



**Rabobank**

## Energy crisis - The case of South Africa

*High energy prices and supply constraints are causing serious problems across the globe. With a recent study of the African Development Bank showing electricity to be an important limitation for doing business in low income countries, the issue is especially pressing for developing countries and emerging markets. The case of South Africa is a clear example of the widespread impact that energy shortage can have. This special report will look into what went wrong in South Africa and which future steps need to be taken to prevent repetition.*

### Power problems in South Africa

Starting in November 2007 during South Africa's summer, the frequency of energy supply disruptions increased in South Africa, reaching record levels in January 2008. On 24 January 2008, South Africa's state energy company, Eskom, declared *force majeure*. Eskom lacked the spare capacity to meet peak demand and urgently requested its customers to reduce their demand (load) to prevent a total collapse of the energy system. Also, Eskom shut down the energy supply to certain areas based on a rotating schedule. Eskom had planned a heavy maintenance schedule in summer to prepare for high demand in winter. With the reduced generating capacity Eskom was unable to absorb a series of unexpected events. The level of unplanned outages due to breakdown of equipment was unusually high. Plants had been running close to maximum capacity since early 2006 and this took its toll. Moreover, capacity at coal-fired stations (90% of generating capacity) was lower than normal. Coal was wet due to heavy rainfall and stocks were depleted due to a new short-term purchase strategy and poor planning during the Christmas holiday.

### Energy crisis exposes structural issues

Although this series of events triggered the acute energy crisis in January, the underlying

structural problems in South Africa's energy sector date further back.

During the Apartheid era, Eskom was one of the pillars of South Africa's economy. Cheap electricity was provided to the industry and mines, which became the base for economic development. Plans to export cheap energy to the rest of Africa encouraged an investment program, which started in the early 1970s. By the time the new power plants were up and running in the early 1980s, South Africa's economy was in trouble, creating an over-capacity in the energy sector. With Apartheid gone in 1994, the customer base of Eskom grew fast, as the government saw cheap electricity as part of their development program. Currently, more than 70% of the population is connected to the grid, twice the number in 1994. Also, economic development created a booming demand for electricity. The Department of Minerals and Energy issued a report in 1998 stating that the overcapacity of the 1980s would be fully utilized by about 2007. This would have justified significant investment in the generating capacity by Eskom. Instead, the government decided to promote private sector involvement. They intended to attract (foreign) private investors in the energy market and end Eskom's monopoly. Unfortunately, private sector interest was deterred by government-dictated electricity prices, which are among the lowest

#### Box 1: Main concepts in energy sector

**Blackout** = power cut-off (planned or unplanned)

**Outage** = loss of power due to breakdown of equipment

**Load** = demand for electricity

**Load shedding** = power cut-off to lower demand, usually based on rotating schedule to spread impact (also called 'rolling blackouts')

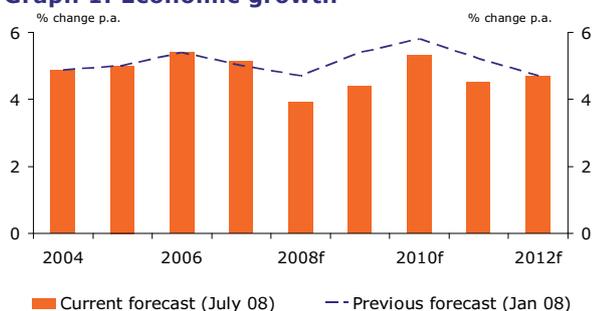
**Reserve margin** = spare generating capacity available when the highest demand of the year is recorded

in the world. In 2004, the government finally realised that the overcapacity was rapidly decreasing and implemented an investment program. Nevertheless, it was too late to prevent an energy crisis, as it generally takes 7 to 10 years to build a new installation. The reserve margin dropped to close to 10% in 2007. If the operational (working) capacity is measured rather than the installed capacity, the reserve margin was a mere 3%. Internationally, a reserve margin of 15% is seen as adequate. South Africa has set its long-term target at 19%.

### Economy hit hard by energy crisis

Estimates about the direct costs of load shedding during the period November 2007-January 2008 go up to ZAR 50 bn (USD 6.6 bn), but the overall costs will be much larger. Economic growth is expected to drop to less than 4% in 2008, compared to a previous forecast of almost 5%. The economy slowed down to 4.0% in the first quarter of 2008 from 5.8% in the same period in 2007. The mining sector suffered the most and it contracted with 22,1% in the first quarter of 2008. In January, a number of large mines closed one week for safety reasons, as Eskom was unable to guarantee energy supply. After restarting production, mines agreed to 'voluntarily' lower energy usage by 10% in the coming years.

