BRIEFING NOTE
April (No. 2022/02)

THE EVOLVING ANALYTICAL REQUIREMENTS TO SUPPORT DECISION-MAKING AND IMPLEMENTATION OF JUST DECARBONISATION IN SOUTH AFRICA

Emily Tyler and Celeste Renaud
With review by Grové Steyn, and acknowledging ongoing discussion with the Meridian team

1 INTRODUCTION AND CONTEXT

The past few years have seen a number of profound shifts within the international climate policy community in terms of our collective understanding of the policy problem of decarbonisation. The Special Report on 1.5˚C by the Intergovernmental Panel on Climate Change (IPCC) showed how, in order to contain temperature rise to 1.5˚C, we have to reach global net zero carbon emissions by mid-century (IPCC, 2018). This is a fundamentally different proposition to that of reducing emissions below 'business as usual' baselines, which was the dominant framing until that point. Achieving global net zero by 2050 implies a transition to decarbonised economies within a limited timeframe.

Then there is a move – at least in the scientific community – towards a more holistic systems view of the decarbonisation challenge above the prior sectoral and techno-economic emphasis. The recently released Working Group III's contribution to the IPCC's 6th Assessment Report (2022) includes new chapters focusing on systems, cross-sectoral perspectives, demand, social aspects and services.

Finally, there is the rise of the concept of a 'just transition' as opposed to the previous and more incremental concept of 'sustainable development'. 'Just transition' has caught on like wildfire in South African policy circles – where the transition to global net zero carbon by 2050 will require a structural economic change for the country, with uneven impacts across different sectors and locations.

Internationally and domestically, there is a strengthening majority view that decarbonisation and containing global temperature rise to 1.5˚C is desirable. The devil, however, is in the details: how much decarbonisation, how, and how soon; and then too how to make this transition happen? The twin objective of requiring the transition to be just greatly complicates these questions.

In the past eighteen months a number of key policy development have signalled a concerted effort towards more ambitious climate and just transition action in South Africa. In December 2020, the Presidential Climate Commission (PCC) was established as an independent, statutory, multistakeholder body to engage key social partners including government, labour, business and civil society in working together to progress South Africa's transition. High on the PCC's priority list is to develop a Just Transition Framework for South Africa, and to facilitate coordinated efforts by various stakeholders. In September 2021, South Africa announced the update of its Nationally Determined Contribution (NDC), with its new targets now deemed commensurate with SA's 'fair' contribution to the Paris Agreement temperature goal of 1.5 degrees. The country's Climate Change Bill is currently under review by Parliament, and the 2022 Budget saw a steep post-2026 carbon price hike for high emitters being announced. A particularly significant moment occurred in November 2021 at the Conference of the Parties (COP26) in Glasgow, whereby it was announced that a substantial funding package of at least 8.5Bn USD will be made available by a set of developed country governments to the South African government in order to assist its transition efforts.

With these efforts, the South African climate policy community can be said to be moving on from the task of putting a 'just decarbonisation' onto the policy agenda, to the challenge of engaging with its details and implementation.

2 OBJECTIVE OF THIS NOTE

At the beginning of 2022, Meridian Economics undertook a high-level overview of South Africa's national-level decarbonisation analytical resources, which are mostly based on technical modelling work. The purpose of the overview was to identify areas where further work was required and scope an additional contribution to the existing body of work.

As part of this exercise, we reflected on similarities in how the existing body of work approached the decarbonisation challenge, the global shifts described above, and the demands of engaging with the details of a just decarbonisation and its implementation.

We investigated the extent to which the existing national level South African decarbonisation analytical resources: 1) respond appropriately to the evolving understanding of the nature of the just decarbonisation policy problem and, 2) are sufficient to support this new phase of policymaking, specifically to enable optimal and effective decision making. Are there different ways of understanding the problem and viewing the challenge? Are there different and new types of information required for implementation decision-making? And if so, what might these look like?

This concept piece is an outcome of this exploration, drawing on previous research (Tyler & Cohen, 2020) and ongoing discussions within Meridian. It is styled as a provocation, an invitation to the South African national decarbonisation and just transition policy making community to reflect on where we are, both domestically and internationally. As a community we speak much of urgency, but do we have adequate analytical tools to enable us to focus, develop all the necessary insights and prioritise strategies?

The primary question we ask in the note is: do we have the analysis, appropriate to the changing nature of the decarbonisation challenge, that is needed to support South Africa's 'just decarbonisation' implementation and decision making?

The intention of the piece is not a detailed critique of the analytical resources we have – these are undoubtedly valuable, and even exceptional relative to countries at similar levels of development. Rather, our intention is to create a space for reflection given the rapidly changing nature of our world and the decarbonisation challenge in particular. We hope hereby to nudge our collective understanding of the problem, how it is approached analytically, and how these insights are communicated to policymakers.

The next step, that of responding to these changes with adequate tools and methods is admittedly difficult and unfamiliar terrain. This we don't attempt but, towards the end of the note, provide a nod as to what these might look like. Scoping and experimenting with new methods is the subject of future work.

