

South Africa's Green Transition? The Case of Atlantis Greentech Special Economic Zone

RICHARD GRANT

*Professor, Department of Geography, University of Miami and
University of Johannesburg*

*PÁDRAIG CARMODY

*Associate Professor, Department of Geography, Trinity College, Dublin and University of
Johannesburg*

Email carmodyp@tcd.ie Phone +353-1-8961243

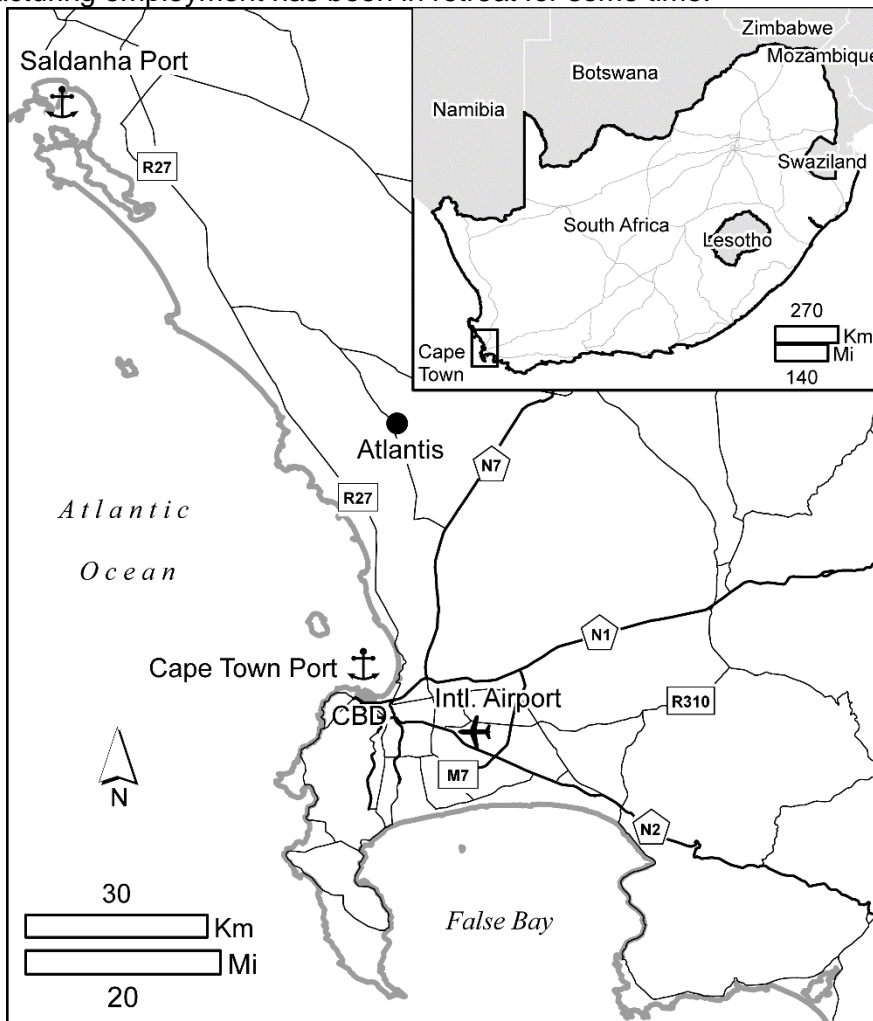
JAMES T. MURPHY

Professor, Graduate School of Geography, Clark University, Massachusetts, USA

*corresponding author

INTRODUCTION

This paper explores the case of a newly designated 'greentech'¹ SEZ – Atlantis Greentech (AG) – in South Africa in order to situate its development within a broader political-economic transition that is evolving in the country (see Map 1). Beginning in the 1970s manufacturing took place in Atlantis, but boom-and-bust-cycles and decline after the mid-1980s when incentive programmes and defence contracts ended meant only a handful of manufacturing firms remained at the industrial site (e.g., Atlantis Foundries, KayTech). To begin to revitalise the area's manufacturing economy, the City of Cape Town (CCT) in 2011 identified two parcels of vacant city-owned land in Atlantis for the purpose of establishing a greentech industrial park. By late 2014 Gestamp, a Spanish wind tower manufacturer, began constructing its facility to build components for utility-scale wind projects. There are high hopes for Atlantis as a potentially transformative project: one that is particularly salient in South Africa, the most industrialised Sub-Saharan African country, yet one where manufacturing employment has been in retreat for some time.



Our analysis of Atlantis is guided by theoretical perspectives on sustainability transitions, particularly the multilevel perspective (MLP) on sociotechnical transitions (Geels 2004, 2010). In a broader sense, our analysis critically examines the coupling of a classic regional economic tool of geographical clustering of related industrial activities with rapidly emerging efforts (e.g., see the 2015 Sustainable Development Goals [SDGs]) to achieve more sustainable economic systems and societies globally. The concept of 'sustainable industrialisation' is integral to the SDGs. Importantly, in the African region there are no historical examples or current models to emulate (Okereke *et al.* 2019).

