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LESSONS FROM DEVELOPING A ROADMAP FOR THE COAL INDUSTRY IN SOUTH AFRICA: A MULTI-STAKEHOLDER PROCESS

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ABSTRACT

The South African coal roadmap process was initiated by the coal industry, including business and government, to provide an evidence base to support decision-making and inform policy as it relates to the coal value chain. This paper briefly describes the process and provides an overview of the quantitative model that was developed. A reflection is presented on insights gained from the multi-stakeholder process in which there were conflicting interests and viewpoints, as well as differing expectations of what such a process is able to deliver. Finally, consideration is given to how results are best presented to a wider audience who may not be familiar with the model structure and inputs, to help support decision-making and planning.

INTRODUCTION

South Africa is heavily dependent on coal for its primary energy supply, with over 90 percent of electricity being supplied from coal. Coal mining also provides a significant source of foreign revenue through exports, and provides much-needed employment. At the same time, the dependence on coal results in a greenhouse gas intensive economy, and negative impacts on the natural environment. The coal industry in South Africa faces an uncertain future due to South Africa's stated commitment to a low carbon trajectory on the one hand, and its need for continued economic growth and energy security on the other.

The South African coal roadmap (SACRM) process was a three-year research and quantitative modelling study initiated by the South African coal industry to provide a fact base to support decision-making and policy engagement as it relates to the coal value chain.

APPROACH TO DEVELOPMENT OF THE ROADMAP

Scenario analysis provided a framework to describe four future worlds, each of which would have different implications for how the value chain may evolve to 2040, from a coal intensive "more of the same" future to a "low carbon world" (Figure 1). These futures were defined in terms of the role of coal in supplying both electricity and liquid fuels and quantitatively modelled to determine the wider implications for the coal value chain, the economy and South Africa as a whole. To develop the roadmap, the results from the scenario analysis were interrogated, and used to identify actions that are required regardless of which future evolves.

The roadmap also presented industry-agreed standpoints on contentious issues that reflected the consensus that the process helped to achieve.

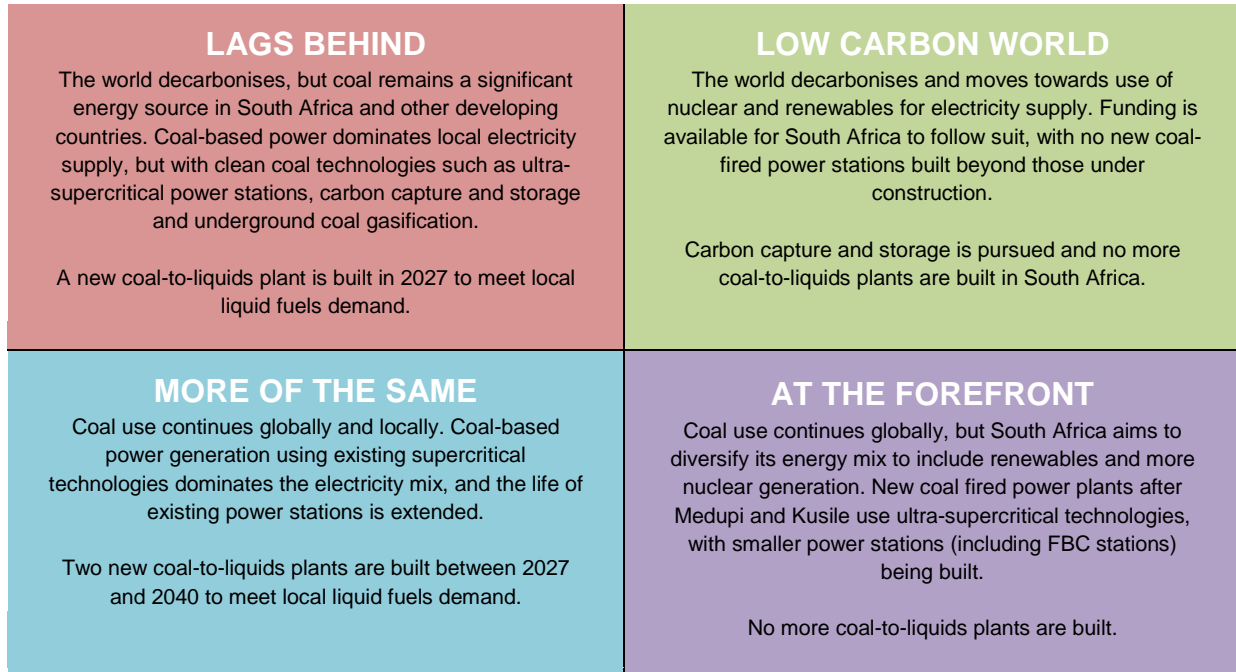


Figure 1. Scenarios considered in the coal roadmap development

DESCRIPTION OF THE QUANTITATIVE MODEL

The quantitative model for this study was developed in the Analytica modelling software (Lumina Decision Systems, 2013). Input data was obtained from publically available literature and from input from industry experts.