3 DECARBONISATION STUDIES CONSIDERED

In our overview, we considered a total of 14 national level decarbonisation studies having been conducted or in progress by different research groups in South Africa. We are aware of others underway but with limited information yet in the public domain, in particular the work of the Departments of Mineral Resources and Energy, and Forestry Fisheries and the Environment, Eskom and the Council for Science and Industrial Research. The general focus of each of the modelling studies is summarised in Table 1 below. All are based on modelling, but differ in terms of the modelling frameworks used, sector(s) analysed, assumptions, level of detail, metrics and indicators. We recognise that this set of work is non-exhaustive and therefore it is only intended as an exemplar of the existing body of work in South Africa.

Table 1: Exemplar of key national-level decarbonisation work conducted or in progress by organisations in SA (non-exhaustive)

Organisation/Project Group	Focus of modelling work	Modelling framework
UCT Energy Systems Research Group *(2005 – ongoing).* (For amongst others Department of Forestry, Fisheries and Environment, Presidential Climate Commission).	Energy system modelling studies – exploring implications of decarbonisation on key economic sectors to 2050	Energy-economy linked model (SATIM-GE)
National Business Initiative *(2020 – ongoing)*	Just Transition Pathways Project – mapping decarbonisation pathways for South Africa's key economic sectors to 2050	PLEXOS power system model plus Social Accounting Matrix (SAM)
Meridian Economics & Council of Scientific and Industrial Research *(2017 – ongoing)*	Power sector modelling studies – exploring the cost of increased mitigation in South Africa's electricity system to 2050	PLEXOS power system model
IHS Markit *(2021)*	Exploring green hydrogen development scenarios for South Africa to 2050	Electrolysis cost model plus SAM
COBENEFITS Project *(2020 – 2021)*	Exploring employment impacts of different pathways for expanding electricity generation in South Africa to 2050	Energy-economy linked model (SATIM-GE)
The GreenHouse *(2018)*	Modelling mitigation pathways for South Africa's key economic sectors to 2050	Analytica model (physical sectoral model)
Res4Africa *(2021)*	High level modelling of key economic sector decarbonisation pathways to 2050	Sectoral 'bottom-up' modelling approach
National Treasury *(ongoing)*	Exploring net zero pathways	E3ME simulation-based integrated assessment model
Department of Environmental Affairs (conducted by North-West University and Gondwana environmental solutions) *(2016)*	The development of a GHG emissions baseline for the agriculture, forestry and other land use (AFOLU) sector in South Africa to 2050	National emissions model (MARKAL) plus additional sectoral modelling
Department of Environmental Affairs (conducted by Camco Clean Energy) (*2014)*	South African Mitigation Potential Analysis: Mitigation opportunities in South Africa's key economic sectors 2000-2050	Multi-sectoral macro-economic model (INFORUM)

Whilst the focus of this note is on the national-level body of work in Table 1, we did consider a number of city-level and company level studies, and return to these briefly later in the note. Figure 1 below depicts the extent to which the approach of the national-level studies relied on quantitative or qualitative analysis and also shows their sectoral emphasis.

