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Spatial processes and politics of renewable energy transition: Land, zones and frictions in South Africa

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ABSTRACT

This paper seeks to make a contribution to on-going debates about how to conceptualise the spatial processes of renewable energy transition. It makes a case for understanding renewable energy transitions as simultaneously spatial and political processes, constitutive of new territories and configuring development pathways. Drawing on a case study of South Africa's Renewable Energy Independent Power Procurement Programme (REI4P), the paper explores the ways in which energy transitions are intrinsically bound up with both the materiality and the historical and contemporary politics of land. It then examines the relationship between energy transitions and territory to conceptualise the ways in which transitions take on an experimental shape in the form of 'zones'. The paper argues that these zones are new territories deploying forms of spatial and political-administrative exceptionality, which allow political and economic actors to exercise authority and commercial power. Two types of zone emerging from South Africa's energy transition exemplify these processes: legally-defined zones for the development of solar and wind energy and zones of socioeconomic development required by REI4P. The paper explores the spatial and political consequences of these strategies and suggests that these may not necessarily translate into conflict and confrontation, but instead produce uneasy co-existences of different political, social and spatial projects and interests, with potential to create new polities.

1. Introduction

There is a long and rich history of engagement by geographers with energy (see Calvert, 2015), but until recently, the importance of geographical approaches to understanding renewable energy transitions has been largely neglected. As Shove and Walker (2014) argue, energy policy, engineering and material science tends to focus on methods for either meeting demand more efficiently or for reducing CO_2 emissions, while social scientists tend to focus on questions about the politics of access, provision and supply. There have been basic analyses of some of the geographical dimensions of contemporary energy challenges at different scales (global, regional, urban, household); geographers have also used the concept of 'energy landscape' to analyse how different modes of energy production, distribution and use underpin material relations, such as landscape form and livelihoods (Calvert, 2015; Nadai & Van der Horst, 2010). However, debates about renewable energy transitions have tended to focus on the temporal dimensions of 'transition' and to neglect "the way in which spatial processes shape energy systems and influence their capacity for transformation" (Bridge, Bouzarovski, Bradshaw, & Eyre, 2013, p. 332). Bridge et al. call for interventions that seek to examine the spatial organisation and governance of new energy systems, and to generate new ways of thinking about energy transition as a spatially-constituted process "involving the reconfiguration of current patterns and scales of economic and social activity" (2013: 231). As Huber (2015: 27) argues, understanding renewable energy transitions "will also require new spatialities and new spatial imaginations."

In response, this paper seeks to make a contribution to on-going debates about how to conceptualise the spatial processes of renewable energy transition, while also making a case for understanding renewable energy transitions as simultaneously spatial and political processes. Timothy Mitchell (2011) has illustrated how the material properties of carbon fuels revolutionised first western and then global polities. Due to its bulk and dependency on labour to move it, coal gave working-class people and labour unions new power, acting as a catalyst for democracy and progress. The fluid properties of oil allowed elites to regain control over energy supplies, devise systems through which to maximise profits and reduce

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vulnerability to democratic pressures. Oil also made it possible for the first time in history to reorganize political life around the management of 'the economy' and the promise of its infinite growth. The global ramifications of renewable energy transitions are beyond the scope of this paper, but it makes a case for examining the ways in which such transitions are already constitutive of new territories and polities in particular locations. Specifically, the paper first explores the importance of acknowledging the ways in which energy transitions are intrinsically bound up with both the materiality and the historical and contemporary politics of land. Second, it develops the notion of energy transitions as a form of territoriality (Bridge et al. 2013) to conceptualise the ways in which they take on an experimental shape, deploying forms of spatial and political-administrative exceptionality – 'zones' – that allow political and economic actors to exercise authority and commercial power. Third, it explores the unintended spatial and political consequences of these strategies, reflecting on the kinds of polities that are emerging and could emerge within these spaces.

The paper develops these ideas through an exploration of South Africa's renewable energy transition, which has proposed around 600 renewable energy projects, both grid and off-grid and ranging from utility-scale to household-level systems, in the absence of a consolidated strategic spatial plan (Cape-Ducluzeau and van der Westhuizen, 2015). Yet, as this paper argues, spatial processes are shaping the emerging energy transition and their consequences are likely to be dramatic. The South African government has recently committed to a strategy for electricity generation until 2030 that makes provision for a diverse energy mix. As part of this, in 2011 it launched the Renewable Energy Independent Power Producer Procurement Programme (REI4P), a public-private partnership that provides impetus to a low-carbon energy transition. This is an ambitious programme that attempts to ensure renewable energy capacity is fully developed while mediating the competing powerful interests involved and ensuring that some of the profits are retained in South Africa. To date, REI4P has procured approximately 5041 megawatts (MW) of renewable energy in four bidding rounds at costs increasingly competitive with coal-fired electricity by mobilising over R168 billion (£8.57 billion)[1] of investment, largely from the private sector (Papapetrou, 2014). South Africa has thus secured more investment for more independent power generation than has been achieved across the entire African continent over the past 20 years and, since 2012, has ranked among the top ten countries globally in renewable energy Independent Power Producer (IPP) investments (Eberhard, Kolker, & Leigland, 2014). The scale remains relatively modest when gauged against planned procurement from other energy sources (7400MW from new coal-fired, gas-fired and hydro-electricity generation; 9600MW from a nuclear-build programme; 15,000MW from the Grand Inga Hydro-electricity Partnership in the Democratic Republic of Congo).[2] However, the commitment to sourcing over 40% of new electricity generation from renewable sources by 2030 represents a considerable policy shift that positions South Africa as a leading player in utility-scale wind and solar power generation, and in which the REI4P is a significant driver.

While it is too early to assess the success of REI4P, this paper examines the ways in which it is already remaking territory, creating new polities, and producing new scalar relationships within and beyond South Africa. It draws on research conducted between 2012 and 2014, including six weeks of fieldwork in the Northern and Western Cape provinces. Thirty-six interviews were conducted with key informants including: two local government officials and three Community Programme Managers involved in renewable energy in both provinces; CEOs in three sustainable energy companies; three independent sustainability consultants; twenty-one individual off-grid energy consumers in five different locations in both provinces, and; six sustainable development professionals. The paper also draws on document analysis of government renewable energy policies, industry and government press releases, and other reports on South Africa's renewable energy roll-out. The first section of the paper makes a case for the importance of situating REI4P within histories and politics of energy and land, focusing specifically on the simultaneous re-valuing and discursive occlusion of land within South African renewable energy policy and debate. The second section of the paper uses the concept of 'the zone' to examine new territories emerging from and shaping the renewable energy transition. The first are zones that have been identified as optimal for the location of wind and solar energy projects, and in which business is being made easier for international investors in renewable energy. The second are zones for development surrounding individual renewable energy projects, which are spatially defined by procurement rules and in which IPPs are required to deliver socio-economic benefits to the local 'community'. Drawing on Easterling (2014a: 1–2), the paper argues that these two zones are "meta-infrastructures" administered by public and private actors and creating "de facto, undeclared forms of polity". They are spaces in which "extrastatecraft"—activity that is both outside of and in addition to statecraft – is performed, and in which state and private sector forces have attained "power and administrative authority necessary to undertake the building of infrastructure" (*ibid.*: 2). A critical question in the context of South Africa is whether or not these two different zones are also spaces in which a just energy transition (Newell & Mulvaney, 2013) can occur. Inspired by Tsing's (2005) notion of "zones of awkward engagement", the paper suggests that within these zones global investors and speculators, national and local government discourses of development, and the autonomy and desires of the poorest in society exist together in a state of friction. The paper explores the possibilities for the emergence of new polities out of these frictions and reflects on their likely outcomes. Finally, it draws some tentative conclusions about the broader significance of understanding renewable energy transitions as simultaneously spatial and political processes.

