

## Sustainable Energy Briefing 12: What does our energy supply really cost? Who is paying? Who knows?

The White Paper on Energy Policy (WPEP) adopted in 1998 states that: “Government policy is to remove distortions and encourage energy prices to be as cost-reflective as possible. To this end *prices will increasingly include quantifiable externalities.*”

It also recognises that “comprehensive evaluations of the economic, social and environmental implications of all feasible supply and demand side investments will have to be undertaken.” and

“The Department of Minerals and Energy will include explicit environmental considerations into studies regarding energy suppliers and users and will integrate these results through Integrated Energy Planning.”

### Overview

This briefing attempts to provide an overview of the status of energy planning and quantification of externalised costs (the costs arising from energy supply that are not borne by the commercial concerns involved, such as public health care costs caused by air pollution) and some of the implications thereof.

### State of play

The National Treasury’s Environmental Fiscal Reform process published a draft policy paper in April 2006, on which comment was invited, but it has not been heard from since. The paper contemplates a tax on coal for power generation, as one of several options to start to address the costs of energy supply that are carried by society as a whole. It does not support measures that might more directly level the playing field for sustainable energy options, such as a levy on coal-fired electricity to support a feed-in tariff for electricity from renewable resources. Minister Manuel has promised to include some “green” measures in his next budget, in 2008.

A study of the externalised costs of energy supply was nearly commissioned by the DME in 2006. Following a revision of the terms of reference first finalised early in 2005, the study was put out to tender and bids went through an adjudication process. However, the study was postponed as the second round of Integrated Energy Planning (IEP 2), which was scheduled to report to cabinet in March 2007, was suspended by the new Deputy Director General. A joint meeting of working groups of the Advisory and Review Committee (EIPARC) was indefinitely postponed in September and stakeholders were this year informed that: “Due to internal restructuring and realignment which, it is hoped will be finalised as soon as possible, as well as the Department having to focus on planning for 2010, the IEP 2 will be held in abeyance for the time being. “

A letter from the Minister’s office dated 15 March has subsequently noted:

“a National Integrated Energy Plan, which will also have a long-term view between 20 and 30 years, will be sent to Cabinet for approval in the last quarter of 2008“ and

“The externalities study... has not been discontinued, but rather refocused.”

Additional funding was sought: “Although our request was considered favourably by the British High Commission, funding has not been received.”

However, the letter also states:

“A security of supply masterplan for the electricity and petroleum sectors will however be sent to Cabinet in June 2007. The masterplan will detail supply options and infrastructure plans for both sectors.”

It says nothing regarding processes for either IEP or development of the masterplan, nor evaluation of the social and environmental implications of the investment plans that will be put to cabinet in the short term.

In the mean time, in the electricity sub-sector, supply imperatives are being shaped and prices set by deals made by Eskom, and the Minister of Public Enterprises has pronounced on the supply options on which public funds will be spent. Eskom has signed a 25-year contract to supply electricity to the aluminium industry, well known for locating plant according to where it can extract the lowest-priced electricity. A ‘conventional’ nuclear power plant was announced with firm conviction, long before even Eskom’s own feasibility study was concluded, much less an evaluation of the employment potential of alternative supply technologies had been considered.

## Externalised costs of energy supply

There is a wide range of externalised costs involved in energy supply, some of which are not generally considered quantifiable. Most work in South Africa has been done in relation to electricity supply and largely focused on the impacts of air pollution and greenhouse gas emissions. Water use is paid for, although arguably subsidised. Water pollution, including leaching from discard coal and ash dumps, is not well documented and whether cumulative acidification impacts on water and/or land are significant is disputed. Liquid fuels have also been investigated, focusing mostly on vehicle emissions, although civil society organisations have tried to develop a picture of the local impacts of petroleum product refineries.

Other externalised costs range from mining deaths to infrastructure impacts: Ermelo is apparently being traversed by an average of one coal truck every 30 seconds, 24 hours a day, which in addition to road and building damage is claimed as the primary cause of 39 pedestrian deaths in 2006. Exhaust gasses from coal-fired power stations include a wide range of harmful substances not covered by regulations or not considered in South African externality studies, including heavy metals and radioactive material. The negative impacts on childhood development of air pollution, incl. dust from mining and dumps, routine emissions of volatile organic compounds, accidents at refineries and gas flaring, are known but not quantified.

