



Theme: Sustainable Development

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Poverty and inequality in South Africa's energy and climate policy issues

Researchers from the Energy Research Centre (ERC) have investigated historical and current climate and energy policy options. The current top three climate policies in South Africa are the carbon tax, the National Response to Climate Change White Paper and the Renewable Energy (IPP Procurement) Programme. All policies have implications for inequality and poverty. ERC Director Prof. Harald Winkler served on the World Bank's Commission on Carbon Taxation to investigate development-compatible carbon-pricing models. Other reports have looked into its political implication and offsetting. Research on the White Paper and the Renewable Energy Programme have analysed the implementation of both policies. Especially, the Renewable Energy Programme came with interesting implications for socio-economic development, which opened a lot of questions. Local content requirements aimed to boost industrial development, while community development requirements aimed at poverty reduction in communities close to the power plants. ERC has produced research in all areas.

More traditionally, ERC has also investigated pro-poor, sustainable energy solutions in the African context. This research spans from studies with a technology focus such as solar home systems to the barriers to the uptake of improved cook stoves. Further research

About this brief

This brief was commissioned by the Mandela Initiative to help inform a synthesis report on its work since the 2012 national conference, *Strategies to Overcome Poverty and Inequality*, organised by the University of Cape Town. The MI provides a multi-sectoral platform to investigate and develop strategies to overcome poverty and reduce inequality in South Africa. While the Nelson Mandela Foundation is a key partner, the Initiative has relied on collaborations between academics and researchers, government, business leaders, civil society, the church and unions.

The synthesis report serves as a framework for reporting on the work of the MI at a national gathering on 12 – 14 February 2018 at the University of Cape Town. The MI *Think Tank* has identified the objectives for the gathering as:

- to anchor the contributions of the MI within an analysis of the current South African political and economic context;
- to share the recommendations emanating from the MI-related work streams at a policy/strategic level to advance the goal of eliminating poverty and reducing inequality;
- to critically engage with the potential impact of the recommendations on eliminating structural poverty and inequality; and
- to discuss ways of promoting popular conversations and debate about what needs to be done to eliminate poverty and reduce inequality, beyond the MI.

The synthesis report aims to assist participants to prepare for the national gathering. The report drew on findings from the sectoral research projects of Think Tank members; the MI's *Action Dialogues*; a report on an MI *Community of Practice workshop* with research chairs from different universities to identify cross-cutting themes emerging from the MI's *research programme*; and the work programmes of others who have expressed an interest in contributing to the goals of the MI.

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investigates gender equality and the productive uses of energy (de Groot et al. 2017), children's use of energy in South African townships and the distribution of the benefits and burdens from energy generation in South Africa. The above-mentioned studies all have strong linkages with the policy environment and aim to address the structural inequalities existing in South Africa and beyond.

The ERC is also home to an economic and energy systems modelling group that researches energy models in combination with macro-economic models. These models allow understanding the implications of different electricity and fuel choices on income distribution, gross domestic product and poverty in the country. The South African Times model, SATIM, embodies comprehensive expertise in difficult areas such as household energy and poverty and transport and has been applied and tested for many years to answer social and economic policy questions beyond energy technoeconomics of the energy system.

The link to the computerised equilibrium model eSAGE makes the ERC-linked model system unique in the sense that it projects the consequences of large changes to the economy and, most importantly, feeds these impacts on the economy back into the energy system. The linked model makes provisions to changes in the supply side like new coal plants, nuclear plants or influx of renewable energy technologies in the electricity sector, but also changes in the oil price, energy exports and energy-usage patterns of households.

The linked model has also been used to understand scenarios of decarbonisation and how achieving the country's climate goals will impact the economy. Achieving the international 2 °C limit climate policy requires stringent reductions. This work utilises an economy-wide computable general equilibrium model (e-SAGE) linked to an energy-system optimisation model (TIMES) to explore improving development metrics within a 14 GtCO₂e cumulative energy sector carbon constraint through to 2050 for South Africa. The electricity sector decarbonises by retiring coal-fired power plants or replacing with concentrated solar power, solar photovoltaics and wind generation. Industry and tertiary-sector growth remains strong throughout the time period, with reduced energy intensity via fuel-switching and efficiency improvements. From 2010 to 2050, the model results in the unemployment rate decreasing from 25% to 12%, and the percentage of people living below the poverty line decreasing from 49% to 18%. Total energy GHG emissions were reduced by 39% and per capita emissions decreased by 62% (cit in Altieri et al. 2016).

The same model was applied to understand decarbonisation of the South African economy and the potential impacts of implementing efficiency improvements in the transport sector (Caetano et al 2017, Ahjum 2015).

The ERC models are public domain but not easily replicable, as they comprise decades of accumulated knowledge and expertise in modelling of highly complex systems.



What are the major issues you have identified about the manifestations of structural poverty and persistent, deep inequalities, in South African climate and energy policy?