2. Renewable energy transition and the politics of land

Approximately 96% of South Africa's electricity is generated by Eskom, the largest energy producer in Africa (Baker, Newell, & Phillips, 2014); 93% of Eskom's generation is coal-powered (Tyler, Boyd, Coetzee, & Winkler, 2011). South Africa's minerals-energy complex (Fine & Rustomjee, 1996) – a regime of accumulation that has its origins in apartheid – continues to exert enormous influence over the country's energy sector (Swilling & Anneke, 2012). However, South Africa is experiencing an on-going energy crisis, shifting from historic over-capacity fuelled by cheap domestic coal for commercial and industrial use under apartheid, to rising demand and falling reserves fuelled by economic growth and post-apartheid grid expansion. The crisis has been exacerbated by lack of infrastructure investment, fuelled in large part by uncertainty within government strategic planning. In the late 1990s, the government drew up plans to partially privatise Eskom, including divesting 30% of production capacity, outsourcing functions, creating independent regional distributors and fully corporatising

[1] Currency conversions are based on July 2015 rates. The Rand has fallen steadily against major global currencies since 2011, when £168 billion would have equated to £14 billion.

[2] These figures were confirmed in the 2015 State of the Nation Address (see http://www.gov.za/president-jacob-zuma-state-nation-address-2015, accessed 12/6/15).

Eskom. These plans stalled in 2003. As McDonald (2009) argues, some commentators saw this initially as a retreat from privatization, but plans for private sector involvement have remained central to government strategy. REI4P is one eventual outcome of this commitment to liberalisation. In the meantime, government has been forced to commit to massive infrastructure investment in order to meet rising demand, with R385 billion (c. £20 billion) invested in 2013, rising to over R1 trillion (c. £51 billion) by 2026 in a planned doubling of capacity. Over the last decade, Eskom has been struggling to build an additional 17,000MW of generation capacity by 2018 amidst a funding crisis that has led to maintenance backlogs and delays (Eskom, 2011, p. 61). Its response has been expensive buyback agreements with industrial users paid not to consume electricity, and 'load-shedding' (rolling power-cuts) and year-on-year tariff increases of 27.5% for domestic consumers. This has been deeply unpopular, stoking suspicions of favourable tariffs for corporations (Ngwane, 2008) not helped by a widely perceived culture of secrecy within Eskom.

South Africa's minerals-energy complex is underpinned by an economy that is structurally dependent upon energy intensive growth, based on abundant sources of low-cost coal and the exploitation of black labour (Baker et al. 2014). While the architecture of South Africa's political economy creates enduring structures of power between the financial sector, parastatals, government, and the private sector that underpin the minerals-energy complex, a number of factors have made it increasingly unsustainable (*ibid.*). These include: the financialisation of South Africa's resource conglomerates and liberalisation of capital flows resulting in capital flight; the crisis of legitimacy brought about by continued exploitation and oppression of black workers; and increasing concerns about the environmental consequences of carbon-intensive energy production. Consequently, the last decade has witnessed a gradual policy shift towards investment in renewable energy, marked by the 2003 White Paper on Renewable Energy (DME, 2003), the 2008 Energy Act and the 2010 Integrated Resource Plan (DoE, 2010a; 2011). At the 2009 Copenhagen climate change summit, President Zuma pledged to reduce South Africa's greenhouse gas emissions by 34% by 2020 and 44% by 2025 (Baker et al. 2014), focusing attention on utilising the country's natural assets. South Africa has a large area (around 194,000 km^2, see Fig. 1) of high radiation and the Northern Cape is one of the best solar resource areas in the world (Edkins, Marquard, & Winkler, 2010). Taking advantage of this requires large investments in infrastructure for both electricity production and transmission to the main electricity consumer centres (Pegels, 2010). In 2011, the revised IRP determined that 42% of new electricity generation capacity would come from renewable sources – mainly wind, solar photovoltaics and concentrated solar power, [3] with some biomass and geothermal generation – by 2030 (IRP, 2011). In order to meet investment requirements, 30% is being procured through the REI4P. The government has thus taken the first step in the liberalisation of South Africa's energy market and promulgated the beginnings of a renewable energy transition.

The drivers of this shift are likely to be significant in determining wider outcomes. First, REI4P is a response to the country's escalating energy crisis since 2008 and an urgent need to produce additional generation capacity to the grid. Wind and solar power plants are the quickest to build (the government's enormous investment in coal and nuclear power stations will take much longer to come on stream). The second driver is the government's adoption of the post-Rio+20 'Green Economy' agenda, which sees economic development as the principal force and outcome of investment in renewable energy, fuelled primarily by public and private investments (Sukhdev, Stone, & Nuttall, 2010; UNEP, 2011). REI4P signals the government's endorsement of this framework despite criticism that it could produce new power relations of inequality and injustice (Clemenceau, 2012; Death, 2014). The renewable energy sector is seen as a key element in a 'New Growth Path' aimed at job creation which, given that South Africa has one of the world's highest unemployment rates at 34% (StatSA, 2014), remains a critical issue for government. The third driver is recognition that South Africa, as the 12th highest carbon emitter in the world (CAIT, 2012; IEIA, 2013; Rennkamp & Wlokas, 2012), needs to diversify its energy mix in order to honour its international commitments to reduce greenhouse gas emissions. Therefore, although REI4P is the outcome of considerable political will and desire to promote a sustainable renewable energy industry delivering both cost-effective energy and socio-economic benefits (Papapetrou, 2014), poverty alleviation and inequality are not principal drivers. Yet, as Baker et al. (2014: 793) argue, the government is aware that "the production of energy has to enhance the employment prospects" of the unemployed "while also addressing the issue of energy poverty".

To date REI4P has awarded 77 projects to the private sector and 20-year Power Purchase Agreements are in place between Eskom and IPPs. Round 1, completed in 2011, has procured twenty solar parks and eight wind farms that have already started to come on stream. Round 2, completed in 2012, has procured ten solar parks, seven wind farms and two small hydro projects. Round 3, completed in 2013, has procured eight solar parks, seven wind farms, one biomass and one geothermal project. Round 4 was delayed because Eskom was unable to provide transmission grid access to the new projects, but was completed in April 2015, with six solar PV projects, five onshore wind projects, one biomass and one small hydro project. As Fig. 1 illustrates, a clear geography of REI4P projects has emerged, with the majority of the solar projects (including all Round 4 projects) located in the Northern Cape and wind projects concentrated in the Western, Eastern and Northern Cape Provinces. Northern Cape has 41 projects in total, Eastern Cape 16 and Western Cape 9 (WWF, 2015). REI4P is lauded as a successful model, for South Africa and internationally (Montmasson-Clair & Ryan, 2014), of a watertight public-private partnership and tendering process that is competitive and free from corruption – what has been euphemistically termed 'tenderpreneurialism' (Eberhard et al. 2014, p. 1). It remains to be seen, however, if REI4P can deliver energy in ways that are more economically and socially just than has been the case with South Africa's traditional energy sector. Its spatial processes and outcomes will play an important role in determining this; understanding these requires a conceptualisation of renewable energy transition that acknowledges historical and contemporary politics of land and how they give rise to new forms of territory – political technologies comprising "techniques for measuring land and controlling terrain" (Elden, 2010, p. 811).

