

Social sustainability

► Indicator 3: Households with Access to Electricity

The South African mass electrification programme has been one of the most successful elements of the South African Reconstruction and Development Programme. Initiated by Eskom in 1991, and included as a key government programme after the 1994 elections, the programme has brought electricity to more than 4 million homes since 1991 (NER 1999, 2000; Mlambo-Ngcuka 2002). The annual connections made by Eskom and the local authorities in charge of distribution for most municipalities are shown in Figure 4.

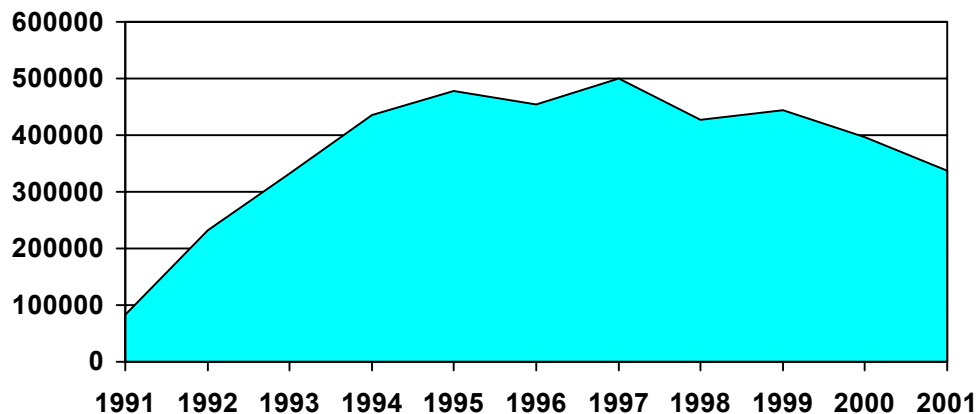


Figure 4. Annual electricity connections, 1991-2001

Source: (NER 1999, 2000; Mlambo-Ngcuka 2002)

According to World Bank estimates, only 17% of the population of Africa has access to electricity, while 23 African countries have less than 10% access. (O'Sullivan & Hamaide 2002) In South Africa that share stood at roughly 66% at the end of 2001, with 77% and 49% of urban and rural households having access, respectively (Mlambo-Ngcuka 2002). This is up from less than 35% access in 1990 (Eberhard & Van Horen 1995).

For this indicator, the value for 1 on the vector is 0% access, while the value for 0 is 100% access. For vector value for South Africa in 2001 is therefore 0.34, and 0.65 for 1990 (ie one minus the share with access).

Metric (actual data) for 1990: 35% and 2001 66%

Vector values for 1990: 0.65 and 2001 0.34

Discussion:

The electrification programme is likely to slow down, as costs per connection have started to rise and as the target-driven approach is being replaced with a 'market-related' one. Most of the connections in the 1990s were in urban areas and rural areas where the financial returns to the utility from selling electricity were closer to the investment cost for the electrification. The challenge facing government is how to further extend access in the face of rising costs and declining average consumption (Borchers *et al.* 2001), given the fact that electrification has social and environmental benefits not captured by the utility and electricity prices (Spalding-Fecher 2000). While Eskom originally estimated the customers would need to use 300 kWh per month for the electrification investment to break even, average use among these customers five years after electrification is less than 140 kWh (NER 1996).

Two important shifts in this programme are the new government commitment to off-grid electrification in rural areas, and the change in electrification financing. The DME has launched a programme under which seven concessionaires will be in charge of providing off-grid electrification to a total of 350 000 homes (NER 2001c). This market is discussed in more detail with Indicator 4. On the second point, in the past Eskom financed their electrification connections internally, essentially subsidising electrification for the poor from revenues from other customers. The DME has proposed shifting this funding back into government. Eskom would pay tax and dividends to government, which they have not in the past, and part of this funding would go into the National Electrification Fund, which would fund both Eskom and local authority connections.

The restructuring of the National Electrification Programme should allow continued increases in access to electricity, particularly in rural areas, while promoting renewable energy through the off-grid electrification concession programme (NER 2001c). The pending restructuring of the electricity distribution industry could be a major barrier to implementing energy efficiency programmes (Clark 2000).

Notes to SEW or next year’s Observer-Reporter:

The National Electricity Regulator regularly publishes electrification statistics, which are updated annually.

► Indicator 4: Clean Energy Investment

A growing body of research world-wide is showing that an investment led strategy of promoting renewable energy and energy efficiency can create far more jobs than traditional supply driven, capital intensive energy investments (eg IWG 2000; Krause 2000; Krause et al. 2000; Renner 2000). Tracking investment in 'clean energy'² as a share of total energy sector investment is therefore an important tool to measure the contribution of the energy sector to employment generation and social welfare. The difficulty, however, is that investment data on the energy sector is notoriously difficult to find, particularly in developing countries. A combination of lack of government statistics, lack of data from private or non-listed companies, and the diffuse nature of the energy market (especially if we include demand-side investments), make this one of the most difficult indicators.

In South Africa, the energy supply industry is still highly concentrated. Eskom, the national utility, generates 96% of all electricity (NER 1999), while only three coal-mining companies (Sasol Mining, Ingwe Coal and Amcoal) contribute 83% of total coal production (Chamber of Mines of South Africa 1999). The members of the South African Petroleum Industry Association (SAPIA), along with Sasol Synthetic Fuels, would also supply almost all of the liquid fuels for the country.

