A JUST DISTRIBUTION

The overlooked role of energy distribution policy and governance in achieving a just energy transition in South Africa

ENERGY AND SOCIETY WORKING PAPER #1
DECEMBER 2020

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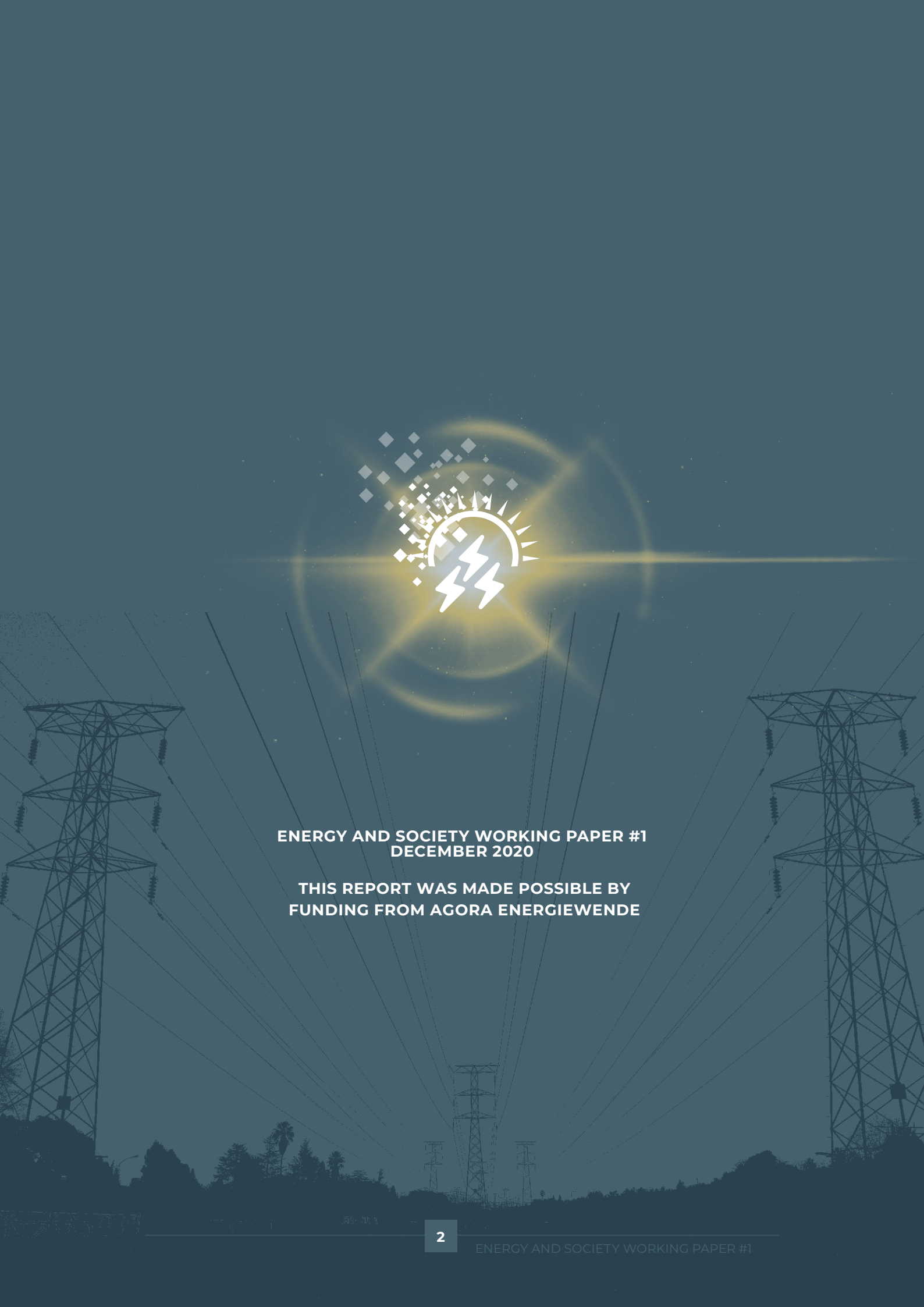

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NOTE: In this paper we have used the term ‘energy’ to indicate what is more accurately a particular sub-category of energy – electricity and its common substitutes. In turn, when we refer in this paper to the conceptualisation of a just transition in South Africa, we are making particular reference to that part of the transition narrative that deals with alternative electricity production models, rather than all energy issues.

1

ENERGY, POVERTY AND INEQUALITY

1.1 Introduction

The linkages between energy and socioeconomic development are well documented, and the need to increase access to affordable, safe and reliable energy sources is a key component of South Africa's long-term development strategy – the 2030 National Development Plan (NDP). South Africa's energy system, along with many others around the world, currently faces the prospect of significant change – a transition, and in theory, a 'just transition'. There are multiple definitions of exactly what constitutes a just energy transition, but most encompass both the necessity of transitioning to a low-carbon system, and doing so in a manner that is just. There is general agreement about the low-carbon side of this goal (although there are some differences in respect of what constitutes 'low'), but less so in respect of how 'just' is to be defined and measured. Some definitions include a generally more equitable society as part of the goal, but many confine themselves to ensuring that potential losers in a transition (generally workers and businesses in the coal sector, and coal-dependent regions) are considered and compensated for those anticipated losses.

... in a number of other ways, the current structure and governance of the energy system actively undermine the poverty and inequality reduction goals of the NDP.

This latter focus is not surprising, given that the notion of a just transition has its roots in the global organised labour movement, and the notion aimed to reconcile the goals of employment (particularly in the coal value chain) and a shift to a low-carbon planet: justice for labour; justice for the environment (Heffron and McCauley, 2017). A just transition under this definition means one that incorporates concrete measures to mitigate any potential losses that these coal-industry stakeholders may suffer as a result of the changes in the energy system. We could term these mitigation definitions of a just transition as primarily reactive: that is, the problem that requires solution is one that is caused by the transition itself.

The implication of these reactive definitions is that the current energy system (apart from its climate impact) is not problematised to any significant degree.

In theory, South Africa is committed to a just transition in terms of Chapter 5 of the NDP, although the country is only at the very start of a meaningful movement away from coal. How is this just transition understood in South Africa? The first observation is that while influential organisations like the National Planning Commission (NPC) talk about a broad goal of 'transitioning to an environmentally sustainable, climate change resilient, low-carbon and just society', in practise they focus on communities affected by a move away from coal mining, rather than broader linkages between the energy system, social welfare and creating a truly just society. They underscore this limited focus by emphasising that the aim of the just transition is to address unemployment and job losses *caused* by the transition**:** **'**Whilst climate change must be addressed, the primary focus of a just transition will be to address the triple challenges facing South Africa of unemployment and job losses as a *result* of the transition, poverty and inequality' (our emphasis). This definition largely fits our use of the term 'reactive' outlined above, in that it does not include many of the existing negative impacts on poverty and equity produced by the energy system in its demarcation of future action. This omission reflects Baker and Phillips (2018) observation that 'questions of power, politics, equity and socioeconomic welfare … remain under represented in research on energy transitions to date' (Baker and Phillips, 2018, p180).

