

COBENEFITS of the new energy world of renewables for the people in South Africa

South Africa is in the midst of an energy transition, with important social and economic implications, depending on the pathways that are chosen. Economic prosperity, business and employment opportunities as well as health impacts, issues related to the water–energy–food nexus and global warming impacts: through its energy pathway, South Africa will define the basis for its future development. Political decisions on South Africa’s energy future link the missions and mandates of many government departments beyond energy, such as environment, industry development, science and technological innovation.

Importantly, the whole debate boils down to a single question: **How can renewables improve the lives of the people in South Africa?** Substantiated by scientific rigor and key technical data, the study at hand contributes to answering this question. It also provides guidance to government departments and agencies on further shaping an enabling environment to maximize the social and economic co-benefits of the new energy world of renewables for the people of South Africa.

Under their shared responsibility, the CSIR Energy Centre (as the COBENEFITS South Africa Focal Point) and IASS Potsdam invited the Department of Environmental Affairs (DEA) and Department of Energy (DoE), together with the Independent Power Producers (IPP) Office, the Department of Trade and Industry (DTI), Department of Science and Technology (DST) and the South African National Energy Development Institute (SANEDI) to constitute to the COBENEFITS Council South Africa in May 2017 and to guide the COBENEFITS Assessment studies along with the COBENEFITS Training programme and political roundtables.

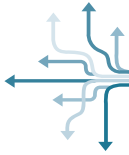
We particularly highlight and acknowledge the strong dedication and strategic guidance of the COBENEFITS Council members: Olga Chauke (DEA); Nomawethu Qase (DoE); Gerhard Fourie (DTI); and Lolette Kritzinger-van Niekerk, Frisky Domingues, Thulisile Dlamini and Lazarus Mahlangu (IPP Office). Their contributions during the COBENEFITS Council sessions guided the project team to frame the topics of the COBENEFITS Assessment for South Africa and to ensure their direct connection to the current political deliberations and policy frameworks of their respective departments. We are also indebted to our highly valued research and knowledge partners, for their unwavering commitment and dedicated work on the technical implementation of this study. The COBENEFITS study at hand has been facilitated through financial support from the International Climate Initiative of Germany.

South Africa, among 185 parties to date, has ratified the Paris Agreement, to combat climate change and provide current and future generations with opportunities to flourish. Under the guidance of the National Planning Commission, municipalities, entrepreneurs, citizens and policymakers are debating pathways to achieve a just transition to a low-carbon, climate-resilient economy and society in South Africa. With this study, we seek to contribute to these important deliberations by offering a scientific basis for harnessing the social and economic co-benefits of building a low-carbon, renewable energy system while facilitating a just transition, thereby **making the Paris Agreement a success for the planet and the people of South Africa.**

We wish the reader inspiration for the important debate on a just and sustainable energy future for South Africa!

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Executive Summary



Future skills and job creation through renewable energy in South Africa

Assessing the co-benefits of decarbonising the power sector

South Africa has an abundance of renewable energy resources. This, combined with the recent drop in technology costs and the need for new power generation as coal power plants reach retirement, provides an opportunity for the country to decarbonise its electricity sector. Managing this process will allow for a just transition in coal-dependent sectors and regions, thus opening new opportunities for current coal sector employees and other job seekers.

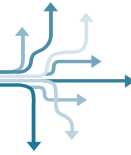
This study analyses the employment impacts of different plans for expanding electricity generation in South Africa's power sector; this was carried out in the context of the COBENEFITS' project with the aim of assessing the co-benefits of a low-carbon energy transition in the country. Four scenarios for the future development of the electricity sector in South Africa were analysed: Council for Scientific and Industrial Research Least Cost planning scenario (CSIR_LC); Department of Environmental Affairs Rapid Decarbonisation scenario (DEA_RD); Integrated Resource Plan 2016 (IRP 2016); and Integrated Resource Plan Policy Adjusted scenario 2018 (IRP 2018).

This report presents the resulting employment effects within the electricity sector, primarily focusing on coal and renewable energy sources. It also provides an initial assessment of the skill attainment levels required for South Africa's energy transition, and the potential for workers to transfer from the coal sector to the emerging renewable energy sector.

The four scenarios considered two timelines: The short-term timeline up to the year 2030 which is based on the expected electricity generation mix to meet the rising demand in the country and which is aligned with the National Development Plan 2030. The long-term timeline considers the timeframe up to 2050, based on the electricity generation mix predicted to meet the projected growth in energy demand in the country within this timeframe. It also considers the predicted decommissioning timeline of coal power plants in the country by 2050. The 2018 IRP is only modelled to 2030; the timeframe between 2030 and 2050 runs optimally within the model for the net employment impacts assessed. Hence, the results from the years 2035 till 2050 for the IRP 2018 scenario are based on optimal assumptions. The IRP 2016 was used as the reference case as the IRP 2018 was released towards the end of the study.

