Routledge
Taylor & Francis Group

Urban Research & Practice

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rurp20

The 'capability' of South African energy governance to deliver urban sustainable transitions

Stephen Essex, Federico Caprotti, Jiska de Groot, Jon Phillips, Lucy Baker, Peta Wolpe & Yachika Reddy

To cite this article: Stephen Essex, Federico Caprotti, Jiska de Groot, Jon Phillips, Lucy Baker, Peta Wolpe & Yachika Reddy (27 Sep 2023): The 'capability' of South African energy governance to deliver urban sustainable transitions, Urban Research & Practice, DOI: 10.1080/17535069.2023.2261899

To link to this article: https://doi.org/10.1080/17535069.2023.2261899

Published online: 27 Sep 2023.

URBAN RESEARCH & PRACTICE
https://doi.org/10.1080/17535069.2023.2261899

Routledge
Taylor & Francis Group

The 'capability' of South African energy governance to deliver urban sustainable transitions

Stephen Essex [a], Federico Caprotti [b], Jiska de Groot [c], Jon Phillips [d], Lucy Baker [e], Peta Wolpe [f] and Yachika Reddy [g]

[a]School of Geography, Earth and Environmental Sciences, University of Plymouth, Drake Circus, Plymouth, Devon, UK; [b]Department of Geography, University of Exeter, Exeter, UK; [c]African Climate and Development Initiative, University of Cape Town, Cape Town, South Africa; [d]Department of Development Studies, Centre of African Studies, School of Oriental and African Studies, University of London, London, UK; [e]Science Policy Research Unit, University of Sussex, Falmer, Brighton, UK; [f]Urban Energy and Climate Change practitioner, Cape Town, South Africa; [g]Sustainable Energy Africa, Tokai, Cape Town, South Africa

ABSTRACT

Critical to the trajectory and outcome of urban sustainable energy transitions is the ability of government institutions to foster conditions for change and innovation. In this paper, a theoretical perspective combining state power and local governance capability is used as a lens to examine the transition of the energy system in South Africa based on semi-structured interviews with a range of relevant stakeholders, supplemented by analysis of published academic and policy literature. The discussion highlights uneven transitional pathways across the country caused by variations in 'capability', together with continuing conflicting interests within the system which require more politically-informed policy processes.

ARTICLE HISTORY
Received 18 August 2021
Accepted 17 September 2023

KEYWORDS
Urban sustainable energy transitions; governance; South Africa; institutional capability; political power

1. Introduction

Critical to the trajectory and outcome of urban sustainable energy transitions is the ability of government institutions to foster the appropriate conditions for change and innovation. Institutions embody the formal and informal rules (standards, regulations and policies), practices (implementation of rules) and narratives or discourses (processes of explanation and persuasion) of the dominant socio-technical regime, which can act to enable or constrain transformation (Jehling, Hitzeroth, and Brueckner 2019). The spatial structure, organisation and extent of integration between and within institutions can also have a significant effect on reconfiguration trajectories. Being part of multi-scalar governance regimes (Caprotti et al. 2020), the role of the state in energy transitions is never as neutral, independent or atomised rational actors, but rather embroiled in deeper networks and structures of material and institutional power, which affect the regulation, nurturing and protection of the sector (Haque, Lemanski, and de Groot 2021a; Smith and Raven 2012). This perspective, while under-researched,

CONTACT Stephen Essex stephen.essex@plymouth.ac.uk

offers the potential to provide deeper insights into socio-technical transitions (Andrews-Speed 2016; Argyriou 2020; Caprotti et al. 2021; Schreuer, Rohracher, and Späth 2010).

This paper examines the effect of the governance structure and institutional 'capability' of the energy system in South Africa to deliver a sustainable transition, comprising the challenges of providing energy access and affordability for the population, whilst reducing carbon emissions and achieving energy security. Governance structure refers to the effect of power dynamics – reflected in political drivers and barriers, vested interests and global agendas – on the 'capability' of institutions to respond to sustainable energy transitions. The 'capability' of institutions is influenced by local circumstances; alignment of institutional structures and practices; political interference and corruption; the knowledge, skills and professional behaviours of employees; societal expectations; and participatory governance. This focus for the paper is a response to the calls from: Johnstone and Newell (2018), for an improved understanding of the prospects and limitations of state-led interventions in transitions through a more dynamic, relational and practice-oriented approach to research; and from Cowell *et al.* (2017) for combining the traditionally separate bodies of work on energy transitions and governance to generate new insights for each. South Africa is a highly relevant context for investigating transitions and capabilities as the country is plagued by a strong reliance on coal-fired power, which is heavily intertwined with its post-apartheid aspirations of equality and redistribution. At the same time, energy provision and energy transitions towards sustainable futures are thwarted by inefficiencies in the country's governance system, the underlying political economy, and the power relations of institutional and political change. The contribution of the paper is both theoretical, in terms of combining state power and capability as a lens to examine transition, and empirical, through in-depth engagement with practitioners from the multi-level institutions during the research process.

The paper is organised into three sections. First, the role of government institutions on the trajectory of urban sustainable energy transitions is examined. A dialogue between two separate bodies of literature that can help to understand and link state capability and transitions is established, namely Palmer *et al.*'s (2017) concept of the 'capability of the state' is connected to Johnstone and Newell's (2018) five dimensions of state power in sustainable transitions. Second, this analytical framework is employed to analyse the influence of political power on sustainable transitions and the capability of the relevant government departments and those formulating policy in the energy industries to deliver change. This discussion is based on analysis of government and policy documents, published academic research, participant observation and observer participation at energy policy workshops in Johannesburg, Polokwane and Cape Town, and 42 semi-structured interviews with members of the electricity supply industry, government stakeholders, academia, and non-governmental organisations/civil society carried out in Johannesburg and Polokwane in 2017–18. Third, the main conclusions and implications for the future research agenda are highlighted, which emphasise the political, financial, organisational and societal variability of factors influencing the trajectory and speed of the urban sustainable energy transitions across South Africa. In effect, the transition might be more accurately represented as multiple transitional pathways, which are both spatially- and politically-specific. For the transitions to

succeed, a more politically-informed policy process for renewable energy technology across all stakeholders, including domestic users and in relation to affordable access, is fundamental to align the expectations of multi-scalar governance regimes with society. A future research agenda might therefore focus on understanding the variability of transitions across cities and territories, as well as a more place-based and experiential understanding of user energy needs.

2. Governing urban sustainable energy transitions: the capabilities approach

Governments, through their policies, regulations, practices, structure and organisation, can both enable and constrain change, innovation and transformation towards a sustainable future. Government policy interventions, such as carbon emission reduction targets, renewables obligations, feed-in tariffs, voluntary codes, capital grants, planning policies and development management decisions, can nurture and encourage radical and transformational niches (Schreuer, Rohracher, and Späth 2010). The implementation of renewable energy projects also requires the alignment of national policies and processes with regional and local ones, with recognition that niche or path creation is a geographically localised process (Coenen and Truffer 2012; Coenen, Benneworth, and Truffer 2012; Essletzbichler 2012; Geels and Schot 2007). Only when a new discourse with consensus emerges to transform existing interests and challenge existing institutional norms can radical transformation be expected to occur (Kern 2011). On the other hand, institutions can impose inertia on potential change through embedded practices and approaches; a lack of vision by those in key decision-making positions; and the tendency of governments to be influenced by dominant regimes. In these conditions, the trajectory or pathways of energy transitions develop within specified boundaries of the 'possible', or 'transitional corridors' imposed by the institutional structure, with associated 'path dependency' and 'lock-in effects' (Bailey and Wilson 2009). An energy transition in these circumstances is likely to produce incremental innovations that strengthen existing technological trajectories. Institutional structure and organisation, together with processes of institutional development and change, are therefore central to the trajectory and outcomes of energy transitions (Lockwood et al. 2017).

To consider the unfolding of current trajectories of urban energy transitions (or the lack thereof) from an institutional perspective, it is key to broaden the conceptual analytical scope to encompass mechanisms which enable, inhibit or mediate socio-technical and other forms of transitional change. The paper establishes a conceptual framework that links two complementary conceptual lenses: Palmer's *et al.* (2017) concept of the 'capability of the state' and Johnstone and Newell's (2018) five dimensions of state power in sustainable transitions. While the concept of 'capability' represents a 'constructive approach' by establishing the distinctive components of the state's ability to deliver services and innovation, the five dimensions of state power represents a 'deconstructive approach' by revealing the underlying power dynamics of the state, the unintended consequences of state action and the conflictual role of the state in accumulation/exploitation (Figure 1). By combining these two analytical models, the political influences upon the operation and capability of state institutions that affect the delivery of an urban sustainable energy transition will be elicited. By demonstrating how capability and power are intertwined in delivery of energy

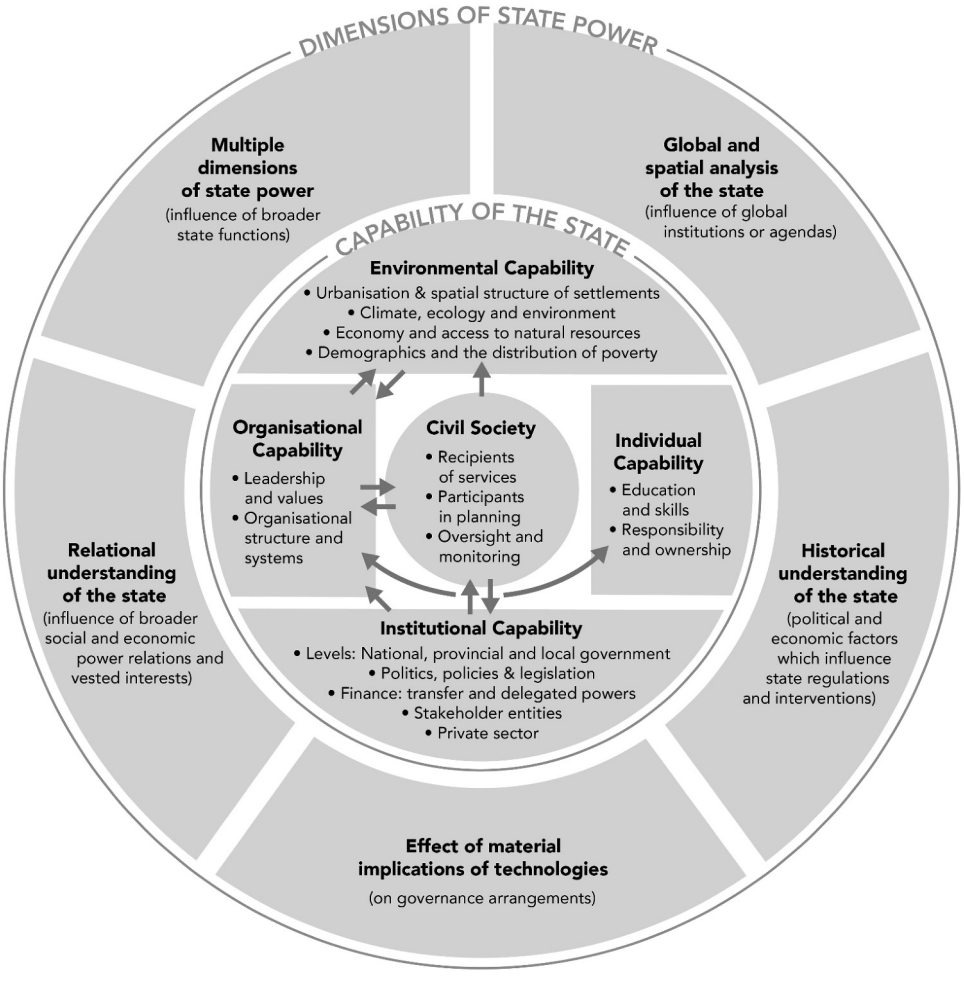

Figure 1. The role and 'capability' of the state in sustainable energy transitions.
Based on Palmer (et al., (2017), 11) and Johnstone and Newell (2018).

transitions, the paper thereby makes a significant conceptual contribution to the field of policy formulation and evaluation.