This is not to suggest that the local just transition movement has ignored entirely the need to address current problems in the energy system that undermine socioeconomic development and social welfare, but rather to propose that it has failed to take into account some of the most important of these. There is a general understanding that electricity supply needs to increase to facilitate economic development, that much greater grid stability is required for the same reason, and that the national power utility (Eskom) has serious technical and financial problems that need solutions. However, in a number of other ways, the current structure and governance of the energy system actively undermine the poverty and inequality reduction goals of the NDP.

The narratives of development matter: they determine how policymakers (and wider society) understand both 'problem' and the range of possible solutions (Crush, 1995). Important issues around the linkages between energy and poverty have not been incorporated into mainstream narratives of what constitutes a just transition, in large part because the relevant causal linkages are often difficult to identify. Our analysis indicates that many of these issues arise in the distribution part of the energy system and have been rendered effectively invisible – to both policymakers and advocates of a just transition – because of the complex governance and institutional arrangements in energy distribution that have effectively obscured causal linkages. This complexity is particularly the case in respect of energy distribution, where multiple delivery and oversight mandates have blurred the line between 'energy' issues and 'non-energy' issues.

PARI's Energy and Society programme was established in 2020 to undertake research into exactly this gap: the wide range of social justice issues that originate

in the distribution part of the energy system, that are not currently on the just transition agenda because they are not immediately visible as the appropriate focus of that agenda.

Why is this research important? Firstly, the dominant narrative effectively determines and sets limits to the just energy transition agenda – what is on the table for discussion and for the attention of policymakers. By implication, the factors that are not currently part of this narrative are effectively not on the just transition agenda. They therefore do not (and will not) receive the requisite attention from either policy makers or civil society. In our assessment, these overlooked factors are significant in respect of their impact on poverty and inequality, and are thus critical to building a more equitable and socially just energy system. The current opportunity for radical restructuring of the energy system is unlikely to be repeated: if we do not include a broader social justice agenda in the energy transformation agenda now, we may never have as good an opportunity again. Instead, we are likely to further entrench existing patterns of poverty and inequality driven by the energy system, further undermining the national developmental agenda.

The first gap is created by the fact that many of the current proposals for transforming our energy system focus on the generation of energy. This generation focus includes the impact of changing generation models on coal mining stakeholders central to most local just transition narratives.

Secondly, the mainstream definition of what constitutes a legitimate just transition agenda also determines who is considered a legitimate stakeholder (and thus entitled to contribute to solution creation) and who is not. A limited agenda effectively excludes from the national debate those who actually may have a significant vested interest in the future form and operation of the energy system

1.2 Energy distribution – the overlooked social justice issue

What is missing from the current narratives of a just transition? In our initial assessment, there are two key gaps in the current national just transition debate that will undermine significant progress towards a genuinely inclusive and socially just energy system. The first gap is created by the fact that many of the current proposals for transforming our energy system focus on the generation of energy. This generation focus includes the impact of changing generation models on coal mining stakeholders central to most local just transition narratives. They focus on the future generation mix (renewables versus coal), the challenge of increasing the supply of electricity, the terms and conditions for new generation companies entering the market, and on restructuring Eskom to accommodate these changes.

However, an energy system comprises much more than the generation aspect: it also includes the distribution of that energy to end users. In fact, the end user is

more correctly viewed as the *central* socioeconomic purpose of an energy system, rather than a distant afterthought. The kinds of distribution models selected, and the form, reliability and cost of distributed energy to end users has a significant impact on economic growth and socioeconomic development, via a number of complex causal linkages. In particular, there are linkages between the details of the electricity distribution model and key measures, such as poverty and inequality. These impacts are particularly significant in South Africa, given both our historically high levels of household poverty and inequality, and the current form of the distribution model. It is the aim of PARI's Energy and Society programme to investigate in detail the nature and quantum of these impacts, and the causal mechanisms that drive them.

Our initial findings (presented in this report) indicate that, via a number of different and interconnected pathways, the current distribution system is actively and significantly contributing to increased poverty and inequality in a manner that is completely contrary to the intentions of both South Africa's pro-poor transformation agenda and original policy intentions with respect to the developmental role of energy in a post-apartheid society.

Despite the importance of energy distribution in creating (or undermining) social justice goals such as inclusivity, equality and poverty reduction, the issue has to date received very little attention in the just transition narrative, where the definition of the social welfare aspects of transition have largely been limited to those of employment (or future unemployment) in the coal sector.

The current distribution system is actively and significantly contributing to increased poverty and inequality in a manner that is completely contrary to the intentions of both South Africa's pro-poor transformation agenda and original policy intentions with respect to the developmental role of energy in a post-apartheid society.

The second identified gap, closely related to the first, is that the current just transition narrative in South Africa is predominantly a *reactive* one; effectively limiting its focus to inequalities in the energy system that will be *caused* by a low-carbon transition in the generation part of the system. It generally ignores existing factors in the energy system that are exacerbating poverty and inequality, particularly those that are linked to distribution. These factors are unlikely to be addressed by either new generation models or programmes to reduce the negative impact of transition on coal-mining communities, because they arise predominantly in the distribution part of the system.

As discussed above, we believe that this omission reflects in large part the complex and opaque governance of electricity distribution, and the very mixed policy messages, which make identifying causal

linkages difficult, rather than any intention to overlook these issues. But largely ignoring electricity distribution in the just transition debate is likely to perpetuate the current mechanisms that entrench poverty and inequality. These outcomes may largely be unintended, but in order to prevent them we need to embrace a wider understanding of what constitutes a just transition.

The ongoing effective invisibility of distribution in the transition debate reflects a policy bias identified in the 1998 White Paper on Energy: 'The South African energy sector has historically tended to promote policies which predominantly address supply side issues..... (however) energy is not an end-good but is rather consumed as a means to an end'. The White Paper goes further to state that 'despite the importance of energy services for low-income households, such services have not been adequately supplied in the past, the priority of government having been the development of a modern industrial urban society'. This policy bias (a disproportionate emphasis on supply/generation issues, and a much stronger focus on the energy needs of industry than poor households) has in large part gone unchanged for the intervening 22 years, despite the White Paper making it clear that is needed to change.

Where the literature and narratives on the South African just transition do include issues related to distribution (and households and small enterprises), these tend to be limited to the (generally positive assessment of) technological change that has enabled the emergence of energy 'prosumers' and the potential decentralisation of generation, bypassing existing distribution structures. Although these factors are likely to impact the future form of the energy distribution system, they are largely peripheral to the biggest structural factors currently contributing to poverty and inequality in that system. In some instances, discussed in more detail below, these technological innovations may contribute to *exacerbating* the impact of these structural factors. Unless we have a much better understanding of what these structural factors are, and how their causal mechanisms work, we run the real risk of making policy choices that we will regret in the long term.

