Sustainable Energy Briefing 6:
Policies and Measures (PAMs) for Renewable Energy and Energy Efficiency

Ten years into democracy South Africa still faces the challenges of job creation and poverty reduction. In meeting these challenges, South Africa has committed itself to development that is sustainable, where the social, economic and environmental consequences of policies and measures are considered, so that any interventions are for the overall good of the country.

As the backbone to South Africa's economy, energy is central to meeting the objectives of job creation and poverty reduction. 'The Independent PAMs Study' commissioned by the SECCP (which was undertaken by the same research institute commissioned by government to do the modelling in Integrated Energy Planning 1) shows that there are a number of energy-related policies and measures, consistent with current South African policy, that would meet economic objectives in ways that are socially and environmentally beneficial too. This briefing explores exactly what these policies and measures (PAMs) are[1].

Overview of existing energy system in South Africa

In exploring which policies and measures could contribute to the sustainable development of South Africa, the researchers first took a snapshot of the energy system as it currently exists. In summary, they found that:

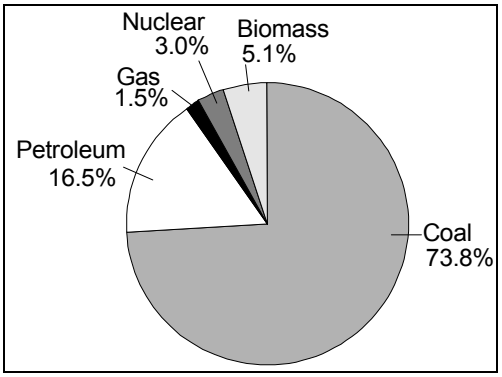

Figure 1:
Share of total primary energy supply 1999[2]

- Almost 75% of South Africa's energy comes from coal – leading to pollution and associated social and environmental damage. This is exacerbated because South Africa uses a high amount of coal-generated energy per unit of economic output compared to OECD countries – in other words South Africa wastes a lot of energy.
- There is significant potential to save energy through energy efficiency measures, particularly within the industry and transport sectors.
- The theoretical potential for renewable energy is very large.

Methodology

Having taken this snapshot, the researchers then developed an overview of possible energy-related PAMs that would have economic, as well as social and environmental benefits. They then short-listed and grouped these PAMs into three scenarios, which were compared to a Base Case of business as usual based on DME's official projections, viz.:

Economic instruments	Moderate; focus on economic instruments to correct market failures in relation to renewable energy (RE) and energy efficiency (EE)
Policy reform	Moderate; focus on meeting targets for RE and EE cost-effectively
Intensive policy	Intensive; more focus on promoting RE and EE; stronger weighting of social and environmental concerns

These scenarios each present a different view of the future, and a different path that government policy could take in terms of emphasising certain kinds of policies. Quantitative analysis of these scenarios was conducted on the LEAP 2000 and MARKAL models (as used in Department of Minerals and Energy Integrated Energy Planning process).

