

Overseas lessons in coping with power scarcity

Anton Eberhard

Business Day January 24 2008

Load-shedding is the most inefficient way of rationing scarce power supplies. This is the conclusion of a World Bank study on how a number of countries, including China, Japan, Brazil and the state of California, coped with power shortages.

Load shedding is a euphemism for non-negotiable and often unpredictable power cuts. They are irritating, highly inconvenient and economically costly. Eskom obviously resorts to load shedding as a last resort when it simply does not have enough power generating capacity to meet demand and maintain power stability over the national grid. What are the alternatives?

Eskom has sought to improve security of supply through a massive new investment programme. It is returning to service previously mothballed generation plants and has ordered two new coal powered stations. However, these base-load generators take time to build and the first unit will come online only in 2012.

In the meantime, Eskom has installed new open cycle diesel-fired turbines to help meet peak demand. These units take only 18 months to install and more will be built this year and next. But they are very expensive to operate. Currently they are operating at their limit and are adding significantly to Eskom's operating costs. These turbines cannot fully solve our current problems. They are meant to run at peak periods, not to supply ongoing electricity needs throughout the day.

What else is Eskom doing to cope with the supply-demand gap over the short term? There are two further important initiatives. It has invited industrial enterprises to construct cogeneration plant, i.e. to use their waste heat streams to also produce electricity which they can then sell into the grid. There has been a great deal of interest from industry.

Eskom is also seeking to induce significant energy savings by electricity customers. It currently has a highly successful "demand market participation" programme that pays industries to reduce power demand during critical periods. Its demand-side management programme is also contributing savings (albeit too slowly) and includes an expanded subsidy programme for solar water heaters, compact fluorescent light bulbs, and other energy efficient devices.

However, these initiatives will still not be enough to restore supply security. Probably even more cogen needs to be contracted and cross-border private independent power projects need to be re-examined and contracts concluded. Furthermore, it almost certainly makes sense to postpone the proposed aluminium smelter at Coega in the Eastern Cape. This single industrial plant would consume around 1300MW, adding more than 3 per cent to national demand.

Eskom managers have suggested that further mining and industrial projects might have to be cancelled or postponed and there is the real risk now that electricity

shortages could constrain economic growth. Resorting to further load-shedding can only exacerbate the situation.

Fortunately there is a better way forward that need not constrain growth opportunities. The World Bank study makes clear that a transparent and well designed power rationing system, without load-shedding, is a much more efficient way of proceeding. One variation of this scheme is a cap and trade system. All consumers (except perhaps low-income, pre-payment customers) would be required to reduce their electricity demand by between ten and twenty per cent. Those that continue to use more would face penalties through much higher tariffs. Industrial consumers who use less than their quota might also be permitted to sell part of their quota to those consumers who continue to use more.

There are some interesting international precedents where such a system has been applied successfully. For example, in 2001 and 2002, Brazil faced electricity shortages through inadequate hydroelectric resources. Aggregate and individual demand reduction targets were established for each customer category. Penalties were charged on those that exceeded their quotas. Non-residential consumers could trade their quotas and there were even auctions for quota entitlements. Bonuses, in the form of tariff discounts, were also awarded for energy savings beyond the established quotas. The result was that Brazil was able to achieve between 20 and 25 per cent savings without serious load shedding during its period of energy scarcity.

Power rationing may seem a rather draconian and unattractive option. However, it allows clear price signals that better reflect the scarcity of energy and which will incentivize investments in energy savings. South Africa has one of the most energy-intensive economies in the world – largely because electricity in the recent past has been so cheap. There is already evidence that users are prepared to modify their consumption patterns when faced with scarcity and increased prices.

Power rationing, without load-shedding, also creates more certainty. Households and businesses will know they can rely on a continuous Eskom supply compared to the infuriating current situation. And if properly designed, a power rationing system that induces additional energy savings will also allow room for demand growth from expanded business and industrial activity, thereby not prejudicing economic growth.

Starting (and ending) power rationing will be a difficult political decision. Effective implementation will require leadership and executive authority across multiple sectors, institutions and interest groups. The system will have to be well designed and stakeholder support will need to be won through careful communication and explanation of the advantages of power rationing versus unpredictable power cuts. Special allowances will have to be made for strategic services such as healthcare and policing, and for vulnerable groups in poor communities. Overall, however, it will be important not to socialize losses or gains. A market based rationing scheme relies heavily on incentives and penalties. Those who save should win and those who waste should lose.

The Brazilian experience demonstrates that effective power rationing is not only possible but is an efficient response to electricity scarcities. Power rationing puts control over electricity usage back in the hands of individual customers rather than

Eskom bearing all the responsibility. South Africa would do well to consider and implement such a system at the earliest opportunity

Anton Eberhard is a professor at the University of Cape Town's Graduate School of Business where he runs a research and teaching programme on infrastructure reform and regulation.