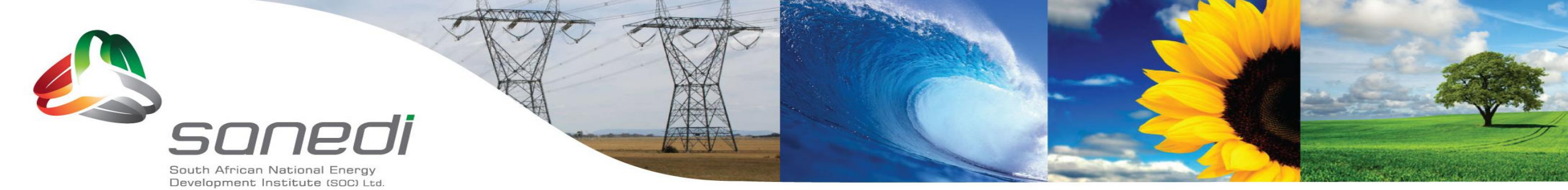

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South African National Energy Development Institute (SOC) Ltd.

Strengthening Skills For a Just Energy Transition Industrial Pathways

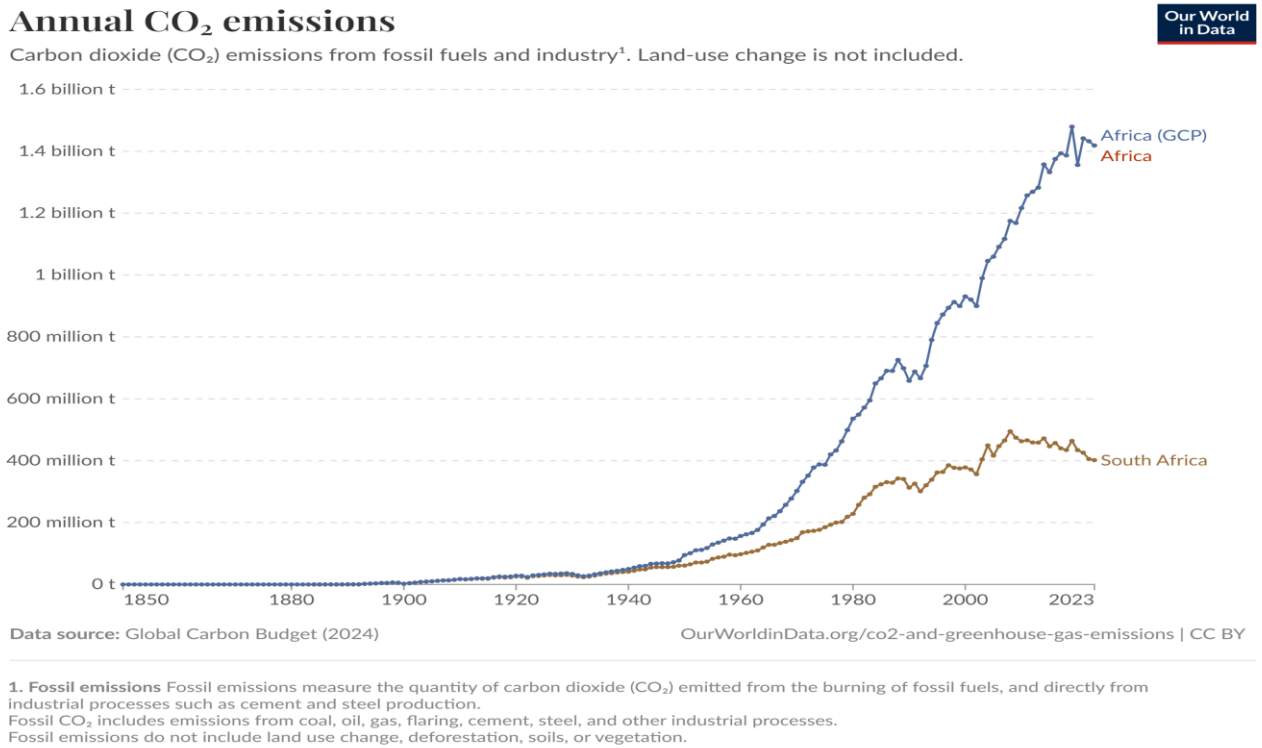
Skills Indaba 2025 For A Just Climate Transition