**Graph 1: Economic growth**

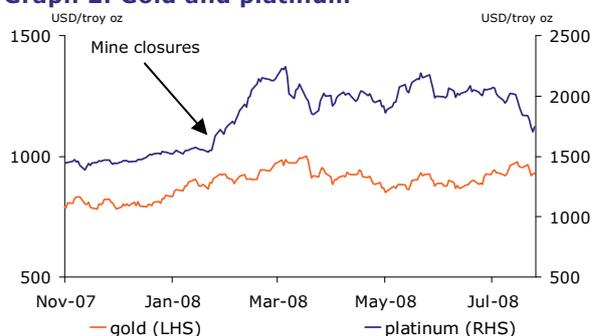


Source: EIU

Effects of the energy crisis on South Africa's export revenues are mixed. Electricity-intensive sectors (i.e. mining and manufacturing) account for 85% of total

exports. The export volume is therefore expected to decrease. However, this is partly compensated by higher commodity prices. As the news of mine closures reached the market, platinum prices soared to new heights in January – South Africa supplies about 80% of world production. Gold prices also increased. Prices of other commodities (e.g. diamonds) and prices of export products (e.g. car parts) will not increase. Thus, the effect of a lower production volume will in general be larger than the compensation from higher prices. The impact on the import side of the trade balance is also diverse. On the one hand, lower economic growth will slow down the import of consumer goods. On the other hand, the reliance on imported fuel to run Eskom's natural gas powered stations and private backup generators increased. Overall, the effect of the energy crisis on the current account is expected to be negative.

**Graph 2: Gold and platinum**



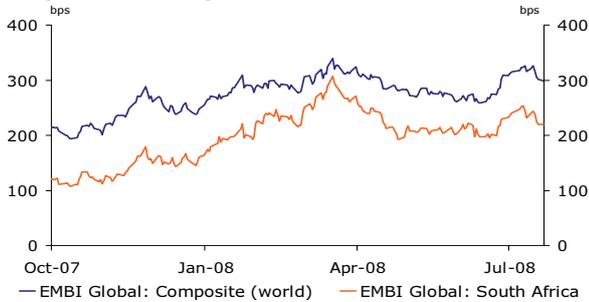
Source: EIU

### Financial markets react negatively

South Africa depends heavily on portfolio inflows to support its large current account deficit (8% of GDP in 2008). A substantial part of these portfolio inflows are directed at the Johannesburg Stock Exchange (JSE). JSE is dominated by large mining companies and has benefited from the international interest in commodities. However, the rolling blackouts have damaged investor confidence in South Africa. As a result, the JSE dropped in January, and the rand depreciated. This downfall can only partly be attributed to the global credit crunch. South Africa's EMBI spread – a

measure of country risk perception – increased much faster January through April than the EMBI spread of emerging markets in general. The energy crisis thus has a negative impact on the investor confidence in South Africa.

**Graph 3: EMBI spreads**



Source: JP Morgan

### Regional impact of energy crisis

The impact of the energy crisis extends well beyond South Africa’s border. Eskom supplies 85% of traded electricity in the Southern Africa Power Pool (SAPP). SAPP was established in 1995 to create a regional market in 11 Southern African countries. Botswana, Namibia and Swaziland import more than half of their electricity via SAPP. As the power problems unfolded, countries that were supplied by Eskom were also confronted with blackouts. Despite efforts of the pool to absorb the capacity shortfall of South Africa, it was unable to do so. In fact, the combined generating capacity of SAPP is expected to remain below its required level until 2011.

As the energy crisis unfolded, calls to halt electricity exports to SAPP grew stronger in South Africa and are still heard. However, benefits would be very small as Eskom uses just 6% of its capacity for export and it also imports 4.5% from SAPP.

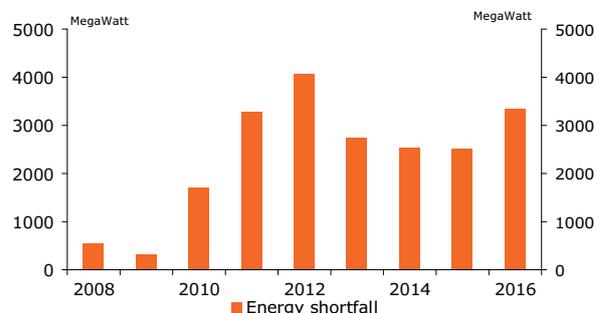
The energy problems in South Africa could affect the region indirectly too. South Africa is the engine of growth in the region. If this engine coughs, it could slowdown regional growth levels. Moreover, the negative publicity surrounding the energy crisis in South Africa travelled around the world as news on Africa, which may hurt investor confidence in the region as a whole.

