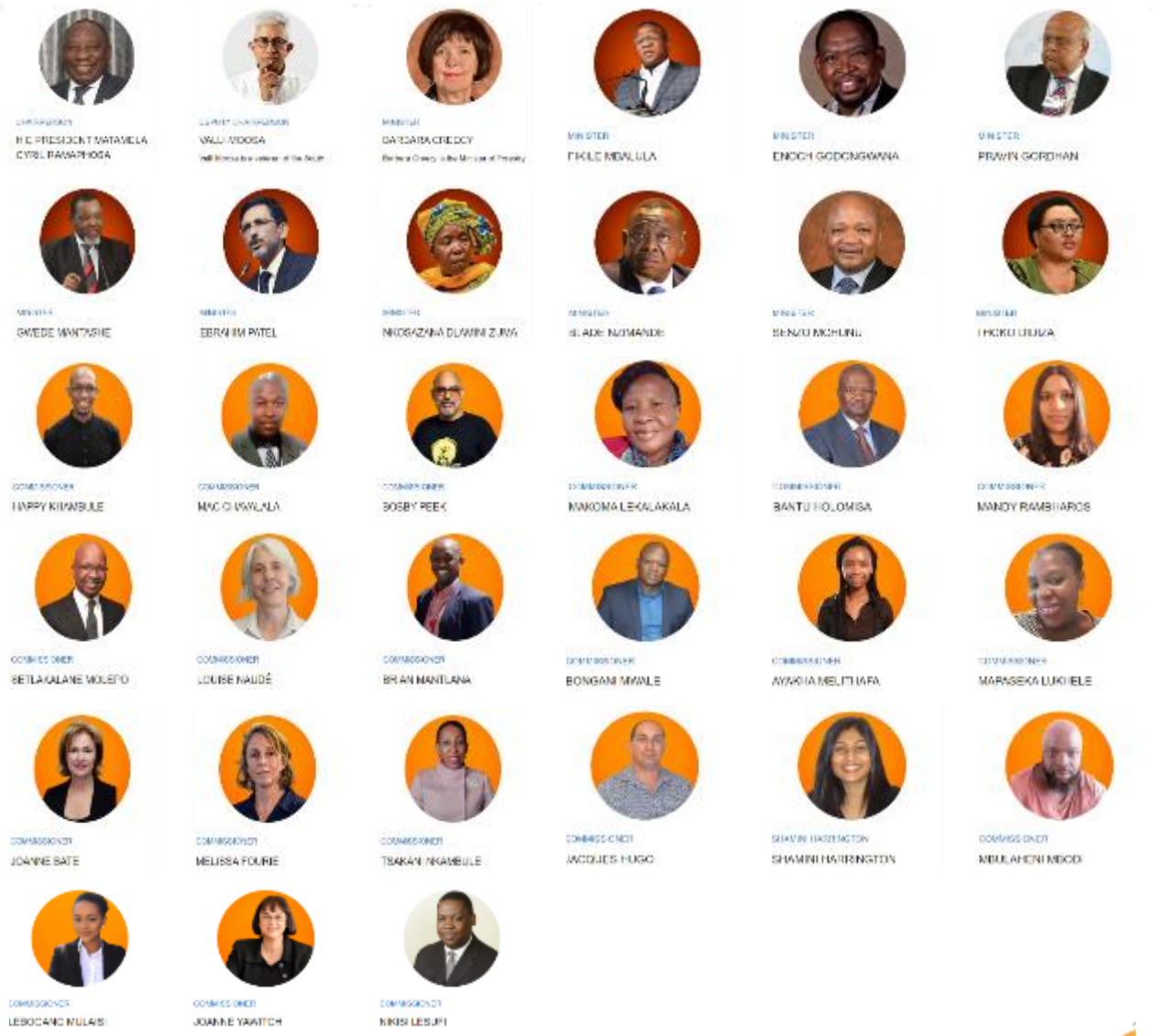
PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

PCC Energy Recommendations

Commissioners agreed in the February 2022 PCC strategy session that the PCC should make recommendations on how to deal with the carbon constraint in energy planning and governance



The PCC agreed they will:

1.

make recommendations on an energy mix and energy governance that enables us to achieve the emissions trajectory set out in our NDC.

2.

base its recommendations on best available science and modelling that factors all aspects of a just energy transition - affordability, security, job creation and decarbonisation.

3.

PCC will do this in a participatory and inclusive way that enables participation by all social partners, and draws conclusions in a transparent and participatory manner.

Our conclusions thus far 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.

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

Feb and Mar 2023

9

Specific stakeholder engagement sessions sharing initial views and seeking input. Engagement will be with business, government, labour, civil society, the youth, and interfaith-movements. We will also engage with specific communities and workers in Mpumalanga, Lephalale and the Northern Cape. 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.

We are thus presenting our learning and our preliminary conclusions to you today. We would love your feedback. We will adjust our presentations and draft reports as we go.

The climate transition represents a developmental opportunity to materially change South Africa's triple challenge of poverty, inequality and unemployment