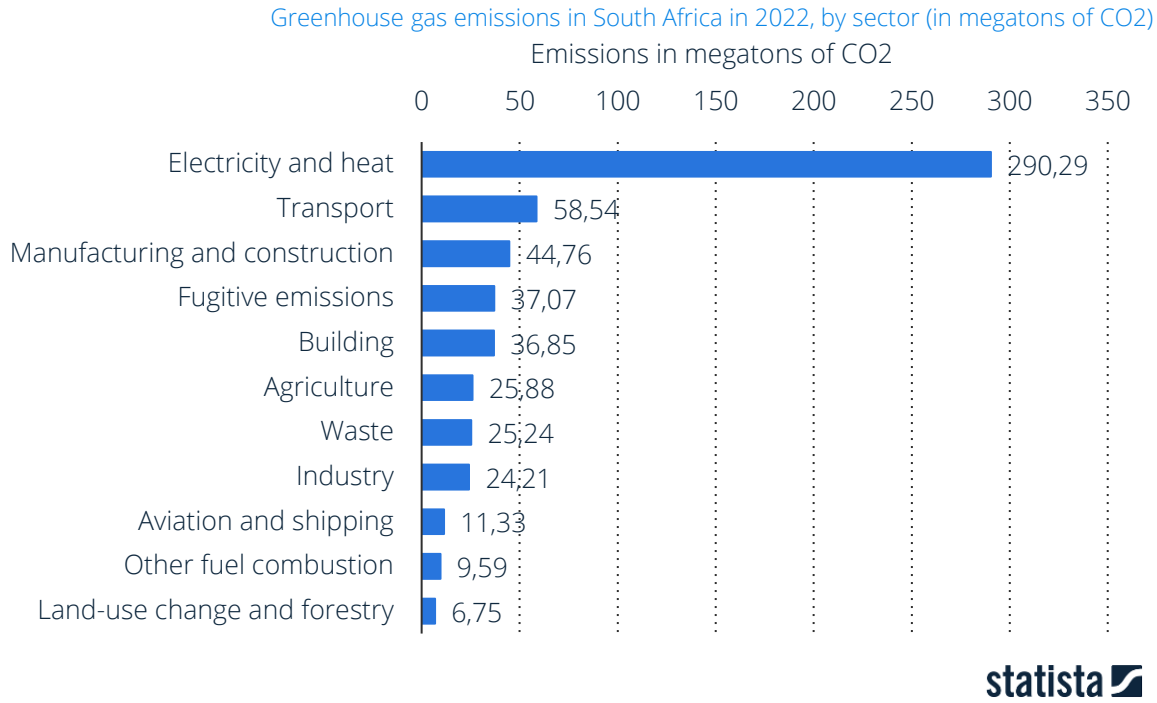
30 October 2025

Presented By:

Dr Zwanani Titus Mathe (Pr. Eng)
Chief Executive Officer

Why are we transitioning - South Africa perspective





Environmental issues

- SA is amongst the highest polluters in the world (GHG per Capita)
- SA contributes ***1.09%*** (as of 2022) to global GHG. *As per the Paris Agreement, SA's NDC revised targets range between* ***398 to 510 Mt CO2eq for 2025, and 350 to 420 Mt CO2eq for 2030, and 320 to 380 Mt CO2eq for 2035***
- ***Electricity, transport, and manufacturing/construction sectors are*** major contributors to GHG in SA

Source: https://ourworldindata.org
Source: Statista 2025

“A successful transition is one that does not displace workers but rather transforms their prospects. It must prioritise reskilling, protect livelihoods, and anchor new industries that generate quality jobs — so that workers see themselves not as casualties of the transition but as co-authors of a new energy future.”

- *Hon. Dr Kgosientsho Ramokgopa, Minister of Electricity & Energy, 1 May 2025, G20 Energy Transitions Working Group (ETWG) meeting held in Cape Town*

Source: [Just Transition 'opportunity' must be just for all | SAnews]

Energy (Electricity) Transition Mapping

Now (Energy Crisis & High Carbon Economy)

Supply/Generation

Improve EAF to above 70%; Bring New Capacity (utility scale Solar/Wind & SSEG), Lifex of Koeberg, Clean Coal Demos (incl CFB, CCUS), Nuclear SMR Demos); Green Hydrogen R&D