None of the current debates around the nature and form of a just energy transition currently includes a comprehensive and systemic analysis of the multiple linkages between energy and socioeconomic development in the distribution part of the system. Our initial research suggests that the current negative impact of the energy distribution system on poverty and inequality is in fact significantly greater than the expected impact of a low-carbon transition, and yet it receives essentially no attention. A better understanding of the linkages between distribution and socioeconomic development and achieving a decarbonised energy system is critical to our ability to design and implement a genuinely just energy system. If we continue to ignore them, we run the very real risk of restructuring our energy system in ways that will permanently entrench current mechanisms that are deepening poverty and inequality.

1.3 Expanding the just transition narrative

What is required is a much broader definition of what constitutes a just transition in South Africa, in order to better align it with national goals in respect of reducing poverty and inequality. In particular, we need to incorporate strategies to deal with the multiple ways in which the energy system *currently* contributes to entrenching poverty and inequality, rather than confining ourselves only to the expected effects of a transition to a low-carbon system. In essence, we require a broader and more detailed definition of what constitutes an equitable and socially just energy system, and that broader definition should replace the current narrow definition that is in common use within the just transition debate.

In contrast to the reactive stance towards a just transition outlined above, we believe that what is required is a *proactive* stance towards its definition. An approach that takes a whole energy system view and problematises the existing energy system beyond just the parts that will be directly impacted by a low carbon transition and that can help to deliver that transition both in terms of emissions cuts and social benefits. If we want an energy system that underpins a more socially just and equitable society then we need a better understanding of the multiple ways in which that system impacts poverty and inequality. As outlined above, we believe that a significant percentage (albeit not all) of these linkages take place through the energy distribution sector, and it is thus the current focus of our research programme.

The aim of PARI's Energy and Society programme is to investigate in detail these linkages between energy distribution and socio-economic outcomes, with the clear goal of contributing to a more inclusive and comprehensive definition of what constitutes a genuine just energy transition in South Africa. Our goal is to highlight those parts of the energy system that are critical to the attainment of South Africa's long-term transformative developmental goals, but which are effectively being ignored in the current just transition debate. We have decided on the term 'just distribution' to describe these multiple factors. Our research is focused on identifying and quantifying the components of a just distribution, and the policy responses that are necessary to give effect to a just distribution.

Specifically, the Energy–Society programme aims to provide insights in respect of the following:

- A detailed description of the main linkages between electricity distribution and socioeconomic outcomes;
- The impact of the current distribution system structure on these socioeconomic outcomes;
- The reasons for the form and quantum of these impacts (i.e. why have we ended up with these outcomes rather than others), with a particular focus on governance and institutional arrangements; and
- The policy implications of our findings.

We aim to investigate in detail the linkages between the electricity distribution model and development indicators that have not received the same degree of attention in the national energy debate, notably the relationship between electricity

distribution and the financial sustainability of local government, household poverty and livelihoods. The overarching priority of our programme is to remedy the current gap in the just transition debate; to illustrate both the importance of energy distribution in key social justice issues, the various ways in which the current distribution model is contributing to poverty and inequality, and to ensure that these issues are incorporated into the just transition agenda.

Policy making (particularly in the macro-economic resource-constrained environment is which we currently find ourselves) is fundamentally about choosing which trade-offs to make, among multiple and competing goals. Those choices, in turn, cannot be made optimally without a full picture of what those trade-offs are, and the likely implications of different choices. The problem, as we currently view it, is that because of the effective invisibility of energy distribution as a problem to be addressed in any meaningful just transition, it is unlikely to receive the policy attention it requires. As a result, decisions that effectively result in exacerbating poverty are being made without full cognition of the trade-off being made. Our aim is to remedy that situation.

Our research programme clearly covers a large area of investigation. This working paper (the first to be produced under the programme) aims to provide a high-level view of the energy distribution landscape, as it is relevant to poverty and inequality indicators, and to present our initial version of a linkages model: an energy-society model that documents the causal linkages between energy distribution and socioeconomic development indicators, the variable factors that impact those linkages, and the nature of the socioeconomic outcomes produced.

If we want an energy system that underpins a more socially just and equitable society then we need a better understanding of the multiple ways in which that system impacts poverty and inequality.

Subsequent working papers will focus on the details of this model and its various components. The overarching goal of the programme is to ensure that climate damage, pollution, poverty and inequality are all addressed together; that we build a common understanding of causality and solutions across all of these challenges. Our work is to identify and describe the key drivers and causal pathways that produce adverse outcomes. The research findings will be used to advocate for change in the energy system, driven primarily by an expanded understanding of what constitutes a just transition in South Africa.

The second chapter of this paper provides a brief overview of the structure of energy (electricity and related) distribution in South Africa. The third chapter presents an initial analysis of the multiple ways in which this structure is linked to and impacts on a range of socioeconomic development indicators (our causal linkages and outcomes model). This is a preliminary analysis, and will be expended and fleshed out during the next two years, as we accumulate a body of empirical research findings.

The final chapter provides a summary of our analysis and the policy implications, and an overview of future research directions.

2

THE ELECTRICITY DISTRIBUTION LANDSCAPE IN SOUTH AFRICA

2.1. Introduction

There are multiple linkages in South Africa between the larger energy system and a range of socio-economic development indicators. Some of these linkages – such as the relationship between the availability, reliability and cost of energy and economic growth – have been well documented, and have created much of the pressure for a reformed local energy system and a more efficient public utility. The aim of our research programme is to investigate in detail the linkages between the electricity distribution model and socio-economic development indicators. These linkage have not received the same degree of attention as others in the national energy debate. In particular, the complex relationships between electricity distribution and household poverty, livelihoods and the financial sustainability of local government have largely been overlooked.

The detailed investigation and documentation of these various linkages, and the implications for energy system reform, is a long-term assignment. This working paper presents our initial findings, which we will build on over the next two years.

As indicated, the main focus of our work is in respect of the **electricity sub-sector of the energy system**. However, it is not confined entirely to electricity, since the analysis also includes energy sources that are commonly used as substitutes for electricity, such as coal, firewood and paraffin. The categorisation of the various energy sources for the purpose of this paper is thus in terms of their utility to end users, rather than their source or whether they are classified as 'clean' or 'dirty' energy sources. For example, although paraffin is technically an oil- or coal-derived liquid fuel, in households it is most commonly used as an alternative to electricity. This categorisation of energy sources – in terms of end-user utility rather than by source or carbon-generation impact – is somewhat different from the categorisation used in policy making such as integrated resource planning. It focuses our attention on the reasons for – and impact of – energy-use decision making at a micro level. This, in turn, implies that a detailed understanding of micro (household, enterprise) energy-use decision making is an important part of energy system governance reform.