The four key components of 'capability' proposed by Palmer *et al.* (2017) relate to the work of municipalities and are presented as the inner core of Figure 1. Given the central role of the state in the establishment, regulation and operation of public services and infrastructure, a 'capable state' is one '. . . where inter-governmental arrangements do not falter or fragment at the point of service delivery' (Palmer, Moodley, and Parnell 2017, 5). Capabilities can be summarised as:

(1) The socio-economic and geographic context or 'environmental capability' within which government functions: This context includes the spatial structure of settlements; the economy; the demographic and social composition of the population; and access to natural resources.

(2) The institutional and financial framework within which the government agencies operate or 'institutional capability': This context includes the national and provincial government policy; and the legislative and institutional framework governing the regulatory, enabling, support and financial arrangements for local government. The relationship between the state and the private sector, industry and finance, including the role of the state in regulating, enabling, and curtailing the private energy companies is also contextually important.
(3) 'Organisational capability' reflects the factors influencing the performance of agencies to operate effectively, such as strategic leadership; sound policies, organisational structures and operational practices; organisational memory; human resource management; technical and scientific skills; and access to finance.
(4) 'Individual capability' refers to the potential and competency of staff within government agencies reflected in their technical and generic skills as well as knowledge and attitudes acquired through professional development and networks. This capability also incorporates the values, relationships and organisational culture associated with good performance and how these attributes are acquired and sustained (Palmer *et al.*, 2007, p.9).

The framework also acknowledges a fifth component, namely the role of civil society in the co-production of services and how societal values and interests are aggregated through political institutions (Lockwood et al. 2017, 325). While not recognised as a state capability per se, the importance of civil society should be afforded greater prominence in such analysis given many governments' targets for universal access to empower citizens and communities as well as create successful enterprises (Haque, Lemanski, and de Groot 2021a; Palmer, Moodley, and Parnell 2017, 10). Communities, in the form of householders, businesses and civil organisations, act as both recipients of services and as active citizens engaged in the constant monitoring and improvement of services. The public can make their views over services known through election campaigns and protests, including over 'impure public goods' for poor communities related to universal service provision (Akinboade, Mokwena, and Kinfack 2013; Burke 2019; Haque, Lemanski, and de Groot 2021b; Tsheola 2012). The community perspective is especially key in the South African context, due to a context of marginalisation and inequality relating to energy, as well as strong civil society-led engagement in politics.

The construction of a 'capable state' is therefore an ongoing and continuous process requiring the alignment of political, technical and institutional circumstances. It can be a vulnerable and fragile process and subject to considerable spatial, temporal and sectoral variation. Indeed, Palmer *et al.* (2017, 252) concluded that the capability of the South African state at municipal level for the delivery of water, sanitation, electricity, roads, public transport and housing was 'vulnerable' rather than being robust. Since the end of apartheid, service improvements for the general population have been secured, but with a high degree of variability over time, space and between sectors. The prospect of an energy transition and its effect on the stability of the energy governance system represents a logical, sector-focused extension to Palmer *et al.*'s (2017) evaluation. This paper assesses the capability of the state to deliver or manage an energy

transition(s) rather than Palmer *et al.*'s focus on municipal capacity to deliver a range of services. The analysis therefore recognises that, because of the limited capacity and power at the municipality level, the responsibility for transforming the energy sector also lies beyond the local scale.

Johnstone and Newell's (2018, 75) five dimensions of state power offer a complementary analytical framework that elicits relevant political drivers of, and barriers to, change within the institutions affecting the energy sector. First, historical understanding of the state provides insight into the underlying political and economic factors which influence the regulation and intervention pursued by states and the direction of potential transitions. Second, global and spatial analysis of the state indicates the influence of global institutions that might facilitate or constrain the decisions of government. Third, multiple dimensions of state power refer to how broader state functions, such as the military and 'non-environmental' policy regimes, will often be more influential than policies for sustainable transitions. Fourth, relational understandings of the state refer to broader social and economic power relations and vested interests that might constrain the kinds of state action possible (Jessop 2007). Fifth, material implications of different technologies will affect governance arrangements pursued by the state – either to reproduce centralised forms of governance where energy technology poses security risks or where technologies related to the environmental agenda might present different challenges. These dimensions provide a richer starting point for studies on the role of the state in enabling and frustrating energy transitions in urban centres. The dimensions affecting state power, which might reflect political goals, vested interests (including corruption) and global agendas, have a real effect on the 'capability' of the relevant institutions at different scales to deliver a sustainable energy transition.

South Africa presents a highly complex historical, political and economic geographically-specific context for the potential of energy transitions (Baker and Phillips 2019; Baker, Newell, and Phillips 2014; Essex and de Groot 2019; McEwan 2017). In South Africa, contingent factors necessarily include the generation of electricity from historically cheap and plentiful reserves of coal; the accumulation strategy around the country's minerals-energy complex (MEC) (Baker 2015b; Fine and Rustomjee 1997; Winkler 2011); state-owned electricity production through the centralised agency of Eskom, a public utility, and a highly regulated price system; the pervasive impact and legacies of apartheid-era energy policy (Power et al. 2016); and spatial planning affecting patterns of energy vulnerability and poverty (Knox, de Groot, and Mohlakoana 2018; Wolpe, Reddy, and Euston-Brown 2012). These influences make policy reform very slow and complex, especially in a monopolistic environment with a state-own utility and a highly regulated price system. Given the aftermath of the country's apartheid era, universal energy access and affordability has represented an important agenda since 1994 (Department of Minerals and Energy 1998; Swilling and Annecke 2012) to which the international pressure to respond to climate change can now be added.

3. Materials and methods

The methodology for this paper was based on a constructionist approach to the analysis of data from 42 semi-structured key informant interviews carried out in South Africa

with members of the electricity supply industry (6), national government (5), provincial government (3), municipal government (10), academia (7) and non-governmental organisations/civil society (11) between April, 2017 and June, 2018.[1] The interviewee typologies were selected to engage with multiple communities of practice in the complex actor networks involved in energy transition policy and practice in South African municipalities (Roulston 2014). Applying purposive sampling to ensure a spread of expertise and stakeholder groups, these interviews were undertaken in the context of one large metropolitan city (Johannesburg) and one secondary city (Polokwane). In both cities, the municipal governments have created institutional structures and planning processes that address the energy transition in relation to other levels of government (Reddy and Wolpe 2018). While the purpose of these interviews was focused on the broader context of the energy transition in South Africa, the theme of governance and its 'capabilities' across national, provincial, and local levels was prominent. Interview-based research was supplemented by analysis of secondary sources (academic, government and policy documents).

The semi-structured interviews adopted an open and conversational approach, but focused on the dual transition of providing energy access and affordability for the population whilst reducing carbon emissions; strategies implemented to address energy poverty and renewable energy; the visions for an urban energy transition and the opportunities and constraints on implementation, particularly related to legislation; funding models/tariff reforms; metering and off-grid solutions; the alignment of national, provincial and municipal institutions; and issues related to community attitudes, preferences and engagement in policy reform. Participant observation and observer participation were also employed at four one-day workshops, co-convened by South African Non-Government Organisation (NGO) 'Sustainable Energy Africa' and municipal governments in Cape Town, Johannesburg and Polokwane. Workshops provided forums for participants to identify and reflect upon state capabilities and challenges in the urban context. All research approaches compiled with the conditions of ethical approval granted for the project by Kings College London and the University of Exeter related to anonymity, confidentiality and the right-to-withdraw. The data were transcribed and analysed using thematic analysis to draw out relevant issues related to the capability and the dimensions of state power.

4. Results: the 'capable state' and delivery of a sustainable energy transition in South Africa

4.1. *Environmental capability*

In South Africa, the environmental capability of the state to deliver a sustainable energy transition, comprising low carbon and affordable access, remains strongly influenced by the country's political economy, the historical legacy of apartheid, and the continuity of its urban structure. From the 1920s, the minerals and mining industry facilitated and required a plentiful supply of electricity generated from extensive and cheap fossil/carbon reserves. As a result, a so-called MEC became dominant in protecting the requirement for, and monopoly of, cheap power. This coalition of interests became institutionalised by the state with the establishment of a government parastatal utility

company, Escom (now Eskom) in 1923. Eskom grew to become a very powerful political and economic actor in the system and, until the late 2010s, continued to demonstrate attachment to carbon-intensive pathways and resistance to new socio-technical regimes in the electricity supply mix. While the historical structures of the MEC have fragmented, and Eskom is probably at its least powerful now than it has ever been, some institutions continue to exert influence on government energy policy and investment, including through processes of financialisation and neoliberalisation (Ashman and Fine 2013; Baker 2015a).