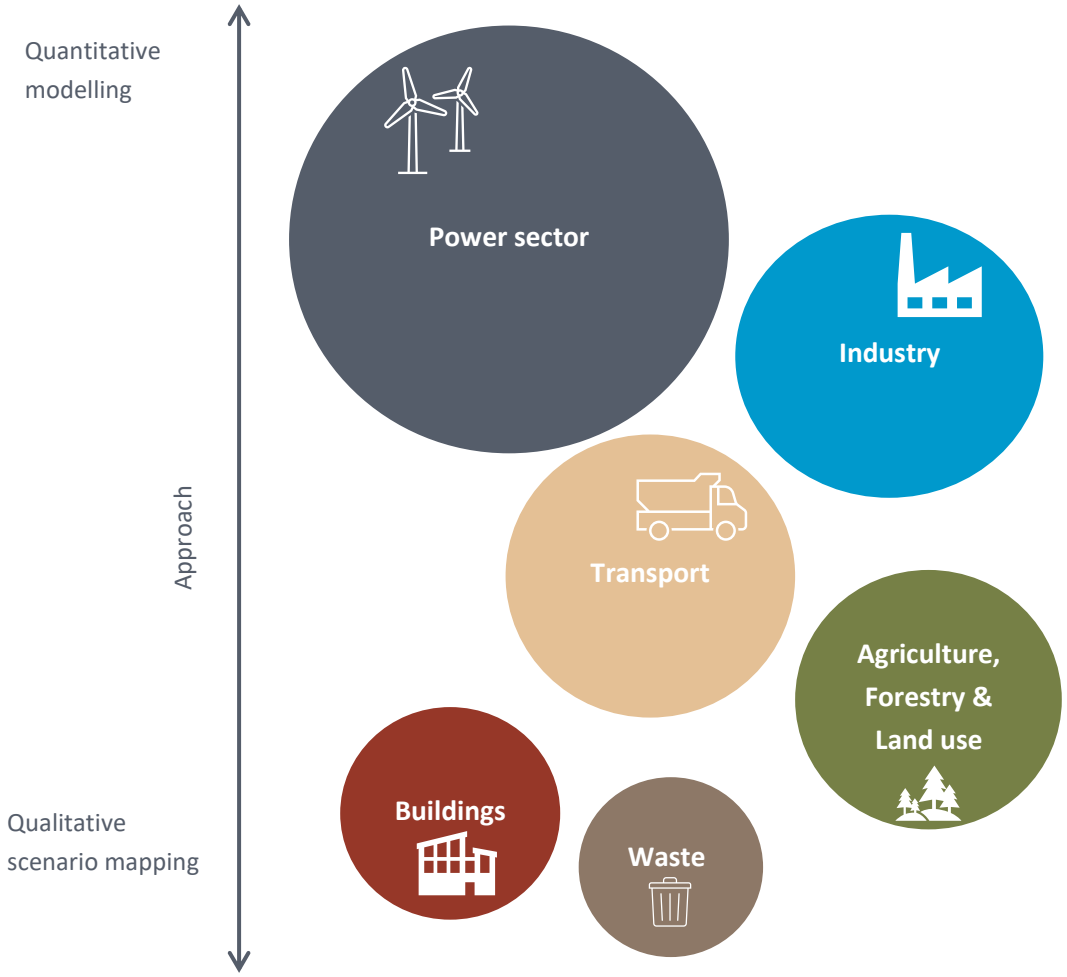

Figure 1: Snapshot of national level decarbonisation studies (note the size of each bubble represents the relative emphasis on that sector in decarbonisation studies, i.e. power sector decarbonisation has been explored extensively in South Africa).

4 SIMILARITIES OF APPROACH ACROSS THESE STUDIES

Almost all the national level studies which we considered share some similarities of approach which are particularly relevant to the primary question we are asking in this concept piece: Do we have the analysis, appropriate to the changing nature of the decarbonisation challenge, that is needed to support implementation and decision making?

These similarities can be articulated as four high-level themes: First, we observe the use of **long term, deterministic models as a preferred quantitative approach**. Deterministic modelling assumes that a particular set of inputs always produces the same output, that the development of future states of the system under investigation involve no randomness. In the studies considered, typically, a few continuous, near-linear scenarios from the present to 2050 are the focus, and are foregrounded in study outcomes. An early example of this is that of the Long-Term Mitigation Scenario (LTMS) planning process undertaken in 2007 which provided the first graphical framing of South Africa's decarbonisation challenge (See Figure 2). Such graphics provide powerful conditioning of our collective understanding of the decarbonisation challenge.