Cost to the economy

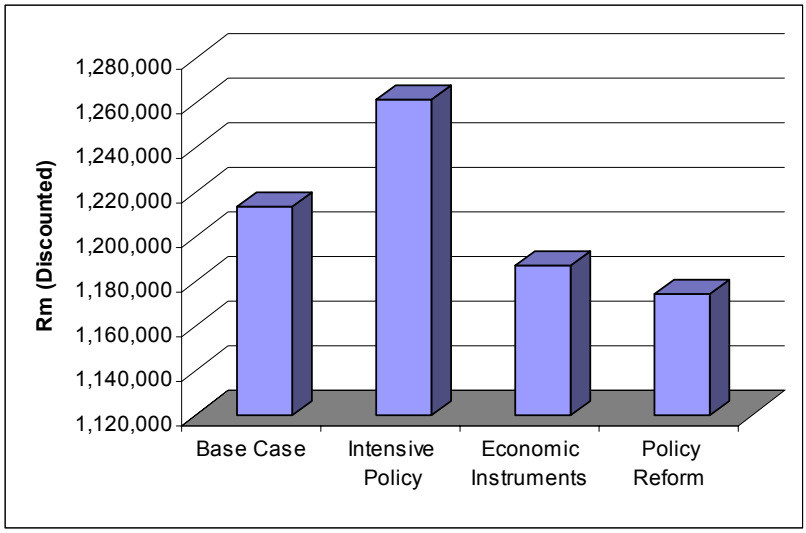

Figure 2:
Summary of total energy system costs over entire study period

As shown in Figure 2, the total energy system costs are higher in the Intensive Policy scenario than for the Base Case. However, this increase is not highly significant – the difference in investment as a share of GDP is less than 1% for most years. Of interest is that the Base Case scenario proves more expensive than the scenarios involving Economic Instruments and Policy Reform, in both of which costs fall below those of the Base Case after about 15 years.

In conclusion, the scenarios involving Economic Instruments and Policy Reform would be cheaper for total energy system than business as usual – and they include social and environmental benefits.

Policies and Measures

The researchers of the Independent PAMs study identified 5 Policies and Measures that stood out as contributing significantly to sustainable development in South Africa.[i] They are summarised below:

1. Mandate codes and standards for energy efficient buildings in government, commercial and residential sectors

At the moment, many buildings in South Africa waste a lot of energy because of the way they are built. For example, big north facing glass windows trap the heat in offices, which need air-conditioners to cool them – even in winter. South Africa could save a lot of energy by passing laws requiring that energy efficient building codes and standards be implemented.

Commercial building codes

Policies to increase the energy efficiency of commercial buildings would:

- Speed up the starting date of the South African Energy and Demand Efficiency Guidelines (SAEDES) standards, which aim to reduce commercial building energy consumption (excluding lighting) by 25%.
- Strengthen the SAEDES Guidelines by adopting them as standards and enacting them into legislation, such as the National Building Regulations and Building Standards Act (103 of 1977).

Government buildings

Government offices could be the first sector to implement and exceed the agreed building standards.

Residential building codes

Although the 'National Norms and Standards in Respect of Permanent Residential Structures' developed by the Department of Housing contain guidelines and information on environmental issues and energy efficiency, these are presently not contained in legislation (enforcement is at the discretion of the various housing programmes administered by the Department). Not only should these norms and standards be revised, they should also become mandatory for all new houses, with a 10-year phase in period for existing houses.

[i] This 'best package' was proposed by the independent research team, so is not necessarily the recommendations that Earthlife Africa would make if it put forward a 'best package.'

Making these guidelines mandatory would mean that the current subsidy for low-income housing would not be enough. As such, this subsidy would need to be increased, with consensus that the additional amount would be used for energy efficiency.

2. Set equipment standards for industry and commerce

Not only is a lot of energy wasted in South Africa because buildings are badly designed, energy is also wasted because equipment (such as computers and air conditioners) are not energy efficient. Setting equipment standards for industry and commerce would include a mandatory energy labelling strategy as well as mandatory performance standards for all industrial and commercial equipment.

- ***Commercial equipment*** to which the labels and standards would apply includes air conditioners, water heating systems (geysers), electronic office equipment (e.g. computers, printers, copiers, etc), and lighting.
- ***Industrial equipment*** categories that should be labelled include boilers of all types, compressors, motors, variable speed drives, and lights.

Once labels were finalised for a given product category, they would be mandatory for all new products.

Institutionally, this would also require some form of collaboration with the South African Bureau of Standards (SABS) and other participating stakeholders. All new equipment should then be required to meet these standards before it can be sold. New legislation would be required that incorporates these standards as the existing legislation and standards regulating such equipment is geared towards the promotion of health and safety.

3. Set targets for renewable electricity generation

- After modelling various renewable electricity targets (including 25% in the Intensive Policy Scenario) the researchers recommended that 15% of all electricity in South Africa be generated by renewable sources by 2020. Setting this target would promote investment in renewable energy and contribute to greater energy security through diversity of supply.

Note:
Since the publication of the Independent PAMs study, the Renewable Energy White Paper has been published, which sets a renewable energy target of the equivalent of 10 000 GWh by 2013. A progressive reading of this target (i.e. that renewable energy would actually contributes a total of 10 000 GWh to South Africa's total energy mix in 2013) translates into a target equivalent to 4% of total electricity generation in 2013, which is roughly 1% of total energy. However, the DME insists that it is cumulative (in other words, an average of 1 000 GWh per year for ten years) which translates into a targeted increase of about 0.15% of total energy from new renewable resources by 2013.