The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), introduced by the government in 2011, was a competitive bidding programme through which successful independent power producers (IPPs) were awarded the rights to sell electricity generated from renewable energy technologies to Eskom's grid. About 2400 MW of renewable energy generation was connected to the grid under this scheme (Annecke and Wolpe 2022). The initial successes of the REIPPPP scheme were celebrated internationally, but the programme subsequently faced various political, economic and technical challenges, in large part due to strong political and ideological resistance by Eskom and associated political factions (Ting and Byrne 2020). Eskom refused to sign outstanding power purchase agreements from the fourth bidding round, arguing that it would make a loss from having to purchase energy from IPPs, and claiming that (in 2016) the country had returned to an electricity surplus and additional capacity from renewable energy was therefore unnecessary (Baker 2022).

Access to electricity for domestic use was heavily constrained by the country's apartheid system (1948–94). Electricity was mainly supplied to the heavy industry and the white population only, which left a substantial proportion of the population, including Black, Indian and Coloured populations, without homes and under-served by public services such as electricity. Without understating the marginalisation and exclusion writ large, it was the black communities that were, for the most part, worse off and less well-served. Their neighbourhoods (townships) are usually located on the outskirts of cities with poor public transport connections, which have created high levels of poverty and deprivation (Euston-Brown and Borchers 2018; Wolpe, Reddy, and Euston-Brown 2012). The post-apartheid Constitution has focused on achieving equality of service delivery to all sections of the population, including water and housing, alongside grid electricity, which to an extent was enabled by the abundance of cheap coal at this time. The percentage of households with electricity for lighting increased from 58.2% in 1996 to 86% in 2017 (Department of Energy 2018). Although the electrification drive has contributed to economic development and improved living standards within society, the apartheid urban form has been perpetuated in the post-apartheid period.

The targets set by the South African government for universal access have been fluid. In 1994, universal access was to be realised by 2012; then 92% by 2014; and 97% by 2025 (Reddy and Wolpe 2014). The issue is not simply about the number of households connected to an extended grid, but whether the electricity is affordable to those households, which perpetuates the continued use of alternative 'dirty' fuels and encourages illegal connections (Ledger 2021). Populations in rural areas tend to have fewer grid connections and the constant expansion of informal settlements at the edge of most South African cities represents an additional challenge for access to electricity. The provision of public services for such migrants on settled land is problematic, because of its 'unproclaimed' or 'uninhabitable' status – that is, land which

is unstable, prone to flooding, legally assigned for other uses, has health or environmental implications, or is in private property ownership. Such land has not been zoned for settlement in terms of the spatial planning framework of urban areas (Gaunt et al. 2012, 12), which means that electricity cannot be supplied via the grid infrastructure. Coal is no longer cheap and supplies have been curtailed for numerous reasons, meaning that inequalities in affordable access to electricity remain.

Energy access and affordability issues have become intertwined with growing international concerns about climate change and are central to the 2015 Sustainable Development Goals. As the world's fourteenth highest emitter of greenhouse gases by country (The carbon brief, 2015), South Africa faces mounting international pressure to reduce emissions, including through the deployment of renewable energy and demand-side reduction, whilst also ensuring adequate supply and affordability to meet its energy access goals. In terms of an energy transition, the objective must be to achieve universal service coverage through a sustainable and environmentally responsible approach. Renewable energy in South Africa has been developed in two ways: as large-scale generation by independent power producers connected to the Eskom grid as part of a power purchase agreement or, more recently, through municipal procurement from independent power producers[2]; and as small-scale embedded generations schemes, where the power generated is used solely on site. Indeed, a decentralised system might offer a more realistic proposition for a sustainable energy transition in South Africa, especially for those sections of the country's population that live in townships and informal settlements as well as in isolated rural areas (de Groot et al. 2022).

These factors emphasise the complex historical, power relations, material implications of new technologies, and global influences that have shaped and continue to shape the institutional structure of South Africa's energy landscape following Johnstone and Newell's (2018 dimensions of state power. The legacy of dependence on coal; the dominance of the MEC and Eskom; the attachment to the centralised electricity system of generation, transmission and distribution; and the energy inequalities resulting from the apartheid regime have all contributed to the challenges now being faced in delivering an urban energy transition, especially a sustainable one. Progress is also being made with a 'just transition', whereby actions are taken to avoid the lives of the poor being further compromised by the low carbon agenda. The Presidential Climate Commission and Eskom's Just Transition Office, both established in 2020, have recognised the importance of this agenda (Annecke and Wolpe 2022; Montmasson-Clair, Patel, and Wolpe 2022). The growing international environmental pressure to combat climate change in the energy sector represents a challenge to the institutional status quo in South Africa. However, Swilling *et al.* (2016) have argued that ' … the underlying balance of power remains largely unchanged … and the state is not configured to drive either developmental welfarism or a sustainability transition' (Swilling, Musango, and Wakeford 2016, 657). The key question is whether the institutional and organisational structure of the electricity sector in South Africa is capable of responding to these new conditions within its environmental and historical contexts to deliver a sustainable transition, which the next sections will evaluate.

4.2. *Institutional capability*

Since the establishment of the country's new Constitution in 1996, government in South Africa has operated at the national, provincial and municipal 'spheres' or levels (Figure 2). The concept of spheres of government represents a multi-scalar model of governance rather than one based on subsidiarity involving nested tiers of government (Palmer, Moodley, and Parnell 2017, 6). Based on the principle of devolution, these three spheres of government have relative autonomy, although must be cognisant of the policies and activities operating at each level of government and work in a cooperative manner. The Constitution obligates national and provincial government to support and regulate municipal government, although the quality of the expertise of this central support has been severely criticised and recognised as an institutional barrier (Ledger 2021; Palmer, Moodley, and Parnell 2017, 65).

Arguably, within this structure, municipalities can be regarded as the most important sphere for delivery of services, such as electricity. Their constitutional responsibilities as 'developmental local government' are committed to 'working with citizens and groups within the community to find sustainable ways to meet their social, economic and material needs and improve the quality of their lives' (DCD, Department of Constitutional Development 1998, Section B1). Despite these high expectations, municipalities are often perceived as the 'underdogs' in dealings with other government bodies and possess limited institutional capacity to fulfil their remit (de Visser 2009, 20–23).

In electricity, the Department of Mineral Resources and Energy (formerly the Department of Energy, 2009–19) formulates policy, while the National Energy

Service	National	Provincial	Local
Local Government	**Department of Cooperative Governance** (regulation: Municipal Systems Act 2000 & Municipal Structures Act 1998)	**Departments of Local Government** (regulation & support)	**Municipalities** a) Metros b) Local Municipalities c) District
Municipal Finance	**National Treasury** (regulation: Municipal Finance Management Act 2003)	**Departments of Finance** (regulation & support)	–
Water & Sanitation	**Department of Water & Sanitation** (infrastructure is a national function) Regulation & support to Municipalities	–	Distribution & sanitation (source infrastructure, dams, groundwater abstraction)
Electricity	**Department of Minerals and Energy** (generation and transmission is a national function) ↓ Public enterprises → **Eskom** regulated by National Energy Regulator of South Africa (NERSA)	→ sale of electricity to municipalities	Distribution, reticulation (with **Eskom** for some urban, rural & industrial customers) ↑
Roads, Railways & Public Transport	**Department of Transport** (national road & rail system)	**Department of Roads & Transport (provincial roads)** Regulation & support of public transport operators	Municipal Roads. Public transport in higher capacity municipalities (National Land Transport Act 2009)
Housing & Human Settlement	**Department of Human Settlements** (regulation through Urban Settlements Development Grant 2011)	**Department of Human Settlements** (housing is a provincial function & regulate use of USDG)	Some devolution of responsibilities to Metros
Planning	**National Planning Commission** National Development Plan 2030 (2013) Integrated Resource Plan 2010-2030 (2011)	Strategic planning, legislation and monitoring performance of local government	Formulation of Spatial Development Framework plans and the control and regulation of land management

Figure 2. The 'spheres' of government in South Africa.
Based on Palmer (et al., (2017), Chapter 3).

Regulator of South Africa (NERSA) regulates the sector. A total of 165 of the 257 municipalities have been granted a licence to distribute electricity under the Electricity Regulation Act, 2006 and provide and maintain infrastructure for electricity distribution. While Eskom generates over 87% of the country's electricity, it sells to those municipalities, who are licenced to distribute and sell to their communities (reticulation). These municipalities are responsible for the distribution of about 40% of the electricity, mainly to urban areas, while Eskom supplies industries, those municipalities not licenced to distribute electricity, the former townships and rural areas (which comprise about 60% of the distribution) (Baker and Phillips 2019). The surplus from the resale or reticulation of electricity by municipalities is critical in maintaining their financial viability, including the cross-subsidy of electricity for affordable access programmes. The distribution of electricity by two government-related bodies has been criticised as creating inefficiencies, variations in tariffs, poor economies of scale and inadequate maintenance of networks (Gaunt 2008). These institutional arrangements have important implications for the operation of the electricity sector in South Africa and its ability to respond to sustainable energy transitions.

Since the early 2000s, vested interests have hindered reforms that would have led to the liberalisation of Eskom (Gaunt 2008; Gratwick and Eberhard 2008), and, since 2012, corruption and 'state capture'[3] within national government and state-owned enterprises, including Eskom, has accentuated its inefficiencies (Bhorat et al. 2017). In the mid-2000s, the attempt to create Regional Electricity Distributors (REDs: six metros and one for the rest of the country) collapsed because REDS were not constitutionally able to reticulate electricity as municipalities had (Jaglin 2014; Jaglin and Dubresson 2016; Swilling 2014). In preparing the sector for reform, the government had frozen the construction of new generation infrastructure by Eskom between 2001 and 2004. Together with an ageing fleet of power stations and poor maintenance, Eskom's ability to generate sufficient power to meet national demand was compromised and has contributed to frequent load-shedding[4] since 2008. According to Bloomberg UK, South Africa experienced 197 days of power cuts in 2022 (Njini 2022). The action has caused substantial reputational damage to Eskom, had a huge impact on energy-intensive users, small businesses and investment into the country, and led to significant increases in electricity tariffs for households. The intention of successive Integrated Resource Plans since 2010 has been to introduce renewable sources into the energy mix, alongside the dominant sources of coal and nuclear.