REI4P requires bidders to procure land as sites for development and to submit environmental impact assessments, but political discourse concerning REI4P has until recently underplayed issues of land ownership and value. The discursive erasure of land within public debate about renewable energy is particularly notable given that the South African land question is of great political sensitivity and importance, and in which the minerals-energy complex is historically embroiled (Freund, 2010). The Natives Land Act of 1913 dispossessed indigenous South Africans of 90% of the nation's land

[3] Solar energy has greatest renewable resource potential in South Africa. It produces electricity either through concentrating solar power, which uses mirrors to concentrate the sun's thermal energy and heat a transfer fluid to produce steam and drive turbines, or through solar photovoltaics, which uses primarily silicon panels to convert solar radiation directly into electricity (Pegels, 2010).

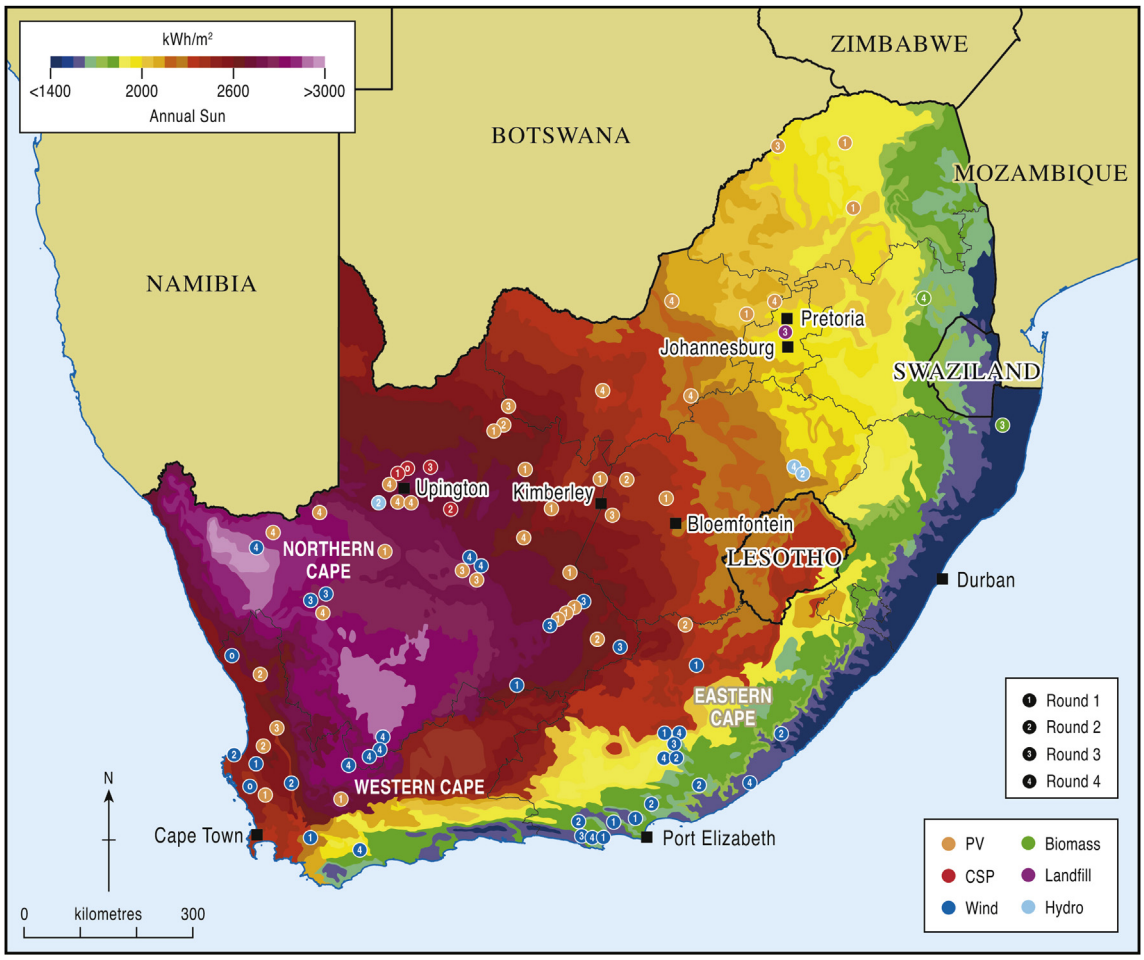

Fig. 1. Insolation (solar irradiation) in South Africa.

and helped proletarianize a large proportion of the rural population shortly after the discovery of minerals, providing a source of cheap labour for extractive industries (Hall & Ntsebeza, 2007). Post-apartheid governments have made land reform, restitution and redistribution a priority in order to bring about socio-economic redress, but the pace of change has been painfully slow. As Hall and Ntsebeza argue, the land issue is "a complex one that encompasses the question of how land is accessed and used … and how capital is accumulated" (*ibid.*: 4). Its role in alleviating structural poverty and job creation is important for policy-makers, particularly given the failure of neo-liberal macro-economic policy to generate jobs in urban areas. South Africa's renewable energy transition has particular implications for land use and profitability, as well as potential to further politicise land ownership. Land capable of providing opportunities for generating renewable energy gains a "new source of potential value" (Bridge et al. 2013, p. 335) and such spaces are currently being targeted for commercial development. These include the flat, semi-arid landscapes of the Northern Cape, which are preferred sites for solar power, and the coastal and upland areas of the Western and Eastern Capes, which are optimal for wind power. In other countries experiencing similar energy transitions, the effects on land of renewable energy development have "become a key arena in the debate on energy policy" (Nadai & Van der Horst, 2010: 143), yet this has not been the case in South Africa. Why this is so is likely down to three factors: the effects of government discourse, REI4P compliancy rules, and the nature of land ownership in areas targeted for development.

The role of government discourse has been particularly notable in the case of the development of solar energy in the Northern Cape. An important speech by the then Minister of Energy at an Investors Conference in 2010 is revealing for what it does and does not say:

> Diamonds that used to attract people to the Northern Cape have been depleted. We are here to see how we can harvest the diamond that is the sun in the sky … We are on the cusp of a world-wide green revolution with a plethora of economic opportunities, particularly in solar energy, available to our country … and this dry and dusty Northern Cape, which is one of the poorest regions in South Africa, will become the centre of our response. (DoE, 2010b: 12, 15).

The Minister went on to describe the Northern Cape as having "excellent and consistent sun" and "flat and sparsely-populated land", and she issued a "challenge [to] my colleagues in the Northern Cape to make Upington one of the Solar Capitals of the world." The Northern Cape is thus newly constituted as an energy resource at the same time as the government is establishing legal and extra-legal mechanisms through which to create resource access (Karplus & Meir, 2013). The province is discursively constructed as a resource frontier for the nascent South African market in renewable energy and its second largest town – Upington, with a population of less than 75,000 – as a potential centre of a global energy revolution. Tsing (2000: 119) refers to this discourse as

globalist "conjuring" and "hegemonic world-making", in which claims are made on a global scale as a means for justifying the rendering tangible on a region's landscape the aspirations of a national elite. Government discourse is aimed at wooing potential international investors by creating an almost magical vision of a renewable energy landscape that does not yet exist in a dramatic performance which, in turn, creates an expectation that is the prerequisite of economic performance. This discursive territorialisation "does political work" (Bridge et al. 2013, p. 336) in positioning the South African government at the centre of global energy transitions and attracting investment, while simultaneously occluding questions about land.