Grid

Grid expansion & Modernization/Digitization; Micro/Mini Grids

EEDSM

Smart Meters; Smart Geysers, SSEG (incl Rooftop Solar PV), EVs; Storage

2040 (Low Carbon Economy)

Supply/Generation

- RE + Storage; Clean Coal (incl CFB & CCUS); Nuclear (incl SMRs); Gas (incl Green Hydrogen)

- **Grid**
  - Partially liberalized electricity market, reliable and sustainable & partially digitalized power system & expanded grid

- **EEDSM**

Smart Meters; Smart Geysers, SSEG (incl Rooftop Solar PV), EVs; Storage

2050 (Net Zero)

Supply/Generation

- RE + Storage; Clean Coal (incl CFB & CCUS); Nuclear (incl SMRs); Gas (incl Green Hydrogen & Indigenous Gas); Gas to power to include CCUS

Grid/End-Users

- Fully liberalized electricity market, competitive, sustainable, reliable & digitalized power system

- **EEDSM**

Smart Meters; Smart Geysers, SSEG (incl Rooftop Solar PV), EVs; Storage

IRP 2025 (gazetted 28 Oct 2025)

Deemed Installed

New Capacity

Year	Coal	Gas	Nuclear	Solar PV	Wind	Distributed Gx	Storage	Pumped Storage	Hydro	Other (Bioenergy/CSP/etc)
2025	40960	3830	1860	3646	5344	7065	712	2732	1600	704
2026				3553	964	900	144			35
2027				2886	2847	900	150			332
2028				1760	770	900	615			
2029		3000		1314	760	900	2615			
2030		3000		900	2000	900	200			
Total (New by 2030)		*6000*		*10313*	*7341*	*4500*	*3723*			367
2031				1000	2500	900	200			
2032		1250		1200	2500	900	200			
2033		1250		1400	2600	900	200			
2034		1250		1600	3000	900	200			
2035		1000		2000	3000	900	200			
Total (New by 2035)		*4750*		*7200*	*13600*	*4500*	*1000*	*1332*		
Total (New by 2042)		*7500*	*5200*	*11200*	*22000*		*3500*			
TOTAL (New 2026 to 2042)	0	18250	5200	28713	43041	9000	8223	1332	0	367

Transition to lower-carbon technologies

- Decarbonisation of the electricity system, manufacturing/mining, transport, etc

- Develop new skills to support economic opportunities such as:
  - Green hydrogen
  - Electric vehicles
  - Solar PV / Wind
  - Gas to Power
  - Nuclear (incl SMRs)
  - Storage (BESS, Pumped-Hydro, Gravity, Compressed Air, Thermal, Capacitors, Hydrogen)
  - Clean coal (incl CFB, CCUS, SOx, NOx, Hg, Particulates, CCPs utilization, etc)
  - Transmission (ultra high voltage 1100kV) and grid-forming
  - Smart Meters; Smart Geysers; Smart Grids (incl. Micro/MiniGrids)

Transitioning Skills for JET

1. Solar PV and Wind

Emerging Skills

- *Renewable systems engineers & site resource analysts*
- *PV installers & turbine technicians*
- *SCADA & O&M specialists*
- *Environmental, social, and quality officers*
- *Solar/wind technicians, renewable project managers, yield analysts*

Transition Focus: *From coal-plant operations ⟶ renewable generation design, installation, and digital maintenance*

2. Transmission

Emerging Skills

- *Grid expansion planners & power-systems engineers*
- *Substation & HV/MV line technicians*
- *SCADA, cyber security & grid data specialists*
- *Energy market & policy analysts*
- *Smart-grid engineers, system operators, grid-data analyst*

Transition Focus*: From manual grid operations ⟶ smart, digital, and integrated transmission management*

3. Storage & EEDSM

Emerging Skills

- *Battery and BESS engineers & integrators*
- *Energy auditors & efficiency project managers*
- *Smart metering & data analysts*
- *Green finance & carbon-credit specialists*
- *BESS technicians, energy modellers, ESCO project developers*

Transition Focus: *From traditional generation balancing ⟶ storage, efficiency, and demand-side management*

4. Green H_2 & NEVs

Emerging Skills

- *Electrolysis engineers & hydrogen safety specialists*
- *Fuel cell & catalyst researchers*
- *EV assembly & charging infrastructure planners*
- *V2G software & hydrogen logistics developers*
- *Hydrogen process engineers, EV battery technicians, fuel-cell technologists*