During Jacob Zuma's Presidency (2009–2018), and under the guise of a radical economic transformation agenda of broad based black economic empowerment, a repurposing of state institutions, including Eskom, was undertaken to enrich an elite motivated by wealth and political power (Public Protector 2016; Bhorat et al. 2017; Godinho and Hermanus 2018; February 2019; The Judicial Commission 2019; SALGA 2021). A relationship between the President and the Gupta family[5] had engineered the formation of a 'shadow state', and essentially what amounted to a 'silent coup' (Bhorat et al. 2017, 3). Zuma-Gupta interests benefitted from the removal and appointment of state ministers and Eskom board members, who then interfered with the business decisions to secure preferential state contracts and/or share sensitive information to privilege Gupta-owned companies. Enormous costs were added to Eskom's operational expenditure (an estimated R140bn pa: c. £5.9bn or US$7.51bn or Euro 6.87bn) (Godinho and Hermanus 2018, 14), which increased tariffs and reduced

the reliability of supply, with negative outcomes for the economy, inequality, and human development. Expertise, institutional values, culture and governance were lost in Eskom, which now jeopardises the recovery of the institution (Eberhard and Godinho 2017), and has consequently affected institutional capacity negatively. Between 2007 and 2022, Eskom has had 11 different chief executives, which has affected its leadership and is likely to further affect its institutional capacity.

The Zuma-Gupta network also contributed to the blocking of official energy planning processes, such as by delaying the update of the Integrated Resource Plan, refusing to sign power purchase agreements from renewable energy independent power producers for two years (Godinho and Hermanus 2018, 28; Ting and Byrne 2020, 12) and promoting nuclear power. These actions reinforced state control over the electricity sector and delayed the introduction of alternative energy sources (Bhorat et al. 2017, 62). At the time of writing, the 'unbundling' or 'divisionalisation' of Eskom into three wholly-owned separate legal entities (generation, transmission and distribution)[6] was underway. The legal separation of the transmission entity was completed at the end of 2021. Given the complexities and politics involved in the process, the end date is tentative and subject to change. Any serious attempt to promote a sustainable energy transition in the short-term is unlikely, although the crisis has also created new and longer-term opportunities to embrace renewable energy technologies.

Other significant challenges to a sustainable energy transition exist at the municipal level. The 'developmental local government' role established under the post-apartheid constitution in 1996 acts as a constraint on reform by funding municipal services, such as the cross-subsidisation of electricity provision for the poor (through Free Basic Electricity [FBE] for indigent households), from the sale or reticulation of electricity. The business model, regulations and laws governing municipal operations, in particular, the Municipal Finance Management Act (MFMA), mean that municipalities have to operate on a profitable or sound economic basis, but at the same time act in a developmental manner to support the delivery of services to the poor (Reddy and Wolpe 2014, 39). As two interviewees noted:

> 'Your problem starts in the constitution, with the role of local government in electricity reticulation'. (MUN1)
>
> 'The skewed dependence of municipalities on electricity revenues is one of the biggest problems we have in terms of modernising electricity services'. (NAT3)

The arrangement, which links the funding of municipal services to income generated by energy supply reticulation, has created conflicts of interest and operational issues for the system. Municipalities are expected to provide the Free Basic Electricity (FBE)/Electricity Basic Services Support Tariff to all eligible households, even in Eskom distribution areas within their region. The cost is supposed to be covered by the Equitable Share Grant from the National Treasury (although the grant is not conditional on being spent on electricity), with any shortfalls covered by the reticulation of electricity (Ledger 2019; Palmer, Moodley, and Parnell 2017, 203). By March, 2021, municipal arrears to Eskom stood at R35.3 billion (c. US $1.9bn or £1.5bn or Euro 1.7 m) (Hermanus et al. 2022, 14).

The financial challenges of municipalities undermine their affordable access goals (Ledger 2021). The FBE scheme entitles 'indigent' households to 50 kWh of free electricity per month, but suffers from a number of limitations. First, the allocation

of 50 kWh is insufficient for the needs of most households, who realistically require 200–420 kWh per month. Second, eligible households are also subject to further restrictions, such as being switched to the normal domestic tariff if more than 50 kWh are used; losing rights to the FBE if the household defaults on payments; and the household supply being limited to a maximum of 10 amps. Third, eligibility for indigent status is defined and controlled by each municipality, who have restricted access to homeowners with an income of less than R3,500 per month. Tenants are ineligible. These criteria are likely to exclude the full extent of the need, including small enterprises and farmers, but help to subsidise the budgets of municipalities. Fourth, there is evidence that fewer households receive FBE payments from municipalities than are funded by the National Treasury. According to Ledger (2021, 31), the percentage of eligible indigent households receiving the FBE over the period 2014/15 to 2019/20 was between 20.9 to 31.6% of the total eligible households (meaning that 5.9 m to 8.0 m eligible households did not receive the benefits). Fifth, there is an absence of an effective oversight mechanism to monitor the implementation of affordable access by central government departments and agencies.

Any further challenges to the funding model of municipalities, such as reduced electricity consumption because of higher prices, energy efficiency initiatives and/or distributed renewable energy generation by private residential customers (small-scale embedded generation, SSEG), escalates the financial vulnerability of municipalities, their ability to deliver affordable access, and the prospect of a 'utility death spiral' (ESI1). Apart from a decline in economic activity as a result of the recession and load-shedding, consumption of electricity has also fallen as an outcome of higher electricity prices, demand management through the adoption of pre-paid meters (MUN1), more efficient lighting and housing developments (NAT3), and businesses generating their own electricity through the installation of solar panels in their own parking lots (NAT3). Faced with these changed circumstances, energy transitions by municipalities are guided in large part by revenue protection and security of supply concerns (for business investment) rather than environmental drivers (MUN10) or affordable access. The need for a fundamental rethink of the funding model of municipalities is generally acknowledged.

The institutional capability to respond to the energy transition is therefore severely constrained. Not only has Eskom represented a force of inertia through its state responsibility to supply cheap electricity to industry and debilitating effects of corruption and 'state capture' on the electricity sector, but the funding model of municipalities is dependent on the re-sale of electricity at a profit to fund affordable access policies. Any threat to this funding model, such as institutional reform, energy efficiencies or renewable energy from small-scale embedded generation, represents a challenge to the continuation of municipality services and affordable access policies. Paradoxically, the promotion of a sustainable energy transition threatens the ability and capacity of municipalities to fund their affordable access policies and to remain as viable propositions (Baker and Phillips 2019). These circumstances highlight the relevance of an understanding of the historical, institutional relations and global influences on power within the electricity sector (Johnstone and Newell, 2018). Reform of the funding model at both the national and municipal level appears to be an essential prerequisite for an energy transformation.

4.3. *Organisational capability*

The institutional capabilities noted in the previous section raise some important issues about the organisational capability of the state to deliver an energy transition in contemporary South Africa. As electricity represents a broad category of resources, technologies, infrastructures and services, it is considered across a number of central and provincial government departments. For example, the Department of Human Settlements has funded housing programmes which have incorporated energy efficiency, such as the introduction of ceilings in low-income housing as well as, through donor sponsorship, solar-powered water heaters. South Africa's new energy efficiency building regulations since 2018 have been an important new development for driving efficiency within the country's built environment (C40 Cities 2018). While such programmes are making a contribution to energy conservation and climate change adaptation, the financial implications of reduced revenues from energy charges for Eskom and the municipalities are a consequence. In this case, the environmental objectives of some government departments can directly conflict with the business model of other government bodies.

One interviewee identified a few cases where coordination between different levels of government had not taken place and therefore had a significant impact on the capability of the state. In one case, the provincial government had decided the location of economic corridors and new housing developments without recourse to the spatial planning responsibilities of the municipality. In this example, the respondent explained that a provincial government housing scheme had been approved without consultation with the municipality on whether the site selected had sufficient bulk infrastructure, including electricity transmission lines. The municipality had taken the case to the High Court and won. The respondent noted that when:

> 'The City won … it reconfirmed the case that local planning is the competency of the City so when a province allocates houses they need to do it in collaboration with the City so the infrastructure needs can be secured'. (MUN2)

The level of professional and financial support provided to municipalities by national and provincial governments is another dimension of organisational capability. The National Treasury's City Support programme and the Department of Environment, Forestry and Fisheries' (DEFF) Municipal Support Programme are set up to assist municipalities. As a generalisation, technical support from national and provincial governments has tended to lack expertise and competence, while financial support has also been questioned. For example, the Local Government Equitable Share Grant from the National Treasury, which can be used to support affordable access policies at the municipality level, does not have to be allocated to such schemes (Ledger 2021). One interviewee noted: *'A lot of them [municipalities] use the Equitable Share [Grant from central government] to pay their electricity accounts, or buy the mayor a car'* (ESI1). Ajam (2021) highlights that National Energy Regulator of South Africa (NERSA) price regulations have set the price that municipalities may charge for the reticulation of electricity at a price lower than ESKOM bulk charges. Some argue that municipalities have become too dependent on government grants and might do more to reduce their

own costs, such as through staff restructuring, as well as maximising their own revenues through reducing rates of transmission losses and electricity theft. Unchanged, these fiscal constraints are also likely to affect the ability to deliver a sustainable energy transition.

The scope of the municipalities' role in the energy transition has been constrained by national legislation and regulation. Under previous government regulations, municipalities were unable to procure renewable energy (except for generation on their own buildings and estate), although the ceiling of licensing exemptions for the distribution of private energy generation via the grid has moved from 1 MW to 100 MW in changes to Schedule 2 of the Electricity Regulations Act No.4 of 2016 (Hermanus et al. 2022). Metros, based in large urban centres with strong economic bases, tend to be regarded as better resourced and so are able to take an initiative. In contrast, district municipalities, based in rural areas of the former homelands, often lack the economic base, critical mass, administrative systems, skills and expertise to innovate (Reddy and Wolpe 2018).

Similarly, 'bureaucratic siloisation', whereby organisational cultures and 'trained incapacity' within different departments of municipalities can inhibit innovation and change in service delivery, can be another important consideration (Aylett 2013). New problems are formulated within the existing structures, procedures, institutional practices and professionalisation of particular departments (and often of managers), which can stifle innovation and transformational initiatives or activities or policies. Communication across organisational divisions and horizontal integration is needed to increase substantive knowledge, learning, skills/competences, and so create mobilisation capacity for new ways of working (Polk 2011). The ability of municipalities to respond competently to the regulatory, tariff and technical complexities therefore represents a significant barrier to the reconfiguration of energy supply in South African cities (Swilling and Annecke 2012). As a response to these barriers, a number of programmes for municipalities since 2017 have developed competencies related to the cost of supply, tariff development for renewable energy and integration of decentralised power generation into the municipal grids. However, the extent to which these ongoing initiatives will increase the capacity of municipalities is unclear to date.

