# Energy Transition Accelerating Wind Power Deployment in South Africa

April 2021

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South African Wind Energy Association

# Resolving the Energy Crisis

## The Energy Crisis

- Demand exceeds supply
- Eskom Energy Availability Factor below 65%
- Maintenance backlog , several plants due for decommissioning
- **LOAD SHEDDING**

## Government Commitments to Resolve Energy Crisis

- 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 I applications by commercial and industrial users to produce electricity for own use above 1MW
  - accelerating the completion of bid window 4 RE projects

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# Energy Transition Drivers: Decarbonisation

- SA Carbon Intensity – Top 20 global polluters.
- Currently coal power contributes 77% of the total energy generation (Department of Energy, 2017)

- Transition driven by climate change policies and international commitments
- Climate Change Commitments: Reduce carbon emission by 34% beyond BAU by 2020 and by 42% by 2025; Paris agreement - INDCs

- Renewable energy is arguably one of the viable options to urgently decarbonise the energy system at low cost.

- The energy sector contributes about 80% of the country's total greenhouse gas emissions of which about 40% is from electricity generation (Department of Environmental Affairs, 2012).

- Policy decision to incorporate renewable energy into the energy mix, the aim was not only to address the energy security issue, but also deal with environmental issues as well as derive economic benefits.


- Socio-economic benefits are closely tied with the roll-out of renewable energy.

# Energy Transition Drivers: Decentralisation

Decentralisation – moving away from a centralised single vertically integrated utility to more decentralised generation through utility scale independent power producer projects and small scale embedded generation projects.

Introducing a very large number of small-capacity units that are all connected to the power grid, natural gas supply network or urban heating/cooling networks to generate energy from renewable sources at local level.

Energy produced closer to where it will be used, rather than at a large plant elsewhere and sent through the national grid.

Reduces transmission losses and lowers carbon emissions

Long term decentralized energy can offer more competitive prices than traditional energy

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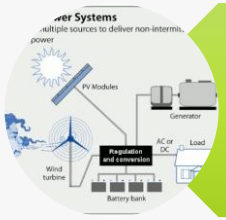
# Energy Transition Drivers: Decentralisation

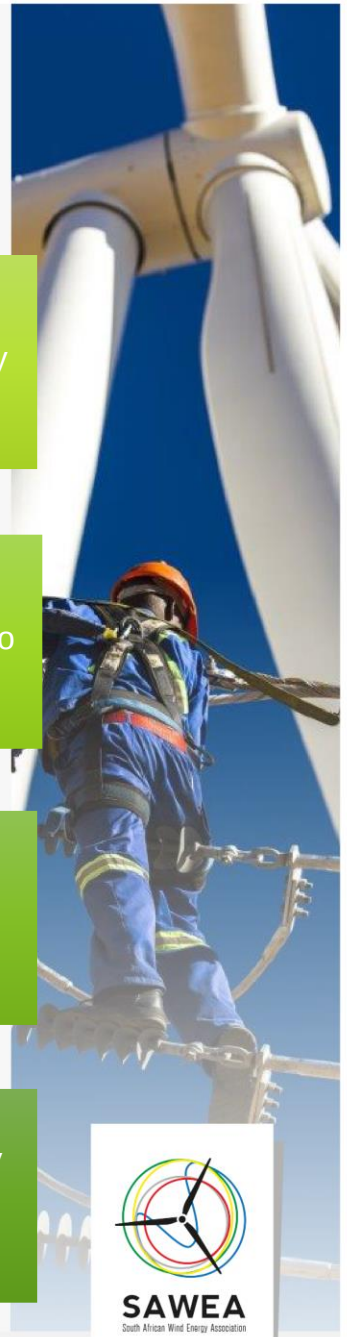



Democratisation - opening the energy generation business to private entities. Non-discriminatory open access to key energy infrastructure such as the national electricity grid


REIPPPP, where for the first time in South Africa the Independent Power Producer were able to develop energy projects (Renewable Energy, Coal, and Gas) and sell it to the national power utility through a government run programme.


From 2015 to 2018 we saw a stale-mate between the national power utility and the independent power producers in terms of signing of the power purchase agreements for the 4th bidding round projects which was awarded in 2014. Any change process is bound to experience challenges as it challenges the status quo which leads to incumbents' insecurity and feeling the need to protect their territory.