South Africa 2022

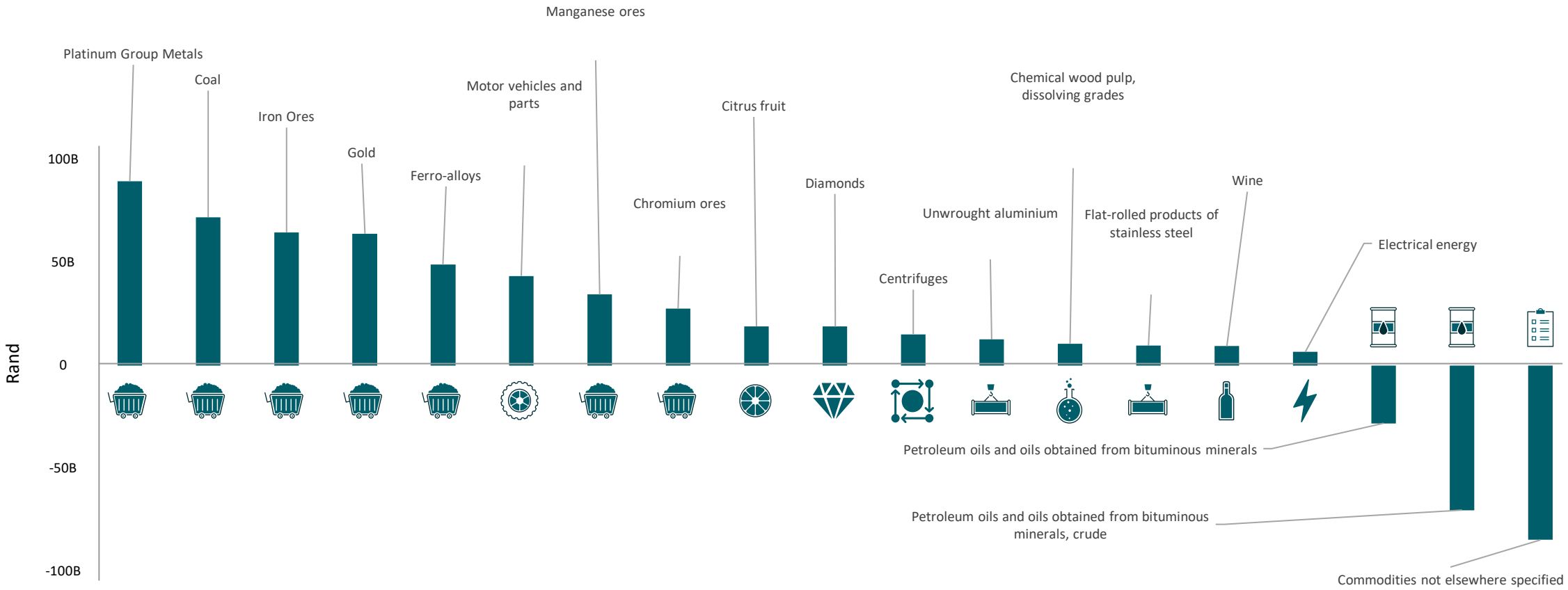
- High vulnerability to climate change
- Low-productivity, carbon-intensive economy
- Weak public sector, poor implementation capacity
- Extreme levels of inequality, unemployment & poverty
- Decreasing per capita income
- Strong social base laid for Just Transition

South Africa 2050

- Economy & society resilient to climate risks
- Net-zero carbon economy
- Growing investment to GDP ratio & competitive economy
- Effective & enabling state
- Dramatically reduced levels of inequality, unemployment & poverty
- Social inclusion and just transition

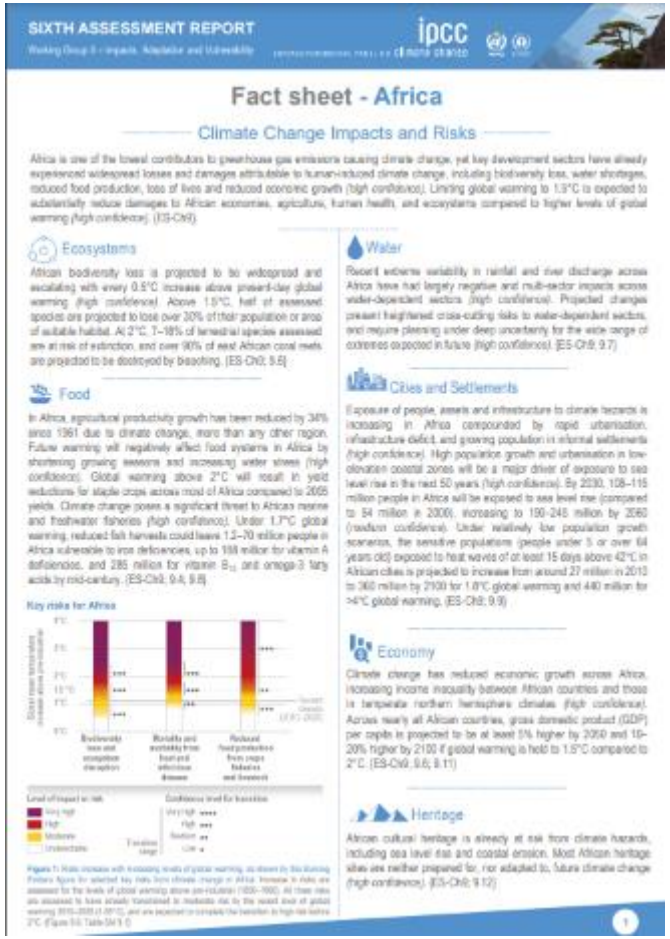
Source: WB SA CCDR 2022

Failure to act on climate change will make our economy less competitive…



Source: https://www.nbi.org.za/climate-pathways-and-a-just-transition-for-south-africa/

as well as exacerbating climate impacts, both trade risk and physical risk impacting the poor more harshly



Impacts

- A 34% reduction in agricultural output due to climate change, more than any other region.
- Reduced income and growth and increased income inequality for African countries compared to their northern hemisphere counterparts.
- Over 3.6 million weather related displacements.
- A -5% impact on GDP per capita for South Africa

Projected Impacts

- A further 25 to 75% reduction on agricultural output, depending on crop and scenario
- A 50% drop in South Africa's GDP by 2100
- With 1.7°C global warming by 2050, 17–40 million people could migrate internally in sub-Saharan Africa, increasing to 56–86 million for 2.5°C