As shown in the blocked Note above, government is clearly a long way from adopting the target of 15% of electricity in 2020 from renewable energy recommended by the researchers. This in turn means that the RE market won't have the necessary stimulation in order to grow and develop local production to realize its job creation potential (36 400 direct jobs – see S E Briefing 2).

International experience indicates that there are a number of policy options for setting renewable energy targets, including renewable portfolio standards, grid-feed laws and renewable energy obligations. The researchers do not recommend a particular option, but note that when choosing policy instruments, the differing interests of stakeholders – government, the renewable energy industry, Eskom, and civil society – would need to be taken into account. This is at odds with Earthlife Africa and the Sustainable Energy Society of Southern Africa as both favour grid-feed laws.

4. Subsidise the production of renewable electricity

Subsidies are aimed at levelling the playing field for renewable electricity. At the moment renewable electricity is competing with very cheap coal-fired electricity. The reason that Eskom can produce electricity so cheaply (at

between 1.5 and 10 cents a kilowatt hour – c/kWh) is because it doesn't include all the costs of generating electricity in its selling price. External costs not recovered through Eskom include public health costs for pollution-related illness and environmental damage such as acid rain and climate change. If these costs were calculated then Eskom-generated electricity would be much more expensive. Because these external costs aren't included and Eskom tariffs do not reflect the costs of generation from new power plants, renewable electricity seems very expensive, and needs to be subsidised to make it economically competitive.

Based on international experience the researchers note that subsidies supporting the production of renewable electricity are better than capital or investment subsidies. This is because capital and investment subsidies can lead to technology that generates electricity from renewable energy sources (such as wind turbines) being installed but which deliver no energy, because it's undercut by generation from old fossil plants. As such, they recommended that the production of renewable electricity be subsidised, in order to make renewable electricity competitive. The levels of subsidy would depend on the technology being used to generate electricity, and would decrease over time.

The researchers suggest that Government get the money to subsidise renewable electricity from a pollution tax (discussed below) as well as international sources of funding such as the Clean Development Mechanism of the Kyoto Protocol and investment and donor funding.

5. Implement a pollution tax

The final major recommendation made by the researchers is that Government introduce a tax on air pollutants. An air pollution tax would have two major advantages:

- It would internalise the external costs of local air pollution and the benefits of renewables and energy efficiency in avoiding health costs and local environmental damage.
- It would reduce greenhouse gas emissions.

The tax would apply both to global pollutants (Carbon dioxide – CO_2, Methane – CH_4 and Nitrous oxide – N_20), as well as local air pollutants (Sulphur oxides, Nitrogen oxides, particulates, and non methane volatile organic compounds). For local air pollutants, the level of tax would differ for high level pollutants (e.g. Eskom power stations) and low-level pollutants (e.g. commercial and industrial energy emissions) because of the relative health impacts.

Legally, any new tax would require an amendment to existing legislation and effective compliance and enforcement systems. Although the implementation of a tax based on local pollutants is consistent with the polluter pays principle outlined in the National Environmental Management Act as well as established and accepted principles of cost internalisation, the effectiveness of such a tax is dependent on a number of issues. Of the utmost importance in implementing an effective pollution tax system is the availability of reliable data. The targeted companies would have to be compelled to develop effective monitoring systems, which would need to feed the information through the correct channels to inform the tax system.

Conclusion

The researchers conclude by recommending that energy efficiency policies and measures be implemented first, as immediate benefits will result. Interventions to support renewable energy, which require higher upfront costs, should then follow. Through these policies and measures South Africa will be able to meet its commitment to undertake development that is sustainable.

[1] Policies and Measures for Renewable Energy and Energy Efficiency in South Africa, research commissioned by the Sustainable Energy and Climate Change Project and undertaken by the Energy and Development Research Centre, University of Cape Town, March 2003.
[2] Department of Minerals and Energy.