

Conclusions

►Reporter's Conclusions on all Indicators

To summarise the results for South Africa on the indicators, it is helpful to review how the vectors were created. In each case, the value of 1 on the vector represents the 'status quo' – either by reflecting world averages in the last decade or the actual country's performance in the last decade. The value of 0 on the vector represents the sustainability goal. Moving all the way to zero on a given vector means that the country's energy system is highly sustainable along that particular dimension, whether it be economic, social, environmental or technological. Vector values greater than 1 either mean that the country is even more unsustainable than the global average, or is getting worse than the performance in the last decade.

South Africa is the closest to the sustainability target on the indicators for access to electricity (0.34) and resilience to external impacts (energy exports) (0.08). The former reflects the success of the ambitious mass electrification programme, which has been a key social and economic goal for the democratic government. Government commitment to continue this programme, and provide substantial funding for it, bodes well for continued improvement in this indicator.

The low value for resilience to external impacts (energy exports) may be somewhat misleading. While it is true that South Africa is not as vulnerable to international energy markets as the OPEC countries, there is significant concern in the country about how the implementation of the Kyoto Protocol will affect the coal industry, and the 61 000 workers that it employs (SANEA 1998). The DME, for example, commissioned its first ever major climate change research in early 2001 – and the top priority is to analyse impacts of the Kyoto Protocol on coal markets. A report from the International Energy Agency suggests that South Africa may be the most vulnerable fossil fuel-exporting country in the world to the impacts of the Kyoto Protocol (Pershing 1999). South Africa will have to drop well below 0.09 on this indicator, therefore, before it is less vulnerable to external impacts.

South Africa performs worst on the indicators for carbon emissions per capita (2.35) and energy intensity (2.21). The reasons for the energy and emissions intensity of the economy are described in more detail in the body of this paper, and include heavy reliance on energy-intensive industries for domestic economic production and export, high dependence on coal for primary energy, higher energy-intensity of synthetic petrol made from coal, low energy prices and poor energy efficiency of individual sectors. Continued high energy-intensity is potentially a competitive disadvantage for the South African economy. The National Economic Development and Labour Council, for example, a powerful tripartite commission comprising representatives from government, industry and labour, has recently commissioned work to look at impact of the Kyoto Protocol on manufacturing in South Africa (as opposed to the coal industry), which focuses on the risk to energy- and emissions-intensive sectors.

High carbon emissions intensity makes South Africa increasingly vulnerable to pressure to take on some kind of commitment within United Nations climate change negotiations process. Although South Africa is still classified as a developing, or 'non-Annex I' country, its emissions per capita and per unit of GDP are considerably higher than most developing countries. On the other hand, this carbon emissions intensity makes South Africa an attractive candidate for Clean Development Mechanism³ international investment projects, which could help to move the country onto a lower emissions intensity path. Nevertheless,

³ The Clean Development Mechanism under the Kyoto Protocol to the UN Framework Convention on Climate Change allows industrialised countries to invest in project in developing countries that reduce greenhouse gas emissions, and claim part of the credit for these reductions against the industrialised countries' emissions limitation targets.

government policy is urgently needed to address carbon emissions intensity in way that also promotes development – for example, through stimulating large-scale investment in cost-effective energy efficiency and diversifying South Africa’s energy mix.

Investment in clean energy is only beginning in South Africa, so this indicator is also still quite high (0.99). As discussed in this paper, there are positive signs of both public and private sector commitment to increase investment in renewable energy and energy efficiency. The challenge is to maintain these goals through the restructuring of the energy industry – particularly the electricity industry – so that restructuring does not spell the end of clean energy. The indicator for renewable energy deployment (1.04) also reflects the long road ahead for South Africa in developing renewable energy sources – and challenge to move beyond seeing these only as solutions to remote area energy problems.

Finally, while the indicator for local pollution remains high (0.85), the significant improvement since 1990 is encouraging. More research will be needed, however, to make this indicator accurately reflect the national progress on local air pollution, rather than progress in only one location.

In summary, the political commitments of the post-apartheid South African government recognise the importance of equity in access to affordable energy. Progress in this important area of sustainability is a major accomplishment. The new South Africa, however, is full of legacies from the old – including the energy-intensive economic structure and reliance on abundant domestic coal – and in some cases current policies are reinforcing these legacies. This poses a major challenge to policy makers, industry, and civil society. New policy documents recognise the importance of these issues, but progress ‘on the ground’ has been slow, and there are, at the same time, conflicting policies that push South Africa away from sustainability. Our hope is that these indicators, and the discussion of their implications, will provide an useful starting point for stakeholders to debate South Africa’s future, and how co-ordinated policy and concrete action can create a more sustainable energy sector that supports the development and welfare of all South Africans.

► Recommendations to SEW

*** conflict between indicators – access before no public investment

This section raises several issues about the indicators, and how they are used for a country such as South Africa. Changes to how the indicators are measured, or which indicators are used, could improve the quality of reporting – and also reduce the time required to produce the reports.

1. Access to affordable energy

While indicator 3, access to electricity, is one important indicator of the social equity side of energy systems – and a relatively easy one to measure – it does not really tell us whether people can *afford* the energy to which they have access. Research in South Africa suggests that many electrified households still do not use electricity – and may even use traditional, highly polluting fuels – because they can not afford to pay for the electricity (Mehlwana 1998; Thom 2000). There are also a variety of social and cultural reasons why people may still choose to use non-electric fuels (Mehlwana 1999b). Of course, simply tracking the price of energy is not the answer, because we are concerned about *services* (eg home heating, cooking, hot water) rather than energy use and prices, per se. Perhaps an additional measure could be ‘the cost of cooking a meal for the poor’, which would reflect not just energy costs but the efficiency of the appliances and fuels available to households. We recognise that the data for this will be hard to find for many countries, but there is a substantial information on cooking stove efficiency and often data on the share of households that use particular appliances. It might be possible to make some estimates at least that would provide a valuable social metric.

2. Indicator 4: Clean Energy Investment

As mentioned in the text, having to compare clean energy investment to the total requires significant additional research and analysis. Maybe it would be just as effective to compare clean energy investment to energy sector GDP. Of course, the sustainability goal would not be 100%, because annual investment will only be a fraction of energy sector GDP. Additional analysis would be needed to define a sustainability target, but it would be easier to use GDP and annual investment.

3. Indicator 5 – resilience and trade

The conclusion for South Africa discusses why a relatively low value on this vector is not necessarily good news. It may be necessary to scale this vector so that even 10% of total exports to non-renewable energy is still relatively close to one. This could be done with a logarithmic scale. More county reports should be analysed to see whether this would be feasible.

4. Indicator 6 – burden of public investment in energy

Our proposal is that this indicator should measure investment and not state expenditure. Ideally it should include R&D investment, but this may be difficult. This is explained under the discussion of indicator 6 in this report.

5. Indicator 7

There has been some discussion in the past about whether this indicator should be energy productivity (GDP/energy) or energy intensity (energy/GDP). While energy productivity is a more positive concept, to convert the information to a vector with 0 being the best, we would still have to use the inverse of productivity.

► Notes to Future Observer-Reporters

Most of the necessary comments to observer-reporters have been included under the individual indicators. In addition, the spreadsheet containing the data and calculations for the indicators is available from the author (randall@energetic.uct.ac.za). A list of contacts for the data and reports will also be included.