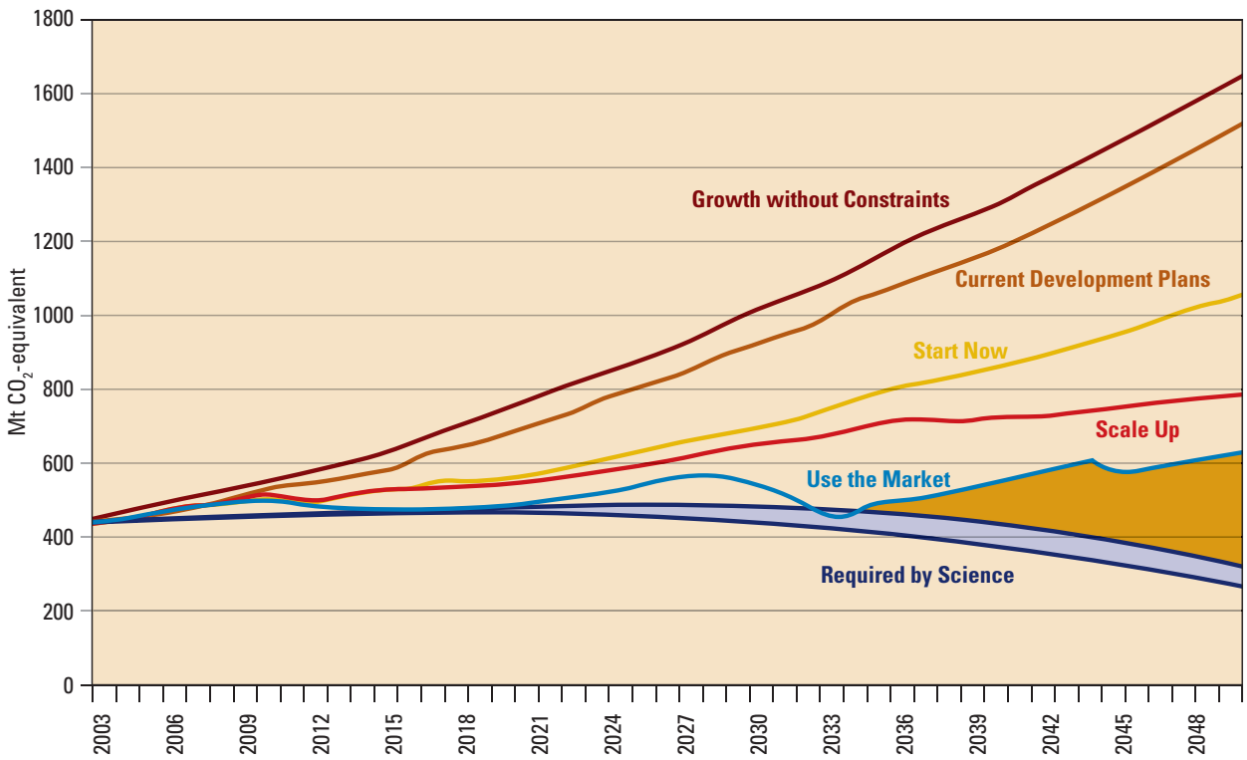

Figure 2: Long Term Mitigation Scenario Analysis, Strategic options to get from 'Growth without Constraints' to 'Required by Science'. (Department of Environmental Affairs and Tourism, 2007)

Whilst modellers themselves are usually very aware of what models can and cannot say given the modelling frame and assumptions, modelling is a highly specialised activity, and the challenge of translating modelling outputs as useful inputs for policymaking is not in-substantial. This challenge is exacerbated by an inbuilt tendency in western-educated brains to interpret a small number of modelled scenario results as predictions, if not consciously then sub-consciously. We are far more comfortable assuming the future to be knowable and predictable than we are at dealing with the messy reality of uncertainty, shocks, and crises that reverberate across system scales and sectors, tipping our societies in various unanticipated directions. We do not have the thinking habits to engage with the reality of this level of uncertainty, we assume that the only option forward is to make better predictions. As our world accelerates into increasing interconnectivity and complexity, the potential and impact of such crises is similarly increasing exponentially. Just this decade the implications for decarbonisation and just transition of both COVID-19 and the Russian invasion of the Ukraine provide clear evidence of this.

Deterministic, near-linear, long-term models provide a lot of valuable techno-economic insights relating to the decarbonisation of South Africa's socio-economic system. They can show how a system responds if constrained in a particular way, or how different policy choices might lead to different system futures. These models have proved very useful in demonstrating the impacts of a long-term issue, and the need for different action as a result. However, they also contain many distractions. For example, forecasts of the marginal costs of emission removal technologies in 2050 are highly unreliable in our context of rising uncertainty. Models also rely on numerical inputs – the more difficult something is to quantify, such as behavioural change or politics, the less likely it is to be considered by a modelling exercise.

Internationally, there is a growing awareness of how the current suite of models typically used by the decarbonisation policy community (such as Integrated Assessment Models and energy-economic models) miss important dynamics of complex interconnected systems (Geels, Berkhout & Vuuren, 2016; Yue et al., 2018; Hafner et al., 2020). In addition to masking inherent uncertainties, deterministic modelled pathways also hide other features of complex systems highly relevant to the decarbonisation and just transition challenge. Emissions reduction is primarily realised from the phase down of large emitting plant (coal fired power generators), or by many individual actors shifting away from emitting activities (such as from internal combustion engine to electric cars, or

changing farming practices). These changes are not incremental, but rather subject to the non-linearity of tipping points, path dependencies and lock-in/out effects. The decision to build a railway rather than upgrade a road, or to procure an electric bus fleet can catalyse a significant decarbonisation shift in a short period of time.

Approaches to decarbonisation analysis that are grounded in a complex systemic view of the world highlight the role of uncertainties and non-linearities in a way that deterministic modelling and associated policy analysis does not (Farmer et al., 2019; Sharpe & Lenton, 2021).

Second, whilst there is a wealth of analysis at a sub-national level, particularly for cities but also for some sectors, the **inter-scale and cross-sectoral decarbonisation and development connections are not well mapped or understood**. Here again, the types of models, whilst very well equipped to understand a sector or a region in-depth, are ill-equipped to capture the complexity of interconnections between these, together with their rapid evolution. For example, city-level actions to facilitate the shift to electric vehicles through preferential access could impact national power demand profiles, and trigger a tipping point in the demand for internal combustion vehicles, with implications for the national motor vehicle industry.

Third, most of the analyses we considered abstract to a large extent from all but the techno-economic aspects of our society. **South Africa's social and natural capital constraints are underexplored**. These aspects are, however, highly consequential in understanding the decarbonisation routes available to us as a country. For example, South Africa is currently haemorrhaging skills which it appears to be consistently unable to replace through its education system. The lack of skilled human capital imposes a long-term constraint on the types of decarbonisation interventions that the country can implement. So too, government capacity has been severely eroded in the past decade, leaving patchy ability to effectively implement policy and regulation. Decarbonisation interventions that rely on a uniformly and well-capacitated government for implementation are therefore unlikely to be successful. Similarly, a thin system-level understanding of how our social and economic policies will impact land use, and therefore South Africa's natural carbon sink, has potentially significant implications for overall levels of mitigation ambition.