The impasse on signing of PPAs signalled the need to restructure the energy industry from a centralised single vertically integrated utility to separate entities handling generation, transmission and distribution. This will facilitate equitable grid access



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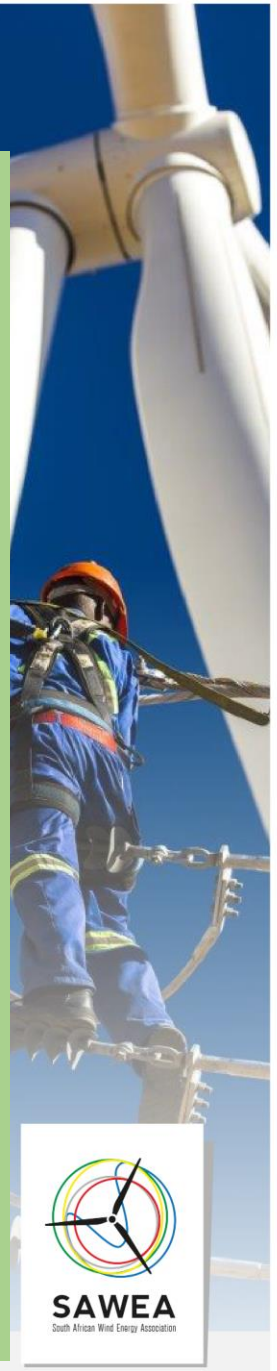
# Energy Transition Drivers: Decentralisation

Source: https://www.dnvgl.com/power-renewables/themes/digitalization/index.html

- Key enabler of the transition to a low-carbon energy system because it enables integration and a smarter grid and offer a way to manage the changes
- The energy sector stands to benefit quite substantially from the use of digital technologies that enable the power system to integrate a higher share of renewable energy while improving the general efficiency of the system and resulting in optimal use of energy.
- Digitisation of the energy transition signals the launch of the smart grid & smart meters

- Provide a secure communication platform which will make the electricity supply system fit for the energy transition
- Enables creation a local energy marketplace based on peer-to-peer energy trading in the community and then looking at layering on
- Additional benefits such as being able to offer demand response
- Decentralized energy transactions, renewable energy integration, metering and billing
- Data sharing between asset owners, operators, regulators and investors
- Benchmarking of asset performance, application of machine learning across large BIG DATA numbers of diverse assets
- Enhanced forecasting models, new insights into large operational asset data sets



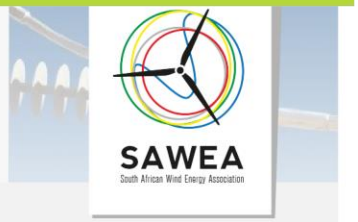
# Energy Transition Drivers: Decentralisation

- In the electricity sector, renewables and battery technology are continuing to become cheaper in many applications. Government should encourage investment in small-scale embedded generation (SSEG) that offers low carbon energy services and leverages private capital.
- Households and companies will increasingly make this investment because of the economic business case and due to energy security and environmental benefits. However, this will threaten revenue models of Eskom and municipalities and complicate the system, making planning more difficult (risking load shedding and blackouts).
- The grid will remain an affordable way to balance these systems (for example, when the sun is not shining) and to provide a market for generators to sell surplus power.
- Eskom and municipalities need to evolve their revenue models to benefit from the trading of electricity across the transmission and distribution grid.

# Just Energy Transition

- The world has moved past the debate on whether renewable energy is viable or not. Even the need to scale it up is undisputed today as more and more countries increase the renewable energy share of their electricity generation.

- The cost of renewable energy, particularly solar PV and wind, has reduced drastically and therefore one cannot argue against renewable energy from an energy system cost perspective. It is the socio-economic impacts of renewable energy that require analysis and understanding.