CONCEPTUALISING SUSTAINABILITY (SOCIOTECHNICAL) TRANSITIONS AT THE URBAN-REGIONAL SCALE

Sociotechnical perspectives on urban-regional development processes offer a powerful (heuristic) means to capture the myriad forces, factors, and relationships that shape the prospects for sustainability transitions such as those envisioned for AG. Sociotechnical systems are understood here as ‘a cluster of elements, including technology, regulations, user practices and markets, cultural meanings, infrastructure, maintenance networks and supply networks’ (Geels 2004: 3).

These systems are foundational to the everyday (dys)functioning of places given they determine the quality, accessibility, spatial distribution, and evolution of production-, consumption-, and infrastructure-related activities needed to sustain economic growth and the provisioning of collective goods such as employment, energy, housing, water, etc. (Geels 2004). Moreover, sociotechnical systems are multiscalar in nature, constituted by actors, forces, and influences near and far, such as economic globalization, agglomeration, local labour markets, states, and geopolitical relations that shape the ideological, material, and social preferences/priorities built into them. Because of this, their evolution or transition to more sustainable configurations is conditioned by myriad factors, which are often beyond the control of local policymakers, planners, innovators, and technocrats.

The study of sociotechnical systems and their transitions has made significant progress over the past decade, evolving into a vibrant, diverse field of scholars and practitioners (Köhler *et al.* 2019). A central framework for many of these studies is the multi-level perspective (MLP) with much research focused on basic-service-provisioning regimes, systems, technologies, and infrastructures such as those related to water, energy, and food (Geels 2004; Geels & Schot 2007; Köhler *et al.* 2019). The MLP considers sociotechnical systems as constituted on three levels – landscapes, regimes, and niches. Landscapes encompass or account for the broader societal and political-economic contexts that shape sociotechnical systems and their evolution. Landscape features include demographic processes, climatic change, societal values, worldviews, cultures, and the macro political economy wherein systems are situated.

Regimes are central features of sociotechnical systems in that they serve as the primary forms of governance over particular sectors, industries, and services (e.g., housing, manufacturing). Regimes are heterogeneous configurations of technologies, regulations, rules, meanings, norms, routines, and practices that ‘impose a logic’ for the functioning and evolution of sociotechnical systems (Geels 2004). As such, they determine the business-as-usual operation and structuration of particular areas/sectors, creating particular path dependencies with respect to the evolution of a sociotechnical system.

The niche, the third dimension of the MLP, is understood here as the level at which experimentation, innovation, and/or entrepreneurial activities that can spur transitions occur or are situated (Geels 2004). Niches are significant for system transitions given they are contexts where the development of innovative ideas and technologies takes place, allowing alternatives to mature and possibly align with or compete at the regime level. Their ability to do so stems from the ability of niche actors (e.g., firms, venture capitalists) and innovators to destabilize or reconfigure dominant regimes such that they are manifest in more sustainable practices, technologies, markets, and materials. Niches are – like regimes and landscapes – multiscalar in constitution, influenced by the global economy, transnational relations, national actors, local factors, and sociocultural trends (Sengers & Raven 2015).

While early research posited that regime changes could be managed strategically and technocratically (e.g., Kemp *et al.* 1998), more recent work has highlighted how embeddedness, power relations, elite interests, and political-economic factors can limit transition possibilities (Lawhon & Murphy 2012). This more sobering view recognizes that regimes and sociotechnical systems are anchored in real places (e.g., Western Cape) where industrial, technological, and institutional ‘lock ins’ – functional, cognitive, and political – and path dependencies make it difficult to achieve transitions (Grabher 1993).

In applying the MLP framework to the case of AG and the WCP, we conceptualise the regional economy as a sociotechnical system constituted by three interconnected

regimes related to production, consumption, and infrastructure. Production regimes account for the structuration of the region's industrial base and the potential for it to transition to greener, more sustainable sectors, firms, and manufacturing practices. Consumption regimes account for the domestic and international markets that WCP industries serve and the ability of these to support a sustainability transition. Infrastructure regimes are critical for both production and consumption activities, providing essential collective goods and basic services (e.g., transportation, energy, housing) that contribute to the productivity of workers and firms, connect the regional economy to domestic and international markets, and determine, in part, the quality of life available to residents. As is the case with all regimes, they are shaped by landscape factors and emergent niches and innovations such as those associated with green industry projects like AG.

LANDSCAPE FEATURES IN SOUTH AFRICA: SPATIAL ECONOMIC PLANNING 2.0 AND THE GREEN ECONOMY TILT

Southern Africa is experiencing unprecedented development challenges, some of which are legacies of apartheid, whereas others relate to the state's shortcomings in industrial policies, corruption, and state capture (Madonsela 2018) and failures to generate anticipated development (Nel & Rogerson 2014). The situation has been adversely affected in recent years by the plummeting of investor confidence, the eroding of external competitiveness, domestic recession, the downgrading of South Africa's international credit rating, and the impending climate crisis. Southern and South Africa are a climate change 'hotspot' (Intergovernmental Panel on Climate Change 2018) – which translates into high exposure to hot, dry, and water-stress challenges where local warming and drying will be greater than the global average, and to interrelated outcomes, such as the potential for a 'Day Zero' in Cape Town when the municipal water supplies will run dry.