### The way forward

Electricity will be in short supply for the remainder of 2008 and regular shortages should be expected through 2012. With an eye on the planned World Cup in 2010, soccer fans can rest assured though. The government has suggested assigning the stadiums the same level of priority as hospitals during the tournament.

To increase supply, Eskom has laid out a ZAR 343bn (USD 43bn) investment plan. Demothballing three coal-fired power plants and building two new gas turbines will provide extra capacity in the near term. New large-scale capacity is planned to start producing in 2012, although 2013 is more likely. To support the investment plans, the government granted a ZAR 60 bn (USD 7.5bn) loan to Eskom. It also allowed an increase in electricity tariffs of 27.5% per July 2008, despite the sensitivity of price increases. South Africans are used to cheap electricity and it has long been part of social development programs. Nevertheless, demand reduction programs gained political support during the energy crisis. It became clear that the expanded generating capacity would still fall short of demand after 2012, if demand is not reduced. More tariff increases and price differentiation are expected in the coming years to improve energy efficiency.

**Graph 4: Electricity capacity shortfall without demand reduction**



Source: National Energy Regulator of South Africa

To reduce demand in the short term, Eskom requested all consumers to voluntarily cut demand. Although a serious reduction has not been achieved yet, consumer behaviour is

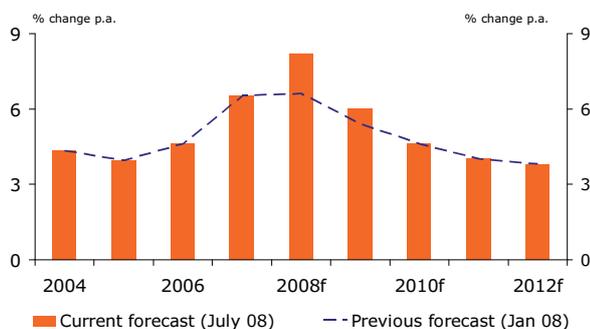
already subject to change – if only because people have little choice. The sale of solar panels has gone through the roof and energy-saving products are booming.

### Economy not out of the woods yet

Investment in infrastructure – especially the energy sector – is likely to be an important driver of economic growth in the medium term. Despite this, growth is expected to stay below the medium-term target of 6% in 2010 - the year South Africa will host the soccer World Cup. The energy shortage can partly be held accountable for this, directly and indirectly. Due to higher inflation pressure, the central bank is expected to hike its policy rate even further. Besides external factors such as global food and fuel prices, the energy tariff increase plays a big part in the upward pressure on inflation in 2008. Although the tariff increase per July 2008 is a one-off event, second-round price effects and more tariff increases are expected to add to inflationary pressure in 2009 and beyond.

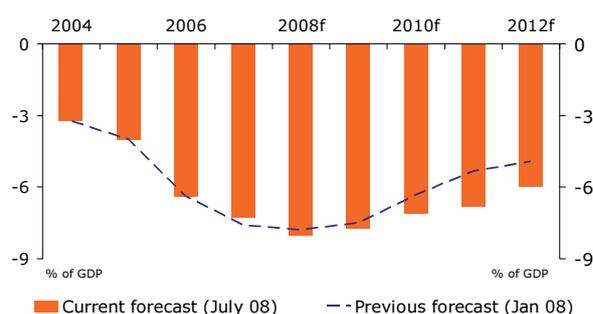
The extensive investment program of Eskom is forecast to have a high import content. In the medium term, this is expected to give the import bill an extra boost. Also in this respect, the energy crisis seems to add to the disturbingly high current account deficit. Consequently the vulnerability to international investor sentiment increases, as portfolio inflows and direct investment are needed to cover this deficit.

**Graph 5: Consumer prices**



Source: EIU

**Graph 6: Current account balance**



Source: EIU

### Conclusion

*The case of South Africa shows clearly how much impact energy shortages can have on an economy. However, the costly investment needed to keep the energy sector in line with demand creates a strong incentive for governments to postpone the decision; a decision that is bound to backfire. Especially energy-intensive sectors are vulnerable for supply disruptions. In emerging markets, underinvestment in energy infrastructure combined with energy-intensive productive sectors is rather common. Vietnam and Indonesia are examples of economies that will face the same choices as South Africa. The case of South Africa also shows the implications policy mistakes in a country may have for the region. This pattern also appears in other emerging markets such as Chile, which depends on Argentina for its energy supply. It puts the focus on the importance of having a variety of energy sources. All-in-all, South Africa will have to bite the bullet and deal with the situation. If the necessary investment is made, and further price increases are allowed, the country's energy sector should be back on track by 2015.*

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