Those interviewed in this research clearly recognised these variabilities. One respondent noted the pro-active approach taken by one large metro to diversify its revenue model through establishing their own renewable energy unit and their willingness to test the right to generate its own energy in the Constitutional Court (NAT3) or purchase directly from independent power producers (MUN8). The City of Cape Town took the government to the High Court in May, 2020 to allow the city to purchase of electricity directly from independent power producers and so diversify its own power supply (The Citizen 2019). Other solutions to the funding problem facing municipalities proposed by other interviewees was to levy a network charge from customers as well as for electricity consumed (MUN1; ESI1). Indeed, a number of cities, including Johannesburg City Power, the City of Cape Town and the City of Mangaung, have introduced a fixed service charge to fund the maintenance of the electricity grid, following approval by NERSA in 2016 to address these issues (City of Cape Town 2019).

This spatial variability of response means that an energy transition will be starting from different points across the country. The energy 'transition' in South Africa will, in

fact, be composed of 'multiple transitions', which will start from different points along a broad transitional pathway. It represents further evidence of the uneven geographical development within the country that the state will need to address in a sustainable energy transition.

While there appears to be a lack of alignment in government institutions, the voluntary sector has partly filled the leadership vacuum (SALGA 2022, 38). One of the respondents noted that the South African Local Government Association (SALGA) had a better overview of municipalities than national government planning, which tended to treat local government as a 'black-box' and demonstrated a lack of awareness of new developments and dynamics emerging in the sector (MUN5). SALGA was established in 1996 as a voluntary association under the Constitution to represent, promote and protect as well as raise the profile of municipalities (SALGA 2021; Palmer et al.; SALGA 2021, *et al.*, p.77). It works through lobbying, building capacity, providing support and advice, as well as promoting knowledge and information sharing amongst local government, including peer learning, performance benchmarking and best practice.

In relation to electricity, SALGA supports municipalities in the management of the energy transition, industry challenges, financial sustainability, and the adoption of technological advances (SALGA, 2021, p.51). It has acted to encourage municipalities to develop an active role in renewable energy, rather than perceiving it as a threat to revenue streams, through the formulation and implementation of cost-reflective tariffs for small-scale embedded generation (SSEG) within generation capacity regulations (SALGA, 2021, p.44, 46 and 71). The Association has also played an advocacy role in the shift in national policy in 2021 to allow municipalities to be able to buy electricity from independent producers rather than just Eskom (SALGA 2021, 45). SALGA and municipalities are heavily intertwined, but nevertheless recognise the variable capacity of local government for transformation (SALGA 2021, 46).

The organisational capacity of the state appears to be sub-optimal because of the lack of coordination between the three levels of government as well as within the different levels; constraints imposed by national legislation and regulations; and the variable capacities of the different types of municipalities to initiate and manage an energy transition. These factors relate most strongly to Johnstone and Newell's (2018) historical dimensions of state regulation and intervention, which highlight the need for organisational reconfiguration to match the material implications of new and emerging technologies to facilitate a sustainable energy transition.

4.4. *Individual capability*

The potential and competency of individual staff within the levels of government have an important role to play in the effectiveness of the institutions in the delivery of energy transition. Euston-Brown and Borchers (2018) emphasised that sustainable energy transitions in South African municipalities are unlikely to be delivered effectively through an implementation plan or technology drive. Instead, the building of capacity and strong relationships of trust amongst a variety of stakeholders is more likely to be successful. A number of issues are relevant in this regard.

The first issue relates to the post-apartheid negotiated settlement, which failed to change the basic power structures of the apartheid socio-political regime, including Black and economic elites (Swilling, Musango, and Wakeford 2016, 660). Inequalities in society were addressed within the socio-political regime that reflected the power deal: namely, neo-liberalism, financialisation and non-developmental welfarism. Instead of building state institutions to drive 'a non-MEC employment-creating "developmental welfarism", emphasis was on the replacement of White personnel with Black officials as part of a state-driven "new racial nationalism" agenda' or Black empowerment (Swilling, Musango, and Wakeford 2016, 661). As a consequence, there has been a readjustment of personnel within Eskom, which has led to changes in available technical expertise. This factor reflects the multiple dimensions of state power recognised in Johnstone and Newell's (2018) framework, whereby other political agendas deflected the capabilities of the state in terms of skills and expertise within the energy sector.

A second issue raised by respondents was the importance of political interests and support within a municipality or province. Relevant ministers, city mayors and politicians often played a fundamental role in backing or stalling a particular policy initiative. While these influences can vary, ranging from the deference to the authority of tribal leaders in rural areas, vested interests and corruption, political support and power was fundamental to action, especially related to the electoral cycle. As one respondent commented about the installation of infrastructure or small pilot projects for alternative energies:

> '[A total of] 80% of the [province] territory is still under tribal authority. Deference to the authority of the chief is replicated in government. The authority of the minister is paramount. If he doesn't support something, then there is nothing on paper – something signed by the previous minister – that can stand up to that'.(PRO1)
> 'At the end of every five-year electoral cycle, there is a focus on service delivery. And people air their views. [Place name] had uprisings, strikes, demanding services. So the City had to make a plan'. (MUN2)

Third, in the absence of political support and institutional reform, change is often dependent upon the work of a 'champion' or 'agent of change', who can stimulate innovation and reform through individual motivation, personal capital and/or networks. Such individuals can often find innovative ways through the bureaucracy or legislation to stimulate reforms or raise awareness amongst influential managers or politicians (MUN8). The role of local universities and academics were highlighted in providing contemporary knowledge and expertise as well as credibility and profile. However, this mechanism can be extremely fragile and precarious. The dependency on one person, which itself can imply variable human and political capital, can cause a sudden collapse of initiative at the point of institutional restructurings or career progression (CS03). One of the respondents had personal experience of the vagaries of acting as a 'champion' for environment-related issues and maintaining political support for plans and projects:

> 'The previous minister backed it up [a Green Economy Plan]. In the implementation plan we had concrete projects, targets, lead agents. And in the office of the Premier, there was a technical working group on the Green Economy. Then a change in the ministers and overnight [it changed] … the new one is supportive of the mining industry and that's that … '. (PRO1)

The capability of individuals to promote policy reform and innovation, and the willingness of recipients to listen and act, is based on their technical and scientific knowledge, skills, vested interests and professional behaviour. Ultimately, however, successful implementation resulting from these capabilities depends upon political support from ministers and leaders as well as 'champions' working within institutions to raise awareness, wider understanding and support. Both of these elements are often extremely precarious, based on the vagaries of political office and the career progression of individuals. These issues reflect the power relations and vested interests from Johnstone and Newell's (2018) framework operating within a local context.

4.5. *Societal attitudes, aspirations and expectations*

Some of the main legacies of the post-apartheid Constitution have been to establish new attitudes and expectations within South African society about energy access and affordability, particularly amongst the poor and deprived populations, as well as the need for low carbon energy. Electricity was central to the African National Congress' vision of a post-apartheid state, because it was perceived as a convenient, modern system with the potential to create business opportunities, social development as well as reduce negative health effects of indoor air pollution from traditional energy sources. Consequently, grid electricity is generally regarded as the *only* source of energy, which embodies a certain level of status and prestige. While attitudes are beginning to change, off-grid electricity using renewable technologies is generally regarded as inferior and so represents a barrier to a sustainable energy transition. A number of the interviewees summarised these widely held societal attitudes:

> '[Name of a Metro] is the bling bling city; everyone wants everything first class. So the interventions … like the hotbox [an energy-saving cooking device] … can never be a permanent solution for those communities. It's a prosperity thing – people want to access first class technologies'. (MUN1)
>
> ' … the socio-economic background and the political background of our country is as such that everybody wants everything for free. They do not want to be responsible for that [solar system] and if you give them off-grid, instead of nothing, they regard it as second to grid, or inferior to grid. And this actually makes it a bit difficult to really get the necessary appreciation for the non-grid electrification project'. (ESI3)
>
> ' … the post-democratic state has created a ridiculous dependency and expectation – that the government will do everything'. (MUN6)

These findings are echoed by Haque *et al.* (2021a), who demonstrated that perceptions of normality and practices of social capital are connected to collective social influence in the uptake or rejection of energy technologies in low-income communities, where access to grid-tied electricity is often perceived to be the norm. The strength of the public's attachment to grid electricity as the preferred source of energy is demonstrated by the response of communities to disconnection. One respondent reported that a common response to disconnection in townships were community protests and disruption:

> 'Two days ago if you were watching [the] news you would see they switched off electricity there [pointing]…. The electricity was gone for [only] an hour. They didn't even waste another hour for electricity to come back, they striked! They were burning tyres, your plastics. Then if you passed with your car, yeesh I don't know what would happen … '. (CS05)

It is clear that there is a need to communicate the merits of alternative energy technologies in order to change public perceptions as well as understand the problems experienced by users of new technology, which can involve supply chain issues, lack of guarantees, and poor and unsafe installation. Importantly, the communication of how associated technology and equipment, such as solar water heaters, can be self-maintained without recourse to an outside contractor or obsolescence is as much a responsibility of government agencies as it is the public. As one respondent noted:

> 'We should be moving to the energy mix and educating people what the most efficient sources of energy to use for what use … We can do solar water heaters and do them well. The reason they don't work is because people are not educated. The solution that is brought to the people, but without the involvement of the people. Contractors come to maintain the water heater. It's a low maintenance thing - you just need a bucket and a cloth. Residents say it doesn't heat water, but don't know how to get rid of that problem – the dust'. (CS04)

Rather than new technologies being imposed on communities, there needs to be more and trusted communication, collaboration and consistent engagement with the public to create a better understanding of alternative sources of energy, together with a sense of ownership, responsibility and ultimately participatory governance of the country's own energy transition. Friedman (2021) has argued that local politicians and the appointment of local government officials have tended to place too much emphasis on the technicalities of service delivery rather than serving the public with the services that they require.

5. Discussion and conclusions

This paper has sought to investigate the ability of one particular state to deliver a sustainable energy transition through an analytical framework combining the deconstructive approaches of Johnstone and Newell's (2018) 'five dimensions of state power' with the constructive engagement of Palmer's *et al*., 2017 concept of the 'capability of the state'. The productive combination of the two frameworks has facilitated the drawing out of the underlying power dynamics of the state within the operation and capability of state institutions. With regards to the potential of this approach to contexts outside South Africa, the paper offers an analytical framework which is robust and capable of being replicated for other countries so that the state's capability to delivery energy transitions can be assessed and areas for improvement can be identified. Comparable probes into the complexities of achieving a sustainable energy transition in other states would highlight the importance of understanding local conditions in the formulation of related strategies. While it is arguably difficult to compare the energy landscape in different national contexts in a sub-Saharan setting, recent comparative work on energy in peri-urban areas in South Africa and Burkina Faso has shown how issues of scale, scope and design of energy interventions are cross-cutting across national and other boundaries (Cantoni, Caprotti, and de Groot 2022). At the same time, the complexity and ever-changing nature of energy transitions, and of the South African context, must be acknowledged and form a limitation of this paper, in which it

is impossible to capture the full range of interactions that make up the dynamic energy landscape of the country. At the same time, another key limitation is the focus on two cities. While this approach enables the paper to engage at depth with the workings of multiple actor-networks involved in energy governance in those urban locations, the overall urban and energy landscape in South Africa is, as acknowledged above, not only complex but affected by decadal trends that have impacted on urban and other ways in variegated ways.