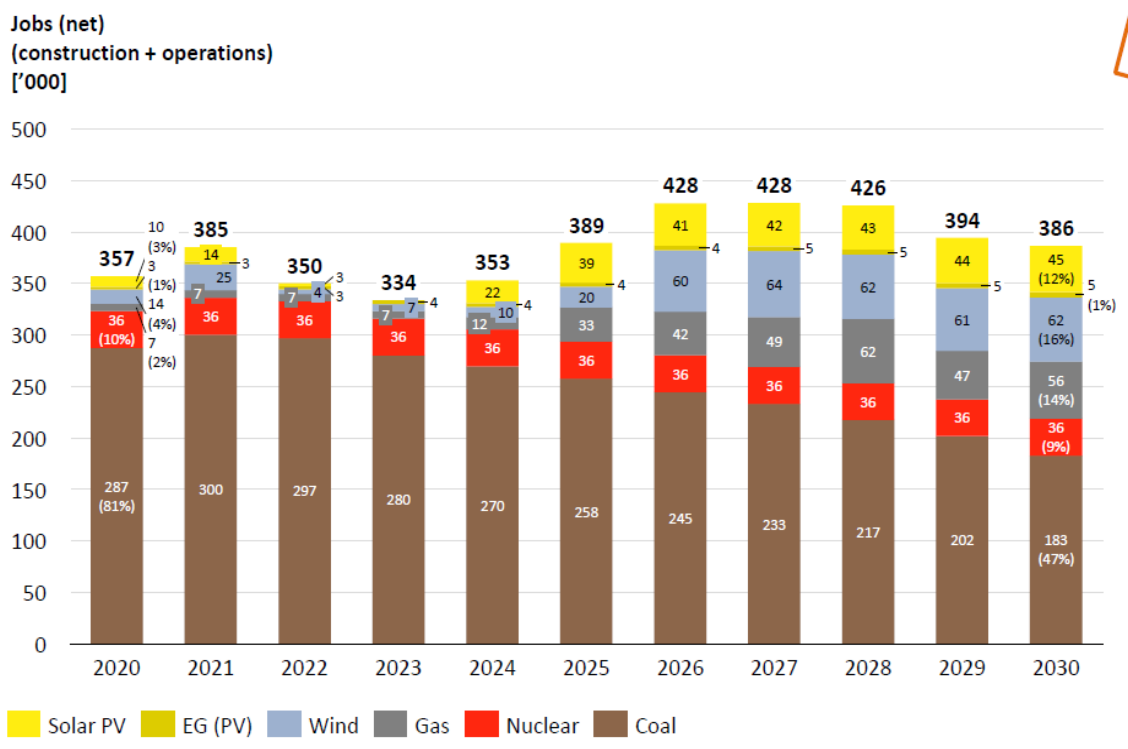


# Just Energy Transition

- There are several parties who oppose further installation of RE plants in South Africa – based mainly, on the perception that installing more RE plant will lead to further job losses for the labour force currently employed by both coal mines and coal fired power plant. This is material issue for trade unions and requires further stakeholder processes to manage any changes in the structure of the sector.

- The renewable energy sector has a huge potential to create more decentralised employment across the value chain but it seems the Cobenefits of renewable energy are not widely publicised.

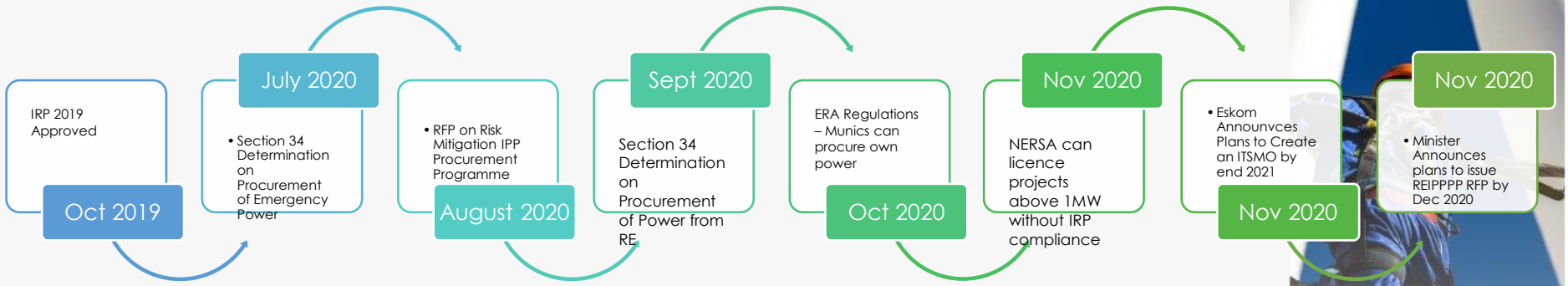
# Just Energy Transition – Jobs Impact




Sources: Draft IRP 2018; CSIR Energy Centre analysis
Note: Job potential includes direct, indirect and induced jobs; Nuclear is estimated based on existing experience at Koeberg (KPMG, 2017)