The South African political economy, underpinned by a historical alliance between a minerals-fossil fuel complex and affiliated labour unions, has been structurally dependent upon energy-intensive growth based on abundant low-cost coal and exploitation of poor black labour (Baker *et al.* 2014). Recently a number of factors have made that economy increasingly unsustainable: the financialisation of South African resource conglomerates and the liberalisation of capital flows resulting in capital flight; the crisis of legitimacy brought about by the continued exploitation of black workers; failure to generate jobs for the large numbers of unemployed; insolvency, decay, and malfunctioning of the state's energy system; and increasing concerns about the environmental consequences of carbon-intensive energy dependence.

An extensive array of policy documents has reinforced a green economy focus, which has served as a significant landscape feature aimed at shaping the development of production, consumption, and infrastructure regimes at the provincial scale (Montmasson-Clair 2012). For example, South Africa's National Development Plan (NDP), closely aligned with the UN's SDGs, envisions that 'by 2030, South Africa's development transition to an environmentally sustainable, climate change resilient, low-carbon economy and a just society will be well underway' (Republic of South Africa 2016: 9). Highlighting the immediacy of this challenge, Minister of Water and Environmental Affairs Nomvula Mokonyane emphasises that 'the window of opportunity for transformation to a green economy is not so long anymore. There is no more room for excuses' (quoted in FIN24 2019: 1).

REGIME CHANGES AND LANDSCAPE FACTORS IN THE WESTERN CAPE: TOWARDS A GREEN ECONOMY?

WCP and the CCT have come together in an assemblage of urban and industrial policy entrepreneurs to 'leapfrog' or transition to infrastructure and production regimes able to support a green economy. In anticipation of spiralling energy costs, carbon trade barriers, impending water and other stressors, the WCP Government launched the *Green Is Smart* roadmap in 2013, aiming to be 'a pioneer, early developer' of green technologies and diversified green economic activities through the prioritisation of 'infrastructure-led growth'

(Western Cape Government 2013). Around the same time, a second provincial agency, 110%Green, was created to be the public face of the green economy within the region. The agency focuses on showcasing key projects, bringing together a mix of players to support each other and commit to environmental goals, and mobilizing civil society towards adoption of the green economy through networks, partnerships, and direct actions that strive to change perceptions of government in economic and social arenas (Petrik 2016). These activities are aligned with the provincial OneCape2040 vision (CCT & WCG 2012), an ambitious plan to facilitate a transition towards an inclusive and resilient economic future for the province. Through these efforts, and remarkably according to some analysts, 'South Africa is the world's fastest growing green economy', with the WCP hosting 60% of green project developers, two-thirds of all green manufacturing facilities, and 70% of all REIPPP projects (Winde cited in FTWonline 2017; Wesgro 2018, int.).

Crucial landscape drivers of these green economy initiatives are profoundly political factors associated with the WCP's significance as a centre of opposition to the African National Congress (ANC). Specifically, the Democratic Alliance (DA), the party controlling the WCP's government, has sought to differentiate its power base through a successful green economy transition, distinct from ANC strongholds where "brown" economic associations in mining and coal power generation are prominent (Petrik 2016). According to Cheeseman (2018) the existential threat posed to opposition-led city/regional governments when another party is in power at the central level may make the former more inclined to support developmental initiatives. The provincial-city assemblage has targeted finance and investments by creating a 'one-stop shop', offering incentives and improving the regulatory environment (Petrik 2016: 57). According to the head of the Belgian Chamber of Commerce, in terms of facilitating foreign investment, 'Western Cape and Wesgro – are really involved in what they are doing' (2018, int.). In this regard, the provincial green growth strategy is an effort to decouple economic performance from that of the country as a whole as much as possible (Petrik 2016).

ATLANTIS TOWN: A NICHE INNOVATION IN TWO ACTS

Atlantis,² a new town, was established in the 1970s by the South African apartheid government for evicted members of Cape Town's coloured population and as a future industrial site at the city's edge. Various government incentives were offered, such as a relocation tax credit, low-cost loans for land and building purchases, reductions in company taxes, guaranteed housing for workers, a 40% tax rebate on wages, rail transportation, and rent and interest subsidies for ten years (Stafford 2005: 35). At its height in 1985, approximately 119 manufacturing enterprises were located in Atlantis, contributing to 8,859 total manufacturing jobs, employment numbers that fell considerably short of expectations (Stafford 2005: 61). As industrial incentives expired in the mid-to late 1980s, factories moved out, jobs disappeared, and poverty and crime became rampant.

THE ATLANTIS GREENTECH SPECIAL ECONOMIC ZONE

The redevelopment of Atlantis as a greentech SEZ commenced in 2011 with the goal of it serving to jumpstart a regional green economy transition (GreenCape 2017). Located approximately 45 km from Cape Town International Airport and 105 km from Saldanha port, Atlantis has a comparative advantage in its proximity to big logistical infrastructure and as a vital link to the West Coast corridor (GreenCape 2018, int.) (see Map 1). Atlantis has specific locational advantages for manufacturing activities that rely on large vehicular traffic in that it enables regional freight to circumvent the congested traffic of Cape Town, and workers traveling to Atlantis will benefit from contra-traffic flows (DTI 2018, int.). The AG site is well located in terms of a large renewable energy market, it includes both greenfield and brownfield components, and it is projected to create approximately 900 direct jobs and 2,000 indirect jobs (Farole & Sharp 2017: 15). The upgrading of AG's physical infrastructure and labour market has already taken place through improvements to electricity, water management, telecommunication, and public transportation systems, and worker skills development in partnership with local high schools and a Technical and Vocational

Educational Training College (Cape Peninsula University of Technology, particularly its South African Renewable Energy Technology Centre [SARTEC], the country's first renewable energy technology centre) (GreenCape 2018, int.).