Our poor understanding of interconnections between sectors and scales, together with the interconnections between the social versus technical and natural aspects results in our being blind to powerful cross-sectoral, cross-scale tipping points. For example, removing the market licensing requirement for renewable energy generation projects below 100MW[1] is at first glance a small energy reform intervention – but one that has powerful tipping point dynamics in favour of low carbon power. This is because renewables are the most affordable new build generation option and, especially photovoltaic power, exhibit weak economies of scale, thereby presenting low barriers to entry.

Place and space are additional dimensions of which the current body of decarbonisation analysis offers little insight. A well observed example is how closing of the coal fleet will have an outsized impact on the socio-economics of the Mpumalanga province, but do we understand the location-specific impacts of the decarbonisation of other emitting assets, for example steel and cement plants? Key and priority spatial / cross-scale opportunities are also less visible from the vantage point of the analytical approaches of the current body of analysis. Upgrading of the rail link between the port of Durban and the inland economic centre of Gauteng could displace huge numbers of emission-intensive trucks. Lock-in or lock-out infrastructure decisions have decarbonisation (and developmental) implications that are hard to see in the way existing analysis presents the decarbonisation challenge.

Finally, **complex aspects that evade easy quantification such as development and justice factors are reduced to fairly high level and limited indicators.** In most of the analyses we considered, development and justice were described in terms of Gross Domestic Product (GDP) and employment. Whilst these indicators do provide critical sensitivity checks on how the socio-economic system responds generally, they

[1] *https://www.engineeringnews.co.za/article/ramaphosa-moves-to-tackle-growth-sapping-electricity-crisis-by-increasing-licence-exemption-cap-on-distributed-project-to-100-mw-2021-06-10*

inevitably miss much of the complexity and nuance of how change impacts on people's lives, for the better or the worse. Distributional and spatial aspects are less well understood, as is the mobility of people and opportunity, skills profiles, ownership and community. What people value as place-based individuals or communities is underexplored, and therefore so too are opportunities, particularly those with the potential to create virtuous cycles exploiting low carbon, high justice outcomes. This type of reductionism is inevitable in macro-scale modelling exercises, but important to understand when interpreting these model outcomes.

The modelling activities outlined above have enabled us to appreciate the impact of a long term issue such as decarbonisation. They have also resulted in a reasonable understanding of the short- to medium-term incremental techno-economics of decarbonisation at a national level. We also have significant sectoral understanding and a high-level pulse check of the implications of system change on economic activity and employment levels. However, we have less understanding of the interconnections between sectors and scales, and are less well versed in social aspects critical to implementation and rapid system change but that are more difficult to model at the macro level. We have little insight into how institutions, politics, and behavioural aspects link to the physical emitting economic activity.

Company-level studies tend to follow a similar analytical approach to the national sectoral / economy-wide studies, depicting company-wide emissions pathways to 2050, including a strong emphasis on net zero emissions targets (e.g., net zero by 2040 or 2050)[2]. City-level studies have a different view, tending to incorporate ore focus on governance, with large emphasis on electricity, transport and waste (public services) – and synergies between decarbonisation and positive social outcomes for citizens, including service efficiency and affordability[3]. However, the general disconnect between sector and city-levels with the nationally focused analysis is noteworthy.

5 THE TASK AT HAND: A CRITICAL DECADE

It could be said that the existing body of work has oriented around the need to convince policymakers to take the decarbonisation imperative seriously. Now that decarbonisation is squarely on the policy agenda, there needs to be a shift in analytical orientation from convincing to decision support. This is a significant shift: what types of analysis, with what framings, are required to support decision making and implementation? And how can these align with our evolving understanding of the just decarbonisation challenge?

At a global level the 2020s have been described as a critical decade for climate action (Roy, 2021). If we are unable to 'bend the curve' substantially in this decade the goal of containing temperature rise to 1.5˚C will be out of reach. Local analysis supports this finding, showing perhaps most strongly the need for urgent and substantial investment in renewable energy capacity this decade. But other near-term decisions (or lack of decisions) will prove decisive too – investment in alternatives to internal combustion engines, our rail infrastructure, the location and energy efficiency of additions to our national building stock, the orientation of our agricultural and land-use policies. There are critical paths which we will need to adhere to, to avoid locking ourselves out of future options.

6 TOWARDS DIFFERENT CONCEPTUAL VIEWS OF THE DECARBONISATION CHALLENGE

The dominant view of the decarbonisation challenge from the body of analytical resources we have accumulated domestically and globally is one of a few continuous and near-linear pathways to 2050, similar to that depicted in the LTMS outputs of Figure 2 (Grubb, Hourcade & Neuhoff, 2014; Fankhauser & Stern, 2016; Tyler & Cohen, 2020). We have argued in this concept note that we need additional conceptual views, models, types of knowledge and ways of integrating

[2] Company decarbonisation strategies considered include those of Sasol, Anglo American, Glencore, Ninety-One and Nedbank.

