

Comment from Meridian Economics on Eskom’s technical report on Gx Operational Flexibility

Meridian Economics welcomes the opportunity to comment on Eskom’s coal flexibilisation study and appreciates the technical work undertaken to provide an initial assessment of the operational capabilities of the coal fleet. This study comes at a pivotal moment for South Africa’s power system, as coal gives way to variable renewable energy (VRE) as the lowest-cost source of generation. This transition fundamentally reshapes the role of the coal fleet, from being a provider of continuous base load supply to being a source of flexibility to support higher levels of renewable energy penetration.

Eskom’s technical report makes a valuable contribution by establishing a baseline and assessing the minimum stable level across selected power stations. However, while it acknowledges the potential for additional flexibility through shorter start-ups and faster ramp rates, we believe its explicit focus on minimum stable level is unduly narrow and overlooks the broader suite of options available to enhance the flexibility of the coal fleet. In particular, the option of seasonal shutdowns – taking units offline for extended periods during low-demand and/or high-renewable periods – is not examined.

A recent modelling [study](#) undertaken by Meridian Economics found that the additional flexibility provided by seasonal shutdown of coal units can have a significantly greater impact on overall system costs than incremental improvements to minimum stable levels (see Figure 1).

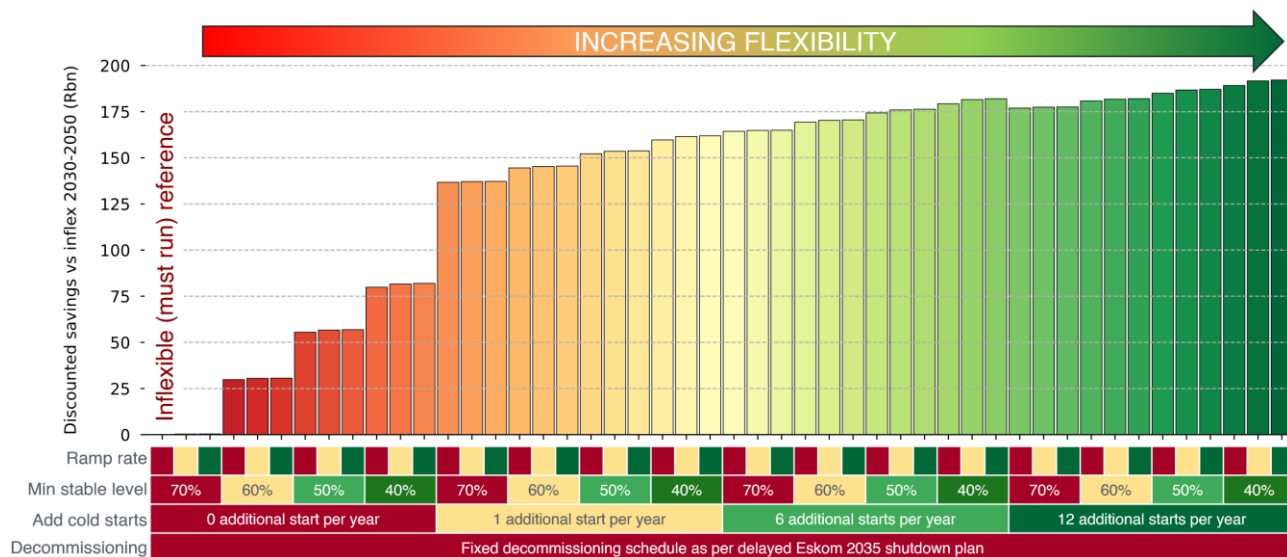


Figure 1: Discounted cost savings of various flexibility interventions relative to a must-run reference

This finding directly contradicts the assertion in Eskom’s report that keeping units online at minimum stable levels is preferable to cycling units on and off when there is too much capacity available. Eskom makes this claim based on the additional fuel oil costs incurred during unit start-up. Using Majuba Power Station as an example, an annual return on investment (ROI) of 6.9:1 is given for running the plant at its minimum stable level instead of placing it in “cold reserve” (See Figure 2).



$$ROI = \frac{\text{Cost Saving from Investment} - \text{Cost of Investment}}{\text{Cost of Investment}} : 1$$

$$ROI = \frac{R\ 39\ 548\ 160 - R\ 4\ 986\ 279}{R\ 4\ 986\ 279} : 1$$

$$ROI = 6.9 : 1$$

Figure 2: Eskom's return on investment calculation for Majuba Power Station

This calculation however is based on the assumption that the plant is put on cold reserve for one weekend every month. This approach leads to 12 cold starts each year, but with only two days of shutdown per start, rendering it a costly option. Seasonal shutdown by contrast would only require one additional cold start per year, with the plant remaining offline for months at a time. While this would still incur a modest fuel oil cost (R3 295 680 according to the Eskom report) this would be more than offset by the significant savings derived from reductions in coal burn and other operating expenses during the shutdown period.