The establishment of a local renewables components manufacturing hub is a priority for AG. In doing so, a goal is to ensure that the SEZ serves as a linchpin of a broader structural green transformation (regime transition) through supply chain linkages, innovation, and entrepreneurship. Efforts to support local green entrepreneurship are being facilitated by the AG-based South African Renewable Energy Incubator (SAREBI) (Invest Cape Town 2019). One start-up, iSOLAR, has fulfilled orders for 900 solar water heaters for the CCT and the Cape Winelands District Municipality (Invest Cape Town 2019). Thus, the AG project is already creating new greentech opportunities with a range of localization spillovers, that is, via supply chain linkages and development of new markets for locally produced goods and greentech services.

Prior to the official green designation in July 2018, the project's development was slow and limited to four large greentech investors: manufacturing wind towers, turbine internals, geotextiles, and double-glazing (GreenCape 2017). The CCT aims to attract another R1.8 billion (approximately US\$130 million) of investment to the zone by 2022 (Le Roux 2017). From a wider regional perspective, new domestic and export markets (ties to other production, consumption, and infrastructure regimes) are anticipated to start after the 2019 national elections (110%Green 2019, int.). Particularly important in this respect are concerns that the main AG foreign investors have with respect to the political and economic risk environment (landscape features) facing South Africa. Specifically, these actors have stressed the need to restore transparent procurement processes and an independent judiciary, and to proceed cautiously with respect to wholesale land reform; essential assurances needed to restore investor confidence in South Africa (110%Green 2019, int.).

Since 2016, the Western Cape Industrial Symbiosis Programme (WCISP) has partnered with SAREBI to support start-up participation in sustainable manufacturing. WCISP has compiled a comprehensive list of volumes of materials and wastes underutilised by Atlantis firms to facilitate exchanges of unused resources among companies, in effect turning waste into secondary materials as opposed to discards. While international success rates of incubated firms bringing industrial symbiosis initiatives to market is very low (1 in 1000), WCISP, in the first three years of operation, reported a success rate of 4 in 70 (O'Carroll *et al.* 2017). Such breakthrough firms augment the AG cluster, linking micro, small, and medium firms to national and international firms and suppliers. To date, most of the secondary metals and e-waste firms are scattered across the metropolitan area (Grant 2019), and SAEWA and others propose that a secondary metals facility located in AG would provide a needed strategic link between formal firms and informal operators (SAEWA 2018, int.).

A second strategy for the AG focuses on getting Atlantis community members and leaders to support the project such that its long-term success is ensured. Given the failure of the apartheid-era Atlantis project, community mistrust towards the AG and the government's ability to manage it remains high and in need of significant efforts to ensure buy-in (GreenCape 2019). Central to these efforts is the establishment of the ASEZ-CSN. Formed in 2019, this entity (comprising 15 representatives³ drawn from labour unions, the informal economy, faith-based organisations, youth, women, persons with disabilities, civic organizations, and cultural groups) enables proactive community engagement to 'build trust', ensuring that local community interests 'are acknowledged by the SEZ', and to advance local economic opportunities (e.g., green jobs, skills development, capabilities) (GreenCape 2019: 2). Such 'soft' governance initiatives are critical for transitions in that they help foster shared rationales and forms of consensus needed for a new, more generative development pathway to emerge. While ASEZ-CSN is indicative of community facilitation, specific transition policies for workers and the population of Atlantis are not yet in place.

A third strategy strives to increase and diversify flows of foreign direct investment (FDI) into the AG, with some early successes already recorded. Spanish wind tower manufacturer, Gestamp Renewables (GR), an anchor tenant, invested ZAR 300 million

(US\$20.3 million) in 2014 in a 12,000 m² factory capable of manufacturing 150 wind towers per annum, creating 220 green jobs. GR expanded its facility in 2015 with ZAR 175 million (US\$11.8 million) investment and added 500m² of factory space, making it the largest greentech investor in the SEZ. Its first set of wind towers were installed on a wind farm in the Northern Cape Province in 2015. Soon after this, however, GR paused production and placed staff on 30% working time, as a change in direction in government policy effectively grounded the market for wind turbines (Wesgro 2018, int.). Investors' interest in establishing new operations in AG was revived in 2018–19. LM Blade, the largest wind turbine manufacturer in the world, considered investing in a five-hectare site for a blade plant given the “the metro is too busy” (Wesgro 2018, int.). However, one potential challenge is that a common platform for blade conformities is still absent in South Africa, and each developer had different specifications, resulting in a “localisation challenge”.