The analysis presented here suggests that the institutional arrangements in South Africa appear to be struggling to shake free from the conditions established in the apartheid era and that have developed in the post-apartheid system, as well as adjust to the new and rapidly changing circumstances of the global energy landscape. Unless the whole raft of obstacles is tackled and resolved, it is unlikely that a sustainable energy transition will emerge. In terms of environmental capability, the discussion indicates that the power relations embodied in institutions related to electricity generation, transmission and distribution in South Africa were very firmly rooted in key developments that evolved in the twentieth century and have been resistant to reform. The main constraints appear to be a dependence on coal, albeit one that is slowly declining; the continued, yet fragmenting dominance of the institutions and relationships of the MEC and a government parastatal, Eskom; energy poverty and inequality from the legacy of apartheid; and electricity transmission and distribution via a centralised grid. While impressive progress has been made in ensuring near-universal access to electricity, the affordability of electricity remains an issue to be addressed. Recent investment in coal-fired power stations to generate sufficient electricity after 'load-shedding' has continued the country's carbon 'lock-in' at the expense of increasing the commitment to renewable energy sources to address the growing international environmental pressure to combat climate change.

These circumstances have clearly shaped the institutional capability of the sector and the appropriateness of these arrangements to deliver a sustainable transition. Eskom, as the main generator of electricity, has acted as a force for inertia over many decades as a central actor within the MEC and therefore within the economy and the state more broadly, and has created a decadal lock-in. Eskom has also been debilitated by these vested interests through the effects of failed privatisation plans, poor maintenance of power stations (Baker et al. 2015), and corruption and state capture (Eberhard and Godinho 2017), which continue to reduce energy availability and fail to create conditions for a sustainable energy transition. Similarly, municipalities, as electricity distributors to two-fifths of the population, face a challenge to their funding model by the sustainable transition in that energy efficiencies or renewable energy from self-generation reduces the fiscal basis of municipality services and energy subsidisation for the poor. The uncoupling of these contingent linkages engender profoundly serious disruption to social service provision. Government institutions with direct responsibilities for the generation and supply of electricity to the public are not currently set up to participate and respond to a sustainable energy transition.

The wider organisational and individual capabilities also appear sub-optimal for change and innovation. The three levels or spheres of national, provincial and municipal government are not well aligned and demonstrate a lack of vertical and horizontal coordination. Most significantly, different types of municipalities based on their size,

income and economies of scale (large urban Metros, secondary cities, large and small towns, and rural areas) possess variable capacities to initiate and manage an energy transition. The opportunity for staff within the municipalities to acquire relevant scientific knowledge, skills and professional behaviours to deliver a transition are therefore also uneven. Initiatives can depend upon political support and/or key staff acting as 'champions' for a cause – both of which can be extremely precarious within the political cycle, and are highly contingent on local context, internal goodwill, and existing administrative structures.

Societal attitudes, aspirations and expectations are also influential factors on the propensity for institutional change. One of the main legacies of the post-apartheid constitution has been to extend access to electricity (as opposed to any other form of energy) to all of its citizens, which has created the perception that grid electricity is not only the *sole* source of energy, but is a legitimised and rights-based resource, which embodies a certain level of status and prestige. Off-grid electricity using renewable technologies has been regarded as inferior, even in locations where the extension of the transmission grid would be very difficult. A sustainable energy transition cannot be delivered without better communication of the issues, more community engagement in low carbon initiatives, a greater sense of community ownership and responsibilities for the new technology and infrastructure (Davies, Swilling, and Wlokas 2018; Haque, Lemanski, and de Groot 2021a; Watson 2014), and a re-imagination of energy distribution away from a centralised modernist grid and towards a more decentralised system incorporating multiple types of generation, including renewables. Unsurprisingly, household renewable energy solutions will only produce a sustainable energy transition when households find the new technology and energy solutions convenient to use, embody an enhancement of service provision, encourage behavioural change, and ultimately contribute to a better quality of life. Such a focus is something which, to date, has not been foregrounded in energy transitions in South Africa.

Two valuable insights into the sustainable energy transition in South Africa have emerged from this analysis. First, there is a need to view transition in South Africa as a broad trajectory composed of multiple pathways that are both spatially- and politically-specific (linked to a particular area of the country) and characterised by geographically uneven socio-economic development. As a consequence of the variable capabilities within government institutions, especially at the municipality level, different parts of the country are necessarily going to be at different points in transition and respond to different parts of the low-carbon/energy access challenge. This recognition has implications for the trajectory of sustainable energy transitions, namely that understanding needs to be geographically and spatially granular.

Second, there is a need to enrol communities and poor households into transitional strategies – both in terms of better communication about the status and maintenance of renewable energy technology, but also two-way communication with poor households to obtain an experiential understanding of their energy needs. This understanding would inform the creation of solutions that will be appropriate and efficient in their living conditions as well as daily routine and behaviours. Such an approach might be part of more politically-informed policy processes. These considerations will become of greater significance if the transition involves decentralised renewable

energy generation and micro-grids under community ownership and management. A broader understanding of the energy mix is also important given that energy consists of more than electricity, particularly in low-income settings, and different forms of energy can be more appropriate for some uses than others. While some of these considerations are part of the Presidential Climate Commission and the 'just energy' transition, the problem is that much of the engagement with communities is 'tick box' and so unlikely to inspire substantial change (Mohlakoana and Wolpe 2021).

While these conclusions appear to be pessimistic, they also indicate more positive perspectives about how the institutional structure might be changed for the better. First, the rebalancing of political power and vested interests in state institutions offers an opportunity to introduce new forms of organisation and practice: namely, from carbon intensive, MEC and a centralised grid to renewable energy, environmental principles and the opportunities of a decentralised grid that can address the dual challenge of increasing affordable access whilst reducing emissions. Second, such a political transformation must embrace the material implications of existing, new and emerging technologies, especially in terms of its potential to improve the quality of life in unserviced informal settlements and raise community awareness and ownership. Third, a new funding model is required to encourage efficiencies and innovation in the generation, transmission and distribution of electricity, incorporating the volume, cost and optimum mix of energy types. The current system of reticulation and subsidisation of electricity supply to the poor is too complex and has created too many barriers to innovation.

Notes

1. The source of anonymised quotes included in the analysis are denoted: electricity supply industry (ESI), national government (NAT), provincial government (PRO), municipal government (MUN), academia (ACA) and non-governmental organisations/civil society (CSO).
2. 'Wheeling' refers to the transportation or transmission of electric energy from within a grid to outside its boundaries (Moodliar, *et al.*, (n.d.)). The introduction of a 'Wheeling' framework would facilitate the distribution of power generated by a private operator in one location to a buyer in another location via a third-party network, but only if it complies with all technical, safety and commercial requirements.
3. State capture has been defined by Godinho and Hermanus (2018, 3) as ' … a political-economic project whereby public and private actors collude in establishing clandestine networks that cluster around state institutions in order to accumulate unchecked power, subverting the constitutional state and social contract by operating outside of the realm of public accountability'.
4. Load-shedding refers to the practice of rationing the available electricity supply for specific areas over a defined period to avoid a complete breakdown and blackout of the national electricity distribution grid.
5. The Gupta family operated a number of computer, mining and media businesses in South Africa between 1993 and 2017. Over this period, the family developed close links with politicians in the ruling African National Congress (ANC) party.
6. Following the appointment of the Eskom Sustainability Task Team in December, 2018 as a response to the crisis associated with state capture and corruption within Eskom, the President's State of the Nation Address in February (2019) announced the unbundling of Eskom into three entities (transmission, generation and distribution). The reform of Eskom had

become essential as its debt (c. R500bn or £21.1bn or US$26.5bn or Euro 24.5bn) had reached two and a half times its gross revenue (de Vos 2019). The debt costs of Eskom could not be covered by its operational income and so the company was likely to default on its debt repayments. It was feared that such a situation might trigger a wider financial crisis across South Africa, so the reform of Eskom had to be swift (Evans 2019).

Acknowledgements

The authors would like to thank Professor Mark Brayshay for his comments on an earlier draft of this paper and Tim Absalom and Jamie Quinn (University of Plymouth) for the cartography in this paper.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Economic and Social Research Council/National Research Foundation Newton Fund Urban Transformations in South Africa scheme (ES/N014138/2: 'Urban Transformation in South Africa through co-designing energy services provision pathways' project). It was a collaborative project between the University of Cape Town, Sustainable Energy Africa, and the Universities of Exeter, Manchester, Sussex and Plymouth. Support was also provided by the AXA Research Fund for Dr de Groot's involvement under the AXA Research Leader Programme: 'Towards a fair, efficient and sustainable energy transition'.

Data availability statement

Transcripts of the interviews have been lodged with the Economic and Social Research Council Data Archive at the University of Essex: Caprotti, F. & Phillips, J. (2020). *Urban transformation in South Africa through co-designing energy services provision pathways 2016–2019*. [data collection]. UK Data Service. SN: 853812, http://doi.org/10.5255/UKDA-SN-853812.

ORCID

Stephen Essex http://orcid.org/0000-0002-7728-4043
Federico Caprotti http://orcid.org/0000-0002-5280-1016
Jiska de Groot http://orcid.org/0000-0002-0413-0051
Jon Phillips http://orcid.org/0000-0001-6286-2165
Lucy Baker http://orcid.org/0000-0001-6008-1656

References

Ajam, T. 2021. "How Adequate is the Local Government Equitable Share Grant in the Face of Escalating Costs of Municipal Service Delivery." *Local Government Bulletin (Special Issue on Local Government Finance)* 16 (4). Accessed January 8, 2023. https://dullahomarinstitute.org.za/multilevel-govt/local-government-bulletin/archives/volume-16-issue-4-november-december-2021/how-adequate-is-the-local-government-equitable-share-grants-in-the-face-of-escalating-costs-of-municipal-service-delivery#:~:text=The%20local%20government%20share%20of,9.7%25%20in%202023%2F2024.