Our analysis focuses on energy use and impacts in households, small enterprises and small farms, rather than industry, mining or larger businesses. This is in line with our goal of focusing on issues directly related to household poverty, inequality and livelihoods, as well as those that are under-represented in the current energy transition debate. These three groups were the original focus of the transformation goals of the 1998 White Paper on Energy. The first of this White Paper's five overarching policy objectives was stated as:

> ***Government will promote access to affordable energy services for disadvantaged households, small businesses, small farms and community services.***

Large industrial and mining users are already relatively well represented in the energy transition debate, through various sector stakeholder groups. A clear goal of our research programme is to extend the definition of what is considered a 'stakeholder' in the just transition debate.

2.2. Electricity distribution in South Africa

How is electricity distribution (as a distinct activity separate from generation and transmission) currently structured? It is not our intention to provide a detailed analysis of the sector here but rather to focus on those aspects that we (currently) believe are most important for our research questions. At this point in our research, these are the key points that appear relevant to our investigation of the linkages between energy and socioeconomic development:

1

Distribution is currently a shared function between local government and Eskom. While electricity reticulation is specifically included in the Constitution as one of the powers and functions that 'a municipality has executive authority in respect of, and has the right to administer', for various historical reasons Eskom is the end-distributor of electricity to just over 50 per cent of all South African households, most of the heavy industries, mines and large numbers of farms. Prior to 1998, South Africa did not have wall-to-wall municipalities, and a significant part of South Africa (townships, farms, mines) did not fall under the service delivery regime of a municipality (Ledger, 2020). Electricity connections in these areas were provided directly by Eskom.

South Africa's household electrification programme (which focused largely on township areas historically not serviced by local municipalities) has been driven primarily by Eskom (although current efforts in large cities are mostly undertaken by the cities themselves). Eskom funded and managed the infrastructure development of the electrification programme, and these new connections became Eskom customers.

Post-2000, when the current structure of local government was effectively put in place, wall-to-wall municipalities with a much wider range of powers and functions were introduced, which now covered the areas where Eskom was

the service provider. However, Eskom kept the direct-distribution customers that it had (and has since added additional customers). There are a small number of municipalities that do not undertake any electricity distribution at all, but most have a shared function with Eskom, to varying degrees. This has created significant complexities in respect of shared responsibilities for programmes such as Free Basic Electricity. In the latter programme, households qualify for a small amount of free electricity every month from their service provider (either the municipality or Eskom).[1] But the municipality (not Eskom) is responsible for identifying qualifying households, and then paying a rebate amount to Eskom.

The aim of our research programme is to investigate in detail the linkages between the electricity distribution model and socio-economic development indicators. These linkage have not received the same degree of attention as others in the national energy debate. In particular, the complex relationships between electricity distribution and household poverty, livelihoods and the financial sustainability of local government have largely been overlooked.

The December 1998 Energy White Paper envisaged that all distribution (i.e. that undertaken by both Eskom and local government) would be consolidated under a number of Regional Electricity Distributors (REDs). The main rationale set out in the White Paper for this strategy was the conclusion that electricity distribution was not a financially viable business for most municipalities. The authors of the White Paper underscored that their conclusion (drawn in 1998) was 'evidenced by an increasing number of municipalities who are unable to pay their bulk accounts to Eskom, high prices, poor quality of supply in many areas and problems with the delivery of electrification.' The White Paper indicated that (at that time) 22 municipalities (some 6%) earned 75% of all the surpluses made on electricity distribution, and that "25 per cent of municipal distributors lose money on their electricity sales".

The conclusion drawn in the 1998 Energy White Paper was that electricity distribution was only a viable business in aggregate, not for most individual municipalities, and thus that REDs were necessary to ensure the financial sustainability of electricity distribution. In turn, that financial sustainability was necessary in order to ensure sufficient resources for infrastructure maintenance and the expansion of the electrification programme. But the plan never got off the ground due to opposition from local government, and a general lack of political appetite to effect the necessary Constitutional amendments to remove electricity as an area of local government authority.

1 The legislated minimum is 50KWh per household per month, but some municipalities allocate a higher amount.

2

The strong opposition from local government to the REDs reflects another key characteristic of the electricity distribution sector: the role of electricity sales in the local government fiscal framework. In quite remarkable contrast to the Energy White Paper, the (March) 1998 White Paper on Local Government was extremely enthusiastic about the revenue-raising potential of electricity distribution, and its authors took a very different position from their colleagues working on Energy. It proposed that local government (in aggregate) had 'considerable' own-revenue raising capacity, and that the most considerable of all of the own-revenue categories was the surplus that could be earned on electricity distribution. This White Paper analysis resulted in a proposed new fiscal model for local government based on the assumptions that:

a. 90 per cent of all local government's revenue requirements could be raised from own revenue.

b. 73 per cent of most total operating expenditure requirements (including critical categories such as the maintenance of all municipal infrastructure) could be funded from property rates and the surpluses earned on the sales of services; and

c. Just over 37 per cent of total operating expenditure requirements across local government could be funded by the surplus earned on electricity sales alone.

These own-revenue assumptions have been enacted into the current local government fiscal framework. Because of the assumed 'considerable' own-revenue raising potential of local government, it currently receives less than 10 per cent of all nationally raised revenue in the annual allocation, despite having a very considerable developmental mandate (Ledger and Rampedi, 2020). The fiscal sustainability of local municipalities, and their ability to cross-subsidise other (non-electricity) categories of expenditure, is thus critically dependent on their ability to meet these electricity surplus targets. Once again, this position is in sharp contrast to that presented in the Energy White Paper which stated that:

> ***if the (electricity distribution) industry is expected to both contribute to funding other municipal services and to pay for the electrification programme … (it) will experience financial bankruptcy without alternative funding and pricing mechanisms, a reduction in the … wholesale price of electricity, or substantial increases in tariffs. … The current structure and funding mechanisms in the distribution industry put it at significant risk. It is already not meeting the objective of providing low-cost and equitably priced electricity to all customers.***

The two White Paper groups appear never to have addressed the reasons for their very different assessments of the same sector.

3

The shared authority of electricity distribution between municipalities and Eskom affects the ability of municipalities to collect non-electricity revenue (such as water and rates and taxes), which impact is generally amplified by the greater the share of Eskom in that distribution in a particular municipality. A Constitutional Court ruling effectively means that municipalities may not completely disconnect water as a credit control measure.[2] This means that electricity disconnection is the main means of enforcing account payment for services such as rates and taxes, waste removal and water. In addition, many municipalities have instituted a system whereby clients with pre-paid electricity meters will have a portion of outstanding municipal accounts (for other services) deducted from their purchase of pre-paid electricity. These credit control measures are not available when Eskom is the direct supplier of electricity to a municipal customer, since they will not disconnect a customer or make deductions from pre-paid payments on behalf of the municipality.