A fourth strategy promotes the AG as a centre for green energy manufacturing in the Southern African region, a niche innovation that can help transform production, consumption, and infrastructure regimes beyond South Africa, in and of itself a small market. The Southern African Development Community (SADC) secretariat is working on developing regional value chains through greater policy certainty and coherence (DTI 2018, int.). Specifically, SADC structures such as the South African Power Pool, the Regional Energy Regulators' Association (RERA), and the SADC Centre for Renewable Energy and Energy Efficiency (SACREE) are collaborating to improve the region's regulatory environment for renewables such that the regional market can grow. Renewables in the Southern Africa region's power capacity increased from 23% in 2015 to 39% in 2018 so there is considerable uptake and upscaling potential (PAGE 2017). PAGE (2017: 33) notes that apart from catalytic converters, South Africa has not generated significant green exports to date, and most greentech firms engage in assembly. Based on South Africa's R&D capabilities and government priorities, several green export opportunities have been identified: small-scale solar-related technologies (solar power systems and smart metres); manufacturing in the biogas-to-transport value chain; and bio composite materials and water-related technologies (water conservation and water treatment).

Despite the potential, the international market is highly competitive, and South Africa's firms are nascent and in need of support through import substitution policies, government procurement initiatives, and export incentives to help them build competitive scale (PAGE 2017). More government funding for R&D and commercialization is essential. In particular, affordable technologies need to be developed for the African market, innovations that demand economies of scale if they are to be realized. Developing export-manufacturing capacity remains challenging, however, due in large part to numerous nontariff barriers (such as local content requirements) that have been implemented in major markets as well as in South Africa. As such, the niche remains rather precarious with respect to its ability to catalyze regime transitions in the WCP.

CHALLENGES OF THE GREEN ECONOMY IN THE WESTERN CAPE: A CRITICAL ASSESSMENT

The 'hard infrastructure' projects and production outcomes in AG need to be complemented by initiatives to foster 'softer' outcomes such as networks, partnerships, and capacity building, especially the development of managerial, technical, and operational skills in national firms and the labour force. Such developments are vital for the legitimation and expansion of green industries in the wider regional economy such that a transition is possible and is one that firmly establishes new, more sustainable sociotechnical regimes. Achieving such an outcome is fraught, however, given the inherent tension between place-marketing and the promotion of specific sites and premises in the AG niche, and the broader green transition that is affected by landscape and regime-specific factors related to national politics, the macro economy, societal trends, business-as-usual services and industries, and developments in the global economy.

The challenges here are myriad, despite the fact that South Africa's REIPPP has been hailed as one the most successful of its kind (Leigland & Eberhard 2018). In fact, 56 independent power producers aimed to deliver 13,356 jobs but managed to achieve 23,475

jobs (Leigland & Eberhard 2018: 580). Domestic content legislation has generated approximately 15,000 jobs in solar PVs, and 38,000 jobs are attributed to the renewable energy sector (International Renewable Energy Agency 2018: 21). However, critics, such as the Congress of South African Trade Unions (COSATU), contend that local content requirement targets are too lenient, and impressive job creation (difficult to verify) has to be contextualized by the tendency to inflate numbers based on temporary, low-value, and/or low-skilled jobs rather than permanent, high-value, and/or skilled forms of employment (Leigland & Eberhard 2018). Even though the Ramaphosa government got REIPPP 'back on track', the focus of the programme is on the lowest cost rather than total economic benefit. For instance, a 5% higher cost for electricity might be worth it if it meant that 60% of the content was locally produced rather than 25%⁴ (DTI 2018, int.). Furthermore, whether the content being localized is based on cheaper, easier-to-manufacture goods or on high-value components, such as wind turbines and blades, is important.

While CCT and the WCP participate in coordinating policy efforts to advance the green economy, these agencies are not always in sync with the national government. For instance, several projects went out of business in AG when the REIPPP was paused: three PV panel manufacturers ceased local operations, adding 1,500 to 2,000 people to the ranks of the unemployed. A revived renewable energy programme is now being supported by R209.4 billion [US\$14.4 B](SA News 2019), and investors are eyeing the REIPPP as a broader selling opportunity that has much potential beyond South Africa's borders, especially in neighbouring SADC markets (GreenCape 2018, int.).

Contemporary AG is a clear example of a spatial policy shift from treating land and space as instruments of social engineering towards a position that seeks to be socially inclusive and to incorporate the population of an impoverished area into a green pathway. While the stakeholder network is an innovative instrument to build community buy-in and provide valuable networks for resource management, an energy transition, and climate change adaptation, it may not be enough. It is evident that policymakers are placing most faith in a large sector response to lift the poor out of poverty with local community consultation, but building broader trust and support for the green transition among the disconnected poor is still a major conundrum. In other words, there is an insufficient understanding of the links between the production regime where industry operates and the consumption and infrastructure regimes that everyday people are forced to contend with, particularly in townships and informal settlements. To realise a more transformational future, Georg (2019) contends that a Green New Deal supported by a revamped national education system will be necessary.

