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Renewable energy, the just transition and inequality: insights from South Africa's renewables procurement

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Abstract

Low- and middle-income countries across the world are facing the dilemma of needing to decarbonise and industrialise in the context of an electricity supply crisis. The transition from fossil fuels to renewable sources of energy is one of the first steps taken in any process of decarbonisation to address climate change. The energy transition is complex and holds significant economic risk. It requires strong governance and a capable state as well as coordination across government, community organisations and the private sector. This mammoth task requires the State to adopt policies that balance social, economic and climate objectives while reviewing past policies that may no longer be appropriate. This paper discusses the de-risking approach and the investment-centred approach to an energy transition, and using the case study of South Africa, argues for the necessity of an investment-centred approach to achieve a transition which supports local development and energy security. In analysing the example of South Africa's Renewable Energy Independent Power Producers Procurement Programme (REI4P), we highlight important learnings for the energy transition, which provide a useful window into the wider carbon transition.

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Introduction

South Africa holds a unique position globally because, while it is not responsible for cumulative emissions in the way that Europe and the United States (US) are, it ranks 16th highest in the world for annual greenhouse gas (GHG) emissions (Climate Watch Historical GHG Emissions, 2022). South Africa also stands out in terms of energy and emissions intensity across sectors due to low energy efficiency, coal dependence and prevalence of a coal-based minerals and industrial economy – what some have called a Minerals Energy Complex (MEC) (Fine and Rustomjee, 1996). Energy intensity[1] is, proportionately, on par with China, despite China having a much more productive economy (Crompton and Matsika, 2021). According to the latest GHG inventory report (2021), the energy sector is the highest contributor to emissions due to the combustion of fossil fuels. Combustion of fossil fuels occurs in energy industries, transport, manufacturing and other sectors, but electricity and heat production are by far the largest contributors to emissions in the energy sector (DFFE, 2021). Therefore, there is significant pressure on South Africa's electricity utility, Eskom, to decarbonise and transition to cleaner fuels amid an energy supply crisis.

Early industrial development across the globe was driven by coal but late industrialisers have used other sources of energy, in addition to coal. Such sources have included natural gas, crude oil and, relatively recently, renewables as these have become more affordable (Spencer and Mathur, 2019). Babayomi et al. (2022) argue that the objective of lower- and middle-income countries (LMIC) in the clean energy transition is to attain industrialisation primarily with low-carbon energy sources. This was something that developed countries did not have to contend with. A key question for LMIC is whether they can continue on an upward development trajectory, particularly in terms of income per capita, while transitioning their energy mix.

There is potential for the energy transition to lead to an energy-efficient development path, requiring lower energy inputs. However, there are legitimate concerns regarding premature deindustrialisation and the implications of that for lower-skilled employment as well as energy security (Spencer and Mathur, 2019). Beinhocker and Farmer (2021) argue that because renewable energy technologies have exponentially dropping prices, it is the best strategy for governments to support investment in clean technology to make it even cheaper and to avoid further lock-in to fossil fuels.

The energy transition is complex and requires policies that balance social, economic and climate objectives. Energy policy is therefore an intensely political matter. The just energy transition in LMICs and the implications of a late transition are yet to be thoroughly studied, particularly on issues regarding affordability (Afful-Dadzie, 2021; Babayomi et al., 2022). Nonetheless, the rate of take-up of renewable energy in LMICs has increased over the past decade (Afful-Dadzie, 2021).

In analysing the example of South Africa's Renewable Energy Independent Power Producers Procurement Programme (REI4P), we highlight important learnings for the energy transition. This provides a useful perspective on the wider carbon transition. South Africa must decarbonise and increase electricity supply, while also addressing

[1] Measured in megajoules/GDP

unemployment and inequality. A de-risking approach by government may support some investment in renewable energy but it fails to account for the developmental needs of the economy and the opportunity for industrialisation. We therefore argue that an investment-centred approach is required, which supports economy-wide industrial policy and regulation for a just energy transition.

This paper considers the role of the State in South Africa's energy transition as well as the trade-offs given different types of state and private sector interventions. Our research design draws on literature relating to approaches to public investment in decarbonisation and specific issues related to the transition to renewable energy. We then present the case study of the REI4P and analyse the programme against the literature. The authors of this paper bring a unique perspective to the energy transition in South Africa, combining expertise in economics and policy reform with actual involvement in policymaking related to the transition in National Treasury and Eskom.

The REI4P programme de-risked renewable energy at a time when the technology was new and there was significant uncertainty in the market. This was the correct first step to support investment in renewable energy in South Africa. However, in later rounds, the focus on de-risking private investment, pursuing industrial policy through local content and political interference has meant that the programme has not contributed adequately to energy security or industrial development. We conclude by discussing a way forward in light of the risks presented, and outline ideas around what an appropriate investment-centred approach would look like for South Africa. This paper is structured as follows: Various approaches to the role of the state in the transition to a low-carbon energy sector are presented. This is followed by key considerations for LMICs and South Africa in particular. A case study on REI4P is presented and discusses the sustainability of the programme going forward before a conclusion is offered.

Approaches to energy transition and the role of the State

Even at its current early stage, it is apparent that the unfolding energy transition will require significant mobilisation of resources, astute governance and significant state policy capacity. This is because transition involves overcoming challenges including "path dependence, monopoly power, resistance to pricing reforms, and behavioural inertia" (Mah et al., 2013: 8). However, what form that governance takes is a subject of debate. Two approaches will be discussed here: a de-risking approach which is aligned to a market-based response to climate change and an investment-centred approach which envisions a more active coordinating and market-shaping role of the State.

De-risking the transition

A narrower approach that has been adopted to finance transition-related infrastructure focuses on de-risking by the State. Gabor (2021) terms this approach part of the "Wall Street Consensus" (WSC) which places global finance at the centre of infrastructure roll-out and broader international development goals. Similar to the Washington Consensus, the WSC also emphasises fiscal discipline, central bank independence and privatisation. Within the WSC, the State de-risks public-private partnerships for institutional investors by taking the risk onto its balance sheet. This, however, increases contingent liabilities because the public sector often is required to compensate investors in cases where currency depreciates, demand falls or there is new regulation that affects profitability

(Dafermos et al., 2021). Where projects are designed largely in favour of shareholders, there are implications for the developmental impact of the programme as it only indirectly supports developmental goals (Müller and Claar, 2021).