The South African renewable energy transition illustrates the ways in which sunlight and wind are now constituted in wider energy transitions as inert resources for renewable energy projects while being mobilised as new means for capital accumulation. The Northern Cape has exceptionally high levels of insolation (see Fig. 1), but the sun is not a resource that can be directly plundered. As with diamond mining, land is the key resource from which value can be extracted. However, the 'diamond in the sky' discourse creates an image of riches being generated from a shared, distant and renewable resource (the sun) and diverts attention from the fact that the solar energy production under REI4P is industrial in scale, requiring significant swaths of land (Huber, 2015). The only hint of this in the Minister's speech is the reference to the Northern Cape being sparsely populated. While this is true (the Northern Cape is South Africa's largest and least populated province with just over one million people), most land is either commercially-owned (also the case in the sites for wind energy development) or municipally-owned. Most of the REI4P projects are being built on commercial farmland (the semi-arid lands of the Northern Cape, for example, are used primarily for grazing). IPPs thus need to secure agreements with landowners on transfer of ownership or lease rights for REI4P projects; as a consequence of prevailing land ownership patterns, these agreements serve the interests of commercial (mainly white) landowners. In the Northern Cape, land deemed previously to have low agricultural value escalates in value when positioned in the optimal zones for solar energy production (Fig. 1). Landowners choosing to lease rather than to sell will receive the bulk of the lease payments for renewable energy projects, on average about 2% of the total revenues over the 20-year life of the project.[4] Given that these are private transactions, it is virtually impossible to find information on the actual benefit accruing to landowners and it would not be in the government's interest to seek greater transparency (McDaid, 2014), but the returns are likely to be considerable.

It is notable that the renewable energy transition has coincided with new legislation regarding land rights. In June 2014, the Restitution of Land Rights Amendment Act reopened the land claims process that closed in 1998, giving groups and individuals who can prove dispossession after 1913 a further five years to lodge claims for restitution or compensation. By March 2016, 143,720 new claims had been lodged. The Northern Cape has seen most claims settled for land restitution to rural communities and families, often involving "tension between mining and agriculture and the best sustainable land use in the province" (Government of RSA, 2016). Significantly for REI4P, renewable energy developers will now need to include potential local land claims in project risk profiles. The Act at least opens the possibilities for the dispossessed to stake a claim for land restitution and/or a share of the lease payments accruing from REI4P. One successful case concerns the Tsitsikamma Community Wind Farm near Wittekleibosch in the Eastern Cape, built on land where amaFengu people were forcibly removed under apartheid in the 1970s. The community returned to the land after a claim was lodged in 1994 and is now a 9% shareholder of the wind farm (Forder, 2015). However, legislation does not help those dispossessed prior to 1913 and, in these cases, REI4P could heighten perceptions of injustice. For example, four neighbouring communities in uMkuze in KwaZulu-Natal recently brought a claim against Charl Senekal, South Africa's largest sugar farmer and KwaZulu-Natal's largest private landowner, whose bid to build a R1.1 billion, 16.5 MW biomass plant was approved in Round 3 (Potelwa, 2015). Whilst the claim has delayed development, it may not be successful because Senekal has counter-claimed that the land has been occupied by whites since 1880.

These cases are important because they counter the reduction of energy landscapes to inert resource frontiers and reassert the ways in which they are simultaneously natural, social and active (Tsing, 2005, p. 29). While land is unlikely to give dispossessed people power similar to that given by coal to working-class people (Mitchell, 2011), its material properties as a resource fixed in situ also give rise to very particular forms of territorialisation and struggle (Li, 2014). Land rights legislation and claims involving REI4P projects illustrate that historical land injustices cannot be erased from South Africa's energy transition. The 2014 Act creates opportunities for some dispossessed groups to stake a claim for a share of landowner profits from the REI4P process. However, the government is equally concerned with demonstrating to overseas investors that there is political will at the highest level to improve the efficiency of doing business in South Africa in order to counter investor fears of being bogged down by land claims. The following discussion examines how it is doing this through the spatial technology of 'the zone'.

3. Spatial politics and renewable energy zones

The idea of 'the zone' provides an important means of conceptualising the spatial politics of renewable energy transitions and their consequences. Reflecting on globalisation, Aihwa Ong (2006: 91–2) critiques its structural logic, which she argues "create[s] a galaxy of differentiated zones [technology zones, growth triangles] unevenly integrated into the structures of state power and global capital". This logic reconfigures national space and results in the "proliferation of differentiated sovereignty within and across borders" (*ibid.*); it shatters meta-geographical demarcations such as 'Developed' and 'Third World', which have "re-converged around enclaves" (Sidaway, 2007, p. 336). Keller Easterling (2014a: 1–2) also argues that 'the zone' – "the Free Trade Zone … or any of the dozens of variants" – is a powerful global form, but focuses specifically on the ways in which space has become infrastructural, which I suggest has deeper significance for understanding the spatial and political outcomes of energy transitions. According to Easterling (*ibid.*), the free zone is "meta-infrastructure" administered by public and private cohorts. Free zones are necessitated by large-scale infrastructure projects, which create a need for an administrative authority comparable to that of the state, but requiring direction from new constellations of international, inter-governmental, and non-governmental actors. They are thus sites of multiple, overlapping or nested forms of sovereignty, where domestic and transnational jurisdictions collide. Easterling (*ibid.*) defines these forms of sovereignty as "extrastatecraft", operating "both outside of and in addition to statecraft" and in which "multiple forces – state, non-state, military, market, non-market – have now attained the considerable power and administrative authority necessary to undertake the building of infrastructure", far removed from familiar legislative processes. Extrastatecraft thus describes how power is increasingly

[4] http://www.climatejobs.org.za/index.php/articles/89-renewable-energy/154-renewable-energy-for-communities-or-for-the-big-corporates (accessed 12/12/14).

exercised not through the language of law and diplomacy, but through spatial, infrastructural technologies. The following discussion draws on the concepts of the zone and extrastatecraft to explore the ways in which renewable energy transitions take on an experimental shape, deploying forms of spatial and political-administrative exceptionality, which in South Africa are generating very specific political and developmental outcomes.

Easterling (2014a, 1) argues that free zones are generating "de facto, undeclared forms of polity" within powerful globally networked systems. Importantly, she suggests that while binary resistance might seem powerless and irrelevant in infrastructure space, activists are also able to engage in extrastatecraft and, through understanding how infrastructure space works, they can relieve and challenge oppression. This idea that political gains can be made is also significant in conceptualising the spatial politics of renewable transitions. The free zone is intended to create a frictionless realm of legal and economic exemptions. However, as discussed below, it often generates other frictions; as Tsing (2005) argues, like rubbing two sticks together these frictions produce movement, action, effect. The free zone can thus be conceptualised as a "zone of awkward engagement" (*ibid.*: xi) in which different competing political, social and spatial interests co-exist uneasily, but not necessarily in confrontation or conflict. Spatial planning for renewable energy development claims to be based on objective research, but the process by which specific areas are classified as acceptable locations for development is profoundly political, shaped by power imbalances in the political-economy and often resulting in environmental injustices (Cowell, 2010). In South Africa, spatial planning related to REI4P is creating different kinds of zones for development that also have the potential to generate injustices. However, I suggest that as zones of friction and 'awkward engagement' they also create possibilities for new, progressive polities through which injustices may be countered.