ERC research has identified the role of poverty and inequality in the current energy and climate policy processes in various projects and various questions.² The overarching question whether developing countries can reduce poverty and emissions at the same is a highly political issue in the international negotiations. The underlying inequalities of the global emissions burden has split the parties into the different blocs and alliances. A long-standing notion in this process was that the developing nations cannot reduce emissions as they still need to develop. Green economy activities and renewable energy technologies have increasingly created gains for multiple actors, which has then softened these trade-offs (UNEP 2011, OECD 2017). ERC research has investigated how these trade-offs unfold in South Africa and we found that they have either been postponed, because of the lack of economic growth or simply do not exist. The analysis of the discourses of the country's three main climate policies – the carbon tax, the Renewable Energy Programme and the National Climate Change Response White Paper – showed that poverty is no major constraint to achieving emissions reductions (Rennkamp 2016). Vested interests of major industries in preserving fossil fuel production present major barriers to sustainable energy transitions. Government investments sustains large industries for fossil fuel production and centralised electricity supply infrastructure which channels revenue into an established elite of industries (Burton, Lott and Rennkamp 2017) without generating obvious benefits to the poor population of the country.

The main reasons for the persistence of the deep inequalities and poverty in South African climate and energy policy

The historically grown structures of the South African electricity sector continue to fuel both the country's high poverty and emissions levels. Powerful actors have managed to shape climate and energy regulation and the lack thereof to protect the revenue streams of their business. The fragility of public enterprises, particularly Eskom, adds to these path dependencies. Black economic empowerment has created new small elites of contractors, but has not transformed the overall structures of the beneficiaries (Burton, Lott and Rennkamp 2017, Eberhard 2017). Current climate policies can potentially help to reduce poverty (Winkler 2017), but they need to be designed in a pro-poor way that can generate win-win situations. The Renewable Energy Programme has successfully build low carbon energy supply infrastructure. At the same time, the programme has uplifted the manufacturing skills bases, added to the country's industrial development, created jobs and community trusts that help the communities in the proximity of the plants (Fyvie 2017, Wlokas 2017, Stands 2015, Rennkamp et al 2017). Despite promising movements towards low-carbon energy generation, reaching the country's poorest populations remains a challenge.

² This overview does not cover all projects undergoing at the ERC, because of the limitations in scope. We can provide more information about further work on urban energy poverty, gender and energy poverty, economy wide impacts on poverty, inequality and income distribution of specific energy technology choices, pro-poor energy technology and others.

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Two studies conducted at the ERC, the [Supporting African Municipalities in Sustainable Energy Transitions](#) (SAMSET), and the Urban Transformation in South Africa through Co-designing Energy Provision Pathways projects, have focused on these challenges at a municipal level. These studies have found that at the local level, the challenges for municipalities to deliver both access to energy for the poor and contribute to decarbonising the energy supply are considerable, in particular with regard to balancing the needs of the urban poor with the poorly regulated small-scale embedded generation of energy. An important issue here is that the municipal electricity sales in many cases cross-subsidise a municipality's pro-poor programmes.

What is being recommended at a macro policy/strategic level to deal with the major issues you have identified?

At this stage, the electricity sector has become a central ingredient in the state capture under the Zuma administration. Eskom and the Department of Energy have been subject to major cabinet changes to push the nuclear programme (Eberhard 2017, Rennkamp and Bhuyan 2016). Initiatives like the state capture project lead by Mark Swilling and the inquiry into Eskom, which was largely informed by Prof Anton Eberhard's work and supported via ERC research, are very important in creating visibility, transparency and insight into these largely hidden operations.

Concerning the delivery of low-carbon energy at the local level (in particular to the urban poor), the ERC researchers have advocated more integrative approach to both the management of energy systems, as well as the formulation of policy across multiple levels of governance, including at municipal and national levels, as well as between public and private entities. In particular integration between the poverty and low-carbon agendas is at present severely lacking, despite the clear potential for a win-win situation. To illustrate, although the Free Basic Electricity policy has a clear potential to provide a bridge between pro-poor energy provision and decarbonisation of the energy supply, e.g. by supplying decentralised energy systems to indigent households, the two remain largely separate in official energy governance spheres.

What do you think the potential impact of the recommendations will be on eliminating structural poverty and reducing inequality?

If state capture ends, the country's tax revenue can flow into the programmes that are already in place, again. Investors might be able to restore their trust in the state's policies that supposedly support green economies. As an example, the decision to renegotiate the tariffs under the Renewable Energy Programme was a disastrous signal for the renewable energy industry. It hampers the progress in green industrial development, job creation and community development that has been made to date. The decisions to cut large parts of Eskom's Demand Side Management Programme has led to declines in the installation of energy efficiency technologies, etc. We see these developments in various sectors, also outside the energy sector. The increases shown in the latest poverty statistics since 2011 speak for themselves (StatSA 2017).

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If in the future, pro-poor energy provision and decarbonisation of the energy supply become increasingly integrated in energy governance, both indigent and other households can benefit from low-carbon energy technologies.

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