Dafermos et al. (2021: 240) argue that the Covid-19 pandemic created an opportunity to accelerate "WSC-related institutional transformation due to rapidly increasing fiscal deficits, the normalisation of central bank interventions in bond markets in the Global South and the policy emphasis on "green recoveries" and climate resilience". The authors argue that the WSC approach will undermine climate-aligned development for the following reasons. Firstly, while in the short run this approach can increase funding available for climate infrastructure projects, the financial assets upon which these loans are based are more susceptible to financial shocks that might stem from climate catastrophes in the Global South. These potential losses can make institutional investors less willing to continue funding climate assets[2] in the Global South in the long run. Secondly, the Global South may become more susceptible to the global financial cycle which can have a negative impact if there are outflows of capital. Third, the scale of infrastructure investment required to decarbonise countries reliant on fossil fuels is significant and a swift shift in investment to renewable energy, which is not well-coordinated in the public interest, may result in the loss of key revenue streams that could exacerbate political instability. Fourth, the WSC approach does not address climate justice issues in that its objective is to create profitable opportunities for investors from the Global North rather than focusing on transfers for debt relief or climate reparations, which the authors suggest are obligatory. The authors conclude that this approach is likely to increase financial vulnerability in the Global South without achieving climate-related development objectives (Dafermos et al., 2021).

The focus of international climate policy to date has been market-based approaches which assume that climate change is the result of a 'market failure' and that the State should only intervene to ensure that the cost of GHG emissions is internalised. This is a market-fixing approach which leads to market interventions such as carbon taxes and subsidies for cleaner technologies. The hope with this approach is that taxes and subsidies will support a change in the decision-making of firms and individuals, thus resulting in reduced emissions. De-risking can be considered a market-based approach. However, this approach has not triggered sufficient acceleration in the energy transition that is required globally to reduce emissions and prevent disastrous climate impacts, and is not sufficient to drive such a shift (Lamperti et al., 2019). Renewable energy technology has also not been scaled up quickly enough to reduce reliance on fossil fuels for electricity (Allwood, 2021). The consumption of fossil fuels is still growing and the use of fossil fuels relative to other sources has not reduced (Somerville, 2020). Therefore, internalising the costs of GHG emissions is not enough. The recent reports of the Intergovernmental Panel on Climate Change (IPCC) acknowledged that transformational approaches are required. These include "rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems" (IPCC, 2018).

Therefore, a more active role for the State is proposed to support a transition to a low-carbon energy system. Mazzucato (2015) argues for a 'green entrepreneurial state', which uses a policy mix, including public direct investments and directed procurement policies. A 'mission approach' is adopted across sectors and governance

[2] Such as climate infrastructure projects – renewable energy, water management systems, etc.

levels to support the energy transition. For this paper, we will term this an investment-centred approach. The investment-centred approach is inherent to plans such as the Green New Deal and the Inflation Reduction Act in the United States and the Green Deal in Europe. Key to these approaches is the belief that the state will take on a central planning role to coordinate the transition (Mason, 2022). However, when there are questions about state capacity, as there are in South Africa, this approach is less feasible.

An investment-centred approach to transition

An investment-centred approach argues that decarbonisation requires significant state and state-directed investment and other market interventions to *build* a low-carbon economy. This approach proposes that economic growth can be enhanced by increased productivity. In the context of South Africa, this may translate as support for the state's implementation arms and astute policy rather than only direct investment – given its failure to date and the dire condition of its state-owned enterprises. An investment-centred approach to decarbonisation requires governance which is (1) multi-level – carried out from national to local governance levels; (2) cross-sectoral – an economy-wide approach; (3) prioritises low-carbon technology; (4) includes a policy mix of industrial policy and regulation; and (5) offers conditional public support (Andreoni et al., 2022; Lamperti et al., 2019).

The type of financing available for the energy transition is central to an investment-centred approach. It is commonly agreed that public resources are required to fund research and development as well as the "high-risk long-run investments needed for transformational innovation" (Lamperti et al., 2019: 76). This approach occurs not only at the start, but continues all the way through to the deployment of a demonstration plant. Instead of simply de-risking, public investment should seek high-quality finance for innovation towards the energy transition. Public investment can take the form of loan guarantees and export credit guarantees to improve access to private finance or, as in South Africa, long-term off-take agreements at agreed prices. In terms of these mechanisms, the risk of innovation in new industries lies with the State. It has been found that the private sector would be more likely to fund high-risk investments when there was public co-investment (Lamperti et al., 2019). Furthermore, due to the subsidies and under-pricing of carbon, investment in renewable energy and low-carbon technology is not as desirable for private investment which necessitates state involvement (Rodrik, 2014).

An investment-centred approach to the energy transition need not only focus on investments in energy generation. There are network services that will also support an energy transition (e.g. water, transport and energy infrastructure) which should simultaneously be prioritised and which requires widespread coordination and alignment (Lamperti et al., 2019).

Given the limitations noted in the State focusing on de-risking alone and the concerns about state capacity, industrial policy with incentives could be created to encourage state investment. Lamperti et al. (2019) argue that the State should also be encouraged to take on these risks by accessing a fraction of the returns for successes. This is in line with an industrial policy which picks winners, supports high-risk investment in innovation, and reaps the rewards (and disappointments) of this. A fundamental aspect of this is the accomplishment of the goal. If subsidies are given and investments made, there should be strict monitoring of progress and opportunities should be adapted if they

do not yield results (Amsden, 2008; Rodrik, 2014). Further, support should be provided with conditions so that state resources are not wasted on projects that do not need state support. Of course, picking winners amid the current twin forces of rapid change and the 4th Industrial Revolution, as well as the shifting energy technologies, requires a particularly astute state with a considerable appetite for risk. Mistakes are inevitable within industrial policy; what is most important is that the policy is designed to recognise errors and make appropriate revisions (Rodrik, 2014).