4. REDZs: renewable energy meta-infrastructure

Under REI4P rules, a bid can be submitted only once the Environmental Authorization is in hand, land rights have been secured, and the bidder can provide evidence of a notarial lease registration and proof of land use applications (DoE, 2015). Some cases have required upwards of twenty permissions, taking over a year to be processed, and the Department of Environmental Affairs has been inundated with and overwhelmed by renewable energy projects seeking approvals. In response, the government aims to speed up the process by creating zones where doing business will be easier and quicker for developers, specifically in meeting the criteria for compliance. In accordance with the National Infrastructure Plan (NPC, 2012), Renewable Energy has been included as part of the Strategic Infrastructure Project for energy, known as SIP8.[5] A Strategic Environmental Assessment (SEA), led by the Council for Scientific and Industrial Research (CSIR), has been initiated under SIP8 to identify Renewable Energy Development Zones (REDZs) – geographical areas most suitable for the rollout of wind and solar energy projects and the supporting electricity grid network. The process will also provide a platform for coordination between the various government departments that have a mandate for issuing environmental authorizations or consents to allow for a more streamlined authorization process. It is intended that through the SEA process all participating government departments will be able to pre-assess the requirements for which they have a mandate and to either issue general authorizations and exemptions or de-list energy applications.[6].

The SEA constitutes the first attempt at proactive spatial planning for wind and solar energy development in South Africa. REDZs are zones in which large-scale renewable energy development would be considered most appropriate based on environmental, social and economic factors. Their mapping begins with wind and solar raw resource data in order to identify areas of highest economic potential, and eliminates areas of environmental and technical constraint, including protected and environmentally sensitive areas and agricultural areas. Consultation with provincial governments, the private sector and members of the public then narrow down these areas, although precisely who has been consulted and on what basis is unclear (discussed below). More detailed scoping assessments have been undertaken in the identified areas for agriculture, landscape, heritage, biodiversity, socio-economic sensitivities and other sensitivities, such as aviation, defence, mining, noise. The outcome is eight proposed REDZs that purport to protect South Africa's natural and social resources while enabling SIP8 targets to be met more efficiently. The intention is for these to align with the SEA corridors for electricity grid infrastructure expansion that is being designed to meet energy transmission requirements up to 2040 (Fig. 2). The process of approving REDZs by government for the rollout of wind and solar in the Cape provinces was finalised in February 2016. These preferred zones now allow for renewable energy projects and the associated grid infrastructure to be developed without environmental authorization, subject to certain conditions, such as adherence to development protocols.

REDZs are spaces of extrastatecraft in that they operate in similar ways to free trade zones, constituting a legal and economic instrument designed to provide exemptions to renewable energy investors and developers, to incentivise growth in the low-carbon economy, and to facilitate private-sector development of energy infrastructure. While they are unlikely to exhibit the most extreme forms of zone law – unlike some free trade zones, REDZs are subject to civil law and government control – they create territories in which private, corporatized bodies are able to exert power and influence in their own interests. Some players in the renewable energy sector appear to want REDZs to operate more like free trade zones, with greater licence for extrastatecraft. For example, the CEO of the South African Wind Energy Association (SAWEA), a not-for-profit organisation representing the wind industry whose mission is the removal of obstacles to sustainable wind energy industry in Southern Africa, believes that the zoning is too spatially restrictive and recommends the removal of the requirement for additional local level authorisations.[7] However, critics are concerned about the extent to which all stakeholders have been consulted in the identification of REDZs. While the CSIR claims that it has engaged with affected communities,[8] a recent study has found that not a single person interviewed in these communities has heard of the strategic environmental assessments (McDaid, 2014). There is also a considerable threat of land grab occurring within REDZs, particularly if potential investors believe there are too few and the overall availability of land is too small. Land values are highly likely to increase within REDZs, raising the potential for the possibility of corrupt and anti-competitive practices.

Although there is very little public debate about potential land grab in relation to REI4P, the spectre of South Africa's land question becoming a lightning rod for protest may have prompted pre-emptive legislation that counters the discursive erasure in

[5] http://www.gov.za/issues/national-infrastructure-plan (accessed 15/06/15).
[6] http://www.sawea.org.za/ceo-blog/79-environmental-authorisations.html (accessed 15/06/15).
[7] http://www.sawea.org.za/ceo-blog/79-environmental-authorisations.html.
[8] http://www.infrastructurene.ws/2014/06/05/strategic-search-for-best-renewable-energy-development-zones/ June 19, 2015.

