

Modelling a Green Economy Recovery for South Africa

This policy brief reports estimates of the potential economic, social and environmental impacts of key policies in the Economic Reconstruction and Recovery Plan (ERRP)¹ published by the South African Government in October 2020. It draws on a case study prepared within the wider project *Inclusive Green Economy response scenario modelling of COVID-19 recovery plans* by Cambridge Econometrics, in collaboration with Prof Margaret Chitiga-Mabugu of the University of Pretoria for the Partnership for Action on Green Economy.

South Africa faces the challenge of promoting short-term economic recovery from the impact of COVID-19 whilst ensuring long-term, environmentally-sustainable prosperity. The analysis reported here explores the tensions and opportunities presented by this challenge, by using the energy-economy-environment macro-econometric model E3ME.

The analysis modelled the impacts of key policies in the Economic Reconstruction and Recovery Plan (ERRP) which have been categorised as:

1. Conventional Policies
2. Public Works
3. Green Policies

Given the worldwide interest in the scope for Green Recovery policies, the analysis also included a 'Green Push' scenario, in which South Africa moves more quickly towards decarbonising its power generation system than is currently planned.

Key findings

- Green policies can promote economic growth, job creation and environmental sustainability and bring back GDP to what it would have been in the absence of COVID-19.
- A recovery without strong green policies would see greenhouse gas emissions return quickly to the levels seen before the COVID-19 pandemic and would continue to rise.
- If green policies are pursued, additional employment and economic activity can be achieved, while also cutting greenhouse gas emissions.
- Moving to a low-carbon economy involves job gains in new sectors and job losses in coal mining. Although there is a positive net effect, policies to support coal miners and their communities will be needed to promote a just transition.

Context

South Africa's road to green recovery from COVID-19.

By October 2020, approximately 1.1m deaths have been recorded worldwide as a result of COVID-19. The global pandemic has also caused the largest global recession at least since the 1930s Great Depression. The latest global economic estimates predict a global contraction in GDP of more than 4% in 2020. Simultaneously, around the world, there has been a surge of national and corporate Net Zero commitments and green recovery policy developments in 2020.

Background of COVID-19 in South Africa

In common with the rest of the world, South Africa has been severely impacted by the COVID-19 pandemic. Compared with other G20 countries, the GDP impact in South Africa lies in the middle of the range. Recent estimates indicate that due to global developments and the lockdown restrictions imposed on the economy during the pandemic, GDP is likely to have contracted by 8% in 2020.

South Africa had been experiencing continued slow economic growth, persistently high unemployment and weak investment levels over the last two decades, even before the current crisis. The challenge is how to promote both short-term economic recovery and long-term, environmentally-sustainable prosperity. The analysis reported here integrates economic, social and environmental indicators in a single integrated model to review ways to stimulate the economy whilst complying with South Africa's global commitment to mitigate green-house gas emissions.

South African Government Policy Response to the Pandemic

The South African government has introduced several policy measures to mitigate the short-term impact of the pandemic. In October 2020 it announced a set of policies to promote long-term economic recovery: the Economic Reconstruction and Recovery Plan (ERRP).

Already in April 2020, a R500 billion stimulus package, equivalent to almost 10% of the country's GDP, was announced in April 2020 as a short-term response, designed to minimise the impacts on unemployment and incomes and also boost the health response to the pandemic. In the long run, the ERRP is designed to include an employment stimulus that aims at building back better whilst transforming the economy and the society and supporting the development of decent work opportunities. The first phase of the ERRP aims at creating over 800 000 job opportunities in 2020/21 and has an allocated budget of R19.6 billion for 2020/21.

The stimulus aims at creating jobs in key departments:

- basic education
- social development
- agriculture
- land reform and rural development
- environment, forestry and fisheries.

Objectives

The objective of the study was to carry out a reliable analysis of measures introduced by the South African Government through the ERRP to mitigate the short- and long-term impact of the COVID-19 pandemic. This was done using a structural macro-econometric model that allows simulation analysis of three key scenarios for recovery policies.

Environment-economy-energy modelling

The study used Cambridge Econometrics' global macro-sectoral economy-energy-environment model E3ME.

E3ME (www.e3me.com) is a model of the world's economic and energy systems and the environment which can be used to quantitatively evaluate the impacts of an input shock at national, regional or global through scenario-based analysis. The results reported here focus on three key indicators of economic, social and environmental outcomes: GDP, unemployment and CO₂ emissions.



Economic recovery scenarios for South Africa

The economic recovery scenarios build on key policies announced in the ERRP.

We distinguish three kinds of policies: conventional policies, public works and green policies. In the modelling, these policy sets are accumulated successively.