We can look towards the developmental state literature to understand the capacity required by the State to adopt an investment-centred approach to the just energy transition. This requires strong state capacity (Chibber, 2002). Chibber's (2002) analysis of the role of the state in industrialisation finds that state capacity has three key requirements. First, internal cohesiveness between entities; second, a rule-following bureaucracy; and finally, an appropriate apportionment of power among state policy agencies. While bureaucratic capabilities are seen as necessary, it is argued that they are not sufficient in and of themselves for successful industrialisation. Bureaucratic capabilities should be coupled with the appropriate institutional arrangements and necessary authority to support developmental aims and avoid interagency rivalry and conflict (Chibber, 2002). Additionally, Chibber (2002) and Amsden (2008) both highlight the requirement that the State should also be able to monitor the performance of firms and ensure that investments conform to policy priorities. Andreoni et al. (2022) refer to this as the 'carrots and sticks' of industrial policy, where public investment is conditional upon meeting certain targets. These lessons on state capacity in the context of industrialisation can be applied to an investment-centred approach for energy transition, particularly in LMIC contexts where industrialisation is often a primary goal of government alongside energy transition.

It is important also to recognise that, especially in LMICs, the State can be an important resistor of change, especially in countries which are significant producers of oil and gas. This is the case because the State wants to maintain control of natural resources in order to use the revenues from fossil fuels to fund development. Therefore, "policy-making in countries that are based on the resource nationalism pattern can be the main hindrance towards renewable energy development" (Lazaro et al., 2022: 3). Electricity governance has often been centralised due to the nature of electricity generation requiring mega-projects and coordinated transmission and distribution. However, as renewable energy technologies grow, there is a shift in the structure of the energy grid, with decentralised electricity generation becoming more common. The role of multi-level governance is therefore important to an (electricity) energy transition, as local and provincial governments must increasingly be involved as the spatial nature of the electricity grid and other services, such as transport, shifts (Lazaro et al., 2022).

Against this background, we consider what these approaches entail for the roll-out of renewable energy and a just transition. Arrangements offering higher returns and lower risks for private investors can make service delivery expensive for the State and undermine climate policy objectives. Instead, an investment-centred approach may be preferred in which the State takes on a multi-faceted role and uses many instruments across multiple sectors to transition the energy sector. The investment-centred approach involves de-risking but this is not its only mechanism

of intervention, and it has strict conditions for the de-risked investments. However, this requires competent state capacity to achieve outcomes as well as institutional arrangements and monitoring of performance.

Context of low- and middle-income countries in the energy transition

LMICs have a unique set of challenges that need to be carefully considered in the context of the energy transition. Importantly, many LMICs are dealing with having to transition to low-carbon energy with a simultaneous energy supply crisis, as well as the need to industrialise and grow their economies. In addition, other related challenges include low grid capacity and inefficiency, lower rates of urbanisation and youth demographics (Babayomi et al., 2022). Moreover, several enabling business conditions need to be put in place to attract finance. This will require better infrastructure and services.

Energy poverty is a problem which affects around 770 million people globally, most of whom are in Africa and Asia (IEA, 2021). The transition to low-carbon energy sources means that there will be an increase in demand for electricity generation as, for example, the transport industry transitions to electric propulsion rather than internal combustion engines which use oil and gas. In the context of an electricity supply shortage, expanding electricity fast enough is a significant challenge in and of itself, let alone for transition. It is possible that, instead of replacing fossil fuels with renewable energy sources and thereby lowering emissions, renewable energy is simply added to the overall generation capacity of the country. In effect, this is a diversification of the energy mix, not a transition. This has been the case in Sao Paulo, Brazil, which is performing relatively well with over 60% of energy generation from renewable sources but, as renewable energy increases, so too have fossil fuels (Lazaro et al., 2022).

The rate of the energy transition in LMICs will be strongly influenced by the ease or difficulty of access to finance, and the cost of available finance. Finance is required for innovation, manufacturing and building consumer infrastructure. Notably, the cost of finance will depend on the risk profile of LMICs. A country's risk profile is determined by whether there are commercial arrangements for predictable revenues, the creditworthiness of counterparties, available infrastructure and enabling conditions (Babayomi et al., 2022). In addition, Babayomi et al. (2022) further note that economy-wide issues, such as depleted public finances, currency instabilities and weaknesses in local banking and capital markets, also raise challenges to attracting investment in energy projects. In such cases, foreign investors deem projects too risky which may result in LMICs having to increase rewards to investors. As a result of the higher cost of capital and logistics capacity, the cost of the transition to renewable energy may be higher for LMICs. Babayomi et al. (2022) suggest that these disadvantages may be offset by the availability of natural resources available in African countries, but this is yet to be quantified. They also note that when the right regulatory and policy frameworks are in place, the cost of rolling out renewable energy can be lowered and could include well-managed auctions and transparent tenders.

Given the fiscal pressure faced by LMICs, policymakers can be forced to maintain a high interest rate to attract foreign capital or to de-risk climate-related infrastructure investments. These measures may redirect much needed public funds in LMICs where there is less fiscal space due to competing interests such as debt-service costs (Löscher

and Kaltenbrunner, 2022). This calls into question the quality and quantity of financing available to transition away from fossil fuels and mitigate the impact thereof. It is important that financing is able to support sectoral transformation and innovation – this requires the State to play an active role in directing finance and coordinating sectors.

In the South African case, an energy transition is an opportunity to confront the inter-linked structural problems facing South Africa, such as lagging investment, rising inequality, bureaucratic procedures that limit interaction and the trust deficit between government and the private sector (Andreoni et al., 2022). This, however, requires the public sector to redesign programmes and incentives such that the outcome is a dynamic one which meets public objectives. In the section that follows we consider elements of the REI4P in South Africa that can be reconsidered to promote the rollout of renewable energy while accounting for other developmental goals.

Case Study: REI4P

REI4P was designed to support state procurement of renewable energy from independent power producers through an auctioning system. REI4P has contributed over 5 661 MW[3] in operational electrical capacity through contracts with 92 independent power producers (IPPs). This has attracted R209.6 billion in investment and has created 63 291 job years[4] (IPP Office, 2021). REI4P had a promising start but has been plagued by delays since 2015 and has failed to accelerate renewable energy generation in South Africa in line with government targets.

We analyse the role of the State within the REI4P programme and consider what this means for South Africa's broader transition plans, in light of the issues raised in the earlier sections of this paper. We highlight some of the risks that will arise should the government pursue financing for climate-related infrastructure in a similar manner. This section raises issues around the sustainability of REI4P and poses key questions for policymakers that should be considered in supporting climate change responses while going forward.[5] This case study is an example of the South African State playing the role of reducing risk for private sector infrastructure investment through public procurement, as described by the WSC, but simultaneously targeting several social and industrial policy objectives typical of an investment-centred approach.