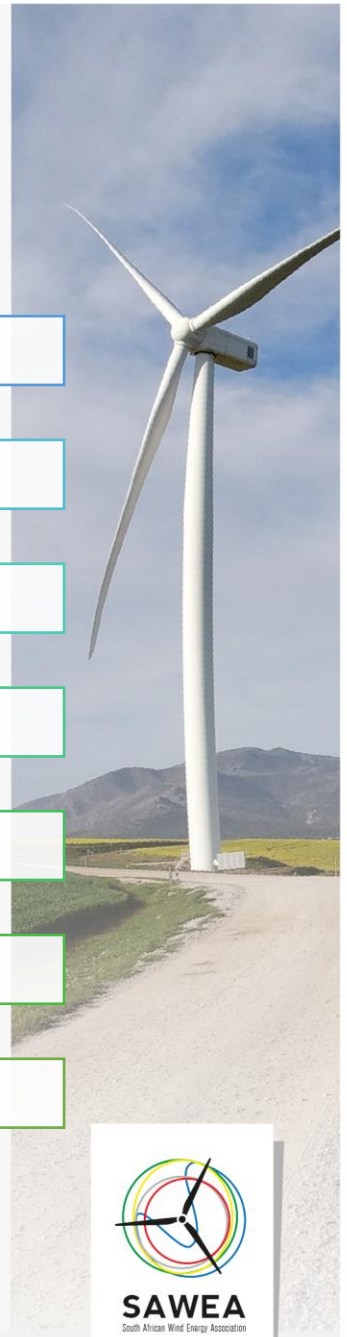
*Source: CSIR Energy Centre*

# Energy Policy Progress during 2020




# Energy Policy Progess Facilitating Growth of RE in SA

- Approval of IRP 2019
- Municipalities procuring own power from IPP
- Private Sector PPA, easing of regulatory environment
- Procurement of additional power from existing IPPs
- Wind sector as key to Post Covid 19 Economic Recovery
- Issuing of Bid Window 5 RFP
- Role of wind energy sector in Just Energy Transition



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# IRP 2019

| | Coal | Coal (Decommissioning) | Nuclear | Hydro | Storage | PV | Wind | CSP | Gas & Diesel | Other (Distributed Generation, CoGen, Biomass, Landfill) |
|---|---|---|---|---|---|---|---|---|---|---|
| Current Base | 37 149 | | 1 860 | 2 100 | 2 912 | 1 474 | 1 980 | 300 | 3 830 | 499 |
| 2019 | 2 155 | -2373 | | | | | 244 | 300 | | Allocation to the extent of the short term capacity and energy gap. |
| 2020 | 1 433 | -557 | | | | 114 | 300 | | | |
| 2021 | 1 433 | -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 | | | | | 1 600 | | 2000 | 500 |
| 2028 | | -475 | | | | 1000 | 1 600 | | | 500 |
| 2029 | | -1694 | | | 1575 | 1000 | 1 600 | | | 500 |
| 2030 | | -1050 | | 2 500 | | 1 000 | 1 600 | | | 500 |
| TOTAL INSTALLED CAPACITY by 2030 (MW) | 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 | |

- IRP 2019
  - 14.4 GW wind
  - 6 GW Solar PV
- 11017 GW of coal to be decommissioned

# Wind Power Capacity in the IRP 2019

“14.4 GW of Wind Power”

*Source: CSIR Energy Centre*

# Ministerial Determinations

| Year | Wind | PV | Storage | Gas | Coal |
|---|---|---|---|---|---|
| 2022 | 1600 | 1000 | | | |
| 2023 | 1600 | 1000 | | | 750 |
| 2024 | 1600 | | | 1000 | |
| 2025 | | | 513 | | |
| 2026 | | | | | |
| 2027 | | | | 2000 | 750 |
| **Total** | **4800** | **2000** | **513** | **3000** | **1500** |