A	Conventional policies	R 835 bn over 10 years which includes interventions such as infrastructure investment, localisation of production, subsidies for the tourism sector and food vouchers.
B	Public works	R 68 bn over 5 years in the form of public employment programmes in various sectors.
C	Green policies	R 190 bn over 10 years including subsidies for renewables, grid investment, energy efficiency measures and restriction on new investment in coal-fired power stations.

We also test the impact of a stronger push towards decarbonising the power generation system than is envisaged in the ERRP.

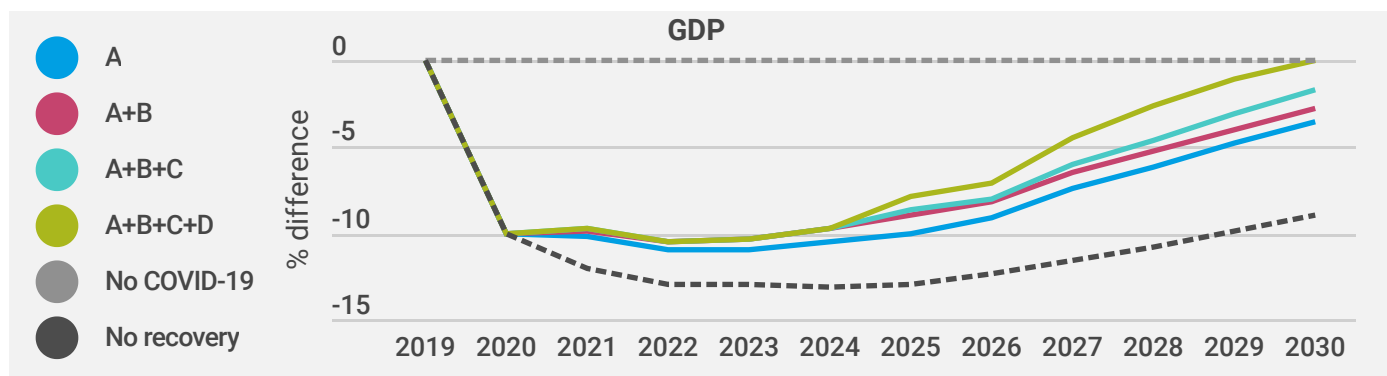
D	Green push	A stronger push towards renewables than is envisaged in the ERRP: early decommissioning of coal-based power generation and an additional R 300 bn of private financing to the power sector
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A key assumption is that the funding required for the investments in all scenarios, both private and public, will be secured. Our modelling shows that policy incentives for renewable electricity will indeed leverage private investment in power generation. We have assumed, rather than simulated, the additional private sector investment expected to be leveraged by the conventional policies package in line with the estimates provided in the ERRP.

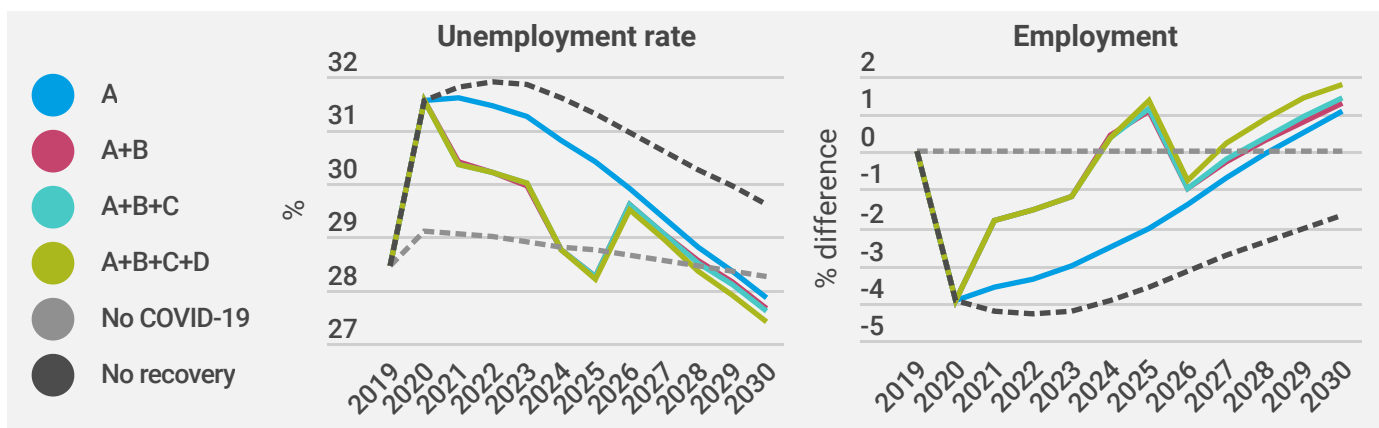
Findings

Green policies can promote both economic growth and environmental sustainability.