Institutional design

The South African government's first entry into renewable energy commenced with the gazetting of the White Paper on Renewable Energy in 2003, followed by its first Integrated Energy Plan[6], also in 2003. It was given a further nudge by NERSA in December 2008 when it published its intention to introduce Renewable Energy Feed-In Tariffs (REFIT) or guaranteed prices for electricity generated from renewable sources. The move towards

[3] 2 292 MW of Solar PV, 600 MW of Solar CSP, 3 357 MW of onshore wind and 74 MW of other energy sources.
[4] The equivalent of a full-time employment opportunity for one person for one year.
[5] Although this case study focuses on renewable power generation it is dwarfed by the state's decision to allow Eskom to try and build two of the largest coal-fired power stations in the world and the cost, contingent liability and environmental consequences of that decision.
[6] An IEP is not intended to be a 'plan' literally. Rather, it is a series of options that set out possible trajectories of future energy development and their associated costs taking into account demand, available energy resources, their transformation, economics, energy efficiency and environmental considerations. It is intended to "serve as a **guide** for energy infrastructure investments" (National Energy Act, section 3(6)(a)), - emphasis added)

renewable energy was given further impetus by President Zuma's commitment to aggressive renewable energy targets at COP 17 in 2009. The REFIT never materialised. Instead, the Department of Mineral Resources and Energy (DMRE) [7] took control of the rate and quantity of generating capacity to be procured, which was determined by its Integrated Resource Plans (IRPs).

The Independent Power Procurement Office (IPPO) launched REI4P in 2011, a form of competitive bidding that yields the best available price at the time. The REI4P exists under a single buyer model in which Eskom buys electricity generated from IPPs, after a Power Purchase Agreement (PPA) has been signed. The PPAs are valid for twenty years. There is an agreement between the DMRE, National Treasury, Eskom and NERSA that guarantees payment to IPPs (Eberhard and Naude, 2017). The effect of the agreement is that the IPP payments are ring-fenced and passed through to the consumers through the Eskom tariffs. An offtake agreement with Eskom and the sovereign guarantee of payment are among the risk-mitigation measures used to attract investors to participate in the REI4P. Thus, the only risks remaining with the investor are construction and operation. As the market matures, it is suggested that the overall risk balance will be increasingly weighted in the investor's favour if the government persists with guaranteed off-take agreements.

Table 1: Summary of REI4P Bid Window Rounds

Bid Window (BW)	**Year**	**No. of projects awarded**	**% solar power**	**% wind power**	**Capacity awarded (MW)**	**Total Investment ($bn)**	**Average price (R/kWh)**
1	2011	28	54	46	1426	6.2	3.12
2	2012	19	45	54	1040	4.2	2.05
3	2013	17	44	54	1457	4.5	1.65
3.5	2014	2	100	0	200	1.8	-
4	2015	13	37	62	2210	2	1.03
5	2021	25	38	62	2583	2.9	0.47

Source: (IPP Office, 2021; Pinto, 2021)

Government guarantees to IPPs have reached R208.5 billion (Republic of South Africa, 2022) which, along with R350 billion in guarantees for Eskom debt, constrain government's ability to fund other needs. The extent of these guarantees calls into question government's capacity to continue financing power generation with such guarantees.

REI4P thus far may be separated into two chapters: a better first chapter and a worse second chapter. Initially, its auction processes were well received by the market. The second chapter of the REI4P concerns Eskom's decision not to sign any further PPAs with the IPPs because it was believed that renewable energy had failed to provide

7 In 2019, the Department of Energy and the Department of Mineral Resources were merged to become the Department of Mineral Resources and Energy.

energy when Eskom needed it most (News24, 2016)[8]. This hiatus prevailed until after a new board was appointed in 2018 when Eskom signed 27 PPAs with a combined investment value of R56 billion and capacity of 2 300MW from REI4P bid windows 3.5 and 4. Eskom's ability to derail government programmes calls into question the prudence of retaining so much of the electricity supply industry in the hands of a single state-owned entity, with or without subsidiaries.

As a result, between 2016 and 2022, state procurement efforts did not add a single new power station to the grid – a delay of six years during an electricity crisis evident in ongoing rolling blackouts. In recognition of the unfolding electricity crisis, President Ramaphosa reiterated Eskom's estimate of an electricity supply shortfall of between 4 000 and 6 000 megawatts over the next five years and announced measures intended to ameliorate the crisis (Ramaphosa, 2021). The opportunity to build power stations up to 100MW would no longer require a licence and municipalities in good financial standing would be allowed to procure electricity themselves. Subsequently, the limit on the size of the power station was completely removed. These announcements constitute another shift towards market reform.

REI4P efforts to enhance local development

All REI4P bidding rounds have required procurement of local products and services, known as local content, in order to encourage local manufacturing of renewable energy technologies. Agreements signed by IPPs contained local content requirements. The hope was that these requirements would stimulate local manufacturing of renewable energy. One of the difficulties with local content requirement is a cost-raising impact and bottlenecks (Müller and Claar, 2021). Eskom found that local content requirements caused its transmission grid construction costs to be 1.42 times that of Namibia.[9] On this basis, the R180 billion investment in the grid required to accommodate renewable generators could be reduced by R53 billion to R126.72 billion if there were no local content prescripts.

There is a substantial debate on the value of local content requirements as industrial policy interventions. Local content requirements within REI4P varied in technology but mostly ranged from 25% to 40% in Round 1 and increased to between 40% and 65% in Round 4 (Ettmayr and Lloyd, 2017). In the REI4P case it failed for three reasons. Firstly, existing global production networks were very difficult to compete with due to low costs and control over intellectual property. Secondly, there were significant delays in the timing of REI4P bids, meaning that manufacturers that were set up in the first five years of the programme had to close because bids after 2015 were delayed. Lastly, international companies used any loophole they could find to avoid local content requirements (Baker and Sovacool, 2017). Therefore, although initially successful, the REI4P has been largely unsuccessful in stimulating the local manufacturing of renewable energy technologies. This calls into question the possibility of productivity growth in the transition to lower emission technologies. Ideally, the transition should include tools that stimulate growth in a range of sectors, rather than simply replacing fossil fuel-based power stations with renewables.