In WCP the economic reality is that growth is still largely driven by non-green sectors – that is, the entrenched, mainstream production regime in South Africa. The green economy transition is still at a niche stage because the economy is not in a position to transition beyond traditional production sectors. Decarbonising the economy will result in a loss of jobs in coal-fired stations, mines, and transport services concentrated in Mpumalanga, and to lesser extent in Limpopo, posing a threat to the socioeconomic stability of those regions. The carbon energy-mineral sectors and their strong unions represent formidable obstacles. While unity was created in the past to oppose the apartheid model of capitalist development, opposition to the environmental effects of capitalism has been harder to consolidate and unify given the socioeconomic implications. While landscape changes to climate are highlighting the importance of a green economy, other features such as societal values, entrenched political interests, and socioeconomic and racial inequality remain entrenched. As a result, there is not a unifying environmental movement with a national platform (Death 2016). Major trade unions such as National Union of Metalworkers of South Africa (NUMSA) and COSATU have sought to develop progressive climate change policies but in parallel with protections for jobs in mining and manufacturing sectors that are associated with the entrenched production regime (Rathzel *et al.* 2018).

There is thus a very delicate balancing act between a green transition, social transformation, and economic competitiveness internationally. In response to a question about whether the zone might attract FDI that would take incentives and use the zone for

imports, one of the GreenCape officials said that ‘any tenant is the right type of tenant as long as they generate jobs’ (GreenCape 2018, int.). This intimates that a strongly liberal approach to economic development is still dominant – one that insufficiently perhaps inverts the prioritization between the economy and the environment. The present environmental crisis, partly driven by globalization and its production and consumption patterns, is now to be addressed by a combination of government procurement and pricing mechanisms and via a SEZ, which both seeks to attract transnational investment and export to international markets as well as generate local linkages and localization benefits. The AG remains a niche, however, whose transformative prospects with respect to the dominant sociotechnical system remain muted given the durability of existing regimes and landscape features that work against a transition.

CONCLUSIONS

Many of the elements of a potential sociotechnical transition are there but the sum of the parts does not add up to a production regime change. Several synergistic pressures are evident, ranging from strong landscape forces ostensibly resulting from South Africa’s impending climatic future, rapid urbanization, and to lesser degree changes in societal values and wavering renewable energy policies. In spite of all this, the entrenched fossil-mineral complex has not been sidelined, and green economy capabilities remain considerably underdeveloped. Still niche experimentation with innovative green technologies in AG is a highly novel approach to the challenges of sustainable development with potentially exciting outcomes.

Evidence from high-income countries ahead of South Africa in a green transition reveal that compared with fossil fuel technologies, which are typically mechanised and capital-intensive, renewable energy is more labour intensive: solar panels need installers and wind farms need technicians for maintenance. This means that, on average, more jobs are created for each unit of electricity generated from renewable sources (Leigland & Eberhard 2018). In addition to the manufacturing jobs created at AG, ancillary and ripple-effect jobs will be created. For instance, industrial symbiosis will open up new opportunities in waste. The development of renewable energy in South Africa, a country severely challenged to provide energy access to poor communities, is highly scalable to areas with limited or no access to electricity. Ending energy poverty will be life-changing for local communities: improving business environments, enhancing home/homework environments, and lessening the burden on women who no longer will have to collect alternative fuels.

Still, sceptics may argue that green initiatives in the WCP and those espoused by the national government are, at best, add-ons to or extensions of existing policies. The green transition has to go beyond energy policy and renewable technologies to be a broader and deeper process. Even though South Africa has a plethora of green documents and there are growing concerns about the climate crisis, the country has yet to promulgate a unifying manifesto given that the language of the green economy is far from mainstream. Part of the problem relates to the fact that there are ongoing protests and forms of resistance to renewable energy by coal truck drivers, business associations, and other public and private sector actors. This reflects the challenges to sustainability transitions that stem from landscape forces and features that cannot be managed simply through good policy, strategic planning, and technological innovations. For instance, the development of green skills within all sections of the labour force and the re/up-skilling of informal workers and their integration into the green economy are at a rudimentary stage of policy support. Gaps in the mix of policy measures and supports to incorporate labour and to ensure that AG is grounded in the socioeconomic realities of its area are evident. South Africa’s extensive array of pro-poor policies barely link to the green economy (Hlahla *et al.* 2016; Petrik 2016), and this link is secondary in AG. While stakeholders are now being engaged in AG via the ASEZ-SCN, civic involvement is largely absent from green policy policymaking and decision-making, meaning that buy-in from society at large remains poorly developed. Taking a wide, landscape view of AG and the green transition, one GreenCape official noted “there won’t be a green economy unless it is a black economy” (Wesgro 2018, int.).