Capital investment in 2000 by Eskom was 3 263 million Rands (Eskom 2000a), while the SAPIA companies invested 2 314 million Rands (SAPIA 2000). Mossgas, the state-owned gas to liquid fuels company, has embarked on a major capital investment plan in new gas development, so their capital expenditure in 2000 was 1 333 million Rands (Mossgas 2002). For the coal industry, the Chamber of Mines has estimated the capital commitments for this subsector will total 9 360 million over from 2000 to 2004, so we have assumed 1 872 million Rands for 2002 (Chamber of Mines of South Africa 2001). Sasol capital investments in synthetic fuels and oil have been estimated based on those divisions' share of total turnover, and amount to 1 202 million Rands for 2002 (Sasol 2000). There are no public estimates of investment by Soekor, the state oil exploration company, or the Strategic Fuel Fund, which oversees storage of strategic oil reserves. While Eskom is doing research and planning demonstration plants for renewable electricity, so far all of the investment captured above is in non-renewable energy – a total of 9 984 million Rands.

Data on renewable energy and energy efficiency investment are even more scarce. Based on a recent report ((EC *et al.* 2000; Stassen 2001), we estimate that the baseline (i.e. outside of the major government programmes) solar home system market was roughly 28 million Rands in 2000, net of the schools and clinics electrification programmes. This does not include the off-grid concessions programme, which is only starting in 2002. The Shell/Eskom joint venture for solar PV electrification, however, did contribute an estimated 14 million Rands (4000 systems) in 2000 (DME 2001a; Spalding-Fecher 2002).

The EU schools electrification programme is providing 15 million Euros for 1999-2001 off-grid electrification, with approximately 45 million Rands in 2000 (DME 2001a). This follows the earlier programme funded by the Dutch government and the RDP from 1995-97. The clinics off-grid electrification programme, funding through the Independent Development Trust (SA), is largely complete, and contributed 14 million Rands to renewable electricity from 1997 to 1999 (Spalding-Fecher 2002).

The solar water heating market is estimated 18 million Rands in 2000 (similar to earlier estimate by EC *et al.* 2000; Purcell 2002), although this is poised to increase dramatically with the National Solar Water Heating Programme receiving a major grant from the Global Environmental Facility (GEF).

There have been no major hydropower or wind power investments from 1995 to 2000, although the Darling Wind Farm has invested more than 4 million Rands on feasibility work

² Within the Sustainable Energy Watch framework, clean energy is defined as all renewable energy source, excluding large dams, and energy efficiency investments

already (Oelsner 2001). The bagasse-based cogeneration plants operated by the large sugar companies were also built prior to the mid-1990s.

There are several major renewable energy investments under discussion – including Eskom’s proposed 100MW wind and solar thermal plants, the smaller 5MW Darling Wind Farm (which is a National Demonstration Project), and even a proposed 200MW ‘solar chimney’ project in the Northern project (Otto 2000; Stinnes 2001).

On the energy efficiency side, there is the least data of all. While Eskom has spent considerable resources in their residential, commercial and industrial energy efficiency advisory services, as well as research and development, very little of this could be called capital investment. The most significant investment is in the Bonesa company set up to implement the national Efficient Lighting Initiative. This company has received 48.8 million Rands from Eskom for 2000 to 2002 and US\$ 2.5 million from the International Finance Corporation, as part of a GEF grant. For 2000, this would be an average total investment of 24 million Rands (exchange rates from SARB 2001).

Of course, there are also companies investing in more energy efficient equipment. A project run by the Energy Research Institute, with Technology Services International, NOVEM (Holland) and ETSU (UK), recently helped three large industrial firms – South African Breweries, South African Pulp and Paper Industries, and AngloGold’s Elandsrand mine – identify more than five million Rands of energy efficiency investment that would pay back within one year (ERI 2000).

The total clean energy investment for 2000 is estimated at 129 million Rands. Although it is possible there is some double counting between this amount and the total investment calculated above (e.g. if Eskom ELI investment is captured in 2000 financial statements as a capital expenditure), this is likely to be quite small.

Based on the limited data available, therefore, we estimate the share of energy sector investment going to clean energy at 1.3 percent. For this indicator, the value for 1 on the vector is supposed to be the 1990 share of clean energy investment out of total energy sector investment, while the value for 0 would be 95% clean energy investment relative to total. Because of the low levels of investment in clean energy, we can say that the 1990 was probably close to zero. This means that the vector value for 2000 is 0.986 (i.e. $(0.95 - 0.013)/0.95$).

Metric (actual data) for 2000: 0.013

Vector values for 2000: 0.986

Discussion:

The share of clean energy is set to increase as the solar markets start to develop. Certainly renewable energy markets are poised to increase rapidly, given the appropriate policy framework. Energy efficiency, particularly in electricity use, is, however, potentially endangered by the restructuring of the electricity supply industry and the break up of Eskom (Clark 2000). The National Electricity Regulator’s attempts to enforce integrated resource planning as a standard practice across the industry, as well as reform in legislation related to independent power producers, will also be crucial to providing support for efficiency and renewable electricity generation (Ellman 1999; Clark & Mavhungu 2000)

This and indicator number 6 are by far the most difficult to assess in South Africa – and this is likely to be true in many other developing countries. While it may be easier with more research to begin to track clean energy investment, tracking total energy sector investment will always be very difficult. It is also not clear how investments in energy transmission and distribution should be counted, because, for example, wires can carry renewable or non-renewable electricity.

Notes to SEW or next year's Observer-Reporter:

Keeping up with the major renewable and efficiency initiatives will be the main task for this indicator. Whether it be Eskom's wind and solar proposal, or industrial energy efficiency, these contacts should be followed up each year. We should also watch the DME off-grid concessions programme carefully, since this will be one of the largest renewable energy markets in the short run.