[8] Part IV Volumes 3 and 4 of the Report of the Judicial Commission of Enquiry into State Capture (the **Zondo Report**), dedicated to state capture at Eskom, published on 29 April 2022, recommended that Mr Molefe along with several other then Eskom executives be prosecuted for contravening the Public Finance Management Act (**PFMA**), and/or Eskom policies, and/or the Prevention and Combating of Corrupt Activities Act. The Commission argued that Mr Molefe's appointment as CEO of Eskom was a part of the scheme of State Capture. Eskom has also launched legal proceedings against Mr Molefe and several other previous Eskom directors and executives.
[9] Personal communication 13-5-22.

The impact of local content requirements and their cost-raising impact on key intermediate inputs (such as electricity) to the economy is a subject of much debate.

Another aspect of local content requirements is the dearth of available suppliers and sufficient capacity to meet demand from IPP bid winners. This delayed a much-needed capacity from being brought onto the grid. Several local suppliers closed after the 2015 hiatus in signing PPAs. There are contesting opinions on whether local content prescripts result in longer-term economic benefits. The IPP Office reported that "total **projected** procurement spend for BW1 to BW4 during the construction phase is R71.1 billion" (emphasis added) (IPP Office, 2021). The actual amount spent on local content was estimated at R45.3 billion in December 2018, but this requires investigation (Montmasson-Clair and Chigumira, 2020).

All bidding rounds have required some form of local community ownership, at least 2.5%. Most IPPs have opted for community trusts, some of which have reported success. "For projects in BW1 to BW4 [bid window 1 to bid window 4], qualifying communities will receive R25.5 billion net income over the life of the projects (20 years)" (IPP Office, 2021). Most of this will be paid out in the later years. Black ownership over BW 1-4 is 34% on average, of which 9% is Black people in local communities (IPP Office, 2021). The actual impact of these policy interventions requires investigation. Furthermore, there have been complaints that the IPP agreements with Eskom are not public (Overy, 2018), although they are supposed to be, which reduces the local community's ability to hold IPPs and the IPP Office accountable in meeting social and economic development commitments (Eberhard and Naude, 2017).

While both localisation and community ownership are important developmental objectives in the long term, there is a sense that local content specifically set unrealistic expectations which the industry itself is unable to meet. This has slowed down the roll-out of renewable energy and constrained energy security.

Risk-sharing under REI4P

This section considers the risk allocating arrangements under the REI4P and whether the model used historically should continue to be pursued.

Regulatory constraints

Payments to IPPs are facilitated through NERSA's Multi-Year Price Determination (MYPD) Methodology which was developed for the regulation of Eskom's revenues. It forms the basis upon which the NERSA or 'the Energy Regulator' evaluates the price adjustment applications received from Eskom. Through the MYPD, payments for IPPs are approved. The MYPD makes allowances for Eskom's over- and under-recoveries through the Regulatory Clearing Account (RCA) and surpluses are recovered through the RCA adjustments to the tariffs. The main issue that has arisen in this setup is that while IPP costs are recovered in full, NERSA has historically not covered the full ambit of Eskom's costs. NERSA has justified this by arguing that Eskom has not been prudent in its expenditure. However, the costs incurred by Eskom are sunk costs and, if they are not recovered through tariffs, they will likely have to be met by the government. Since 2018/19, NERSA and Eskom have been in legal disputes about the process, timing and methodology applied by NERSA to determine tariffs.

The tariff increases allowed by NERSA determine Eskom's liquidity position. This has an impact on the security of electricity supply but, more immediately, on the state budget as Eskom requires bailouts to prevent an Eskom debt default. Such a default would have knock-on effects on other state debt and thus imperil the State's entire borrowing programme. In addition, an IPP under-recovery by Eskom means that Eskom must carry the cash flow burden until, and if, the RCA adjusts the tariffs in compensation, something that Eskom's finances are ill-equipped to do. In 2020, the courts ruled in favour of Eskom which allowed the utility to impose an increase of at least 9.8% in electricity tariffs for its 2021/2022 financial year. It was suggested that NERSA had taken irregular decisions that had brought the competence of the regulator into question[10]. The result is that the South African public faced sudden large increases in electricity prices which contributed to a cost-of-living crisis. Notably, poor regulatory decisions and capacity can have a large impact on the fiscus, as well as on households and businesses.

Eskom's bailouts are an indirect subsidy to the coal value chain which dominates Eskom's power generation. This indirect subsidy to coal also undermines the government's introduction of carbon taxes which are intended to more accurately price the real cost of coal and other fossil fuels in its endeavours to meet its Paris Agreement commitments. As such, a review of the regulatory framework is critical such that services are paid for adequately in line with the 'user pays' principle, which has been the cornerstone of South Africa's financial policies.[11] This would alleviate the burden on taxpayers to cross-subsidise electricity users. In addition, cost-reflective electricity tariffs are important price signals to the market. The current electricity subsidy design may then have to be reconsidered.

Financial gains made by IPPs

One criticism of the REI4P was that investors' gains were disproportionately high. Estimates suggest that the internal rate of return for the first bid window was around 17% falling to 9.5% in the fourth bid window (Pinto, 2021). Nevertheless, the reverse auction process yielded the lowest tariffs obtainable from the market at the time.

An assessment of the type of REI4P investors by Müller and Claar (2021) shows that the investment has been dominated by transnational capital which was responsible for 37.8% of the projects and 50% of projects in BW4.[12] The second most common investment pattern (with 31.7% of projects) is transnational social entrepreneurship, where transnational ownership is complemented by high levels of community ownership. The least common pattern of investment is localised renewable energy ownership (30.5% of projects) where South African-based entities are involved, using more local content with higher levels of community ownership. Debt finance for these projects was usually from national or development banks. This analysis highlights the dominance of transnational investment in 69.5% of REI4P projects (Müller and Claar, 2021). These findings may indicate an increasing role of foreign investors in REI4P bidding rounds.