Given that the levying of property rates and service charges is intended to make up the bulk of local government revenue (90 per cent), needed to fund its extensive service delivery and local development mandate, any inability to collect revenue undermines the delivery of that mandate.

4

The cost paid for electricity by end users varies enormously, based on factors such as type of user, type of connection and where they live. The distribution system is thus characterised by significant complexity in determining exactly what a particular customer in a particular place will pay, and easy comparisons among users in different municipalities (such as an 'average' annual increase in prices) is almost impossible. The National Energy Regulator (NERSA) is responsible for setting annual base-price determinations, but these are far from simple, and cover multiple permutations of usage, location and customer. Eskom also charges its municipal (and direct) customers a range of different rates, based on factors such as categories of users, kind of connection, time of day, distance of connection, and many others. Municipalities, in turn, charge different rates based on factors such as kind of connection, type of user and others. Municipalities also often charge additional fees that are not directly related to usage, such as fixed network charges. Not all of these charges apply to all users in one municipality, nor are they uniform across municipalities. These additional levies are not always set by NERSA, but are permissible in terms of other legislation.

2 Although they may reduce the pressure

The effective result is that a household in one municipality can (and very often does) pay a completely different price for exactly the same amount and kind of electricity to a household that lives in another municipality. This implies that the social welfare impact of the electricity distribution system on end users varies considerably and is determined by a very large range of factors, all subject to different regulatory and oversight regimes.

This highly differentiated and complex pricing structure also means that there is no direct and completely predictable relationship between the price that Eskom pays for electricity, the price that Eskom charges a municipality for electricity, and the price that is paid by any particular end user. As we have discussed below, the cost of electricity for the end user is a critical factor impacting poverty and inequality outcomes, but the current structure of municipal pricing means that there is no complete oversight of the process or its outcomes: NERSA only has a mandate over one part of that process, and no one appears to have oversight over the rest of it. The national department responsible for energy clearly does not believe that it has oversight, and its own annual reports on energy pricing do not include any municipal data.

The implication is that the distribution part of the system operates an energy pricing model that is only partially connected to the cost of energy in the generation part of the system, and with limited oversight.

Despite the central role of local government in pricing (and in particular the prices that are paid by the lowest income households), most of the discussion on future energy pricing in South Africa focuses on costs in the generation part of the system, not costs in the distribution part of the system. Given the ability of local government to add additional costs (over and above those that fall under the mandate of the energy regulator), and the importance of electricity revenue in the municipal revenue model, there is no guarantee that a low-cost generation model will automatically translate into low costs for end users. If anything, lower generation costs (and thus bulk charges) offer the opportunity for higher margins by keeping end-user charges high, a tempting proposition for cash-strapped local municipalities.[3]

5

South Africa has a relatively high level of electrification, particularly in a sub-Sahara African context. Approximately 90 per cent of all South Africans have access to the electricity grid (in 2019), compared to fewer than 40 per cent in 1994. One of the goals of the Reconstruction and Development Plan (RDP)[4] was to increase access to 'modern' energy sources for all households and small enterprises, and considerable resources have been allocated to the

3 The 2018/19 Auditor General's report on local government found that 79 per cent of all municipalities had a financial health status that was 'either concerning or requiring urgent intervention', that 31 per cent of municipalities were considered to be in a 'particularly vulnerable' financial position. In addition, just over a third of municipalities ended the year with a deficit.

4 The first national development plan of the post-apartheid South Africa.

household electrification programme, which is ongoing. However, there is a general acknowledgement that not every single household in the country can be connected to the existing grid. In very remote rural areas the costs of infrastructure development are prohibitive, and it is generally accepted that alternatives to formal grid connection are required. However, these households represent a small minority of households, and our research has not, to date, focused any significant attention on this alternative access policy.

6

Distribution losses from the electricity system are generally understood to be considerable (and well above international benchmarks), although there is no exact and universally agreed number for the quantum of those losses. This is in large part because many municipalities lack the detailed data that would allow them to accurately calculate these losses. Eskom has estimated that its own cost of electricity theft (i.e. excluding the losses incurred by municipalities) is somewhere between R2 billion and R4 billion per annum. Electricity losses in just the eight metropolitan municipalities totalled R7.3 billion in the 2018/19 financial year (National Treasury, 2020).

Losses are incurred as a result of illegal connections and 'technical' factors, the latter mostly as a result of deteriorating infrastructure. Illegal connections and theft of infrastructure (notably cables) often result in damage to infrastructure (such as a sub-station being damaged as a result of cable theft), which imposes an additional cost on distributors. Finally, regular power outages as a result of damage to infrastructure is one of the factors pushing wealthier consumers off the grid, and thus removing them as a source of income for the system.

In summary, the electricity distribution system is complex, and represents the outcome of multiple (and sometimes contradictory or competing) policy and regulation. The complexity of the system, and the presence of multiple governance structures, is one of the factors that has, in our assessment, contributed to the opacity of the system, and thus the effective blurring of many of the causal mechanisms that link distribution to poverty and inequality.


DRIVERS
Energy Policy
Governance
Local govern
Eskom supp
State Res
CAUSAL PATHWAYS
SYSTEM (ENDOGENOUS) OUTPUTS
Cost
Access
Reliability
MACRO (EXOGENOUS) 'FILTER'
er income
cess to
bstitutes
od security
OUTCOMES
DIRECT
SECONDARY
Erosion of municipal services
Erosion of the social wage

3

A PRELIMINARY ENERGY–SOCIETY MODEL

3.1. Introduction

A central long-term goal of our Energy and Society programme is to develop a framework model that can:

- Identify and quantify the impact of the current distribution system on a number of socioeconomic development indicators that are central to the attainment of a socially just and equitable society;
- Identify and analyse the causal mechanisms that contribute to these outcomes, with a particular emphasis on the role of governance and institutional arrangements in the energy sector; and
- Illustrate where interventions are required in order to reduce the negative impact of the current energy distribution system and/or increase its positive impact.
- Be used as a basis for understanding the opportunities and risks in terms of socioeconomic goals during the process of transitioning from coal based electricity to increasing shares of renewable and clean electricity, including its new technologies and their interaction with distribution grids and distribution business models.

The aim of this model development exercise is to identify key causal mechanisms and their outcomes in an extremely complex environment, where many of these linkages are not immediately visible. This is a considerable research task.

This paper presents our initial findings in respect of the causal linkages between the current form and operation of the energy distribution system, and poverty and inequality. These initial findings attempt to provide preliminary answers to the following questions:

- What form do these causal linkages take?
- What are their main drivers? and
- What is the nature and quantum of the socioeconomic impact created?

In attempting to answer these questions our focus is on households (particularly low-income households) small enterprises and small farmers. The reasons for

this focus are, firstly, that these are the energy users identified in the 1998 Energy White Paper as the particular intended beneficiaries of a more democratic and transformed energy system, and secondly, because these energy users have been largely overlooked, both in the just transition debate and in the wider discussion of restructuring the electricity sector.