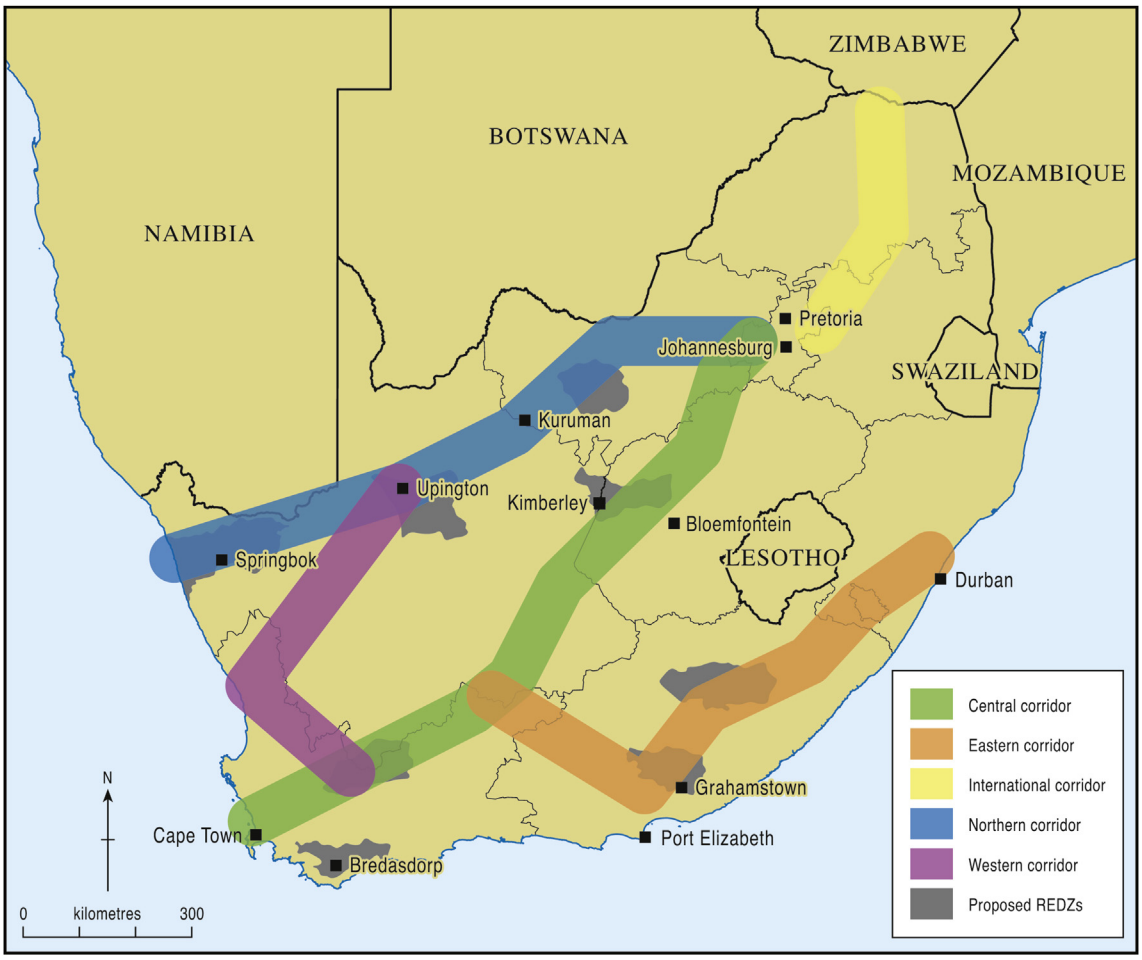

Fig. 2. Proposed REDZs and preliminary EGI corridors (source: adapted from Cape-Ducluzeau and van der Westhuizen 2015).

government rhetoric. The President's State of the Nation Address in February 2015 indicated that a Regulation of Land Holdings Bill, likely to become law in 2016, would be submitted to Parliament.[9] This will prohibit foreigners, including legal entities whose dominant shareholder or controller is a foreign-controlled enterprise or interest, from owning land (specified as agricultural rather than residential) in South Africa. They would instead be eligible only to lease land for periods of between 30 and 50 years. This has the potential to have widespread effects on the country's mining, energy and agricultural sectors, as well as on REI4P. Successful IPP bidders, almost all of which have a dominant or controlling foreign shareholder, have had the option to secure land rights through either land acquisition or a registered long-term lease. To date REI4P developers have demonstrated a preference for leasehold structures, but REDZs make the acquisition of land and land speculation more attractive. The proposed Bill will thus provide important protection against land grabs within REDZs.

5. Beneficiary 'community' zones: development meta-infrastructure

The REI4P stipulates that communities within a 50 km radius of projects must benefit from socio-economic development, creating a second type of zone and forming the "meta-infrastructure" through which extrastatecraft is practised (Easterling, 2014a, p. 2). Two specific criteria pertain to local development within these zones; firstly, 'communities' are entitled to own 2.5–5% of the project shareholding; secondly, the private sector is required to contribute 1–1.5% of project revenues over the duration of the project to local socio-economic development through initiatives that promote access to the economy by black people, including health, education, service delivery, arts and sports programmes (Wlokas, Boyd, & Andolfi, 2012). This is arguably a laudable attempt by the South African government to leverage local, primarily rural, economic development out of REI4P and might also be seen as offsetting the higher price tariffs that have resulted from early procurement rounds. However, as critics have pointed out (see McEwan et al., 2017; Baker & Wlokas, 2014; Tait, Wlokas, & Garside, 2013; Wlokas et al. 2012), these development zones present a number of problems.

First, what constitutes 'community' is not defined, but treated as an arbitrary geographically delimited object for development intervention. In many cases, the 50 km zone in effect comes to define 'the community'. Second, the zone is a homogenised spatial entity that occludes difference within its boundaries. The areas surrounding renewable energy projects are likely to incorporate several social groupings, in separate locales and speaking different languages, with little cohesion, unity or common identity. They may also cross municipal, provincial and/or national boundaries. Failing to account for such diversity is potentially problematic in the context of South Africa. Third, the 50 km radius produces

[9] http://www.gov.za/president-jacob-zuma-state-nation-address-2015.

overlapping beneficiary areas, raising questions about who has responsibility for community development in these zones and how development plans are being formulated. For example, De Aar, a town of less than 50,000 people in an area of the Northern Cape with limited economic development opportunities is within 50 km of eight renewable energy projects likely to deliver considerable revenues[10] (Baker & Wlokas, 2014). Similarly, Upington is within the zones of seven projects, and even much smaller towns, such as Loeriesfontein and Pofadder (both with populations approximating 3000), are surrounded by projects. Developers have not been required to make their socio-economic development plans public and they have no desire to share them with other corporations given the competitive bid process (McDaid, 2014). This has potential to cause great confusion within zones in which more than one private sector company is overseeing community development. Fourth, there is inconsistency between IPPs in how they are working with 'communities' inside the 50 km zones. Where the zone incorporates multiple communities, some IPPs have included all, but in other zones IPPs have chosen to work with just one 'community'. This inconsistency has the potential to create inequities and to fuel division and conflict between communities within and between zones. There is also confusion where the 50 km limit includes large metropolitan areas, such as Port Elizabeth and Jeffries Bay in the Eastern Cape. In these cases, many IPPs are ignoring urban and peri-urban communities in favour of smaller, more easily defined, and often more rural communities. It seems that the 'village-*as*-community' is far more easily managed as a space for extrastatecraft than complex municipal urban spaces. Fifth, the 50 km zones create artificial boundaries, often dividing municipal areas, towns or villages, which heighten the risk of perceived injustice for those excluded. Finally, some 50 km zones are very sparsely populated, creating difficulties for IPPs in meeting investment requirements. For example, the Industrial Development Corporation that is financing the enormous 100MW Xina Solar One project near Pofadder has applied to the Department of Energy to extend the 50 km zone because "the area around the project is … [too] sparsely populated" (IDC, 2014).

As with REDZs, beneficiary community zones are spaces of extrastatescraft because they enable private sector actors to take on responsibility for assessing local need, determining development outcomes and building infrastructure. Also as with REDZs, industry bodies would like greater licence for extrastatecraft in these zones; SAWEA, for example, has complained that the socio-economic requirements are too high (Creamer, 2011). Early evidence suggests that community engagement has been poor throughout the bidding process and early stages of project development (Tait et al. 2013), relying entirely on a passive beneficiary model, which has not enabled the formation of positive relationships between developers and communities. Since community development plans have not been made public, the REI4P process has:

> remained totally non-transparent and can be regarded as structurally flawed as local communities cannot participate in planning their own local development without access to vital information about the project proposed for their area (McDaid, 2014, p. 21).

Responsibility for informing communities about development requirements lies with the project developer because "the detailed requirements in the bid documents and related guidance notes have never been disclosed to the public" (Eberhard et al. 2014, p. 29). However, McDaid's (2014) preliminary survey reveals that very few people within the 50 km zones understand or are even aware of the potential benefits that should accrue to them. While participatory planning and community development is known to be fraught with difficulties (Cooke & Kothari, 2001), experience in South Africa and elsewhere suggests that top-down project implementation is unlikely to solve local problems and can lead to conflict (Tshikululu, 2010), yet private investors and developers have not undertaken participatory community needs assessments and development planning.

