Exemplar 2050 Pathway for South Africa

Created by the Environmental Monitoring Group

INTRODUCTION & OVERVIEW

This Pathway is constrained by the pre-defined parameters of the 2050 calculator. It assumes an **economic growth** path where **GDP** from mining decreases from 7.1% in 2006 to 3.7% in 2050 and the tertiary sector grows to 79.8%. The pathway is ambitious on the **demand side** within the given parameters, reflecting the stance that addressing climate change requires real social and political change beyond technical solutions.

Emissions at 226 MtCO2e/yr in 2050 are brought within the policy-prescribed range, although not on the necessary downward trend. Total cumulative emissions to 2050 for this pathway have not been considered as a potential carbon budget. About one-third of total **electricity** generated is for domestic use with two-thirds exported. This is due to massive scale CSP build. Zero electricity generation from **coal** in 2050. Minor use of coal in liquid fuels production. Direct coal use continues in industry at 16% where there are no alternatives.

DEMAND SIDE

For **transport**, city redesign results in reduced travel and a 30% reduction in energy demand. Freight modal shift from road to rail is significant, including freight vehicle efficiency improvements. 80% of passenger travel demand is being met by public transport. Vehicle occupancy is increased, but for public transport, efficiency of the service should take precedence over vehicle occupancy. Electric vehicles are prioritised alongside continual vehicle efficiency improvements.

Full **household** electrification is achieved by 2020. By 2030 there is a ubiquitous shift to efficient technologies for household lighting, heating, appliances, refrigeration and cooking. Efficiency measures are maximised for **business**. CHP is not prioritised for industry, as this counters a move away from coal and prioritising a robust solar development pathway. Fuel migration to gas (and waste) in the industrial sector is more conservative to dissuade motivation for fracking and to avoid the toxic pollutants associated with burning waste. Stricter building codes improve efficiency of commercial buildings. This should be extended to housing.

SUPPLY SIDE

CSP, **onshore wind**, and residential and commercial **solar PV** generates the bulk supply of electricity nationally. Centralised PV capacity is increased, but decentralised solar generation is prioritised. **Nuclear** power is not supported. Hydroelectric power is not strongly pursued due to the negative social and ecological impacts of large dams. B**iofuel** production from crops is low with minimal cropland used for this purpose. Waste separation and recycling is increased. This should support the generation of biogas (and compost) at scale from organic wastes and sewage.

Carbon capture and storage (CCS) is undesirable as it increases water consumption and counters the move away from coal. **Natural Gas** turbine capacity is moderately expanded alongside a moderate increase in natural gas imports. Gas from fracking is undesirable. **Coal-to-liquids and gas-to-liquids capacity** moves towards decommissioning. There is a slight increase in the gas material share of feedstock for liquids production. No share of liquid biofuels is specified. Refinery capacity is not expanded.

Land management and demand-side efforts reduce consumption of **livestock and dairy**. This aspect should be highlighted and targeted with more ambition.