Developing detailed answers to these questions represents a long-term research project that is currently in its initial phase. In this paper, we have presented our initial conceptualisation of the very complex linkages between the nature and operation of the energy distribution system and a range of socioeconomic development and welfare outcomes. This conceptualisation is presented as a simplified high-level depiction of a causal model. Our initial findings are based on an extensive survey of existing data, literature and relevant policies and regulations, together with a small amount of community fieldwork.[5] In the next phase of this research, we will greatly increase the amount of fieldwork data collected, at various sites around the country. As our body of data increases, so we expect to make adjustments and changes to the initial version of the causal linkages model presented below.

In this initial version, we have focused on a limited number of socioeconomic indicators (both direct and indirect) as a composite proxy for 'socioeconomic impact' on end users, where the term 'end-user' is intended as shorthand for a composite group of:

- Households that live under the official upper-bound poverty line, currently set at R1,268 per person per month. At an average lower-income household size of approximately four persons, this implies a monthly household income of just over R5,000.[6] This group covers approximately 50 per cent of all South African households.
- Small businesses with limited resources
- Small farmers with limited resources

The long-term aim of our model is to obtain insights into how socioeconomic impacts are generated by drivers located in the energy distribution system and/or which directly impact the energy distribution system, and to make an assessment of the form and quantum of those impacts.

5 Our ability to undertake this work during most of 2020 was greatly reduced by Covid-19 lockdown restrictions

6 USD330 at the exchange rate prevailing at the time of writing.

Our starting point for thinking about adverse impacts is to conceptualise an ideal pro-poor (compatible with social justice goals) decarbonised energy distribution system. In our assessment, such as system has a number of characteristics:

- Households are able to access sufficient energy to meet all their basic requirements. Where that energy is purchased (as opposed to being provided as a free service), these purchases are possible without the household having to sacrifice other essential household expenditure requirements necessary to a certain minimum standard of living – such as transport or food.
- Small enterprises and small farmers are able to access safe, clean, affordable and reliable energy where this is critical to the ability of the enterprise or farm to generate a positive return.
- All energy users are able to use forms of energy that have the least (direct or indirect) negative impacts, for all their energy requirements. (Although there is a large negative impact on all households from a high-carbon energy system, in this research we have focused particularly on direct impacts at the user level where households are either forced to use substitute energy sources or not to have access at all. These impacts include indoor air pollution from products such as coal, the real risk of house fires caused by some energy sources (paraffin and candles), the risks that women in particular face in collecting firewood in remote areas and food consumption choices based on the cost of cooking.)

In an ideal energy system, all energy users are able to access sufficient amounts of energy that have the least direct or indirect negative impacts, without having to sacrifice other basic household necessities.

These basic characteristics of an ideal system are the assessment criteria that we have applied to the actual energy distribution system: where these ideal outcomes are undermined, the current system is deemed to have an adverse impact on poverty. In terms of making an assessment about the impact of the current distribution system on inequality, our approach is that if negative impacts appear to be disproportionately experienced by poorer household, small enterprises and small farmers rather than their wealthier and/or more established counterparts, then the impact is deemed to contribute to increased inequality.

3.2. Linkages between electricity distribution and socioeconomic outcomes: the preliminary picture

Our initial conceptualisation of the causal model associated with the direct impact indicators is summarised in high-level form in the diagram below:

The **causal pathways** are the central part of the model; the pathways along which a particular policy, event or governance arrangement in the energy sector is translated into socioeconomic development. In turn, we have conceptualised these pathways as operating in a two-phase manner. The system outputs (cost, access and reliability) are those generated by the drivers in the energy system to the left. We have termed these 'endogenous' since they are the direct outcome of how that system is arranged and governed. However, their impact on the selected socioeconomic indicators is determined by the macro contextual environment. For example, the relative impact of rising energy costs on household disposable income is determined not just by that cost increase, but also by existing household income. In general terms, the impact is greater the lower the current level of household income. We have conceptualised these macro factors as largely exogenous to that part of the energy system where the drivers are located.

The **drivers** are those factors in the overarching energy distribution system that are the most important for determining the central system outputs that impact on poverty and inequality – cost, access and reliability.[7] These include formal policy, system governance (including institutional arrangements) which determines what actually goes on in the system (and which isn't always identical to policy intentions). It also includes local government, given its central role in determining the central system outputs. State resources have been included, since they determine to a great degree the extent of fiscal measures that could reduce impact, and increase supply.

Outcomes are classified as either direct (such as the impact of a change in costs on household disposable income) or secondary (how does that change in income affect household food security.

Each of these issues is discussed in more detail below.

3.3. Detailed model components

3.3.1. Drivers

The key drivers that we have identified at this initial point in our analysis are the following:

- Policy in the energy sector, in particular that which deals with distribution and the envisaged contribution of energy to South Africa's socioeconomic transformation. Relevant research questions include: what are the overarching intentions of the South African government in respect of the nature of energy distribution and energy access for the target groups? Is the policy environment characterised by coherence, alignment and continuity, or are there areas of conflict and/or lack of alignment or continuity?
- Governance, including institutional arrangements. It is the governance of energy distribution (and in particular institutional arrangements in respect of policy implementation, mandate and

7 These are obviously not the only outputs of the energy system: Importantly, the system has outputs that either advance or retard decarbonisation. This model is focused on a limited number of system outputs that directly impact poverty and inequality directly at a household level.

oversight) that determines how – and which – policy is actually implemented (or not implemented), what is actually prioritised or not prioritised. Governance is thus the communications link between policy intentions and events in the energy system.

- Local government significantly impacts those end users who obtain power from a municipality through multiple modes:
  - electricity pricing for end users;
  - setting the terms of access;
  - its role as implementing agents of the free basic electricity policy (even where Eskom is the supplier, it is the responsibility of the municipality to identify qualifying households and to inform Eskom);
  - its role (in some places) as implementer of the electrification programme; and
  - its ability to maintain its distribution infrastructure (which impacts reliability of supply).
- Although electricity supply is usually considered a part of energy generation, supply from Eskom has an impact on the distribution part of the system via both cost (via the base Eskom charge) and reliability of supply. Reliability of supply is determined thus both by Eskom and local government.
- State resources have been included as a driver because:
  - available budget funding determines how much money is available to subsidise energy costs for poor households and the electrification programme;
  - the state resource envelope determines how much funding is available to support the local government balance sheet over and above its own revenue collection; and
  - the less the state funding that is available to support Eskom the greater the pressure on the utility to raise money from increasing prices to customers, and the less resources it has available to replace aging infrastructure.

At this point in our research, we do not have definitive answers as to **which of these drivers are the most important** in our model, but our initial findings suggest that both the governance of distribution and the role of local government may be particularly important in respect of the end users that we are focusing on. The governance of electricity distribution is the focus of the next working paper in this series.