Transition Focus: *From fossil-fuel refining ⟶ hydrogen production, e-mobility, and fuel-cell manufacturing*

South Africa's Labour and Inequality Context

- In Q2 2025, the unemployment rate increased to 33.2% and the expanded rate decreased slightly to 42.9%
- In Q2 2025, the unemployment rate for women was 35.9%, compared to 31.0% for men
- The unemployment rate for youth aged 15-24 is 62.2% in Q2 2025
- For the broader youth category aged 15-34, the unemployment rate was 46.1% in Q2 2025

Source:Statistics South Africa on Quarterly Labour Force Survey (QLFS) – Q1: 2025 | South African Government PowerPoint Presentation

Source: The dark picture of youth unemployment in South Africa

Sandton and Alexandra

Source: The Story Of Sandton And Alexandra — Johannesburg | by Gift Banda | Medium

How do we equip SA workforce - no one is left behind?

Reskilling and Redevelopment

1. Repurpose and repower—not retire—legacy skills from coal, oil, and transport sectors
2. Establish Just Transition Training Hubs at existing facilities

Curriculum Modernisation

1. Align TVET and university curricula with green, digital, and data-driven competencies
2. Capacitate educators

Inclusive Pathways

1. Prioritise **women, youth, and persons with disabilities** through targeted bursaries and apprenticeships
2. Embed **RPL** to transition informal and artisanal workers into new industries

Partnership Ecosystem

1. Mobilise collaboration between **government, industry, academia, labour, communities, and development partners**
2. Leverage partnerships to drive innovation and industrialisation

Understanding of skills development needs for a labour market struggling to grow

Labour-Market Intelligence System

- Strengthen real-time tracking of skills supply vs. demand through data platforms linked to SETAs, SANEDI, DHET, and Stats SA
- Conduct periodic Green & Digital Skills Audits to forecast emerging needs

Sectoral Foresight Studies

- Undertake detailed Energy, Transport, and Industrial Skills Mapping to guide policy and investment
- Integrate findings into National Human Resource Development Strategy

Inclusive Research & Dialogue

- Engage labour unions, youth councils, and local municipalities in defining community-based training needs
- Expand labour-market research at regional universities`

Policy Coherence & Coordination

- Align outcomes with Industrial Policy Action Plan, Just Energy Transition Implementation Plan (JET-IP), Green Hydrogen Strategy, IRP, SAREM, Climate Change

Concluding Remarks

- **The imperative is clear:** South Africa must decarbonise its economy in the next three decades and transform it into a low-carbon, climate-resilient, and innovative economy

- **This transition will require reskilling of existing workforce** that is just and simultaneously addresses inequality, poverty and unemployment to ensure that no-one is left behind and that our future economy is also socially-resilient and inclusive

- **Skills at the centre of JET are centred around:**
  - Green hydrogen; Electric vehicles; Solar PV / Wind; Gas to Power; Nuclear (incl SMRs); Storage (BESS, Pumped-Hydro, Gravity, Compressed Air, Thermal, Capacitors, Hydrogen); Clean coal (incl CFB, CCUS, SOx, NOx, Hg, Particulates, CCPs utilization, etc); Transmission (ultra high voltage 1100kV) and grid-forming; Smart Meters; Smart Geysers; Smart Grids (incl. Micro/MiniGrids)

More than 60% of South African Children are living in poverty

Source: https://www.citizen.co.za/zululand-observer/news-headlines/2020/08/14/more-than-60-of-south-african-children-are-living-in-poverty/