Source: IPCC 6th Assessment Report Working Group II, Chapter 9: Africa

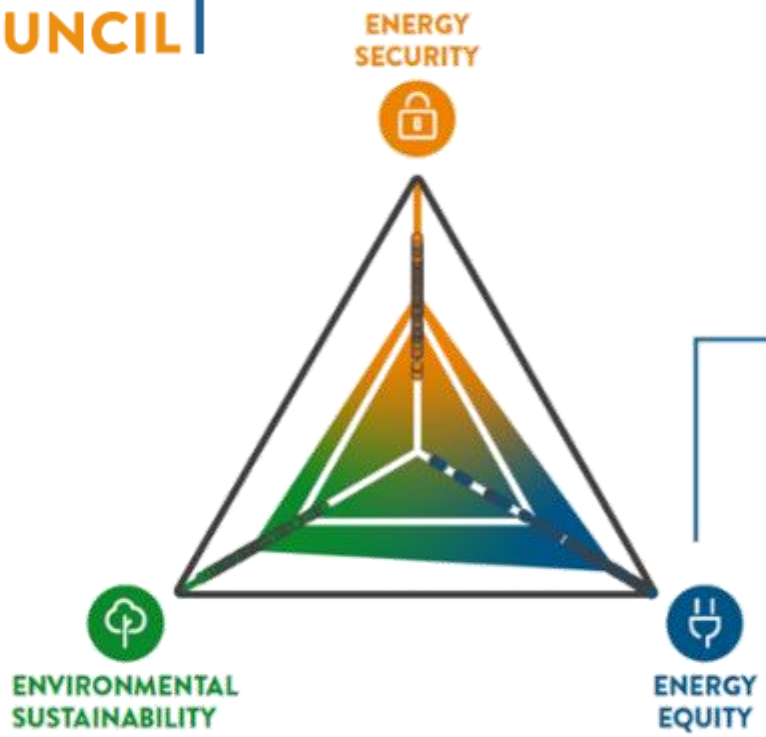
Principles of engagement

1. **Short term solutions cannot compromise long term climate outcomes**

2. **To deviate from climate optimized plans would therefore require significant, data-driven justification**

Selection of energy systems must consider energy security, equity and sustainability; as well as just transition elements

WORLD ENERGY COUNCIL



Reflects a nation's capacity to meet current and future energy demand reliably, withstand and bounce back swiftly from system shocks with minimal disruption to supplies.

Reliability and stability

Assesses a country's ability to provide universal access to affordable, fairly priced and abundant energy for domestic and commercial use.

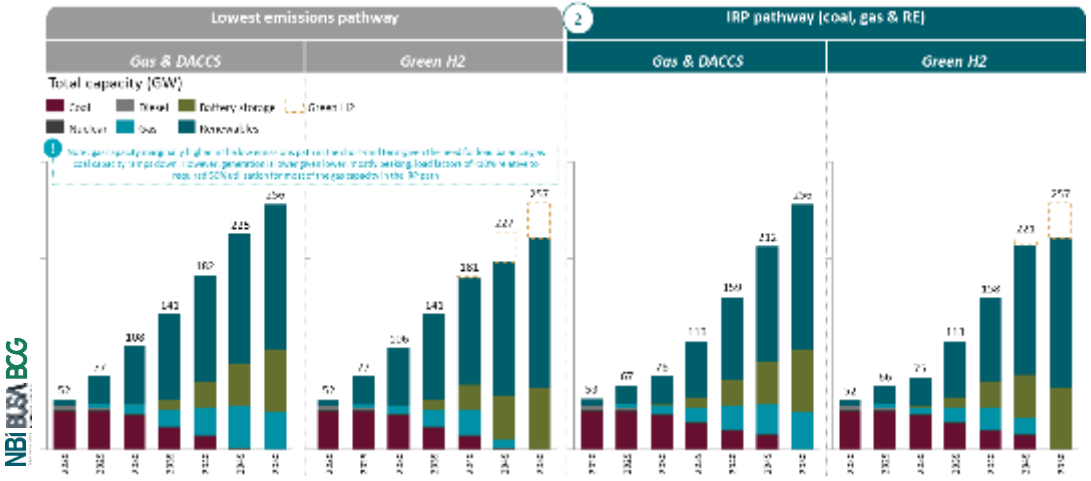
Access, affordability, fair distribution of benefits and costs

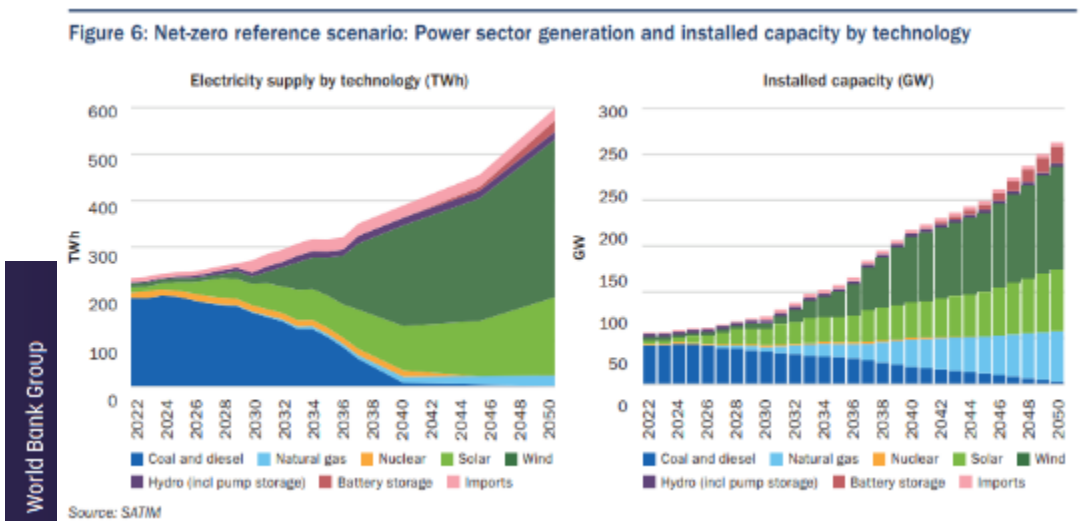
Represents the transition of a country's energy system towards mitigating and avoiding potential environmental harm and climate change impacts.

Climate change, water, and health

There are several local and international, consultative studies that we can draw on

All of which consider the trilemma and conclude similarly, least cost systems are drive by renewables, battery storage and peaking gas





- Massive, urgent investment in renewables
- Urgent investment in the grid
- No new coal or nuclear
- Limited role for gas for peaking
- Investment in storage
- The need to manage inertia and frequency
- Energy efficiency is critical

- Cost is driven by the rate of coal closure

- We should watch technologies like SMR and CCS but they are not yet mature

Even when the models are unconstrained by climate change, they do not build coal. Least cost solutions are renewables based.

	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

The cost of the system is driven by how quickly you decommission coal to meet specific carbon budgets.