Valuation of externalised costs is not an exact science and different approaches yield a wide range of values. Such costs are valued lower in developing countries, largely due to the lower costs of labour, since lost productivity due to ill health is a significant component. Putting a value on lost lives is controversial, since it is usually based on lost earnings. This is no excuse for ignoring the financial implications of competing supply options, as well as demand side interventions, in energy planning and public spending on infrastructure development.

## Externalities of electricity generation

A typical valuation of externalities of electricity generation is that used in a study commissioned by the National Treasury (Conningarth, 2004) in which 5c/kWh is noted as a conservative figure, i.e. tending to under- rather than over-estimate. An earlier study with a broader scope (C. van Horen, 1996) finds a median (middle of the range) value of about 10c/kWh. A study by the University of Cape Town also finds a median figure of 5c per unit, but deducts a valuation of the benefit of electrification (this was the responsibility of Eskom in the year reported upon), to give the following range of ‘quantifiable externalities’:

### Summary of external costs of Eskom electricity generation, 1999 (in R millions)

	<b>Low</b>	<b>Central</b>	<b>High</b>
Air pollution and health	852	1177	1450
Electrification	- 173	- 958	- 2324
Climate change	1625	7043	16258
<b>Total</b>	<b>2304</b>	<b>7262</b>	<b>15379</b>

Source: R. Spalding-Fecher & D. Matibe *Electricity and externalities in South Africa*, 2003, p. 726

The Treasury document: Draft Policy Paper: *A Framework For Considering Market-Based Instruments To Support Environmental Fiscal Reform In South Africa* (April 2006) notes various studies attempting to estimate the costs of air-borne pollution from coal-fired electricity “suggesting a range of between R4-30 billion per year”. Blignault and King (2002), report the “private cost” of generation in 2000 – i.e. costs actually incurred by Eskom - as R4 151 million. It is thus clear that the public cost of electricity generation, borne by the economy or society as a whole, even at conservative estimates, is greater than the private cost borne by the electricity supply industry.

This estimation does not take account of various impacts noted above, nor the use of finite natural resources - depletion of ‘natural capital’ – or opportunity costs of investment choices (e.g. the far greater number of jobs that could be created, plus the value retained, if energy was drawn not from hydro-carbon stocks but renewable resources that are constantly replenished). Looking at the high end of the range, to compensate for the many externalities not included in the above figures, it seems fair to say that the public costs of electricity supply are at least equivalent to the revenue derived by Eskom therefrom.

The benefits of this effective subsidy for coal-fired electricity<sup>1</sup> are enjoyed most by those who consume the most electricity. Industry accounts for about two thirds of electricity consumption (68% according to the 2002 Energy Outlook) commerce 10% and residential customers about 17%. Thus business and industry enjoy a subsidy of about 5 times as much as all household customers (amongst whom distribution of benefits obviously favours affluent, and generally inefficient, consumers). Industry representatives have claimed that they subsidise electricity services in the residential sector, on the basis that Eskom was making more profit from the industrial sector. However, with the public (externalised) costs of generation on a par with payment received by Eskom, it is clearly industry that is benefiting extensively from an effective public subsidy.

## Special deals for energy-intensive industry

World-wide, energy-intensive industries, particularly those requiring electricity, are relocating internationally, seeking out the best deals by playing suppliers off against each other. In this, South Africa competes not only with Australia (also heavily coal-dependent) but Canada, where cheap hydropower is the mainstay of electricity generation. In 2006 Engineering News reported that South Africa offers the “cheapest” electricity in the world, 29% below Canadian prices.

Towards the end of 2006 Eskom signed a long-term electricity supply contact with Alcan – a leading aluminium corporation based in Canada – this deal being the primary condition for Alcan to agree to develop the anchor project for the Coega Industrial Development Zone (IDZ). Most of the raw materials will have to be shipped in and government is key to financing construction of a deep-water port, which will also export most of the bars of aluminium to manufacturing centres in other countries.

The Coega IDZ is a strategic national project that was largely conceived around hosting a massive aluminium smelter and has been fairly stagnant as the international ownership of the original company [Picheny] was traded to give us Alcan as a prospective partner. Years of negotiations, accompanied by on-going pronouncements of an imminent deal in the business press, hinged on the price at which Eskom would sell our electricity to this most energy-intensive of primary processing industries. The level of confidence in our ability to sustain the supply – requiring at least 1300 MW of generation capacity - would also have been a factor, though perhaps not in Eskom’s favour.