- **Key policy message 1:** South Africa can significantly boost gross employment by increasing the share of renewables. With its decision to scale up renewables by moving from IRP 2016 to IRP 2018, employment (measured in job years) can be expected to increase by an additional 40% in the next 10 years. But there is room for more: by following CSIR's least cost pathway, this number could even be doubled.
- **Key policy message 2:** Following the historical development in the power sector with predominant high-skilled labour, about 70% of jobs created through the shift towards renewable energy occur in the highly skilled groups (> Grade 12). This growth is most distinct in DEA's rapid decarbonisation pathway and CSIR's least cost pathway, both reaching a share of 76% in 2050.
- **Key policy message 3:** Coal-sector-based employment is expected to decline regardless of a shift in power generation towards renewable energy sources, with 35–40% decline in employment between 2020 and 2050. However, the transition process should be managed politically, to mitigate negative impacts on affected workers and communities.

⁵ The term "co-benefits" refers to simultaneously meeting several interests or objectives resulting from a political intervention, private sector investment or a mix thereof (Helgenberger et al., 2019). It is thus essential that the co-benefits of climate change mitigation are mobilised strategically to accelerate the low-carbon energy transition (Helgenberger et al., 2017).



KEY FIGURES:

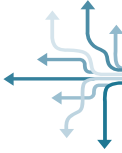
- By 2050, the shift from IRP 2016 to IRP 2018 will have contributed to a 17% job increase. By this horizon more than 150,000 jobs will have been created in the power sector in net terms, i.e., including job losses in the coal sector.
- Up to 1.6 million additional jobs can be created economy-wide through the power sector transformation by 2050.
- Jobs in the coal sector will decline by 35–40% between 2020 and 2050, with expected reductions in global demand and exports being the main driver behind this transformation.

**COBENEFITS
South Africa (2019):
Future skills and job
creation through
renewable energy in
South Africa.
Assessing the co-benefits
of decarbonising the
power sector**

available on
www.cobenefits.info

KEY FINDINGS:

- **South Africa can significantly boost employment by increasing the share of renewables.** Employment can be expected to increase by an additional 40% in the period 2018 to 2030, accounting for 580,000 job years. By following CSIR's least cost pathway this number can be more than doubled to almost 1.2 million job years, created along the renewable energy value chain.
- **Jobs in renewable power generation are concentrated in the services, construction and manufacturing sectors.** However, employment opportunities are created in almost all sectors – including the mining sector, which experiences a net increase in employment despite job losses in coal mining.
- **With the shift from IRP 2016 to IRP 2018 an additional 1.3 million jobs are created economy-wide by 2050.** DEA's rapid decarbonisation pathway would have an equivalent impact. However, following the CSIR's least cost pathway would create an additional 300,000 economy-wide jobs.
- **With the shift from IRP 2016 to IRP 2018, new jobs created in the power sector increase by an additional 17% by 2050,** adding up to more than 150,000 jobs (net).
- In terms of total net employment in the electricity sector, solar PV and wind together account for more than 80% of total net employment in the CSIR_LC and DEA_RD scenarios. Scenarios with higher shares of renewables also lead to the highest net employment figures.
- **By the 2030 horizon, CSIR's least cost pathway will result in the highest number of jobs in the power sector, accounting for 94,000 jobs (net),** and the highest number of economy-wide jobs with almost 300,000 additional jobs in comparison to IRP 2018. In general, CSIR's least cost pathway performs best in terms of economy-wide jobs at both the 2030 and 2050 horizons.



- **The bulk of job creation in renewable power generation is within the high-skilled labour group**, defined as workers with an educational attainment level above Grade-12, although employment is also created in other skill groups. Across all scenarios, around 70% of new jobs created in the power sector by renewable energy are in fact high-skilled jobs (> Grade 12). Growth in high-skilled jobs is most distinct in DEA's rapid decarbonisation pathway and CSIR's least cost pathway, both reaching 76% in 2050.
- **The Renewable Energy Independent Power Producer Procurement Programme (REIPPP) has demonstrated the potential for localised job creation through renewable energy deployment in South Africa.** The localisation requirements of the REIPPP resulted in the development of renewable manufacturing industries and capacity in South Africa. However, growth in the manufacture of essential renewable energy (RE) technologies (and the associated components) is highly dependent on commitment by government to continuous and long-term deployment of renewable energy.
- **Continued job losses are likely in the coal sector: declining global demand for coal is the largest impact factor for coal mining employment;** a decline in demand for South African coal can be observed across all scenarios. Bloomberg New Energy Finance (2018) estimates that by 2050 global coal power generation will decrease to 5% of the global power mix (from 30% in 2017). Across the employment scenarios, jobs in the coal sector are predicted to decline by 35–40% between 2020 and 2050. For IRP 2018, this decline corresponds to 19,000 jobs in total.