Across the trilemma categories renewable systems are considered better, or even

		Variable RE Systems	Traditional Systems
ENVIRONMENTAL SUSTAINABILITY	Climate Change	✓	✗
	Water	✓	✗
	Air Quality and Health	✓	✗
ENERGY EQUITY	Access	✓	✓
	Affordability	✓	✗
	Fair distribution of benefits and costs	?	?
ENERGY SECURITY	Reliability	✓	✓
	Stability	✓	✓

The debate in South Africa is focussed on energy security with claims being that intermittent inverter-based systems are not secure

DAILY MAVERICK

OPINIONISTA

As we move towards a just transition and a resilient energy system, we mustn't abandon coal — yet

By July Ndlovu · Follow · 05 Feb 2023 · 3

July Ndlovu is the chairperson of the World Coal Association and the CEO of Thungela.

Coal has entered a new age that is beyond combustion, and 2023 and beyond will be all about finding new ways of diversifying away from coal while still ensuring energy stability, affordability, reliability and security in the face of the global permacrisis.

Bloomberg

NEWS OPINION BUSINESSWEEK

NEWS

Russian coal billionaire says SA's grid unsuitable for green energy

• BRIEFLY •

Deputy Energy Minister Insists Coal Will Remain King in SA Even As Energy Transition Gains Momentum

The department's deputy minister, Dr Nobuhle Nkabane, was addressing the annual Southern African Coal Conference on Thursday, 2 February, and said that "coal is king' and remains important to SA's energy security.

Academia and utility choices confirm that renewable systems are as secure

YaleEnvironment360 *Published at the Yale School of the Environment*

OPINION

Three Myths About Renewable Energy and the Grid, Debunked

Renewable energy skeptics argue that because of their variability, wind and solar cannot be the foundation of a dependable electricity grid. But the expansion of renewables and new methods of energy management and storage can lead to a grid that is reliable and clean.

BY AMORY B. LOVINS AND M. V. RAMANA · DECEMBER 9, 2021

FINANCIAL TIMES

Opinion **Energy crisis**

Three myths about the global energy crisis

Fatih Birol SEPTEMBER 5 2022 446

The writer is executive director of International Energy Agency

COLUMBIA CLIMATE SCHOOL
Climate, Earth, and Society

State of the Planet

News from the Columbia Climate School

ENERGY

Are Wind and Solar Power Really More Expensive and Less Reliable?

BY JEFF BALLINGER | FEBRUARY 10, 2022 6 Comments

Despite claims to the otherwise, renewables are no less reliable than other power sources during extreme weather events.