10 Thus far Eskom has won all of the legal challenges it has brought against Nersa.

11 This has not prevented it from providing subsidies to the needy for water and electricity.

12 Transnational capital "is characterised by complex shareholder consortia, involving multiple international partners, and an exceptionally high share of inter- and transnational capital, ranging between 40% and (mostly) 60%, with private equity playing an important role" (Müller and Claar, 2021: 341)

In the second bid window, a "value for money" assessment was conducted which takes into account the bidder's price proposal, economic development commitments, the project's calculated internal rate of return and foreign exchange risk borne by the government (Eberhard and Naude, 2017). If payments to developers were considered to be too large or unjustifiable by the then Department of Energy (DOE), the bidder could fail this assessment. Project developers also enjoyed various tax exemptions, including accelerated depreciation on plant and equipment along with deductions for expenditure on supporting infrastructure, such as roads and fences (Bridle et al., 2022). Banks and life assurers were also among the beneficiaries of the programme and made significant returns because, although the risks were reduced substantially, this was not reflected in interest rates charged for making finance available. The financial sector viewed the REI4P in a favourable light as key risks were mitigated through government support mechanisms.

Balancing costs and risks

There is an argument that, given that the market for renewable energy technology was underdeveloped in 2011, the technology was new and there was a trust deficit between the government and investors, it made sense for the government to cover the risk of the programme through offtake guarantees that were backed by government. In addition, prices were the result of a competitive tender process and reflected the novel technology. However, given the changing price and risk profile related to the sector since 2011, the guarantees may no longer be necessary. The literature reviewed provides some important considerations regarding the risk profile of the sector, including commercial arrangements, political and regulatory uncertainty, and infrastructure and logistics.

Prices for renewable energy have come down significantly over the past decade. The much anticipated fifth bid window was over-subscribed and attracted several diverse project developers at much lower prices. Prices for solar PV "have come in at ZAR 0.429 per kWh, a 45% drop from 2015 prices and a 75% drop from the 2011 auction prices. New wind prices came in at ZAR 0.495 per kWh, a 36% reduction on 2015 prices and a 90% reduction on 2011 prices. Finally, concentrated solar power has bid prices at ZAR 2.547 per kWh, showing a reduction of 43% on 2011 prices" (Bridle et al., 2022). The major contributors to the drop in price have been falling global technology prices, growing competition from 53 bidders in the first bid window to over 100 in the latest round, improved efficiencies in site selection and lower financing costs related to debt and equity. The financial sector has also since developed significant capabilities to assess and manage risks in the renewable energy sector. The significant price decline is one of the most demonstrable indicators of the changing risk profile attached to the REI4P (GreenCape, 2020). Unfortunately, given global inflationary pressure in 2022, input prices have increased and the tariffs bid did not allow some of the projects to reach financial close. However, PPAs do make room for allowable adjustments.

Given the substantial decline in price and the maturity of the sector, there has been the suggestion that the private sector shoulder more of the risk, on the one hand. This would entail a gradual reduction or elimination of state guarantees. The single-buyer model has given rise to the need for government support, given the precarious financial position of the buyer (Eskom), which has increased contingent liabilities for the State. The R208.5 billion guarantee for renewables is in addition to the R350 billion in debt guarantees already provided to Eskom, as well as guarantees to other state-owned entities.

On the other hand, there is an argument that if the government is unable to provide energy, evidenced by the increasing intensity of load shedding, then it should take on the risk. Because the State has taken on the role of supplier of last resort and has failed to deliver security of supply, negatively impacting the South African economy[13], some would argue that the government should shoulder additional risk to remedy its failings. However, the government's financial constraints largely preclude this. Instead, policy changes are shifting more of the power supply risk to the private sector and customers. We now turn to some of the challenges that this policy direction will encounter.

Towards a new market structure

Draft amendments of the Electricity Regulation Act were published in early 2022 and provide the foundation to establish a competitive electricity market in which there is a quasi-independent Transmission System Operator (TSO), a subsidiary of Eskom. If the market is to be the solution to providing investment for power generating capacity there are two major challenges to be addressed. Firstly, the issue of the 'single buyer' and investors' different levels of support/subsidy and, secondly, the level of social policy, including local content requirements. If the TSO is required to be the single buyer, what balance sheet will it have enabling it to do so, and will this require more government guarantees? In terms of the policy burden, local content requirements under REI4P mean that successful developers of older projects under the programme (those with "legacy PPAs") will have incurred greater costs due to older more expensive technologies and social policy costs than newer independent generators who register with NERSA under the revised Schedule 2 amendments and have lower technology costs and limited social policy commitments. These differing social and industrial policy costs borne by different producers at different points in time pose challenges to the operation of an efficient electricity market. There are also Eskom's subsidised assets to consider. A clear strategy will need to be developed such that generators (centralised and independent) will be able to compete on an equal footing. In addition to the subsidies Eskom enjoys from regular bailouts, its return on equity is far below private sector market expectations, adding further complexity to the goal of a market with a level playing field.

As a larger share of the electricity market is supplied by the private sector at market-related returns on equity, electricity prices could be expected to rise, *ceteris paribus*. Rising electricity prices will cause increased defection from the grid by wealthier households resulting in a smaller pool of customers to bear the costs of the national system.

In their paper, Bridle et al. (2022) noted that there was insufficient publicly available data to quantify the cost of subsidies to the REI4P generators in South Africa. The subsidy would be the difference in the agreed bid price and a "reference price" that represents unsubsidised prices. Notably, however, the subsidy to renewable energy IPPs is

13 Estimates from a study by Nova Economics on behalf of Eskom indicate that 1% load shedding (as a percentage of electricity sales) is associated with a 0.4% decrease in GDP growth (Eskom, 2021). The CSIR has put the cost at R700-million per load shedding stage per day. In 2019 alone, the CSIR estimated that load shedding cost the economy between R60-billion and R120-billion (Wright and Calitz, 2020).

likely to come down as the price of new technologies has come down. Table 2 outlines the various subsidies in place.

Table 2: Differing levels of subsidy and social policy responsibility for various players in the market

Category	**Subsidy**	**Social policy responsibility**
Eskom	Bail outs, guarantees, below market rates of return	Instrument of a developmental state Local content procurement BEE Legacy subsidies and cross-subsidies to agriculture and residential customers
REI4P	20-year PPA guarantees	Local content (temporarily relaxed in July 2022) BEE Community ownership
Other IPPs	None	None

Source: Author's analysis (IPP Office, 2021)

Given these different subsidies and responsibilities, it is unclear how all players will compete on an equal footing. In addition, some coal power stations – some with 50 years remaining of their useful lives – will not be able to compete in a market and will become stranded assets, which is a key issue for consideration in the transition. Potential job losses and increasing electricity prices may require state support but the government's balance sheet is already stretched due largely to Eskom and, to some extent, IPPs. External financing, therefore, plays an important role but the quality and quantity of finance are important if developmental goals are to be achieved.