REFERENCES

- AfDB, OECD, & UNDP 2016. *African Economic Outlook 2016: Sustainable cities and structural transformation*. Paris: OECD Publishing.
- Baker, L., P. Newell & J. Phillips 2014. 'The political economy of energy transitions: the case of South Africa', *New Political Economy* 19, 6: 791–818.
- Bisseker, C. 2017. *On the Brink: South Africa's political and fiscal cliff-hanger*. Cape Town: NB Publishers.
- Cheeseman, N. 2018. 'Will urban innovation solve Africa's development challenges?' Development Studies Association of Ireland, Annual Conference, October 19 (unpublished paper).
- City of Cape Town (CCT) & Western Cape Government (WCG) 2012. *OneCape 2040: the Western Cape agenda for joint action on economic development*. Cape Town: City of Cape Town & Western Cape Government.
- Death, C. 2016. *The Green State in Africa*. New Haven, CT: Yale University Press.
- Department of Energy 2018. *Integrated Resource Plan 2018*. Pretoria: Energy Department, Republic of South Africa.
- Department of Trade and Industry (DTI) 2016. Industrial Parks Revitalization Program: presented to the Portfolio Committee on Trade and Industry. <https://www.thedti.gov.za/parliament/2016/Industrial_Park_Revitalization.pdf> , accessed 17.1.2018.
- Department of Trade and Industry (DTI). 2018. *Industrial Policy Action Plan 2018/19–2020/21*. Pretoria: Department of Trade and Industry.
- Farole, T. & L. Moberg 2014. 'It worked in China so why not in Africa? The political economy challenge of Special Economic Zones'. WIDER Working Paper 2014/152. Helsinki, Finland.
- Farole, T. & M. Sharp 2017. 'Spatial industrial policy, special economic zones, and cities in South Africa'. Paper prepared for the National Treasury, South Africa. <<https://csp.treasury.gov.za/Resource%20Centre/Conferences/Documents/Urbanization%20Review%20Papers/Paper%205%20-%20SEZs%20and%20Cities.pdf>>, accessed 17.1.2019.
- FIN24 2019. 'SA running out of time to implement green economy- minister'. <<https://www.fin24.com/Economy/sa-running-out-of-time-to-implement-green-economy-minister-20190110>>, accessed 1.6.2019.
- Fridays for Future, South Africa 2019. <<https://fridaysforfuture.org.za>>, accessed 30.5.2019.
- Ftwwonline 2017. 'Green light for Western Cape green tech sector SEZ'. <<http://www.ftwwonline.co.za/article/124543/Green-light-for-Western-Cape-green-tech-sector-SEZ>>, accessed 1.5.2018.
- Geels, F.W. 2004. 'Understanding system innovations: a critical literature review and a conceptual synthesis'. in B. Elzen et al., eds. *System Innovation and the Transition to Sustainability: theory, evidence and policy*. Cheltenham: Edward Elgar, 19–34.
- Geels, F.W. 2010. 'Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective', *Research Policy* 39, 4: 495–510.
- Geels, F.W. & J. Schot 2007. 'Typology of sociotechnical transition pathways', *Research Policy* 36, 3:399-417.
- Georg, C.-P. 2019. 'South Africa needs a Green New Deal'. *Mail & Guardian*. <<https://mg.co.za/article/2019-04-12-00-south-africa-needs-a-green-new-deal>>, accessed 30.5.2019.
- Grabher, G. 1993. 'The weakness of strong ties: the lock-in of regional development in the Ruhr area', in G. Grabher, ed. *The Embedded Firm: on the socioeconomics of industrial networks*. London: Routledge, 255–77.
- Grant, R., 2019. 'E-waste challenges in Cape Town: opportunity for the green economy?' *Urbani Izziv* 30, 2: 5-23.

- GreenCape 2017. 'Solar PV for businesses in the Western Cape'. Industry Brief 02/2017. <<https://www.greencape.co.za/assets/Uploads/Industry-Brief-Solar-PV-FINAL-WEB-Update2.pdf>>, accessed 1.6.2019.
- GreenCape 2019. 'Oversight Committee: report on the SEZ-CSN election'. <<https://www.green-cape.co.za/assets/Uploads/ASEZ-CSN-Election-Report-20190326-release3.pdf>>, accessed 29.5.2019.
- Hlahla, S., A. Goebek & T. Hill 2016. 'Green economy: a strategy to alleviate urban poverty and safeguard the environment? KwaZulu-Natal, South Africa', *Urban Forum* 27: 113–27.
- Intergovernmental Panel on Climate Change (IPCC) 2018. 'Summary for policymakers', in V. Masson-Delmotte *et al.*, *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva, Switzerland: World Meteorological Organization, 1–12.
- International Renewable Energy Agency (IREA) 2018. Renewable energy and jobs. Annual review 2018. Masdar: IREA.
- Invest Cape Town. 2019. 'Success stories. SA renewable energy business incubator'. <https://www.investcapetown.com/success_stories/sa-renewable-energy-business-incubator/> accessed 23.3.2019.
- Kemp, R., J. Schot & R. Hoogma 1998. 'Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management', *Technology Analysis & Strategic Management* 10, 2: 175–98.
- Köhler, J., *et al.* 2019. 'An agenda for sustainability transitions research: state of the art and future directions', *Environmental Innovation and Societal Transitions* (in press).
- Lawhon, M. & J. Murphy 2012. 'Socio-technical regimes and sustainability transitions: insights from political ecology', *Progress in Human Geography* 36, 3: 354–73.
- Leigland, J. & A. Eberhard 2018. 'Localisation barriers to trade: the case of South Africa's renewable energy independent power program', *Development Southern Africa* 35, 4: 569–88.
- Le Roux, M. 2017. 'Atlantis declared a special economic zone', *Eyewitness News* <<http://ewn.co.za/2017/09/11/atlantis-declared-a-special-economic-zone>>, accessed 1.6.2019.
- Madonsela, S. 2018. 'Critical reflections on state capture in South Africa', *Insight in Africa* 11, 1: 113–30.
- Montmasson-Clair, G., 2012. 'Green economy policy framework and employment opportunity: A South African case study'. TIPS Working Paper no. 2012-12. Pretoria: Trade and Industrial Policies Strategies.
- Murphy, J.T. & P. Carmody 2015. *Africa's Information Revolution: technical regimes and production networks in Tanzania and South Africa*. New York: Wiley.
- Murphy, J.T. & P. Carmody 2019. 'Generative urbanism in Africa? A sociotechnical systems view of Tanzania's urban system', *Urban Geography* 40, 1: 128–57.
- National Planning Commission 2012. *National Development Plan 2030: our future—make it work*. Pretoria: NPC.
- Nel, E. & C. Rogerson 2014. 'Re-spatializing development: reflections from South Africa's recent re-engagement with planning for Special Economic Zones', *Urban Izziv* 24: 24–35.
- O'Carroll, S., L. Brasson, J. Lyons, S. Smout & H. Nuwarinda 2017. 'The nature and role of industrial symbiosis in South Africa'. Paper presented at the TIPS Annual Forum. <<http://www.tips.org.za/research-archive/annual-forum-papers/2017/item/3353-the-nature-and-role-of-industrial-symbiosis-in-south-africa>>, accessed 23.3.2019.
- Okereke, C., A. Coke, M. Geebreyesus, T. Ginbo, J. Wakeford & Y. Mulugetta 2019. 'Governing green industrialisation in Africa: assessing key parameters for a sustainable socio-technical transition in the context of Ethiopia', *World Development* 115: 279–80.