Within these zones of extrastatescraft, the private sector is neither expected nor required to relate to existing governance institutions in determining local development needs. This is significant because the roles and responsibilities for local government differ from project to project and further complications emerge from overlapping beneficiary areas. Developers are not required to align with local and national development goals and priorities, and the private sector retains overall control over how socio-economic development revenues are spent. There is no regional oversight of projects to ensure efficient spending and there are no mechanisms to improve community engagement and representation. Moreover, there is little accountability on the part of IPPs. After bid approval projects are often sold, making it difficult to identify who is responsible for which part of the project (WWF, 2015); the only legislative requirement is that appropriate sums of money are spent once the project begins to generate revenues. As with corporate community development in the energy sector elsewhere in the global South (see, for example, Banks, Kuir-Ayius, Kombako, & Sagir, 2013; Frynas, 2005; Gardner, Ahmed, Bashir, & Rana, 2012), evidence suggests that developers focus initially on high profile smaller projects to build 'brand image' and promote acceptance. However, this risks "neglecting strategies to unlock the longer-term economic potential of local areas" (Tait et al. 2013, p. 21), which might include gender and youth empowerment, and results in a lack of alignment between development projects and priorities of local stakeholders.

In terms of meeting South Africa's developmental needs, prior research has already revealed numerous problems with community development requirements (Baker & Wlokas, 2014; Eberhard et al. 2014; Tait et al. 2013; Wlokas & Tait, 2012; Wlokas et al. 2012). Targeting spending at extremely localized levels may be inappropriate or inefficient because it cannot be done equitably by region or nationally, nor can it be directed at areas in greatest need. Projects are clustered around optimal resources and where land is available. As discussed, many are in the sparsely populated Northern Cape, while more densely populated and impoverished eastern and north-eastern provinces have relatively few projects; this pattern is reinforced by the fact that there are no REDZs in KwaZulu-Natal or Mpumalanga. Thus, as with extractive industries that have created 'islands of development' around corporate sites in a larger sea of underdevelopment (Kapelus, 2002, p. 292), the territorialisation of South Africa's low-carbon energy transition is likely to "generate new patterns of uneven development" (Bridge et al. 2013, p. 337). Moreover, the outcomes within 'islands of development' are not always straightforwardly positive and there is already evidence of unintended negative consequences. For example, McDaid (2014: 43) has found an increase in the number of gender-based violence cases in one project area, caused by rapid influx of single male migrants and a sudden increase in local employment, with an associated rise in alcohol and drug use. There has been a sudden rise in teenage pregnancies, single mothers, and increased risk of HIV/AIDS infection rates in project beneficiary

[10] As McDaid (2014) points out, specific numbers for particular projects are not available as this information is not in the public domain. However, the figure for one project mentioned in her study is R84 million, while according to the Department of Energy, the average value of adjusted socio-economic development contribution per MW would be R1,769,475.

zones. Evidence is also emerging that rents and food costs have risen rapidly (often by a factor of three) in towns close to projects (*ibid.*). This is clearly beneficial for property owners, but makes life increasingly difficult for those too poor to buy their own houses or dependent on the availability of affordable rental accommodation. Whether or not REI4P will be successful in creating spaces in which a just energy transition can occur requires further investigation as projects begin to generate revenues. However, the record of energy companies in corporate community development in South Africa and elsewhere in the global South is not generally positive (Farrell, Hamann, & Mackres, 2012; Kapelus, 2002). There is little to suggest that the zonal technologies of REI4P will break the mould.

6. 'Zones of awkward engagement'?

Spaces of renewable energy in South Africa are bounded zones in localities and simultaneously globalised zones of capital, competition and speculation. They thus have potential to create friction. Most early analyses of REI4P view these frictions in largely negative terms. Baker and Wlokas (2014), for example, point out that REI4P has prevented many national firms from entering into and/or retaining a share in the market. This has been a feature particularly of Rounds 3 and 4 because smaller national players have been unable to compete with the low tariffs offered by foreign companies. One of the reasons for this is that, as Baker (2015: 152) argues, the most recent REI4P rounds have seen "a surge of corporate financed projects", with international investors taking more risks for lower returns "because of their track record and experience, their access to capital and the likelihood that they have preferential pricing agreements with equipment manufacturers" (*ibid.*: 153).

The market has certainly become increasingly dominated by big foreign energy and project-development corporations. For example, the Italian giant ENEL secured more than one third of projects in Round 3 (two wind and four solar projects) and a further three wind projects in Round 4 (DoE, 2015). It now controls 938MW of wind and solar power in South Africa. Norwegian company Scatec controls 6 solar projects generating 448MW. Other big players are Ireland's Mainstream Renewable Power and China Longyuan Power, and it appears that the ownership of the programme is increasingly becoming the domain of equity investors and foreign utilities (Baker, 2015). Evidence is also emerging to suggest that, following global trends in project finance, project developers are selling on their equity to larger players, which will result in the extraction of capital from South Africa, as has been witnessed in other parts of the economy (Ashman, Fine, & Newman, 2011). Ownership of firms is likely to rest "increasingly with financial investors as shareholdings become tradable financial assets" (Baker, 2015, p. 148). This distances them from their original productive asset, places emphasis on maximising return on equity as the key objective, and puts the focus on short-term financial gain and extraction of rents rather than long-term sustainability.

Due to increased competition and falling international prices of capital equipment, price tariffs are falling for South African consumers (solar PV tariffs fell by 68% in Round 3 compared to Round 1, and for wind by 42% (Eberhard et al. 2014; DoE, 2013b) and both fell again in Round 4), but this money is increasingly likely to leave the country. This is generating fears that REI4P is increasingly unsustainable in financial terms and national economic benefits. There is a contradiction between, on the one hand, the commercial desires for maximisation of shareholder value and short-term capital gains and, on the other hand, the government's desire to retain a proportion of capital gains through the progressive requirements for community ownership and economic development (Baker, 2015). The government may have intended to create a programme with national interests at its core, but it may prove difficult to "protect economic and social benefits … in the face of international capital" (*ibid.*: 155). Significantly, however, while international speculators are attracted to invest in REDZs, REI4P ensures that their aspirations are realized only when mediated through government and local discourses of development, including a minimal level of local community ownership. REDZs are thus 'zone[s] of awkward engagement' in which frictions, tensions and contradictions are being played out. As Tsing (2005) suggests, these frictions need not automatically translate as negative for local communities. There are possibilities for stakeholders in beneficiary communities to form new polities and engage in extrastatecraft through which to hold both private sector and state interests to account for what is being promised by REI4P. The shape and nature of these polities depends on both the nature of the community development enacted by investors and the nature of local activism. As Easterling (2014b) argues, the key to positive outcomes lies in local communities understanding how these new infrastructure spaces work and being able to engage in extrastatecraft in ways that counter potential injustice.

The possibility of conflict between corporate and community stakeholders is more likely if REI4P appears to be protecting the interests of global capital rather than resolving "energy apartheid" (Corbyn, 2010), and there has been a notable silence concerning the role of REI4P in the latter. There are two aspects to energy apartheid in South Africa. First is the divide between those who can afford to pay for electricity and those who cannot. Energy poverty is a considerable problem: on average, households spend 14% of their total monthly household income on energy needs, which is higher than the international benchmark of 10% for energy poverty. Close to half of all South African households and almost three quarters (72%) of those in the poorest quintile are energy poor (DoE, 2013a). This has led to widespread disconnection, in spite of the introduction of 'life-line tariffs' (McDonald, 2009: xviii). While each bidding round of REI4P has seen reductions in price tariffs (Eberhard, 2013), the Round 4 Northern Cape projects can only be connected when grid capacity has been increased by 2018. Given that tariffs are fixed in the REI4P bidding process and capital costs are likely to continue to fall, this could be a form of arbitrage with initially cheaper tariffs becoming unfavourable to consumers.