The price at which the state agreed to sell electricity over a 25year contract period has not been disclosed, even to officials involved in energy planning. A request to the Minister of Public Enterprises to hold public consultations on the parameters and implications of such deals was flatly refused in early 2005. Towards the end of 2006, detailed questions regarding the terms of the contract were lodged with Eskom, Alcan, the Coega Industrial Development Corporation, the DPE and the DTI, in terms of the Public Access to Information Act (PAIA). All have refused to answer any of the questions, claiming potential damage to the business interests of signatories.

It is not only acceptance of externalised costs that makes developing countries attractive destinations for energy-intensive industry, but also the lack of obligations to address greenhouse gas emissions in the short term. However, any country achieving its development aspirations over the next 10 to 15 years will face such obligations within the same timeframe, before half the lifetime of new power plants has passed. It is well known that current electricity prices are based on operation of plants that have long been fully amortised and that Eskom is pushing for increased tariffs to cover costs of building new plants at a massive scale. The timing of the deal, as well as the woeful state of energy planning, suggests that the price offered assumes business as usual.

---

<sup>1</sup> There are also many externalities associated with nuclear power, from state liability for accidents and long-term high-level waste storage, though financing of the National Nuclear Regulator and local authority emergency response capacity (including along fuel transport routes), such that in the late 1980s the nuclear industry accounted for over 85% of the entire budget of the Department of Mineral and Energy Affairs; then there are the (contested) impacts on workers’ health, security and international diplomacy requirements and ‘strategic’ R & D projects like the PBMR.

## Market failures

The use of fossil fuels thrives on the failure of the market to link costs borne by society, or deferred into the future, to the costs carried by suppliers and their customers. A high cost of capital leads to investment in plant that has low up-front costs, despite the on-going fuel requirements and resulting high risk of cost escalation. Drawing on renewable energy resources will bring down the unit costs of energy over time, as well as serving social and environmental objectives. However, it is not such public benefits, but rather short-term returns on investment, that are driving the deployment of both private and public capital in the energy sector. The energy service needs of those without spending power and the interests of future generations simply do not register as market signals. Climate change is described by a former World Bank chief economist, Sir Nicholas Stern, as “the greatest and widest-ranging market failure ever seen”.

## Conclusions

The IEP process should provide a forum for addressing such issues from a perspective that seeks to reduce poverty and increase employment. To date the job creation potential of developing local industries in renewable energy technologies and the potential for the energy-poor to participate in harnessing locally available resources has not been officially assessed, much less factored into planning. Potential public benefits, as well as externalised costs, remain outside the parameters of decision-making regarding energy development, including about R150 billion of public spending committed to increasing electricity supply.

We need long-term planning to appreciate the consequences of investing in supply infrastructure that has an intended lifetime of at least forty years. The three coal-fired power plants, which constitute the most advanced plans of Eskom for base-load generation, would increase our dependence on coal (a 40% increase in coal-fired generation at less than 40% efficiency) and increase our national greenhouse gas emissions by about 25%. Solar thermal power plants are likely to be directly competitive within about 15 years.

South Africa needs to integrate the full costs of energy supply in determining prices, especially those offered to transnational corporations focused on energy-intensive and export-oriented minerals processing. The DME Externalities Study is not only a necessary input to improve long-term planning, but an essential and overdue tool for responsible deal-making. A revised version of the National Energy Bill (NEB), published for comment three years ago, has been promised “soon” to provide a legislative mandate for such activities.

Successfully hosting a Soccer World Cup is an important and strategic opportunity for South Africa, but does not benefit from suspending long-term energy planning. It will not be improved by ignoring the benefits, particularly in the ‘Second Economy’, that would be realised by drawing on our abundant renewable energy resources (and thus participating in the world’s fastest-growing markets). Adequate supply of electricity and liquid fuels will not be made more secure by designing short-term energy interventions in isolation.

‘King Coal’ certainly rules as the investor-friendly first recourse for major electricity capacity expansion. What is long overdue is an accounting of the full costs of perpetuating this rule and assessment of the benefits and opportunities for democratising the energy sector.

For more on IEP, the NEB or WPEP, see S E Briefings 4, 7 & 8 at: [www.earthlife.org.za/seccp](http://www.earthlife.org.za/seccp)