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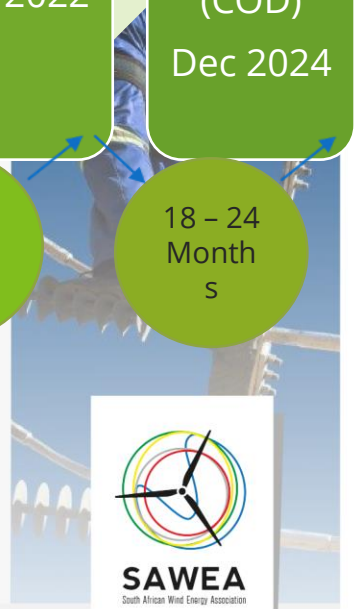
# The Road to New Generation Capacity



| Integrated Resource Plan | Ministerial Determination | Request for Proposals | Bid Submission | Preferred Bidders Announcement | Financial Close & PPA Signing | Construction | Commercial Operation Date (COD) |
|---|---|---|---|---|---|---|---|
| Oct 2019 | Sept 2020 | April 2021 | August 2021 | Nov 2021 | Nov 2022 | Dec 2022 | Dec 2024 |
| 12 Months | 4 Months | 4 Months | 3 Months | 8 – 12 Months | 4 weeks | 18 – 24 Months | |

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# Economic Impacts of Wind Power Investments (As of Sep 2020)

| | |
|---|---|
| Total capacity Procured | 3366 MW Procured |
| Capacity in Operation | 871 MW under construction (7 Projects)<br>2,495 MW in operation (27 Projects) |
| Total Wind Energy Investment | R80.6 Billion of which R13.2 Billion is FDI |
| Total Energy Generated | 28 402 GWh generated |
| Job Creation | Constr: 16113 job yrs O&M 13 222 job yrs over 20 yrs |
| Local content | R20.8 billion (47%) |
| Ownership | Black South African own 31% of wind projects |
| Community Ownership | 10% owned by communities |
| Preferential Procurement | R 24.9 billion BBBEE share of spend to date |
| Enterprise Development | R154.2 million spent to date |
| Socioeconomic Development | R518.2 million spend to date |
| Emission Reduction | 28.8 Mtons CO2Eq to date |

# Wind Energy Tariff Reduction over Bid Windows

| Bid Windows | Price Cap | Bid Tariff |
|---|---|---|
| BW 1 (ZARc) | 115 | 114 |
| BW 2 (ZARc) | 115 | 90 |
| BW 3 (ZARc) | 100 | 74 |
| BW4(b) (ZARc) | 76 | 72 |
| BW 4(a) (ZARc) | Removed | 62 |

# Ownership Targets in REIPPPP

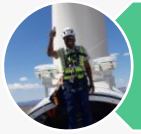
| Ownership | BW 1 | | BW 2 | | BW 3, 3.5 & 4 | |
|---|---|---|---|---|---|---|
| | Min % | Target % | Min % | Target % | Min % | Target % |
| Shareholding by local communities in the seller | 2.5 | 5 | 2.5 | 5 | 2.5 | 5 |
| Shareholding by black people and/or black enterprises in the seller | 12 | 30 | 12 | 30 | 12 | 30 |
| Shareholding by black people and/or black enterprises in the construction contractor | 8 | 20 | 8 | 20 | 8 | 20 |
| Shareholding by black people and/or black enterprises in the operations contractor | 8 | 20 | 8 | 20 | 8 | 30 |

# Types of SED Projects Supported by Wind Farms


Women Empowerment


Capacity Building and Skills Development


Health Care


Welfare and Poverty Alleviation


Education


Social Infrastructure


Environment

# Barriers to RE Deployment


**Political Will & Policy Certainty**

- IRP Not Updated Regularly
- Procurement Gaps
- Regulatory Environment
- Local Content
- Investor Confidence


**Permitting**

- Environmental Impact Assessments
- Civil Aviation Permits
- Land availability


**Single Buyer Model**

- Eskom as a buyer
- Independent System Operator required
- Market for IPPs restricted to utility scale transactions with government - REIPPPP


**Funding Availability**

- Funding for black participation
- Government Incentives
- Financiers requirements sometimes not in sync with gov objectives
- Government Guarantees

**Grid Capacity and Connection**

- Grid availability in low resource areas
- Grid connection delays affecting projects CODs
- System stability - curtailments


**Skills availability and Transfer**

- Local skills development to match deployment rate
- Reskilling in the context of JET

Thank-you

Ntombifuthi Ntuli
CEO
SAWEA
ntombifuthi@sawea.co.za

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