

Energy security and the market

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Despite dire predictions of blackouts this winter in the Western Cape (including by this writer), the lights have generally stayed on. By now forecasted electricity demand should have exceeded available supply capacity. In practice it has not. Eskom's electricity recovery plan is clearly making a difference.

Eskom's plan rests on four pillars. First, power has to be restored at the Koeberg nuclear plant, 30 kilometres north of Cape Town. Progress appears to be on track. Unit one has been repaired and is producing power. Unit two is now being refuelled and is scheduled to be back online by the end of July.

Second, Eskom has a program to minimize Cape transmission line failures by spray-washing pollution and replacing below-spec insulators.

Third, Eskom has implemented an unprecedented energy efficiency program. It has contracted a number of companies to go door-to-door, in mainly low income housing areas, to replace incandescent light bulbs with more efficient compact fluorescent lights (CFLs). Eskom has air-freighted 5 million CFLs from China. Already 1.5 million have been installed. Eskom is confident that the remaining stock will be distributed by the end of July.

Eskom has also purchased 140,000 hot water geyser blankets and is working through energy service companies to distribute these, free-of-charge, to mostly low and middle income households. It is also offering to swop-out electricity cookers for gas appliances.

As cold fronts sweep repeatedly across the Western Cape, power consumption rises and the demand/supply balance becomes tighter and tighter. The critical period is between 6.30 and 8.30 in the evening when households switch on lights, cook their evening meals, heat their living spaces and utilise hot water. Yet actual demand during this period is now remarkably flat. Energy efficiency programs appear to be working.

Eskom is also targeting commercial, industrial and agricultural enterprises and is offering to pay the full cost of energy saving investments. Although there is a relatively high transaction cost to these interventions, significant savings have been achieved. Eskom is also paying industries to activate self-generation and fuel-switching options rather than taking a supply from Eskom.

Together, these energy efficiency programs have delivered tens of megawatts (MW) of savings. While further energy conservation gains will be made, it is, nevertheless, unlikely that they will fully mitigate the total predicted power shortfall of 360MW in June and July.

The fourth pillar of Eskom's electricity recovery plan thus involves a number of contingency programs. It is initiating a high-profile media programme, including

direct television and radio alerts, which try to persuade electricity consumers to switch off electricity appliances during tight demand/supply periods.

Eskom has also contracted 66MW of emergency diesel-powered generators. The City of Cape Town is running its pumped storage generation units at Steenbras, above Gordon's Bay, and its Roggebaai gas turbines, at the Waterfront, during peak periods. And finally, Eskom is incentivizing "demand market participation" whereby industries are paid to switch-off electricity-using processes briefly during periods of emergency shortages. This program is probably the most successful of all – yielding more than 100 MW of potential savings to date.

Despite this impressive progress, electricity system operators confirm that the supply/demand situation in the Western Cape (indeed also on the national power grid) is extremely tight. Brief outages remain a possibility.

A number of lessons can be learned from these emergency programs. First, and perhaps this is obvious, emergency measures to restore electricity security are very, very expensive. Hundreds of millions are being spent on the programs described above. Payments for self-generation, demand market participation, and emergency generation are five to ten times more expensive than Eskom's standard generation costs and full subsidies for CFLs, geyser blankets, fuel switching and industrial energy efficiency investments are almost certainly unsustainable. Electricity consumers, as a whole, are ultimately paying for these programs through higher Eskom costs and tariffs.

While these expenditures may be justified in the short term (as power outages can be even more costly to the economy) attention has to shift to more sustainable and cost-effective programs in the future.

Clearly South Africa needs to improve the efficacy of electricity supply planning and investments, but we also need to develop sustainable demand-side management programmes. Many energy efficient technologies are close to commercial viability – but various market barriers prevent more widespread application. For example, on a life-cycle cost-basis, CFLs are more cost-effective than ordinary incandescent lamps: while they cost more initially, they last longer and use less electricity. But consumers are reluctant to pay higher initial purchase costs.

Market barriers need to be tackled systematically. First, there needs to be an enabling policy and regulatory environment that facilitates energy efficiency programs. Second and third, appropriate finance and business models need to be in place. Fourth, consumers need adequate information. And fifth, the requisite technology and capacity to deliver needs to be in place.

Government could establish energy efficiency standards, testing, certification and labelling systems. The electricity regulator could require electricity distributors to achieve energy conservation targets and could regulate the use of system benefit charges to fund initial efficiency programs. Banks could be encouraged, though partial risk guarantees, to develop dedicated financial products and instruments to fund energy efficiency businesses and programs. Or utilities could finance approved customer energy efficiency investments through repayments on electricity bills.

Energy service companies could be established to assist utilities in reaching consumers and offering specialised energy efficiency products and services. Government, utilities and companies could run information campaigns. And there could be special support programs for technology and skills development.

Eskom will hopefully learn the lessons from the earlier blackouts by improving its planning, operations and maintenance systems. An additional lesson for South Africa is the need to launch systematic market transformation initiatives in a range of niche energy efficiency market segments.

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