Akinboade, O. A., M. P. Mokwena, and E. C. Kinfack. 2013. "Understanding citizens' Participation in Service Delivery Protests in South Africa's Sedibeng District Municipality." *International Journal of Social Economics* 40 (5): 458–478. https://doi.org/10.1108/03068291311315331.

Andrews-Speed, P. 2016. "Applying Institutional Theory to the Low-Carbon Energy Transition." *Energy Research & Social Science* 13:216–225. https://doi.org/10.1016/j.erss.2015.12.011.

Annecke, W., and P. Wolpe. 2022. *What role for social policies in the framework of the just transition in South Africa?*, Research Papers No. 230, Paris: Éditions Agence Francaise de Development.

Argyriou, I. 2020. "Urban Energy Transitions in Ordinary Cities: Philadelphia's Place-Based Policy Innovations for Socio-Technical Energy Change in the Commercial Sector." *Urban Research & Practice* 13 (3): 243–275. https://doi.org/10.1080/17535069.2018.1540654.

Ashman, S., and B. Fine. 2013. "Neo-Liberalism, Varieties of Capitalism, and the Shifting Contours of South Africa's Financial System." *Transformation: Critical Perspectives on Southern Africa* 81 (1): 144–178. https://doi.org/10.1353/trn.2013.0013.

Aylett, A. 2013. "The Socio-Institutional Dynamics of Urban Climate Governance: A Comparative Analysis of Innovation and Change in Durban (KZN, South Africa) and Portland (OR, USA." *Urban Studies* 50 (7): 1386–1402. https://doi.org/10.1177/0042098013480968.

Bailey, I., and G. Wilson. 2009. "Theorising Transitional Pathways in Response to Climate Change: Technocentrism, Ecocentrism, and the Carbon Economy." *Environment and Planning A* 41 (10): 2324–2341. https://doi.org/10.1068/a40342.

Baker, L. 2015a. "The Evolving Role of Finance in South Africa's Renewable Energy Sector." *Geoforum* 64:146–156. https://doi.org/10.1016/j.geoforum.2015.06.017.

Baker, L. 2015b. "Renewable Energy in South Africa's Minerals-Energy Complex: A 'Low carbon' Transition?" *Review of African Political Economy* 42 (144): 245–261. https://doi.org/10.1080/03056244.2014.953471.

Baker, L. 2022. "Procurement, Finance and the Energy Transition: Between Global Processes and Territorial Realities." *Environment and Planning E: Nature and Space* 5 (4): 1738–1764. https://doi.org/10.1177/2514848621991121.

Baker, L., J. Burton, C. Godinho, and H. Trollip. 2015. *The Political Economy of Decarbonisation: Exploring the Dynamics of South Africa's Electricity Sector*. Cape Town: University of Cape Town Energy Research Centre.

Baker, L., P. Newell, and J. Phillips. 2014. "The Political Economy of Energy Transitions: The Case of South Africa." *New Political Economy* 19 (6): 791–818. https://doi.org/10.1080/13563467.2013.849674.

Baker, L., and J. Phillips. 2019. "Tensions in the Transition: The Politics of Electricity Distribution in South Africa." *Environment & Planning C: Politics & Space* 37 (1): 177–196. https://doi.org/10.1177/2399654418778590.

Bhorat, H., M. Buthelezi, I. Chipkin, S. Duma, L. Mondi, C. Peter, M. Qobo, M. Swilling, and H. Friedenstein 2017. *Betrayal of the Promise: How South Africa is Being Stolen*, State Capacity Research Project, South African Universities. Accessed December 3, 2019 https://pari.org.za/wp-content/uploads/2017/05/Betrayal-of-the-Promise-25052017.pdf.

Burke, J. April 30, 2019.South Africa Election: Everything You Need to Know, the Guardian, Online: Accessed March 1, 2020. https://www.theguardian.com/world/2019/apr/30/south-africa-election-everything-you-need-to-know.

C40 Cities. 2018. Four South African Cities Strive to Make All New Buildings Zero Carbon. Accessed March 1, 2020. https://www.c40.org/press_releases/south-african-cities-make-all-new-buildings-zero-carbon.

Cantoni, R., F. Caprotti, and J. de Groot. 2022. "Solar Energy at the Peri-Urban Frontier: An Energy Justice Study of Urban Peripheries from Burkina Faso and South Africa." *Energy Research & Social Science* 94:102884. https://doi.org/10.1016/j.erss.2022.102884.

Caprotti, F., S. Essex, J. Phillips, J. de Groot, and L. Baker. 2020. "Scales of Governance: Translating Multiscalar Transitional Pathways in South Africa's Energy Landscape." *Energy Research & Social Science* 70:101700. https://doi.org/10.1016/j.erss.2020.101700.

Caprotti, F., J. Phillips, S. Petrova, S. Bouzarovski, S. Essex, J. de Groot, L. Baker, Y. Reddy, and P. Wolpe. 2021. "Candles are Not Bright enough': Inclusive Urban Energy Transformations in Spaces of Urban Inequality?" In *African Cities and Collaborative Futures: Urban Platforms and Metropolitan Logistics*, edited by M. Keith and A. de Souza Santos, 121–142. Manchester: Manchester University Press. https://doi.org/10.7765/9781526155351.00012.

City of Cape Town. 2019. *Electricity Tariff FAQs June, 2019*, City of Cape Town, Cape Town. Accessed March 1, 2020. http://resource.capetown.gov.za/documentcentre/Documents/Procedures,%20guidelines%20and%20regulations/Electricity%20Budget%20FAQs.pdf.

Coenen, L., P. Benneworth, and B. Truffer. 2012. "Toward a Spatial Perspective on Sustainability Transitions." *Research Policy* 41 (6): 968–979. https://doi.org/10.1016/j.respol.2012.02.014.

Coenen, L., and B. Truffer. 2012. "Places and Spaces of Sustainability Transitions: Geographical Contributions to an Emerging Research and Policy Field." *European Planning Studies* 20 (3): 367–374. https://doi.org/10.1080/09654313.2012.651802.

Cowell, R., G. Ellis, F. Sherry-Brennan, P. A. Strachan, and D. Toke. 2017. "Sub-National Government and Pathways to Sustainable Energy." *Environment & Planning C: Politics & Space* 35 (7): 1139–1155. https://doi.org/10.1177/2399654417730359.

Davies, M., M. Swilling, and H. L. Wlokas. 2018. "Towards New Configurations of Urban Energy Governance in South Africa's Renewable Energy Procurement Programme." *Energy Research & Social Science* 36:61–69. https://doi.org/10.1016/j.erss.2017.11.010.

DCD (Department of Constitutional Development). 1998. *White Paper on Local Government*. Pretoria: DCD. Accessed March 1, 2020. http://www.treasury.gov.za/legislation/mfma/guidelines/whitepaper.pdf.

de Groot, J., F. Caprotti, M. Moorlach, M. Mathebula, M. Schloemann, A. Densmore, K. Pillay, and C. Butler. 2022. Dealing with Informality: Integrating Off-Grid Electrification Modes for Achieving Universal Access to Electricity in South Africa. A paper prepared for the '*South African Sustainable Energy*' conference. Stellenbosch, November 2021.

Department of Energy. 2018. *South African Energy Sector Report*. Pretoria: Department of Energy.

Department of Minerals and Energy. 1998. White Paper on the Energy Policy of the Republic of South Africa. Pretoria: DME. Accessed November 5, 2019. http://www.energy.gov.za/files/policies/whitepaperenergypolicy1998.pdf.

de Visser, J. 2009. "Developmental Local Government in South Africa: Institutional Fault Lines." *Commonwealth Journal of Local Governance* 2 (January): 7–25. https://doi.org/10.5130/cjlg.v0i2.1005.

de Vos, D. 2019. What to Do About Eskom, *Viewpoints*, No.7, June, 2019, Centre for Development and Enterprise, Johannesburg. Accessed November 6, 2019. www.cde.org.za.

Eberhard, A., and C. Godinho 2017. A Review and Exploration of the Status, Context and Political Economy of Power Sector Reforms in Sub-Saharan Africa. South Asia and Latin America, Energy and Economic Growth State of Knowledge Paper Series, Paper 21. Berkeley: Oxford Policy Management, University of California.

Essex, S., and J. de Groot. 2019. "Understanding Energy Transitions: The Changing Versions of the Modern Infrastructure Ideal and the 'Energy underclass' in South Africa, 1860–2019." *Energy Policy* 133:1–9. https://doi.org/10.1016/j.enpol.2019.110937.

Essletzbichler, J. 2012. "Renewable Energy Technology and Path Creation: A Multi-Scalar Approach to Energy Transition in the UK." *European Planning Studies* 20 (5): 791–816. https://doi.org/10.1080/09654313.2012.667926.

Euston-Brown, M., and M. Borchers. 2018. "Sustainable Energy Transitions in South African Cities." In *Urban Energy Transition Renewable Strategies for Cities and Regions*, edited by P. Droege, 553–578. Amsterdam: Elsevier. https://doi.org/10.1016/B978-0-08-102074-6.00043-7.

Evans, S. July 2, 2019. Time's Up for Eskom: Unbundling Must Happen in Two Years *Fin*. 24: Accessed November 6, 2019. https://www.fin24.com/Economy/Eskom/analysis-times-up-for-eskom-unbundling-must-happen-un-2-years-20190702-2.

February, J. 2019. *State Capture: An Entirely New Type of Corruption*.South Africa Report 25. Institute for Security Studies. Accessed December 3, 2019. https://www.africaportal.org/documents/19536/State_capture_and_entireley_new_type_of_corruption.pdf.

Fine, B., and Z. Rustomjee. 1997. *South Africa's Political Economy. From Minerals – Energy Complex to Industrialization*. Johannesburg: Wits University Press.

Friedman, S. October 5, 2021. Is Too Much Service Delivery Killing South Africa's Democracy? *Mail and Guardian*, Accessed January 8, 2023. https://mg.co.za/opinion/2021-10-05-service-delivery-killing-south-africas-democracy/.

Gaunt, C. T. 2008. "Electricity Distribution Industry Restructuring in South Africa: A Case Study." *Energy Policy* 36 (9): 3448–3459. https://doi.org/10.1016/j.enpol.2008.05.022.

Gaunt, T., M. Salida, R. Macfarlane, S. Maboda, Y. Reddy, and M. Borchers. 2012. *Informal Electrification in South Africa: Experience, Opportunities and Challenges*. Cape Town: Sustainable Energy Africa.

Geels, F. W., and J. Schot. 2007. "Typology of Sociotechnical Transition Pathways." *Research Policy* 36 (3): 399–417. https://doi.org/10.1016/j.respol.2007.01.003.