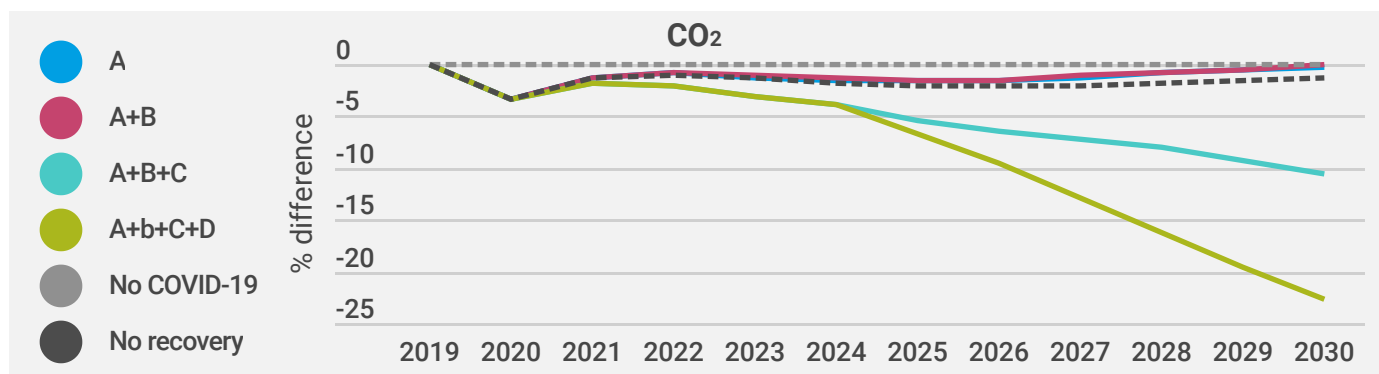
Overall, GDP can be boosted to regain the 2030 level projected before the pandemic. After the large decline in GDP in 2020, the policies in the scenarios promote an accelerated growth path over the rest of the decade, with growth exceeding 6% per annum from 2027.



The policies categorised as 'conventional' receive the largest level of spending (investment) in the ERRP, giving a large boost to GDP. These conventional policies boost employment, but a larger boost comes from the (temporary) public works programmes.



While the impact of the COVID-19 pandemic on economic activity and travel has reduced CO₂ emissions in 2020², scenarios without a 'green element' result in a rapid return to growth in CO₂ emissions and continuing increases in the long term.



When green policies are included, there is a substantial reduction in CO₂ emissions by 2030.

Employment by sector results show that (compared to a baseline with COVID-19 impacts but no recovery):

- 'conventional' measures boost employment in the construction sector due to large-scale infrastructure investments.
- public works, substantially yet temporarily, increase employment in public services, agriculture and forestry.
- decarbonisation could lead to job losses in the production of fossil fuels, while jobs will be gained in production of renewable energy.

Employment by sector (2025)			
	A	A+B	A+B+C
Construction	5.8%	9.9%	10.0%
Agriculture & forestry	5.1%	12.6%	12.6%
ICT	2.7%	3.3%	3.5%
Business services	2.1%	3.1%	3.1%
Transport	1.7%	2.6%	2.7%
Manufacturing	1.3%	1.9%	2.2%
Public services	1.0%	11.0%	11.0%
Tourism & entertainment	0.3%	2.1%	2.1%
Retail	0.3%	0.4%	0.5%
Extractive industries	0.2%	0.2%	-0.8%
Energy & utilities	0.1%	2.5%	2.7%

Additional analysis, performed by the UNEP World Conservation Monitoring Centre, using the ENCORE model, shows that circular economy measures and nature-based solutions should be included alongside decarbonisation policies to mitigate the impact on natural capital assets.

Conclusion

Without strong green policies, economic recovery will bring a rapid return to the CO₂ emissions levels seen before the crisis, and continuing increases thereafter. Green policies can promote higher economic activity and employment at the same time as significant cuts in CO₂ emissions. To achieve South Africa's greenhouse gas emissions target it will be necessary to avoid the lock-in to higher carbon emissions associated with building new coal-fired power stations. The transition to a low-carbon economy inevitably involves more activity in the low-carbon supply chain and less activity in coal mining. Like other countries with a significant fossil fuel extraction industry, South Africa will need 'just transition' policies to support those individuals and communities dependent on jobs that do not have a sustainable long-term future. Mitigation measures will also be needed to protect other natural capital assets.

¹ The Presidency (2020). *Building a society that works: Public investment in a mass employment strategy to build a new economy*. The Presidency, South Africa, Pretoria. https://www.gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf

² Evans, S., 2020. *Analysis: Coronavirus set to cause largest ever annual fall in CO₂ emissions* [WWW Document]. Carbon Brief. URL <https://www.carbonbrief.org/analysis-coronavirus-set-to-cause-largest-ever-annual-fall-in-co2-emissions>.

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