Acknowledgements

- ✓ **Presidential Climate Commission (PCC)**
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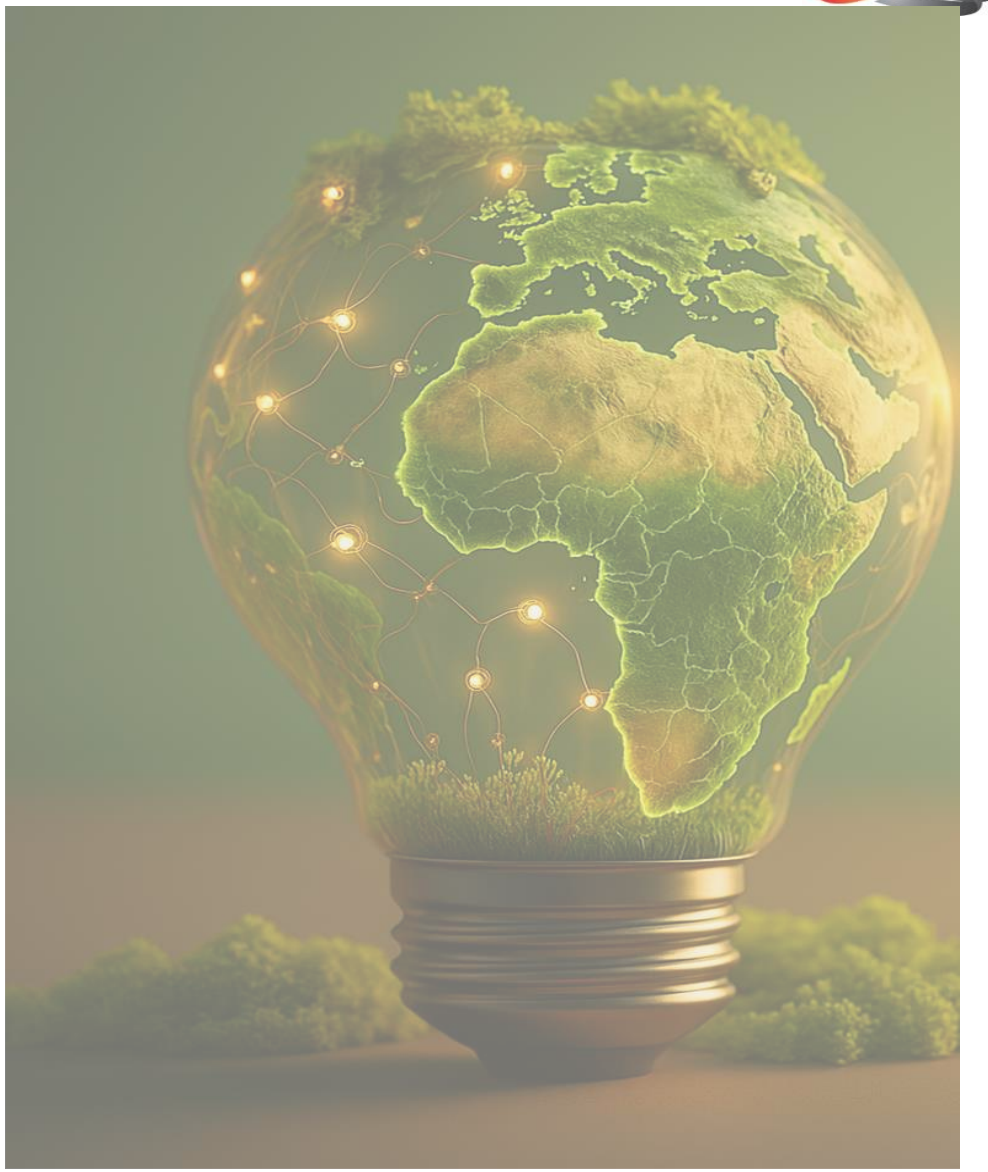
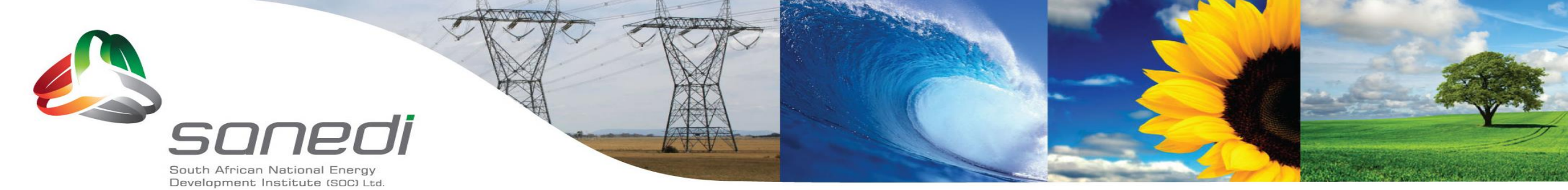
- ✓ **The Energy & Water Sector Education Training Authority (EWSETA)**

"Skills for a Just Transition: Building Pathways for Inclusive and Green Economic Transformation"





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