[3] City- and Provincial level studies considered include: The City of Cape Town's "Carbon Neutral 2050 Commitment", Durban's "1.5°C Climate Action Plan", City of Johannesburg's "Climate Action Plan", Western Cape Government's "Carbon Neutral by 2050 Commitment", and C40 Cities and Sustainable Energy Africa's Study "the potential of municipal standards and by-laws in supporting the decarbonisation of buildings".

these, to assist in dislodging our collective predilection for predictability and certainty, and to enable our development and use of analytical and decision-making tools that respond to the changing nature of our world and the just decarbonisation challenge as well as the implementation imperative.

So, at the conceptual level, what might these alternative and additional views of the challenge look like? Below we sketch out two high-level examples[4]. The first, Figure 3, concerns South Africa's existing stock of large industrial and power emitting assets. These will need to be phased down to achieve net zero, and there are limited options for how this could be achieved under 1.5˚C aligned trajectories. In the figure, each option, or 'route' to net zero for this group of assets is depicted. The cumulative emissions below each route are equivalent, and each route is internally coherent in terms of demand and supply of physical commodities. Given that 1.5˚C aligned decarbonisation ambition is onerous, we propose that the number of possible routes for the emitting asset stock is small, and that each route will have its own advantages and disadvantages, risks and opportunities in the context of the country's development objectives. Having been identified, the routes could then be interrogated and described from different perspectives to add to our understanding of the implications of pursuing different strategies.

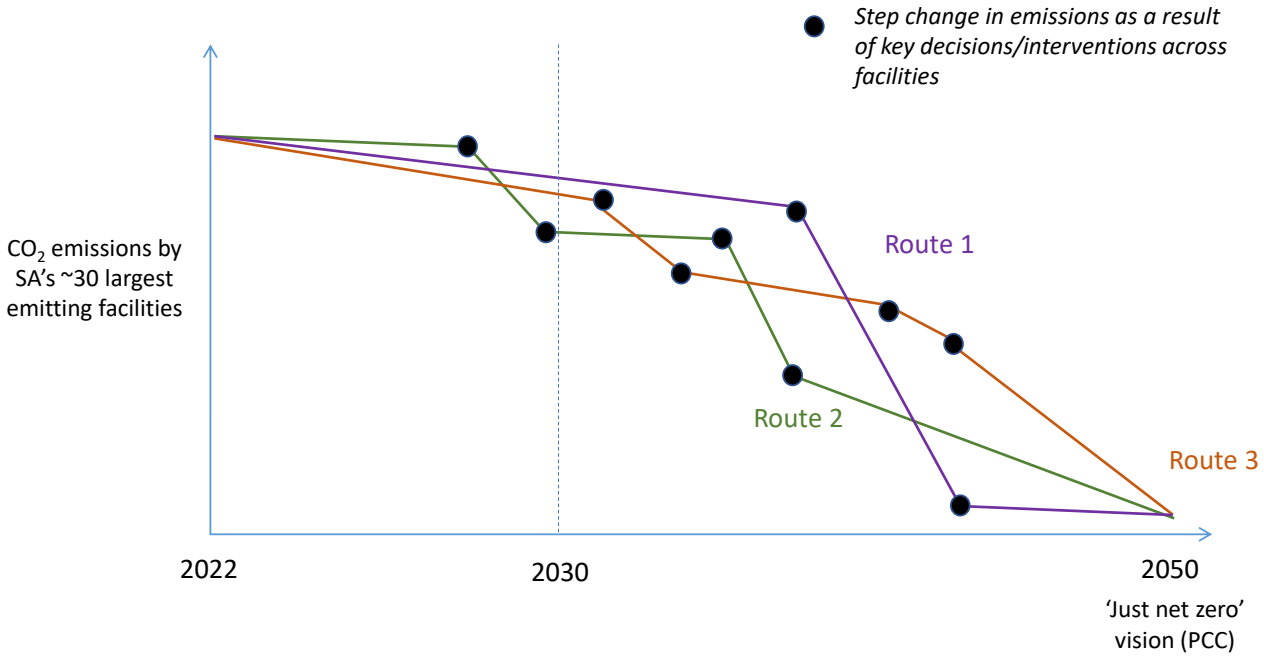

Figure 3: Representative 'step change' routes for South Africa's set of ~30 largest emitting facilities as a result of key interventions across these assets, e.g. pivoting of a steel plant to green hydrogen, early decommissioning of Secunda, etc.

The second high level example, Figure 4, concerns the mirror decarbonisation challenge, that of the building out of green replacement infrastructure, and is inspired by the analysis undertaken by Lenton and Sharpe (2021). Here, the example shows how the non-linearity of the South African socio-economic system can be harnessed to provoke tipping points which exponentially accelerate decarbonisation. The moment of these tipping points is not known in advance, nor can causality be identified with any certainty. Rather, multiple interventions, some intentional (policy and regulatory related), and some the result of market factors or even events in seemingly unrelated systems, combine to provoke a tipping point to an exponential increase in scale.