INTERNATIONAL MONETARY FUND

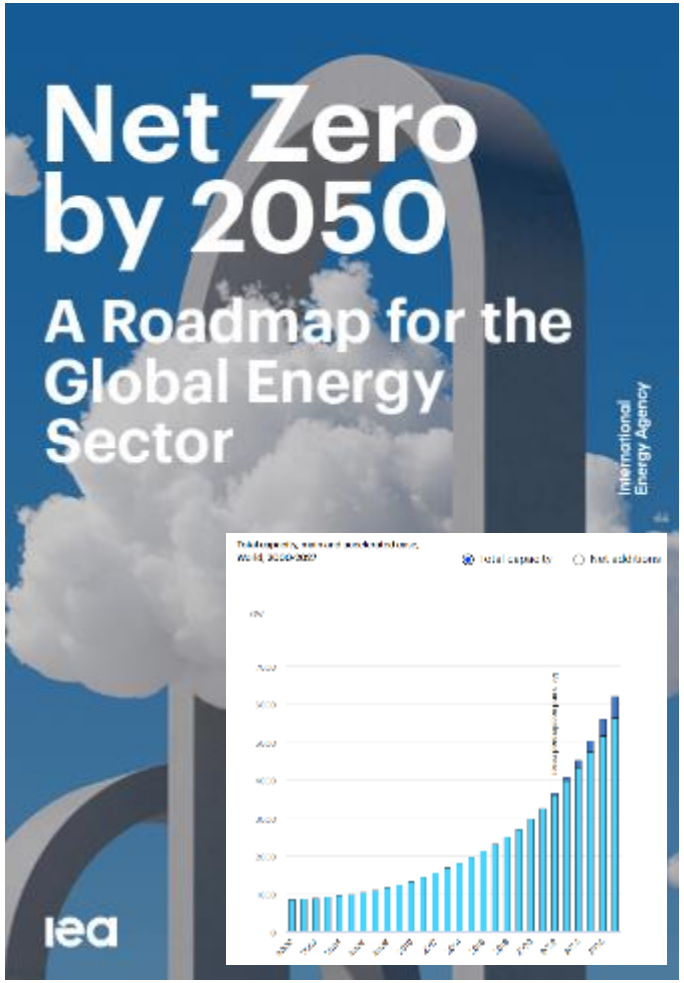
FD FINANCE & DEVELOPMENT

GREEN GROWTH OPPORTUNITIES

RICARDO HAUSMANN

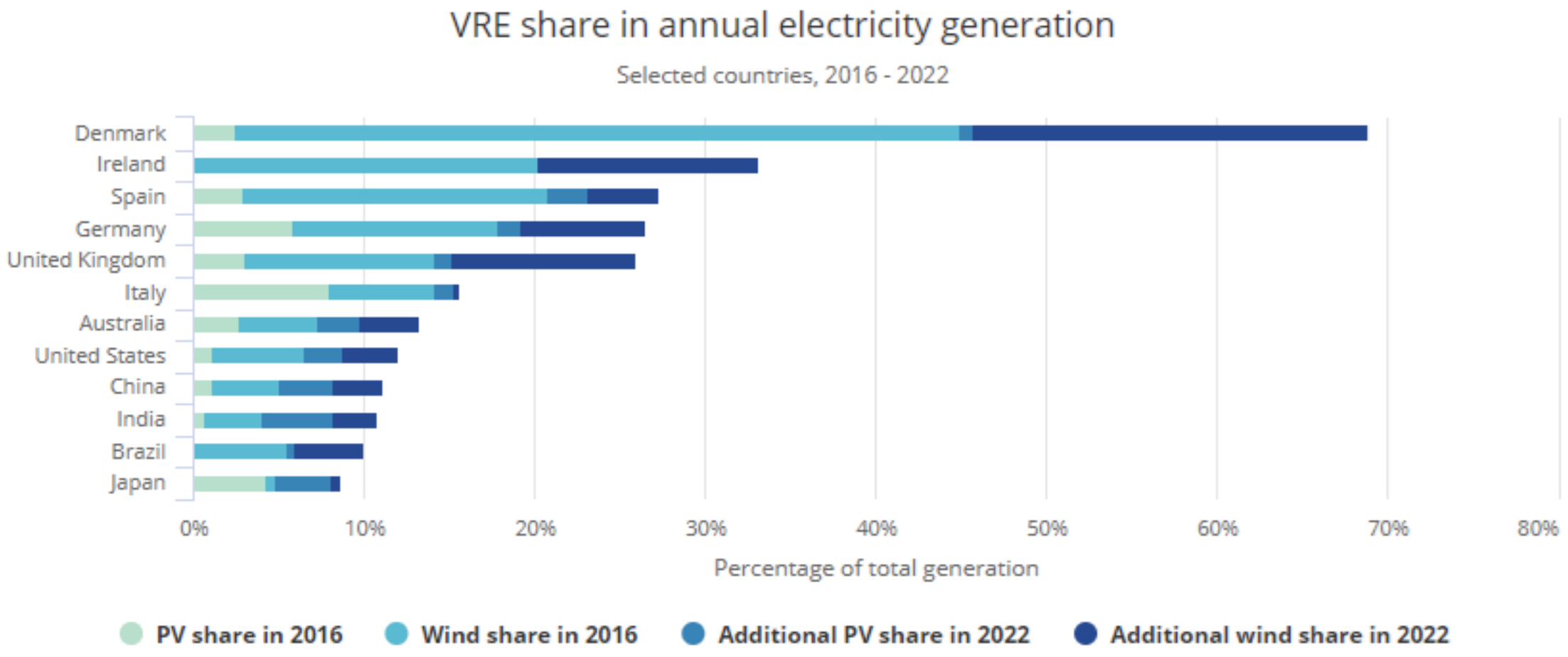
DECEMBER 2022

RICARDO HAUSMANN is founder and director of Harvard's Growth Lab and Rafik Hariri Professor of the Practice of International Political Economy at Harvard Kennedy School.



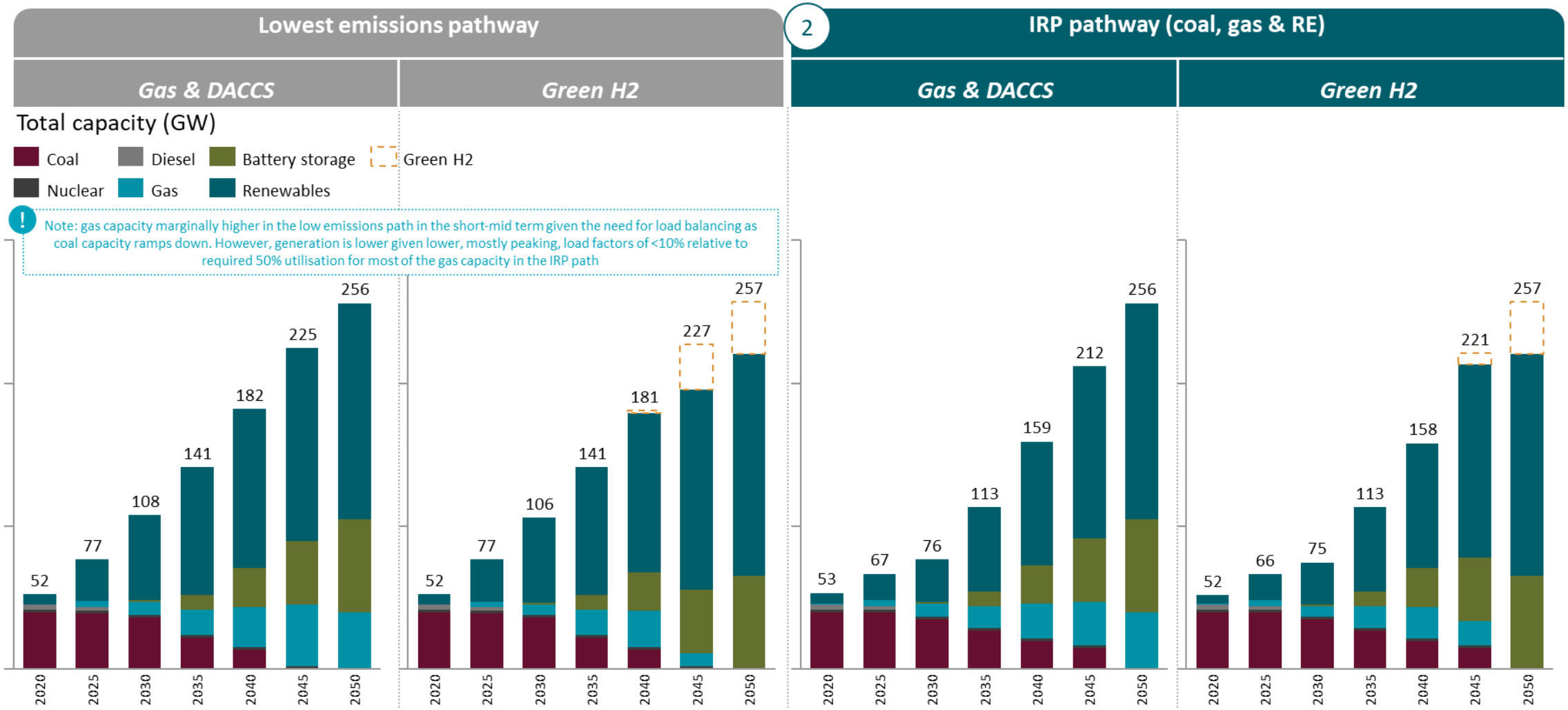
This was the topic of the PCC's first two power dialogues (hosted in 2022), where expert speakers (including from Eskom) confirmed renewable energy systems are mature. You just have to manage them differently.