In the context of South Africa's development challenges, if financing the transition does not take into account broader developmental objectives and a wider range of sectors, the transition is likely to have uneven outcomes. It also raises further questions. Do renewable technologies still require infant industry protection in the form of 20-year price and off-take government guarantees? Would investors invest without such guarantees and, if so, at what price? These are important questions that relate to the distribution of risks, costs and benefits because the government's fiscal space within which to extend such guarantees is limited. In 2022, Eskom auctioned access rights to some of its land to renewable power station investors who have undertaken to invest in some 2000MW of capacity without offtake guarantees from Eskom, demonstrating that the market appears to be ready to invest without state guarantees (Burkhardt, 2022). Judgement should be reserved until those investments have proven commercially successful.

The opening up of electricity generation to private entities has been accelerated due to the crisis of increased load shedding which has had significant implications for government procurement programmes and their sustainability. However, opening the market for generation to private entities will have implications for energy access, affordability

and grid management[14], which must be considered to ensure that energy poverty is not exacerbated. An example of an unforeseen consequence of opening the market is the reduced grid capacity available for bid window 6 of REI4P. When the bids were open, the planned capacity for procurement was based on existing grid capacity and was estimated to be 4 200MW. However, when the winning bids were announced, only six projects were approved with a total of 1 000MW (Creamer, 2022). The reason for the change in allocation was due to private projects taking up the grid capacity. If private generation is given precedence over REI4P procurement processes, bidders are likely to withdraw from the REI4P programme, considering that the likelihood of success is low, and the cost of participation is high.

Inequality and energy justice

Energy security and poverty are integral to the just energy transition, although they are not given as much attention in the literature as employment outcomes (García-García et al., 2020). Although access to electricity in South Africa is at 84.7%, in 2019 there were over 820 000 households that did not have access to electricity and many more that had a connection but could not afford the electricity prices (Stats SA, 2019). Energy poverty is defined as a lack of access to energy or the inability to afford energy and is calculated by assessing the proportion of household income spent on energy. The rate of energy poverty in South Africa was 58% in 2015 (Ye and Koch, 2021). This has a significant impact on health and well-being, limits income-generating activities and increases inequality (Mohlakoana and Wolpe, 2021).

To address the affordability of electricity, the South African government implemented a Free Basic Electricity Subsidy (FBE) in 2003 and a Free Basic Alternative Electricity Subsidy in 2007. The FBE provides 50kWh per month to eligible households. It is funded through the local government 'equitable share' allocation to municipal governments from the national government, but this is widely argued to be insufficient to meet basic needs and the eligibility criteria are believed to exclude many deserving households (Inglesi-Lotz, 2021; Mohlakoana and Wolpe, 2021). In addition, household electricity tariffs are currently designed using an inclining block tariff (IBT) pricing structure. An IBT is a stepped-pricing mechanism whereby the price of a service increases according to predetermined blocks of consumption. In such cases, the charges per unit of electricity increase as the level of consumption increases in a step-wise fashion. This policy essentially requires Eskom and municipalities to cross-subsidise low-income households (both in urban and rural areas) by high-income residential, commercial and industrial customers[15].

The cost of electricity in South Africa has increased significantly over the past two years, with a 15.6% increase in 2021 and an increase of 9.6% in 2022 (BusinesTech, 2022). In comparison to other LMICs, electricity prices are slightly above average (Thompson, 2022). This and future price hikes aimed at cost reflectivity will hit the low- and middle-income residential customers the hardest. These customers are also struggling with an increased cost of

[14] South Africa's grid was not designed for this and will require approximately R180 billion in investment over the next ten years to accommodate more renewable generators (Omarjee, 2022).

[15] In 2022 Eskom applied to NERSA for 'cost reflective' and unbundled tariffs that would be more transparent in exposing and ultimately phasing out cross-subsidies. A decision is awaited.

living due to price hikes for food and fuel. Withdrawing subsidies is often politically difficult and potentially unjust. To compound matters, the cost of electricity is likely to increase due to decarbonisation and upgrading of the grid, even if the levelised cost of electricity for renewable electricity generation is lower. There is a risk that rising electricity prices will contribute to popular sentiment swinging towards opposition to the just energy transition. Continuing electricity tariff increases may have a twofold effect. Firstly, households that cannot afford electricity tariffs simply do not pay and opt for illegal connections. City Power (Johannesburg) has noted a significant decline in revenue as tariffs rose in the last five years because of non-payment. This presents a significant threat to the viability of municipal revenue generation (and, in turn, to Eskom's fragile finances[16]) and, thus, the cross-subsidy. Secondly, increasing tariffs contribute to defections from the grid by wealthier households.

Electricity distribution is mainly conducted through municipalities who also collect revenue from electricity sales. Increased grid defection by wealthy households may then reduce municipal revenue and the ability of municipalities to maintain their electricity networks or to fund other services. Thus, municipalities need to reconsider their funding models and adapt to the changing environment while still maintaining their collapsing distribution networks and providing electricity at affordable rates to low-income households. Increasing tariffs could lead to calls for the State to increase its subsidies to low-income households. Lower-income consumers may be forced to retreat down the energy ladder to cheaper but more polluting fuels such as coal, wood and paraffin, the very opposite of a just energy transition.

Given that tariffs are likely to increase and there will probably be increasing demands on the State to support low-income households through the transition, it is important to reassess subsidies, including those that support the REI4P. The great art in negotiating the just energy transition will be in reducing the costs of the transition to society and allocating those costs to the different sectors of society in a politically acceptable and socially just fashion – a daunting prospect for South Africa's fractured polity.

Analysis of the role of the State in the REI4P

REI4P is an example of a climate policy based on public-private partnerships, where the State plays a de-risking role and supports private investment. It is not uncommon for the State to de-risk private investment in an environment in which there is political, regulatory and economic uncertainty, as the Industrial Development Corporation and other government programmes have done for many years. However, it is not always sustainable in the long term. We argue that while the South African State has attempted to encourage local manufacturing through local content requirements within the REI4P, this was not sufficient to boost local manufacturing and green industrialisation. Therefore, a greater commitment to an investment-centred approach is preferable with a focus on delivering timely outcomes, flexible arrangements that cater to global flux and, once the load shedding crisis is resolved, a commitment to facilitating the development of a competitive local industry using appropriate tools and manageable targets. Alternative industrial policy tools may be more appropriate than local content requirements, which have not

[16] By July 2022 defaulting municipalities owed Eskom over R40 billion.

been implemented successfully, to facilitate the development of a competitive local manufacturing base for a push into renewable technologies.