Both of these examples, and others like these, would need to be rigorously elaborated so as to provide reliable policy information. But as they are depicted here they hint at different ways of approaching the decarbonisation challenge, aimed at revealing what current approaches obscure.

[4] *We'd like to acknowledge conversations with Brett Cohen in advancing these specific depictions.*

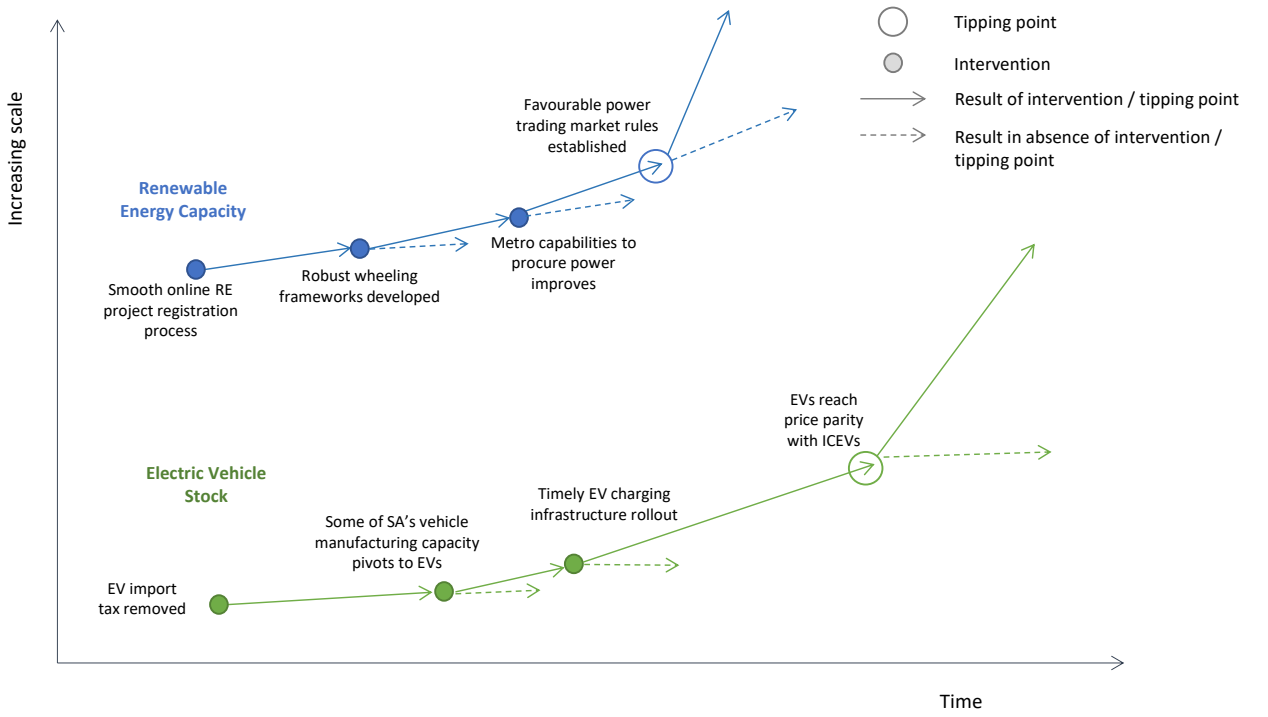

Figure 4: Supporting tipping points in renewable energy capacity and electric vehicle stock

7 WHAT KIND OF ANALYTICAL RESOURCES DO WE NEED FOR THIS TASK?

Most of the gaps highlighted by our four themes of section four are well recognised by the analytical community, although perhaps we are not fully appreciative of their combined impact and implications for policymaking and implementation. The greater challenge however is the lack of tools and methods to speak into these gaps in a useful way. This is not a uniquely South African problem – the international decarbonisation policy community is also beginning to recognise this (Farmer et al., 2019; Sharpe & Lenton, 2021).

Here, we aim therefore to articulate the types of analytical approaches and resources that are needed to adequately support the decarbonisation and just transition in South African and beyond, in response to the evolving global understanding of the decarbonisation challenge. We do this mostly in the form of questions rather than answers: How can we use our existing models differently, in recognition of their limitations? How can we better communicate modelling outputs, highlighting what models can provide useful insight into, and where they distract from what we should be focusing on? What additional modelling tools exist which can be used to support decision making? How do we integrate and afford appropriate weight to other forms of knowledge? What political and process aspects are necessary for this to occur?

For implementation, we need a **strong focus on the current decade**. What decisions have to be taken *now* in order to remain as close as possible to a 1.5˚C aligned trajectory? What are the socio-economic implications of taking these decisions? What are the implications of *not* taking them? How can decisions be made that keep options open? The focus on the 2020s is important for another reason; given increasing uncertainty, and systemic interconnected crises, it is very difficult to know much beyond this time horizon.