3.3.2. Causal pathways

These identified drivers do not generate socioeconomic outcomes directly, but operate rather via a number of causal pathways. For example, policy in respect of energy pricing does not directly change household poverty (one of our chosen outcome indicators), but via its impact on energy cost, relative to that household's

disposable income. However, policy is not the only factor that determines energy cost, and so the concept of a causal pathway that stands between a driver and an outcome allows us to theorise the relative importance of different drivers on one particular outcome.

The causal pathways have further been conceptualised in the model as a two-step process between system driver and system outcome: the first step covers the effect of the drivers on factors that we have labelled **endogenous**, since they are the outputs of the energy distribution system itself – how it is governed and organised, what policy choices are made, etc. The implication is that changing these system factors – cost, access, reliability – require changes *within* the energy distribution system.

The endogenous (first-step) causal pathways that we have identified in our initial analysis are:

- Cost
- Access
- Reliability of supply

As our research progresses, so we may add to these pathways and/or alter our conceptualisation of how these operate and their relative contribution to generating outcomes. At this point in our research, we can make three observations:

i. It appears that cost is a very important factor. The actual cost to end users is, in turn, the result of multiple and complex factors: however, our initial analysis indicates that pressure from the local government fiscal model together with the failure of policymakers to adequately define 'affordability' (which constitutes an important governance gap) are particularly important in driving end-user cost.

ii. Access is a complex issue: it is often conceptualised as a physical grid connection (and is most commonly conceptualised in this way in energy policy), but the reality appears to be that the **terms of access** are a much more important causal pathway than simple physical access. This is particularly the case in South Africa, where we have very high levels of physical electricity grid access coinciding alongside energy poverty (households not being able to use as much electricity as they would like). At this point we can note that one of the important terms of access is the cost associated with that access. Those who cannot pay often have their power supply disconnected, which effectively deprives them of access. In other instances, a household may have formal grid access, but choose largely not to make use of that access because the cost and availability of substitutes, such as coal, makes them a better choice, despite negative environmental and health issues. Access at an unaffordable cost (or access that comes with significant health risks should not), in our assessment, really qualify as access.

   This conditioning relationship between access and cost is just one way in which causal pathways intersect and mutually reinforce (or ameliorate)

a particular outcome. That is, we should not think of these casual pathways as discrete and neatly separated from each other, but rather as interconnected in multiple ways.

iii. Reliability of supply appears to be an issue that is more important for small business and (particularly) small farmers than households, through its disruptive impact on business and farming activity (which in turn is positively correlated with higher poverty and inequality). However, when supply is interrupted for extended periods of time (such as the lengthy blackouts imposed by Eskom on non-paying municipalities) then that is also important for households. Poor reliability encourages the use of substitutes, where this is possible.

The final poverty/inequality outcome of these endogenous outputs is also determined by the **context** within which a particular cost or form of access lands. **This context is the second step in the causal pathway; the macro environmental 'filter' which determines the actual socioeconomic outcome of cost, access and reliability of supply**. As one example of how this filter operates: the actual effect on household disposable income (and thus poverty) of a particular energy cost is determined not just by the quantum of that cost in isolation, but also (often to a much greater degree) by that cost **relative** to the household income (the notion of affordability) and the cost of other essential goods that the household needs to purchase (such as food). The effect will generally be more significant for poorer households, that already have insufficient income to cover all their basic needs. Similarly, the ability of a user to quickly and easily access suitable alternatives sources of energy will determine the actual effect of cost and system access on that particular user.

These filters have been labelled as **exogenous** because they do not arise within the energy system itself. However, the inclusion of these factors in the model focuses our attention on the fact that context matters: we cannot look only at energy system outputs when we make judgements about the merits or otherwise of that system. In our assessment, the failure to adequately consider the macro context within which energy policy decisions land is a significant governance failure in energy distribution.

The exogenous factors that we have identified as being of particular relevance to determining the outcomes of the energy distribution system are the following:

- **End user income**, *relative* to the cost of a particular energy source, appears to be far and away the most important factor in this category. User income not only affects how much energy can be purchased, but also determines access to appliances, which is an important factor in energy choice and utilisation. The issue of appliances was highlighted in the 1998 White Paper on Energy and refers to a household's ability to be able to afford those appliances that will allow them to make effective and efficient use of their physical access to electricity. As one cited example, many households use alternative fuels for cooking because they cannot afford to purchase an electric stove, rather than because of the cost of the electricity.

- **Access to substitutes**: how easily can users access substitutes for electricity, and what is the nature and impact of these? Common substitutes include coal, firewood, paraffin and candles. Our initial findings suggest that substitutes are used for multiple reasons:
    - Their cost relative to electricity: in some rural areas firewood is considered a free resource, even though people can walk long distances to access it. Low-income households often earn small amounts of money on an irregular basis, and try to match expenditure to these income flows. Although pre-paid units of electricity are available in small denominations, there is often an additional transaction cost associated with these purchases, which is higher (as a percentage) the smaller the purchase. Households therefore often buy a few candles or a small amount of paraffin instead. Although in the long run, these purchases often work out to be a more expensive form of energy, in the short term they are the best option for households with very little money and immediate needs (light and cooking).
    - The ability to use a substitute for multiple purposes at the same time (a wood or coal burning stove can cook and generate heat simultaneously in a manner that an electric stove cannot, saving costs). Similarly, appliances such as a coal stove can perform multiple functions in a household with limited resources to buy appliances – cooking and heating – in a manner than an electrical appliance generally cannot.[8]

  Obtaining more insights into the different reasons why substitutes are chosen, and which are most commonly used, is a focus area of our community research.

- **Food security**: the lower the existing level of household food security, the greater the negative impact of any factor (such as rising energy costs) that effectively reduces the amount of money that households have available to purchase food. Approximately 50 per cent of South African households are food insecure, and one third of households may be considered severely food insecure. Just over one in four children under the age of five years is classified as stunted as a result of poor nutritional intake (Ledger, 2016).

3.3.3. Outcomes

The identified outcomes have been classified into two categories:

i. **Direct outcomes** of the causal pathways discussed above. Direct outcomes include the impact on disposable household/enterprise/farm income of energy cost and the terms of access; the use of substitutes as a result of the cost of, effective access to and the reliability of supply of electricity; and energy theft as the last resort of households without access or who cannot afford to purchase electricity, or as much electricity as they need.

8 As highlighted in the 1998 White Paper on Energy.

ii. **Indirect outcomes** are those outcomes that are less direct/less obvious (albeit not necessarily less significant); that reflect the knock-on effect of direct outcomes, and generally tend to be manifested over the longer term. Indirect outcomes identified at this point in our research include:

   a. the long-term health implications of using coal or other similarly polluting energy sources instead of electricity because of limited household income;

   b. the impact on household food security of rising energy costs;

   c. deaths and injuries as a result of shack fires caused most often by non-electrical sources of energy;

   d. deaths and injuries as a result of illegal electricity connections; and

   e. the long-term effect of the inability of local government to raise sufficient funds from electricity revenue to fund its other operating expenditure requirements, such as infrastructure maintenance. These indirect outcomes linked to the local government fiscal model do not generally feature in discussions around the nature and form of a just energy transition in South Africa.

   f. the impact of climate change on weather (e.g. more extremes of temperature, drought, flood, more storms, agricultural challenges and consequent food shortages) and through this the livability of the local environment and the costs of adaptation to climate impacts, in particular for poor households.

