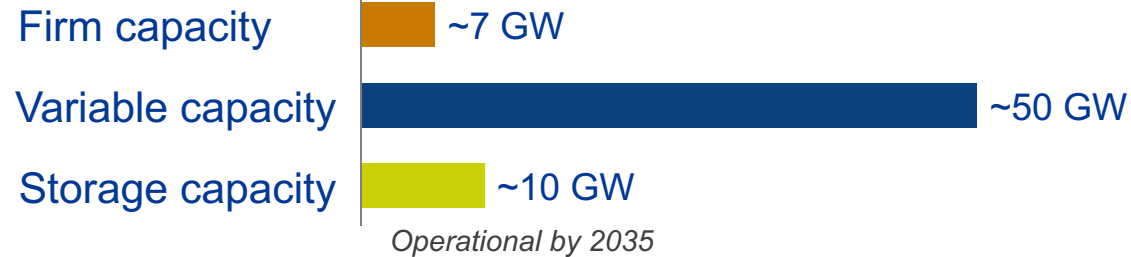
Retrofitting old coal stations will create perverse incentive to extend operations, further slowing down decarbonisation

Capacity required

Required to mitigate energy crisis

Estimated cost

Generation capacity



~R990bn

Transmission capacity

- Expansion and strengthening of transmission network
 - ~8 000 km new line
 - ~101 substations

~R130bn

Distribution capacity

- Strengthening of the distribution network for embedded generation ~7 500 km of line

~R56bn

Low and non carbon generation technologies are not only cheaper, but also faster

Eskom identified a mix of renewables & limited gas as the optimal power source given LCOE & build time

Technology Preference	Technology	Capital cost LCOE ¹	Build time	Build	Own	Operate	Comment / Eskom position
	 PV	975 \$/kW 4,2 U\$ c/kWh	18-24 months	✓	✓	✓	Identified potential sites to retrofit PV capitalising on existing infrastructure & available resources
	 Wind	1 450 \$/kW 5,4 U\$ c/kWh	24-36 months	✓	✓	✓	Leverage sites for, and get environ. auth. for wind to capitalise on existing infrastructure and available resources
	 Gas	1 250 \$/kW 7,3 U\$ c/kWh	24-60 months	✓	✓	✓	Use imported gas as a means to supplement baseload in short to medium term
	 Nuclear	12 500 \$/KW 19,8 U\$ c/kWh	12-15 years	✗	✗	✓	Support Government plans to roll out new nuclear, however, unable to build due to inadequate balance sheet
	 New coal	6 225 \$/kW 15,9 U\$ c/kWh	10-12 years	✗	✗	✗	Own & operate current coal fleet until shutdown, & repower sites with cleaner options. No new Eskom coal projects

1. Capital cost includes EPC cost, capital cost during constriction, LCOE – levelized cost of energy; Source: Lazard 2020 costs