The second aspect of energy apartheid is the divide between those who have access to grid electricity and those who do not. REI4P is concerned with electricity generation and is not intended to respond to the needs of those 12 million South Africans who do not have access to grid electricity. Consequently, zones of friction are emerging in which communities adjacent to renewable energy projects are becoming intricately connected with global processes, but remain (literally) disconnected from their benefits. Many of the wind farms are located on the Eastern Cape coast, close to some of the densest concentrations of people without access to electricity, despite their relative proximity to the grid. Most of the solar projects are located in the Northern Cape, which has the least dense medium voltage grid network in the country and vast areas with no grid electricity (GSEP, 2004). Significantly, inadequate energy provision has been identified as a key community need in many rural areas.[11] Frictions are likely to emerge from the expectations created in remote rural areas, in which the South African government has failed deliver grid electricity, by the appearance of utility-scale renewable energy plants.

[11] Community and Household Options in Choosing Energy Services (CHOICES) project 2012–13: http://www.oneworldgroup.co.za/index.php?option=com_content&view=article&id=1258:access-to-clean-energy-for-improved-rural-livelihoods&catid=207:low-carbon-development.

Such frictions may enable local communities to put pressure on renewable energy developers to respond to energy poverty as part of their community development commitments. However, even if community needs are factored into community development plans, without grid roll-out developers are likely to experiment with distributed generation (e.g. mini-grid) solutions, with which there is already local dissatisfaction. For example, in 2012, the Northern Cape provincial government invested R1 million in a household-level solar PV pilot project in the small informal settlement of Boomplaas, near Keimoes. Interviews with the 16 households suggest that the project has brought some benefits to most, including the provision of lighting and the ability to charge cell-phones. However, some systems have already failed or work only intermittently[12] and all community members are disappointed by the system's low capacity, having been led to believe that it would possess similar functionality to grid power. Current usage patterns, especially poor management of batteries, which result from ineffective training of users and technical weaknesses in project design, are compromising system longevity. Due to the relatively low power capacity, people's needs – principally the ability to cook and use a refrigerator, which they see as making most difference to their quality of life – are not being met. No mechanism has been put in place to provide the required on-going maintenance and engineering support. Furthermore, divisions within households and the community are being created with householders suspicious as to why some people's systems work better than their own. Unless properly resourced, it seems that mini-grid systems as energy solutions for rural communities are unlikely to resolve tensions.

The outcome of friction between global energy corporations and local people with whom they are being forced to engage remains to be seen, but as Tsing (2005) demonstrates in the context of Indonesia, similar frictions in similar zones of awkward engagement have altered dramatically, and not often positively, the lives of poorer and weaker parts of society. In the context of a just energy transition in South Africa, it will be important for REI4P to avoid creating outcomes like those in extractive industries, where similar social processes and profound transformations have opened 'social risks' to the industrial operation, which have then required corporations to direct resources towards highly conservative forms of community development (Banks et al. 2013) – support for law and order, forms of social technology and paternalistic forms of trusteeship – that remain wilfully detached from political processes within communities. However, while Easterling's (2014b) faith in the possibilities of progressive new polities emerging in free zones may be idealistic, the requirements of REI4P at least ensure that developers engage in community development, which could potentially open up spaces in renewable energy zones for these new polities.

7. Conclusions

This paper has sought to examine some of the ways in which processes of renewable energy transition are inherently spatial and political. The South African case illustrates how renewable energy transitions are intrinsically bound up with historical and contemporary politics of land, creating new territories. Within these territories, renewable energy transitions take on an experimental shape, deploying forms of spatial and political-administrative exceptionality – zones – that allow political and economic actors to exercise authority and commercial power. These new spatialities also set in motion power dynamics, creating zones in which different political, social and spatial projects and interests are forced into uneasy co-existence. These new spatialities and the frictions they bring could entrench existing inequalities, generating conflict and confrontation. However, drawing on Tsing (2005) and Easterling (2014b), this paper suggests that they also have potential to create new polities in which diverse actors – including those most politically and socio-economically marginalised – are able to stake their claims.

South Africa's renewable energy transition is notable for the tensions between government and investor rhetoric on the one hand, which seeks to discursively erase land, and the nature of renewable energy transitions on the other hand, which re-centre land as the key resource and ensure that it is re-valued and re-politicised. A feature of renewable energy transitions is that they "require huge amounts of space and territory to generate the energy that with fossil fuels is simply extracted from a 'hole'" (Huber, 2015, p. 36). Concerns about the possibilities of land grab by global investors, in a context in which historical and contemporary land injustices remain a lightning-rod for political unrest, has led the South African government to balance attracting foreign investment with legislation limiting foreign ownership of land. It has also re-opened legal avenues for land restitution that could complicate the REI4P process by allowing some dispossessed peoples to claim either compensation or a share of landowner dividends.

New forms of territory through zoning are emerging from South Africa's renewable energy transition. These include REDZs – identified as optimal zones for the location of wind and solar energy projects that to some extent mimic free trade zones in making business easier for international investors. They also include beneficiary zones drawn around each renewable energy project in which private sector actors are charged with defining 'community' and delivering development, an area in which they lack experience and expertise and have no demonstrable record of competence. This paper has suggested that both zones are types of 'meta-infrastructure' creating spaces of 'extrastatescraft' (Easterling, 2014b) in which public and private actors have attained the power and administrative authority necessary to build energy and development infrastructure, and to determine development pathways. These infrastructure spaces have been lubricated by the government's shift towards liberalisation and privatization, and their nature and likely outcomes give some cause for concern. The level of engagement with people who will be directly affected within these zones is questionable, the ways in which they channel further significant benefits towards land-owners and private, corporatized interests remains unproblematized, and REI4P remains detached from the wider politics of South Africa's energy apartheid. The stories being foregrounded – for example, that beneficiary zones will deliver considerable community development – may serve to disguise or distract from the enormous profits likely to be made by both global corporations and South Africa's elites. However, understanding these spaces as "zones of awkward engagement" (Tsing, 2005: ix) allows for the possibility of progressive outcomes to emerge from the frictions between global investors and speculators, national and local government discourses of development, and the autonomy and desires of the poorest and weakest in society.

This paper has demonstrated that renewable energy transitions are spatially-constituted and political processes, rather than processes simply affecting places. This has significant implications for policy, not least because, as Bridge et al. (2013: 339) argue, "spatial difference and the fundamentally uneven nature of spatial interactions are both potentially disruptive to policy because they complicate many of its assumptions". In the case of REI4P, the government aims to bolster electricity supply to the grid through renewable resources, while ensuring that local communities benefit from socio-economic development, and understanding the

[12] Interviews were conducted between 22/02/13 and 28/02/13.

ways in which spatial interactions and interrelations are enabling or frustrating these policy goals will continue to be important as REI4P becomes further embedded. More broadly, South Africa's renewable energy transition illustrates the ways in which spatial and political processes matter in making sense of energy transformations (Calvert, 2015; Pasqualetti, 2011). Renewable energy transitions produce spatial outcomes and create new territories that are also deeply politicised and policy-relevant. While these outcomes are clearly context-specific, similar spatial processes are shaping and emerging from renewable energy transitions around the world. That these remain largely unexamined suggests that political geography has much to offer in re-engaging with energy, not simply as a resource in the traditional sense, but as potentially constitutive of new spatial patterns and processes, new polities and new development pathways.

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