The investment-centred approach to a transition highlights the necessity for a central coordinating role of the State. Whether the South African state can meet this challenge is uncertain. Swilling et al. (2016) argue that the South African State lacks the autonomous developmental state apparatus to achieve structural transformation, and has supported green growth which emphasises new markets and technological opportunities while failing to challenge the MEC. The Presidential Climate Commission (PCC) has taken promising steps in planning a just transition, but there seems to be conflict within the State on the approach to the transition, with the DMRE establishing its own Just Transition framework in competition with the PCC's Just Transition framework. These processes indicate a lack of coordination across state entities and a lack of commitment to one vision. There is also a lack of consensus on which energy technologies should be supported, and "a broader misalignment persists between South Africa's green economy objectives and the country's other policies and priorities, with substantial support still directed at energy- and carbon-intensive sectors" (Montmasson-Clair and Chigumira, 2020: 8).

In arranging its investment regime for an energy transition, government has to serve public interest and aim for the 'right' balance among competing interests, which include sustainable security of electricity supply, returns to investors, improvements to local manufacturing, affordable pricing and social needs: a tall order. Müller & Claar (2021: 337) argue that the REI4P fell short regarding "affordability, access and ownership of technologies".

South Africa has measures in place to encourage green industrialisation through industrial policy. However, these measures are add-ons to existing policy and lack coordination in implementation. These measures include IDC investment and loans, local content prescripts, funding through the Black Industrialist Support Programme and some tax incentives. However, direct funding support for renewable energy in recent years is a small portion of broader support programmes where plastics, pharmaceuticals and minerals beneficiation received far more (Montmasson-Clair and Chigumira, 2020). This suggests that sustainability and renewable energy are an add-on to industrial policy rather than being central to its design. If South Africa hopes to achieve industrialisation and decarbonisation of the economy, green industrialisation will need to be mainstreamed across coordinated industrial and energy policies. Similarly, subsidies for carbon-intensive sectors will need to be phased out to ensure alignment on sustainable industrialisation. The challenge will be to avoid simply replacing fossil fuel rents with renewable technology rents.

The experience with REI4P provides grounds for an analysis of the State's role in the energy transition so far. The approach was to de-risk investment in renewable energy while putting in place certain requirements for local development through local content requirements, social and economic development spending, and local ownership through community trusts. This approach is, thus, not straightforward de-risking and does have elements of developmental direction in line with an investment-centred approach. Overall, the REI4P is argued to be a success in that it increased investment into renewable energy in South Africa. However, its implementation has not

succeeded yet in supporting much green industrialisation or decarbonisation. A better-coordinated programme may be required to achieve those objectives as South Africa's energy sector enters a new, more liberalised market.

Conclusion

Four lessons can be drawn from this case study. Firstly, the state may need to take on risk, initially to support new technologies in the shift to a low-carbon economy, but over time this should be adjusted based on technological developments and shifts in global pricing. Second, the contradictions between support for the coal value chain via Eskom bailouts, on the one hand, and carbon taxes and state guarantees to renewable energy projects, on the other hand, need to be reconciled from a policy point of view but also to ensure the required level of service while minimising the costs to the state.

Third, industrial policy support cannot be based on intermittent demand. Instead, there needs to be sustained demand over a period long enough to warrant investment in manufacturing capacity, both equipment and skills. Lastly, climate policy should consider the broader impact on the economy, particularly as it relates to employment, livelihoods and equitable access to basic services.

South Africa's Just Transition Framework focuses on public-private partnerships de-risking foreign investment, and blended finance (PCC, 2022). However, there are concerns when it comes to equitable access and local development in this approach and so there should be more consideration of what an appropriate investment-centred plan would look like for South Africa – one that finds the 'right' balance among all of the competing policy objectives.

Recommendations for the improvement of the REI4P programme include opportunities that focus on local development, potentially through a regional bidders round which aims to develop renewable energy projects in provinces where there is no renewable energy at present, but where there is grid capacity. Far more effort will be required to deal with the complexities of moving further towards an open electricity generation market, particularly in dealing with the complex mix of generation assets with their differing degrees of subsidies and the looming prospect of large, stranded assets, with both renewable[17] and conventional technologies.

The approach to industrial policy for renewables has focused too heavily on local content requirements. The local industry requires other industrial policy tools if localisation is to succeed (Müller and Claar, 2021). These could include the following:

- State investment in research and development. The long-running but narrow focus on hydrogen should be broadened to incorporate other renewable technologies.

[17] Renewable technologies could become stranded due to the fast pace of change and decrease in financial feasibility of certain technologies.

- Tax incentives offered to small businesses for renewable power generation should be implemented and widened to include residential and commercial properties.
- Innovative municipal financing solutions require serious consideration (e.g., SANEDI research found that electricity distributors with reliable customer payments could use that fact to obtain loans for renewable developments (SANEDI, 2022, personal communication)).
- Import tariffs, low-interest loans and export credits which could be crafted into coordinated efforts to encourage local manufacturing of renewable energy technologies (GreenCape, 2022).

Managing and enabling the energy transition requires state capacity and alignment on the mission to transition to a low-carbon economy. The existing energy policy needs to be updated to ensure alignment and the best outcomes for energy security, as well as to address energy poverty. The regulatory dispensation must be updated to account for a more liberalised market and these changes should flow into integrated energy planning, industrial policy and policy more broadly. The State also plays an important role in creating enabling conditions for access to finance in terms of sound regulation and commercial arrangements. In addition, communications and other service-related infrastructure supports investment. Building state capacity, mainstreaming sustainability and supporting alignment between government entities is vital for this stage of the transition (Andreoni et al., 2022; Montmasson-Clair and Chigumira, 2020).

Further areas of research include an analysis of the impact of the shifting energy sector on local municipalities and their financial sustainability, as well as the role of other actors, such as the private sector and civil society, in an investment-centred approach to decarbonisation and industrialisation.

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