In contexts of high uncertainty, **a focus on building optionality and resilience** becomes more useful than one that woefully attempts to maximise efficient allocation of resources over a long-term period such as that to 2050. What types of infrastructure will provide the ability to switch pathways as more information emerges? What decisions and actions now build a socio-economic system that is more resilient to multiple interconnected crises? Similarly lock-in / lock-out decisions are consequential. How do we best identify and characterise these in terms of whether the paths they entrench are ones we collectively choose? What information and analysis do we need to compare and evaluate these paths and their consequences?

The decarbonisation of South Africa's socio-economic system is closely influenced by **developments on both the regional and international scale**. Whether Namibia successfully establishes a green hydrogen industry is relevant for South Africa's endeavours in this area. Similarly, whether the European Union's play for a green hydrogen economy is realised or not influences South Africa's decarbonisation strategy and choices. How key climate issues evolve internationally – such as carbon border taxes, or the availability and concessionality of climate finance – equally impacts the pace and depth of South Africa's decarbonisation trajectory. In addition, the regional and international scale are sources of potential crises and opportunities. The volatility in the fuel markets as a result of the Russian invasion of the Ukraine is a current example.

The techno-economic view of South Africa's decarbonisation challenge is well populated. But there are **other lenses on the challenge** which may reveal additional and different opportunities or risks in an interconnected system. These lenses include those of politics and political economy, in particular the perspectives of vested interests, Capital, and organised Labour. Social factors such as institutions, norms and values, behaviour and culture provide important insights into the status quo of complex systems and why and how these can change. Demographics, education, social cohesion and rates of inequality tell us about the volatility of society, as well as constraints to its evolution. Similarly, there are constraints relating to physical infrastructure and its location. The natural world of biodiversity, ecosystems and how these interact with human land use provides yet another perspective.

Related to this, how do we better and more routinely consider **the non-techno-economic starting points of our current system** that constrain or enable what is possible? Many decarbonisation options that could work in other contexts are just not options in South Africa given weak State capacity, and high levels of unskilled human capital. However, South Africa also has unique strengths such as our financial infrastructure and sophistication, and our natural capital. How can we bring these aspects to the fore in our analyses?

If complex systems evolve in a non-linear manner, we need **an understanding of tipping points, leverage points, lock-in processes and path dependency.** Do we understand where the risks of locking in emitting infrastructure that will exceed 1.5˚C aligned emissions trajectories lie? Where might we be locking out low carbon and high developmental opportunities? Equally, what potential is there for supporting the creation of positive tipping points, or even a 'cascade' of positive tipping points as described by Sharpe and Lenton (2021)? Where are the sensitive intervention and leverage points in the system that can promote a rapid tipping of our socio-economic system towards low carbon and high development futures? Often tipping and intervention points are a result of cross sectoral / scale interventions, or those that can only be seen by adopting more than one lens.

Last but not least, how can we understand the **developmental and justice aspects, implications, risks and opportunities** of various decisions in greater complexity and nuance? How do we give greater weight to a spatial understanding of impacts on people and communities, for example when a region loses or gains industry and economic activity? And how do we link social strategies (education, skills, behaviours) with the decarbonisation imperative?

8 CONCLUSION

Much has shifted in the South African decarbonisation policy space in a relatively short period of time. A just transition to net zero is now firmly on the policy agenda, and the focus is shifting towards decision-making and implementation. The global context and understanding of the just decarbonisation challenge is simultaneously evolving, highlighting its systemic, uncertain and interconnected nature. We also know clearly from science that what we do this decade is critical to ward off a level of climate change that will exceed our capacity globally and in South Africa to respond adequately.

Given these considerations, policymakers and leaders across society are tasked with taking decisions towards achieving our Nationally Determined Contribution decarbonisation targets whilst ensuring just transition outcomes. In this concept note we have raised questions around whether we have the analytical approaches we will need to support this decision-making phase. These include:

- Are we focusing on the priority questions?

- Do we have enough different perspectives and types of knowledge, and are we integrating these?
- Do we understand our lock-in / lock-out risks sufficiently?
- Do we have the information to assess whether we are on the critical path?
- Given the urgency to act and scarce resources, what actions have the potential to build positive feedback loops?
- Do we understand the constraints / opportunities embedded in our point of departure sufficiently?
- What new modelling tools might we need to explore these questions?
- How can we use existing models differently?
- How can we convey the insights from existing models in a way that avoids distracting decision-makers?

In raising these questions, our intention has been to create a space for reflection given the rapidly changing nature of our world and the decarbonisation challenge in particular. We hope through this to have nudged our collective enquiry into the nature of the problem, and how it should be approached analytically. This is obviously only the first step. From here, we need to experiment with, develop and use tools and methods that can provide the type of support policymakers will need for effective decision-making for this critical decade.

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