Countries around the world are successfully managing the risks of higher and higher renewable penetration



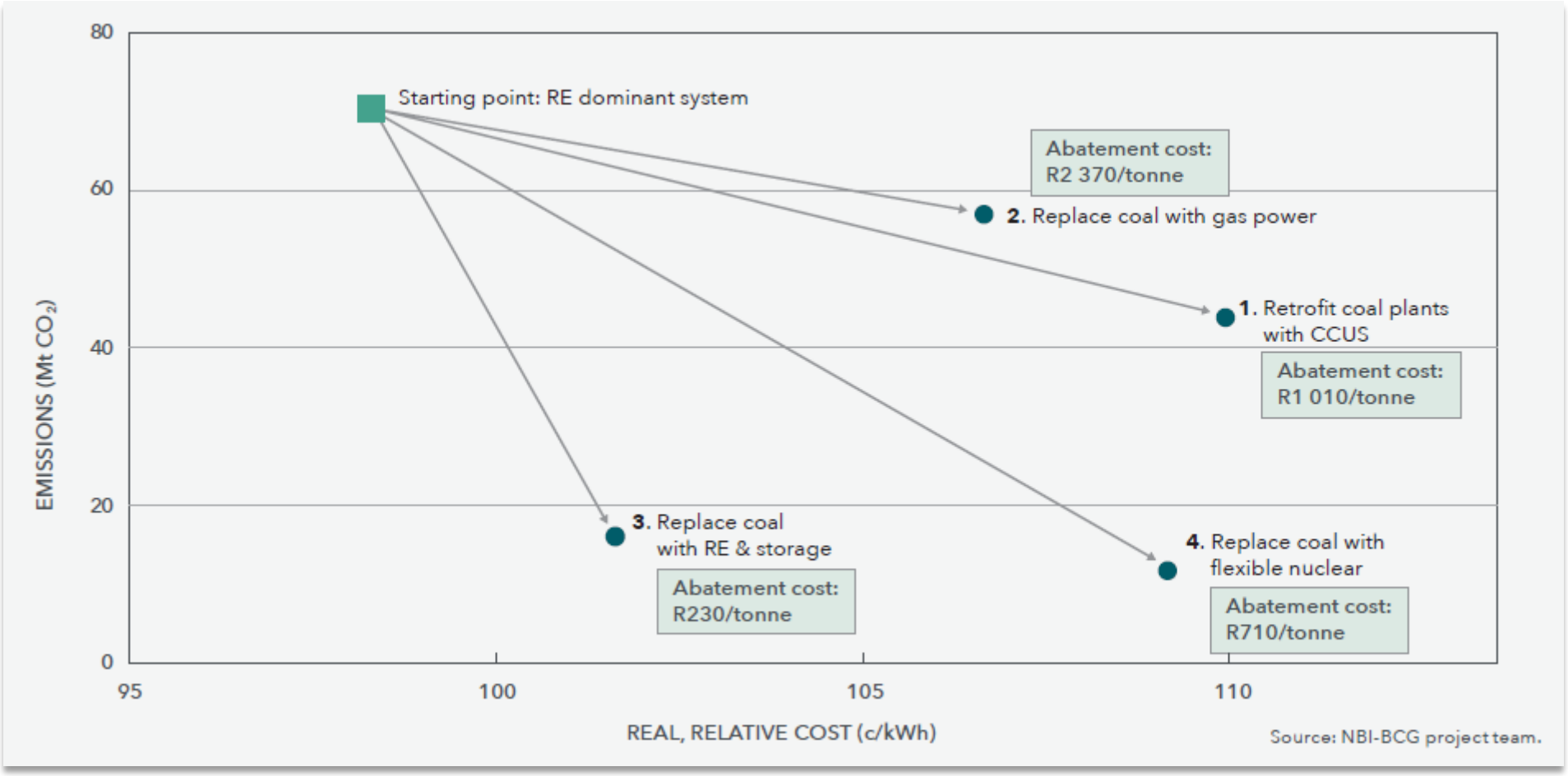
Renewables 2017, IEA

The long-term solutions must therefore be renewables focussed (with gas for peaking support)…



Studies show a range of 5 to 10 GW installed capacity of gas, running at low utilisation levels. In the shorter-term gas could run at higher utilisations to assist with load shedding and commercialisation. It is possible that coal plan could be used at much lower utilization levels (as low as 10%) to provide peaking support in the 2040s. Critical to the question of gas is where to locate it – with coastal applications (especially at Richards Bay) looking the most likely. An over investment in gas will result in stranded assets.

But should carefully monitor not yet mature or commercially viable technologies



Notably:

- Abating coal and gas with CCS/CCUS
- Flexible nuclear (small modular reactors)
- Advances in hydrogen to power
- Other future innovations

There is however a short-term energy crisis that needs to be urgently addressed; short term energy solutions will also be renewables based