The extent and form of both direct and indirect outcomes will be investigated in greater detail in our community mapping work over the next two years.

The causal model presented here represents our initial version of the causal linkages model, and an initial analysis of its various components. Our long-term goal is to develop a detailed quantification of the various outcomes (to date limited and fragmented empirical research has been undertaken on this issue), and much more detail in respect of the pathways whereby these outcomes are generated (and area in which there are currently significant knowledge gaps). That is, our goal is not just to identify the socioeconomic development outcomes of the current system structure and operation, but also to identify the most important drivers of those outcomes that originate in the energy system itself.

The first research area (quantification of outcomes) will support a discussion around the relative importance of current distribution system structure on socioeconomic development, thereby supporting our argument that a critical review of the current distribution system should be incorporated into the just transition agenda. The second (identification of which drivers are relatively more important in terms of outcome generation) will support the identification of priority intervention areas.

4

SUMMARY AND FUTURE RESEARCH

4.1. Summary

PARI's Energy and Society programme was established to investigate a perceived research gap: the wide range of social justice issues that originate in the distribution part of the energy system that are not currently on the energy decarbonisation just transition agenda because they are not immediately visible as the appropriate focus of that agenda.

The current dominant just transition narrative effectively determines and sets limits to the just energy transition agenda – what is on the table for discussion and for the attention of policymakers. By implication, those factors that are not currently part of this narrative are effectively not on the just transition agenda. They therefore do not, and will not, receive the requisite attention from either policy makers or civil society. This is a missed opportunity. It will also limit the effectiveness of efforts to engage energy users to support the energy transition.

In our assessment, these overlooked factors are significant in respect of their impact on poverty and inequality, and are thus critical to building a more equitable and socially just energy system. The current opportunity for radically restructuring the energy system is unlikely to be repeated: if we do not include a broader social justice agenda in the energy transformation agenda now, we may never have as good an opportunity again. Instead, we are likely to further entrench existing patterns of poverty and inequality driven by the energy system, further undermining the national developmental agenda.

Secondly, the mainstream definition of what constitutes a legitimate just transition agenda also determines who is considered a legitimate stakeholder (and thus entitled to contribute to solution creation) and who is not. A limited agenda effectively excludes from the national debate those who actually may have a significant vested interest in the future form and operation and environmental sustainability of the energy system.

We believe that there are two key gaps in the current national just transition debate that will undermine significant progress towards a genuinely inclusive and socially just energy system. The first gap is created by the fact that many (most) of the current proposals for transforming our energy system focus almost entirely on the *generation* of energy (which focus includes the impact of changing generation models – a move away from coal – on mining stakeholders in the just transition narratives). They focus on the future generation mix (renewables versus coal), the challenge of increasing the supply of electricity, the terms and conditions for the entry of new generation companies into the market, and on the restructuring of Eskom to accommodate these changes.

However, an energy system comprises much more than generation: it also includes the distribution of that energy to end users. In fact, the end user is more correctly be viewed as the *central* socioeconomic purpose of an energy system, rather than a distant afterthought. The kinds of distribution models selected, and the form, reliability and cost of distributed energy to the end users has a significant impact on economic growth and socioeconomic development, via a number of complex causal linkages. In particular, there are linkages between the details of the electricity distribution model and key measures, such as poverty and inequality. These impacts are particularly significant in South Africa, given both our historically high levels of household poverty and inequality, and the current form of the distribution model. It is the aim of our Energy and Society programme to investigate in detail the nature and quantum of these impacts, and the causal mechanisms that drive them.

Our goal is to use the findings of this research to make a meaningful contribution to the current just transition debate in South Africa.

Our initial findings indicate that, via a number of different and interconnected causal pathways, the current distribution system is actively and significantly contributing to increased poverty and inequality in a manner that is completely contrary to the intentions of both South Africa's pro-poor transformation agenda and original policy intentions with respect to the developmental role of energy in a post-apartheid society.

Despite the importance of energy distribution in creating (or undermining) social justice goals such as inclusivity, equality and poverty reduction, these issues have to date received much less attention in the just transition narrative than those related to environmental sustainability and the social welfare implications of employment (or future unemployment) in the coal sector.

The second identified gap in the dominant narrative, closely related to the first, is that the current just transition narrative in South Africa is predominantly a *reactive* one; effectively limiting its focus to inequalities in the energy system that will be *caused* by a low-carbon transition in the generation part of the system. It generally ignores existing factors in the current high-carbon energy system that are exacerbating poverty and inequality, particularly those that are linked to distribution. These factors are unlikely to be addressed by either new generation models or programmes to reduce the negative impact of transition on coal mining communities, because they arise predominantly in the distribution part of the system.

In this report we have presented a simplified and high-level first causal model, illustrating the role and relative importance of a range of drivers that originate in the energy distribution system, the direct and indirect outcomes that they contribute to, and the complex and inter-connected causal pathways by which they do so.

Going forward, we will be building on this initial foundation, in order to:

- Refine the details of this model and to quantify and contextualise its various components; and
- Identify where critical interventions are required to ameliorate the negative impacts on poverty and inequality driven by the current structure and governance of energy distribution.

Our goal is to use the findings of this research to make a meaningful contribution to the current just transition debate in South Africa.

4.2. Future research

This is the first in a planned series of working papers that we will produce under the Energy and Society programme. The next two papers in the series will focus on:

i. **Energy policy and the governance of the energy distribution system in South Africa.** The governance of energy distribution is complex, messy and characterised by significant gaps between what original policy intended, and what is actually being implemented. Responsibility for important mandates and oversight is often unclear, and in some areas that are particularly important for poverty and inequality, no one seems to have been given these roles. In many instances, the poorest and most vulnerable households have simply been ignored. In the worst-case scenarios, they are being severely penalised. Part of the reason for the general failure to think about all the parts of the energy system in a joined-up fashion is because of the institutional arrangements that have created a siloed approach towards its various components.

   This paper will examine the history of energy distribution policy, current governance structures, existing institutional arrangements and the various ways in which these factors determine socioeconomic outcomes, via the causal pathways identified in our model.

ii. **A detailed examination of the role of local government as a key driver of system outcomes.** Local government plays a critical role in determining both endogenous system outputs (such as cost and access) and indirect system outcomes (those driven by the link between electricity sales and its financial viability). However, this role is seldom recognised, and therefore most just transition advocates do not see the importance of lobbying for change in that fiscal model as a central tool to drive social justices.

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