During the summer months when solar generation is high and demand is lower, it becomes cost-effective to place coal units in seasonal shutdown. As shown in Figure 3, our modelling demonstrates that it is economic to take excess coal capacity offline during peak renewable generation months (summer) and return it to service in autumn for winter capacity support. The duration and extent of seasonal shutdowns grows significantly after 2030 as VRE penetration increases, and by 2045 coal plants are only operated between March and August.

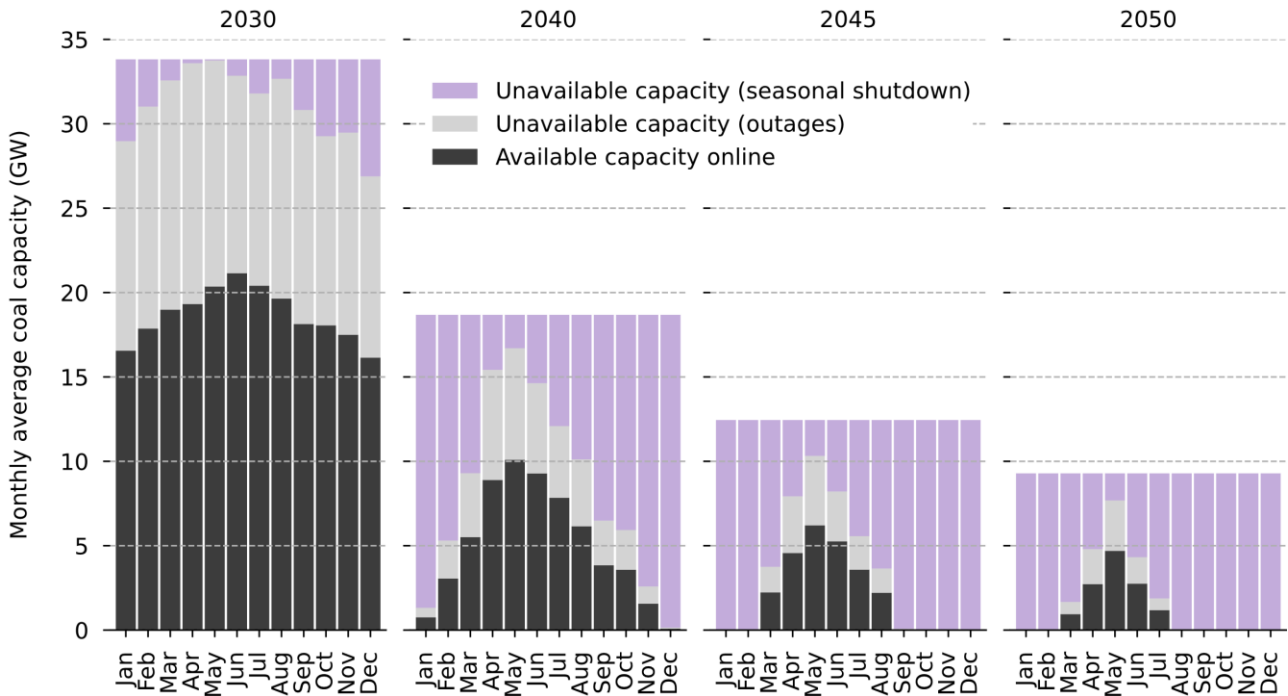


Figure 3: Potential for seasonal shutdown from 2030 - 2050 in a least-cost power system

Beyond being economically optimal, our modelling shows that seasonal shutdowns can cut cumulative emissions to 2050 by up to 1 GtCO₂ and reduce annual SO_x emissions by half. Given this potential, we recommend that Eskom expands the scope of its flexibilisation analysis to include seasonal shutdowns as an explicit option. This should include a detailed assessment of feasibility, operational risks, potential cost implications, and the contribution of this measure to overall system flexibility and stability.