Godinho, C., and L. Hermanus. 2018. (Re)conceptualising State Capture: With a Case Study of South African Power Company Eskom. Paper at the '*State Capture and its aftermath: building responsiveness through state reform*' conference, Public Affairs Research Institute, Johannesburg , 22-24 October, 2018, Accessed December 3, 2019. https://www.gsb.uct.ac.za/files/Godinho_Hermanus_2018_ReconceptualisingStateCapture_Eskom.pdf.

Gratwick, K. N., and A. Eberhard. 2008. "Demise of the Standard Model for Power Sector Reform and the Emergence of Hybrid Power Markets." *Energy Policy* 36 (10): 3948–3960. https://doi.org/10.1016/j.enpol.2008.07.021.

Haque, A. N., C. Lemanski, and J. de Groot. 2021a. "Is (In)access to Infrastructure Driven by Physical Delivery or Weak Governance? Power and Knowledge Asymmetries in Energy Governance in Cape Town, South Africa." *Geoforum* 126:48–58. https://doi.org/10.1016/j.geoforum.2021.07.013.

Haque, A. N., C. Lemanski, and J. de Groot. 2021b. "Why Do Low-Income Urban Dwellers Reject Energy Technologies? Exploring the Socio-Cultural Acceptance of Solar Adoption in Mumbai and Cape Town." *Energy Research & Social Science* 7:101954. https://doi.org/10.1016/j.erss.2021.101954.

Hermanus, L., G. Montmasson-Clair, M. Patel, and P. Wolpe. 2022. *Local Government Toolbox for a Just Energy Transition in South Africa*. Pretoria: Trade and Industrial Policy Strategies.

Jaglin, S. 2014. "Urban Energy Policies and the Governance of Multilevel Issues in Cape Town." *Urban Studies* 51 (7): 1394–1414. https://doi.org/10.1177/0042098013500091.

Jaglin, S., and A. Dubresson. 2016. *Eskom: Electricity and Technopolitics in South Africa*. Cape Town: UCT Press.

Jehling, M., M. Hitzeroth, and M. Brueckner. 2019. "Applying Institutional Theory to the Analysis of Energy Transitions: From Local Agency to Multi-Scale Configurations in Australia and Germany." *Energy Research & Social Science* 53:110–120. https://doi.org/10.1016/j.erss.2019.01.018.

Jessop, B. 2007. *State Power*. Cambridge: Polity Press.

Johnstone, P., and P. Newell. 2018. "Sustainability Transitions and the State." *Environmental Innovation and Societal Transitions* 27:72–82. https://doi.org/10.1016/j.eist.2017.10.006.

Kern, F. 2011. "Ideas, Institutions, and Interests: Explaining Policy Divergence in Fostering 'System innovations' Towards Sustainability." *Environment and Planning C: Government and Policy* 29 (6): 1116–1134. https://doi.org/10.1068/c1142.

Knox, A., J. de Groot, and N. Mohlakoana. 2018. "Post-Apartheid Spatial Inequalities and the Built Environment: Drivers of Energy Vulnerability for the Urban Poor in South Africa." In *Energy Poverty and Vulnerability*, edited by N. Simcock, H. Thomson, S. Petrova, and S. Bouzarovski, 61–79. London: Routledge. https://doi.org/10.4324/9781315231518-5.

Ledger, T. 2019. *A Critical Evaluation of Local Government Equitable Share*. Johannesburg: Public Affairs Research Institute, Universities of Johannesburg, Witwatersrand and Cape Town.

Ledger, T. 2021. *Broken Promises: Electricity Access for Low-Income Households – Good Policy Intentions, Bad Trade-Offs and Unintended Consequences*. Johannesburg: Public Affairs Research Institute.

Lockwood, M., C. Kuzemko, C. Mitchell, and R. Hoggett. 2017. "Historical Intuitionalism and the Politics of Sustainable Energy Transitions: A Research Agenda." *Environment & Planning C: Politics & Space* 35 (2): 312–333. https://doi.org/10.1177/0263774X16660561.

McEwan, C. 2017. "Spatial Processes and Politics of Renewable Energy Transition: Land, Zones and Frictions in South Africa." *Political Geography* 56 (January): 1–12. https://doi.org/10.1016/j.polgeo.2016.10.001.

Mohlakoana, N., and P. Wolpe. 2021. *A Just Energy Transition to Facilitate Household Energy Access and Alleviate Energy Poverty, Policy Brief 5/2021*. Pretoria: Trade and Industrial Policy Strategies.

Montmasson-Clair, G., M. Patel, and P. Wolpe. 2022. *People's Voices: Participatory Justice for a Just Transition in South Africa*. Pretoria: Trade and Industrial Policy Strategies.

Moodliar, L., I. E. A. Davidson, and E. Buraimoh (n.d.), *Wheeling of Electricity: A Friend or Foe in the Energy Transition*, Association of Municipal Electricity Utilities (Southern Africa), Johannesburg. Accessed January 31, 2023. https://www.ameu.co.za/Wheeling%20of%20Electricity%20A%20friend%20or%20Foe%20in%20the%20Energy%20Transition%20-%20Leshan%20Moodliar.pdf.

Njini, F. December 23, 2022. Eskom's Fifth Straight Loss Compounds South Africa's Loadshedding Woes. *Bloomberg UK*, Accessed January 16, 2023. https://www.bloomberg.com/news/articles/2022-12-23/eskom-s-fifth-straight-loss-compounds-south-africa-s-loadshedding-woes?leadSource=uverify%20wall.

Palmer, I., N. Moodley, and S. Parnell. 2017. *Building a Capable State: Service Delivery in Post-Apartheid South Africa*. London: ZED Books.

Polk, M. 2011. "Institutional Capacity-Building in Urban Planning and Policy-Making for Sustainable Development: Success or Failure?" *Planning Practice and Research* 26 (2): 185–206. https://doi.org/10.1080/02697459.2011.560461.

Power, M., P. Newell, L. Baker, H. Bulkeley, J. Kirshner, and A. Smith. July 2016. "The Political Economy of Energy Transitions in Mozambique and South Africa: The Role of the Rising Powers." *Energy Research & Social Science* 17:10–19. https://doi.org/10.1016/j.erss.2016.03.007.

Public Protector South Africa. 2016. *State of Capture, Report No.6 of 2016-17*. Accessed December 3, 2019. https://www.sahistory.org.za/sites/default/files/2019-05/329756252-state-of-capture-14-october-2016.pdf.

Reddy, Y., and P. Wolpe. 2014. Tackling Urban Energy Poverty in South Africa, *Research Funded by Heinrich Boll Foundation Southern Africa*. Cape Town: Sustainable Energy Africa.

Reddy, Y., and P. Wolpe. 2018. *Urban Transformation in South Africa Through Co-Designing Energy Service pathways*, a Research Report from the ESRC-NRF URBATRANS Project. Cape Town: Sustainable Energy Africa.

Roulston, K. 2014. "Analysing Interviews." In *The SAGE Handbook of Qualitative Data Analysis*, edited by U. Flick, 297–312. London: SAGE Publications, Inc. https://doi.org/10.4135/9781446282243.n20.

SALGA. 2022. *Annual Report 2021-22*, Pretoria: SALGA. Accessed December 20, 2022. http://www.salga.org.za/Documents/SALGA_AR2022_Final.pdf.

SALGA (South African Local Government Association). 2021. *Annual Report 2020-21*, Pretoria: SALGA. Accessed December 19, 2022. http://www.salga.org.za/Documents/Documents%20and%20Publications/Annual%20Reports/SALGA%20Annual%20Report%202020-21.pdf.

Schreuer, A., H. Rohracher, and P. Späth. 2010. "Transforming the Energy System: The Role of Institutions, Interests and Ideas." *Technology Analysis and Strategic Management* 22 (6): 649–652. https://doi.org/10.1080/09537325.2010.496280.

Smith, A., and R. Raven. 2012. "What is Protective Space? Reconsidering Niches in Transitions to Sustainability." *Research Policy* 41 (6): 1025–1036. https://doi.org/10.1016/j.respol.2011.12.012.

Swilling, M. 2014. "Contesting Inclusive Urbanism in a Divided City: The Limits of Neoliberalisation of Cape Town's Energy System." *Urban Studies* 51 (15): 3180–3197. https://doi.org/10.1177/0042098013505160.

Swilling, M., and E. Annecke. 2012. *Just Transitions: Explorations of Sustainability in an Unfair World*. Claremont: UCT Press.

Swilling, M., J. Musango, and J. Wakeford. 2016. "Developmental States and Sustainability Transitions: Prospects of a Just Transition in South Africa." *Journal of Environmental Policy & Planning* 18 (5): 650–672. https://doi.org/10.1080/1523908X.2015.1107716.

The Carbon Brief. 2015. *The Carbon Brief Profile: South Africa*. Accessed January 19. https://www.carbonbrief.org/the-carbon-brief-profile-south-africa.

The Citizen. 2019. Cape Town Seeks Court Permission to Buy Electricity Directly from IPPs. Accessed March 1, 2020. https://citizen.co.za/news/south-africa/courts/2217486/cape-town-seeks-court-permission-to-buy-electricity-directly-from-ipps/.

The Judicial Commission of Inquiry into Allegations of State Capture, corruption and fraud in the public sector including Organs of State. Accessed December 3, 2019. https://www.sastatecapture.org.za/.

Ting, M. B., and R. Byrne. 2020. "Eskom and the Rise of Renewables: Regime-Resistance, Crisis and the Strategy of Incumbency in South Africa's Electricity System." *Energy Research & Social Science* 60:1–15. https://doi.org/10.1016/j.erss.2019.101333.

Tsheola, J. P. 2012. "Theorising a Democratic Developmental State: Issues of Public Service Delivery Planning and Violent Protests in South Africa." *Journal of Public Administration* 47 (1): 161–179.

Watson, V. 2014. "Co-Production and Collaboration in Planning: The Difference." *Planning Theory & Practice* 15 (1): 62–76. https://doi.org/10.1080/14649357.2013.866266.

Winkler, H. 2011. *Cleaner Energy Cooler Climate: Developing Sustainable Energy Solutions for South Africa*. Cape Town: University of Cape Town.

Wolpe, P., Y. Reddy, and M. Euston-Brown. 2012. Energising Urban South Africa: Poverty, Sustainability and Future Cities. Paper presented at the *'Strategies to Overcome Poverty and Inequality, Towards Carnegie3'conference*, South Africa: University of Cape Town.