Eskom emphasis short term renewable generation options

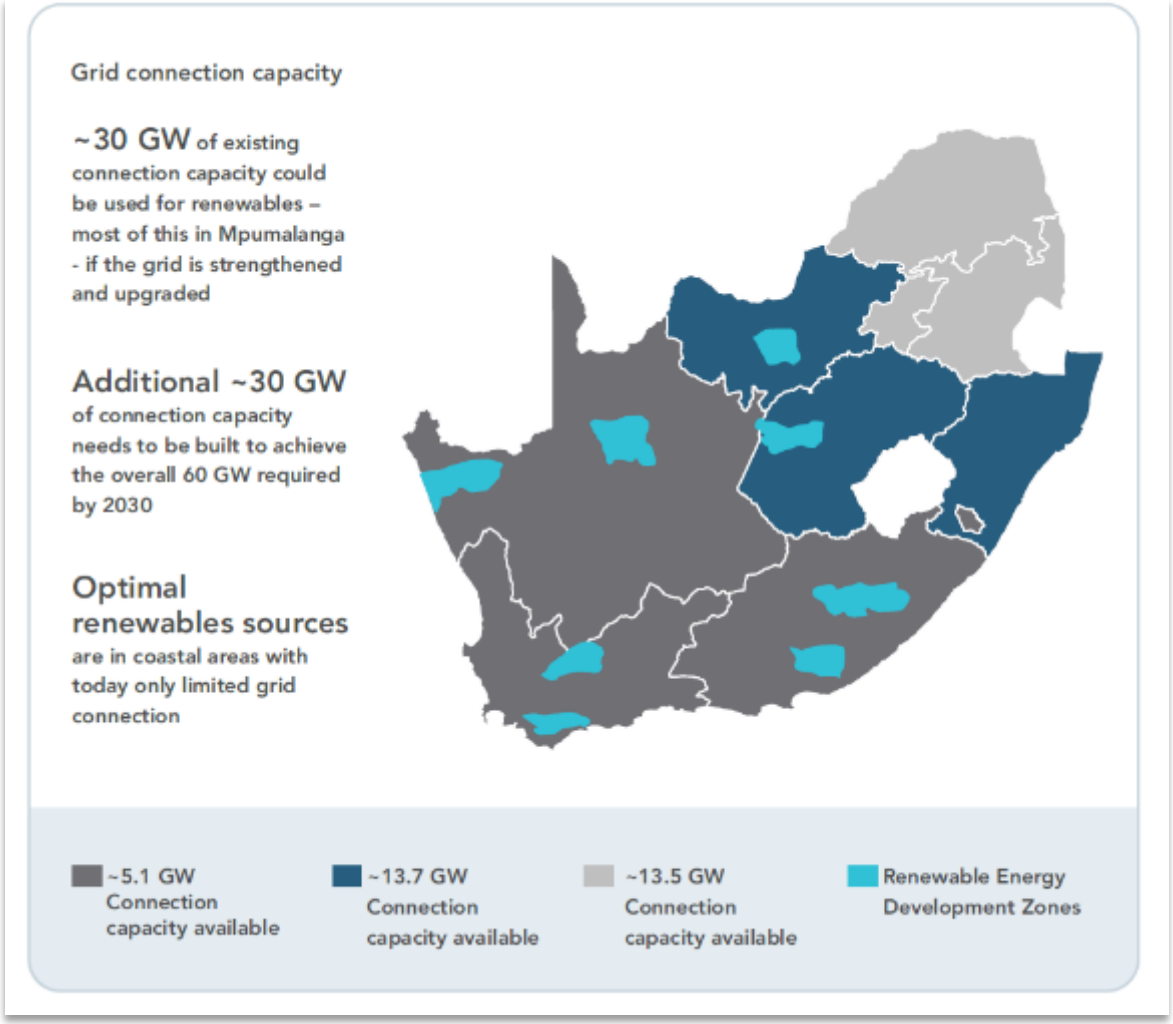
Eskom identified a mix of renewables & limited gas as the optimal power source given LCOE & build time

Eskom

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

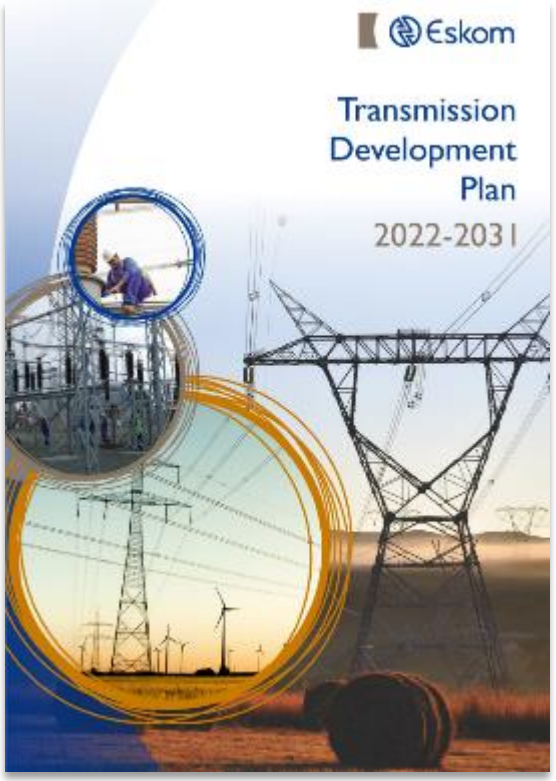
1. Capital cost includes EPC cost, capital cost during constriction, LCOE – levelized cost of energy; Source: Lazard 2020 costs

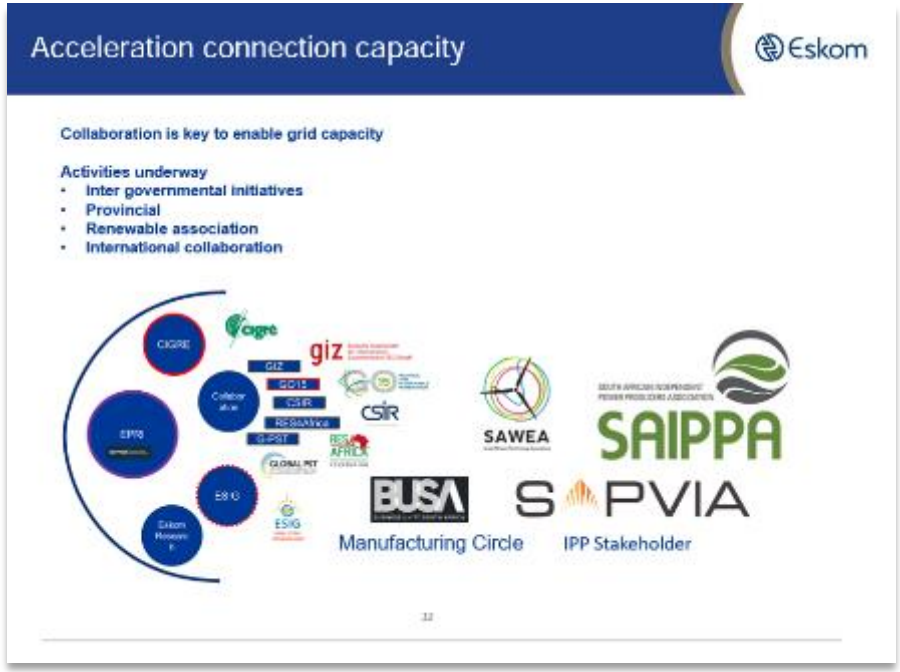
The constraint to short-term solutions is grid availability. We need to stimulate renewable investment where grid access is available.