The coal demand module summed coal demand from electricity generation, coal-to-liquids and industrial users. The electricity generation module considered different power station build plans reflecting the degree of diversification per scenario, including coal-fired power stations as well as generation by nuclear and renewable infrastructure. The coal supply module matched as far as possible predicted coal demand by power stations and industrial users to existing mines and planned mining projects in the country, with the remainder of planned coal projects going to export markets. The cost module determined the cost of supply of coal to power stations, where power stations would preferentially source their coal and export revenues. Finally, various impact modules were used to determine the implications of following the different scenarios for considerations including investment in power generation infrastructure cost, electricity generation cost, export volumes, rail infrastructure requirements and environmental performance including coal resource consumption, greenhouse gas emissions, water demand, non-GHG emissions and solid waste generation.

LEARNING FROM THE PROCESS

The detailed quantitative analysis, including a detailed modelling report (The Green House, 2013a), a scenarios report (The Green House, 2013b), the Roadmap (The Green House and

SACRM Expert Group, 2013c) and a short “glossy” which highlights the key findings are due to be released into the public domain shortly. As such, the results are not repeated here. The aim of this paper is to rather highlight the process and learning from conducting such a large-scale, multi-stakeholder process, with many stakeholders who have competing interests and are custodians of commercially sensitive information.

Managing stakeholder expectations

Stakeholders in the SACRM started off including officials across government departments, representatives of the electricity supply utility company (Eskom), decision makers within large mining companies, technical experts with an interest in the coal value chain, academics, labour and NGOs. Even within organisations, individuals had vastly differing views on the purpose of the analysis. Many parties suggested that the aim was to advise government on the policy direction that it should take. Government was very clear that the study would help them to inform policy making, but not dictate what direction policy should take. Academics suggested that the role was to support identification of a research agenda for the coal industry, while NGOs were strongly in favour of the Roadmap helping to highlight the environmental challenges that need to be addressed by the coal and electricity supply sectors.

As the study proceeded, many stakeholders’ interest in the process dwindled, leaving mostly representatives of large mining companies and the power utility involved. As such, it was these stakeholders’ needs and views that were ultimately represented in the Roadmap.

Communicating the purpose of scenario analysis and Roadmap development

The initial brief on the project identified explicitly a need for scenario analysis in developing the Roadmap. An interesting observation is the vastly different understandings of what exactly scenario analysis is, and its role in decision-making. In particular, for much of the three-year process, stakeholders were under the impression that four scenarios were to be analysed, and then they would choose one of the scenarios that they wanted the country to follow, and see how they could make that scenario happen. It took a lot of repeated discussion to reach the point of collective understanding that scenarios are a set of plausible, internally consistent futures, and the purpose of scenario analysis is to explore how decision makers can plan in the face of uncertainty about the future. The Roadmap then provides guidance on what actions could be undertaken to allow for robust planning for the future.

Data and assumptions

As can be expected in such a large project, covering the entire coal value chain, and with multiple stakeholders all protecting their vested interests, accessing certain data was a challenge. Despite the project team signing non-disclosure agreements and being required to aggregate data, many parties remained reticent to provide proprietary information to support the modelling. As such, the model was largely populated with information from the public domain. This provided a good starting point from which to engage discussions and elicit better data from the stakeholders.

In making projections into the future, a number of assumptions need to be made. Some of the notable variables for which assumptions were required are demand for electricity (which determines both coal demand and investment in new power stations), mine and power station costs, product yields for certain mines and investment appetites of mining houses. Once again, it was interesting to see how experts in the process were obligated to engage in a much



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deeper level on the assumptions fed into the model, once they had seen the model results. After further analysis, many of the assumptions were revised with some variables reduced by a factor of two to five, once the results were presented. The results thus provided an important platform for experts to discuss and reconsider commonly held beliefs. Critically, the model results and extensive checking of assumptions by the experts highlighted the tipping points in the system. So it was not a case of proving one party right over another, but rather showing that both parties are right in their understanding of the system under particular conditions.

Communication of results

Information to support engagement of a wide range of stakeholders needs to be concise, understandable and visual. Technical analysts and modellers are accustomed to presenting lengthy technical reports, detailing all of the input data, assumptions, approaches, sensitivities and uncertainties. Furthermore, graphs that are not always easily accessible to non-technical audiences are relied on to present results, with the assumption that the reader will engage with assumptions and interpretation in the accompanying text.

In the SACRM process, it quickly became clear that audiences generally do not have the time to engage with such reports, and often do not have the technical ability to understand the subtleties, and are thus quickly lost and critical outcomes are often missed.

Exploring the trade offs inherent in the results

A final question that is not easily resolvable relates to how results are ultimately used to support decision making. Ideally some type of MCDA approach would be used to explore the trade-offs between results, given the large number of indicators that were explored. However, in reality different stakeholders only explored the areas of direct interest to themselves, and placed secondary value on the results not directly relevant to them. A recommendation from this work would be to explicitly explore these tradeoffs using structured decision approaches.

CONCLUSIONS

The SACRM provided a platform from which to engage in a real life complex multi-stakeholder process, supported by extensive value chain modelling. This approach allowed stakeholders to see the impacts of decisions made by mining houses and the utility on the value chain, how this relates to the policy context, and the tipping points of the system.

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