- Partnership for Action on Green Economy (PAGE) 2017. 'Green economy inventory for South Africa: an overview'.
http://www.unpage.org/files/public/green_economy_inventory_for_south_africa.pdf, accessed 20.1.2019.
- Petrik, M. 2016. 'A review of the green economy in Cape Town: local policy in the light of international approaches'. University of Cape Town, unpublished MA thesis.
- Rathzel, N., J. Cock & D. Uzzell 2018. 'Beyond the nature-labour divide: trade union responses to climate change in South Africa', *Globalizations* 15, 4: 504–19.
- Republic of South Africa 2016. 'South Africa's first intended nationally contributions'.
<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/South%20Africa%20First/South%20Africa.pdf>, accessed 29.4.2019.
- SA NEWS 2019. 'South Africa renewable energy program attracts R209.4 B to the economy'. <<https://www.eurasiareview.com/25022019-south-africa-renewable-energy-program-attracts-r209-4-billion-to-economy/>>, accessed 23.3.2019.
- Sengers, F. & R. Raven 2015. 'Toward a spatial perspective on niche development: the case of bus rapid transit', *Environmental Innovations & Societal Transitions* 17, 12: 166–82.
- Stafford, C. 2005. 'Apartheid Atlantis: a planned city in a racist society'. Stanford University, History Department, unpublished honors thesis.
- Todes, A. & I. Turok 2018. 'Spatial inequalities and policies in South Africa: place-based or people-centered?' *Progress in Planning* 123: 1–31.
- United Nations Economic Commission for Africa (UNECA) 2016. *Greening Africa's Industrialisation*. Addis Ababa: UNECA.
- Western Cape Government (WCG) 2013. *Green Is Smart: Western Cape Green Economy Strategy Framework*.
https://www.westerncape.gov.za/assets/departments/transport-public-works/Documents/green_is_smart-4th_july_2013_for_web.pdf, accessed 15.5.2019.
- Western Cape Government (WCG) 2019. '110%Green'.
<https://www.westerncape.gov.za/110green/>, accessed 5.5.2019.

INTERVIEWS

- 110%Green, Manager, Energy Security, Department of Economic Development and Tourism 2.6.2019.
- ASN-CSN, Stakeholder member, 4.11.2019.
- Belgian Chamber of Commerce for Southern Africa, Head, 6.13.2018
- Department of Trade and Industry, Chief, African Integration & Industrial Development, 6.12.2018.
- Environsense, Managing Director, 6.17.2018
- eWasa, Chair, 10.10.2018.
- GreenCape, Project Executive, 6.18.2018.
- GreenCape, Project Officer, 6.18.2018.
- OneWorld, Sustainable Investments CEO, 6.15.2018.
- SAWEA, Chair and Coordinator, 6.19.2018.
- Western Cape Government, Research and Development Manager, 6.21.2018.
- Western Cape Government, Deputy Director General, 6.21.018.
- Wesgro, Investment officer, 6.21.2018.

¹ Greentech refers to environmentally sound technologies and to the total system around these which include know-how, procedures, goods and services, equipment, and organizational and managerial procedures.

² Originally the area was called Dassenberg New Town, but it was renamed Atlantis in 1975.

³ ASEZ-CSN is composed of representatives from the following groups: New Life, X-treme Youth, West Coast Community Education Partnership, Atlantis Early Childhood Development Directive, Khoisan Renaissance Cultural Awareness, COSATU, South African Federation of Trade Unions (SAFTU), Atlantis Industrial Initiatives, Atlantis Business Chamber SMMEs, Lumphulo Atlantis Business Development Forum- Informal and Cooperatives, the Commissioners of Justice RSA, Witsand Ministries Fraternal, South African Civic Organisation, and Concerned Citizens of Atlantis.

⁴ According to the Industrial Policy Action Plan, the local content target is supposed to be 65% (Department of Trade and Industry nd).