- The efficiency of non-optimal locations in South Africa are still better than that of renewable energy deployment in Europe
- Collocated renewables and storage can maximise the energy output in the short term
- This will require governance reform including transparency on queuing for grid connections
- The advantage of a regional renewable development approach are twofold:
  - Distribution of renewable jobs
  - The ability to create very detailed spatial plans
- Batteries co-located with renewables can flatten congestion on the grid; and batteries in cities and homes can flatten peaking demand

We need to simultaneously and urgently invest in the long-term improvement of the grid allowing future access for renewables





Including in solving grid inertia and stability challenges that form at high renewable penetrations.

Energy Efficiency and Demand Side Management are easy short-term wins

Institution Interest

- It saves money for institutions
- It provides energy security

National Interest

- It takes the load of a struggling Eskom
- Saved money means more competitive institutions, greater productivity, growth and job creation
- It enables SA to meet its international commitments on climate change.
- Investment in EE creates jobs
- It makes our economy more competitive

All of the modeling assumes aggressive energy efficiency targets are met, often aligned with the National Energy Efficiency Strategy. If they are not even more generation capacity must be added to the system adding significant cost and risk.

Long term and short-term solutions must both have the Just Transition at their heart

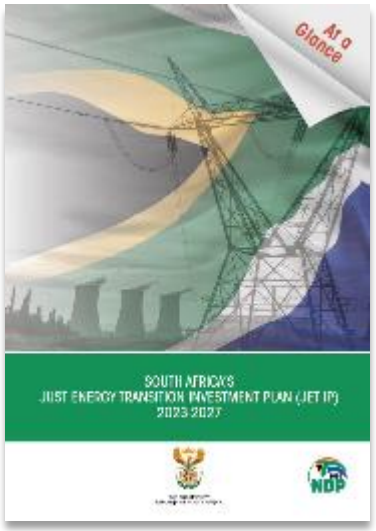
Short Term (2028 to 2030):

- Pricing and social support measures for those most impacted by load shedding and who do not have access to or cannot afford electricity
- Re-skilling and re-training of vulnerable workers
- Provide job opportunities and training for the youth
- Resolving the skills and jobs planning ecosystem challenges
- Build the capacity of local government to support changes in generation and billing
- Job creation through infrastructure investment, including in regions in transition
- Inclusion of black owned business in infrastructure investment and in value chain opportunities
- Repurposing the coal fleet inline with decommissioning schedules

Long Term (post 2030):

- Localisation of manufacturing
- Job Creation outside of power (economic diversification)
- Finding ownership solutions that reduce inequality
- Long term land rehabilitation and re-use

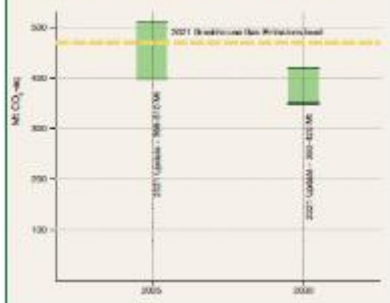
This thinking is aligned with the direction of the JET-IP and a short-term spatial plan will give the necessary meat to the JET-IP implementation



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 CO_2 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

Every effort is needed, we must continue to implement known solutions

Improve EAF as much as possible

- coal contract delivery to spec and remove poor quality coal from system,
- reduce crime and corruption,
- keep to maintenance schedules, enhance quality of maintenance teams
- Consider pilot O&M contract for coal fired power station

Continue work on a Just Transition

- Continue work on Just Transition and build capacity in JT office
- Decommissioning & repurposing of Komati with economic diversification and RE training centre (with SAROTEC)
- Collaboration with Mpumalanga province around economic and industrial development strategy to create a green energy hub
- Work with Mpumalanga stakeholders on economic diversification and jobs planning

Set up independent transmission company and invest in grid expansion

Work with public and private stakeholders to drive Energy Efficiency

Get us much new generation on the grid as possible

- Feed-in tariffs and wheeling
- Private sector generation
- Enable black owned PPAs to develop their opportunities,
- Continue to use available Eskom land
- Collocate batteries with generation to maximize grid utilisation
- Aggregate consumer systems in cities to drive additional generation and storage

Specific Draft Recommendations

The PCC believe that the priority interventions, with the deepest systemic impact, and that are aligned with climate positive outcomes and meet the criteria of the energy trilemma are:

- Develop a short-term spatial plan that maximises grid usage. This should be done in a transparent and public manner providing realistic information to the public about impacts on load shedding.
- Large scale governance reform, including:
  - The establishment of an independent grid operator (ITSMO), responsible for energy planning and adequately capitalise it
  - Making queuing systems for grid access transparent
  - Adjusting the pricing system to be cost reflective and unbundled (separate prices for energy services and power purchased)
  - Set-up day ahead market
- A huge drive on energy efficiency, storage (batteries) and demand side management
- Invest in grid upgrades to support the continuing addition of renewable generation
- Support public, private and household renewable energy generation and storage, including through tariff structures and entrenching the role of cities. This will require policy reform and significant support to municipalities to both implement and to ensure revenue security.
- Ensure measures are implemented to support those most impacted by load shedding and who cannot afford electricity, especially SMMEs. This would include disbursing and improving free basic electricity.
- Support the Just Transition with economic diversification efforts in regions in transition (including accelerating the adoption and implementation of SAREM)

Please provide guidance on if the process is sufficient and on the specific recommendations

Feb and Mar 2023

9 Stakeholder Engagement Sessions

29 Mar 2023

1 Colloquium to share findings, with draft document released a week prior

~ Ongoing expert engagement

In Q1 and Q1 2023

Additional extended net-zero working group meeting (mid to early March), to agree final report content before March colloquium

PRESIDENTIAL
CLIMATE COMMISSION
TOWARDS A JUST TRANSITION

Thank you and Questions