

1. Success through sustainability

Our current energy use patterns – predominantly our huge dependency on fossil fuels – cannot continue. A move to a more sustainable path is important for the following reasons:

1.1 Better local air quality and human health

Local air pollutants from burning fossil fuels (power stations, petrol and diesel exhaust fumes) cause respiratory ailments and airborne particulate matter has been associated with cancer. Negative health effects of air pollution have been estimated to cost South Africa R4 billion annually.

1.2 Arrested global warming

Climate change is an accepted reality. It will place enormous strain on our health sector, agricultural production, plant and animal biodiversity and water resources. Disruptions in agriculture are likely to result in increased urbanisation and pressure on urban resources. Fossil fuel-based energy use is the largest contributor to



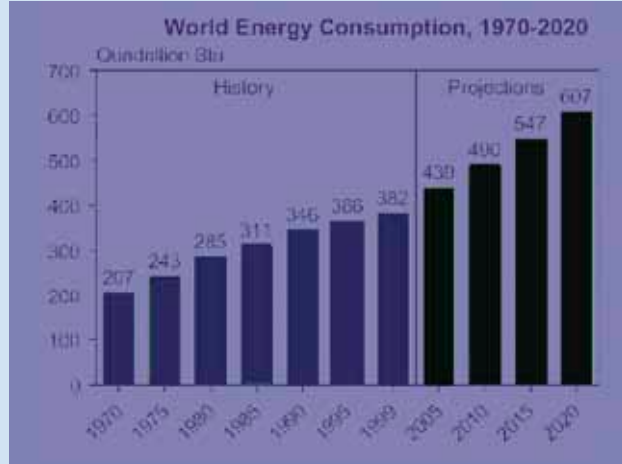
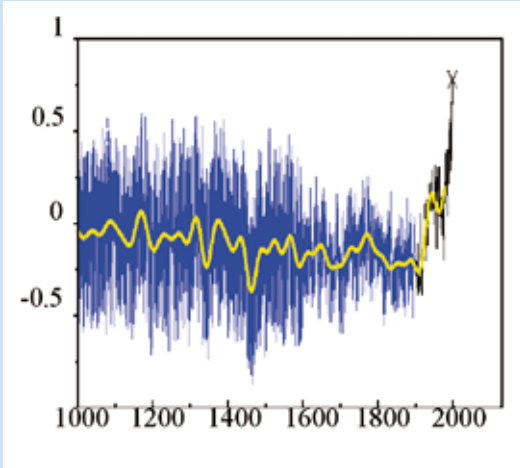
Cedric Nunn

Coal-burning electricity generation and fuel burning for transportation and industry results in poor local air quality in many South African cities.

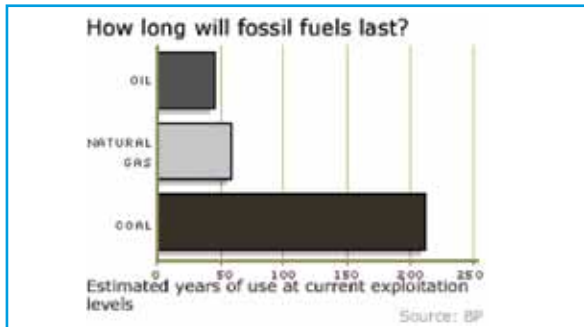
Particularly high levels of local air pollution occur in industrialised areas and in poor households where coal, wood and paraffin are used for cooking and heating.



Cedric Nunn



Average planetary temperatures are rising, and global consensus is that this is due to the release of carbon dioxide and other greenhouse gasses, largely linked to energy generation and use. Worldwide energy use predictions still point to a steady increase, indicating that the situation is likely to get worse before it gets better.



carbon dioxide emissions – the principle global warming gas. South Africa is almost entirely dependent on fossil fuels for electricity generation (i.e. coal) and for transport energy (oil products).

1.3 Energy security

Fossil fuel reserves are finite. In particular, the relatively short horizon for oil reserve depletion means that there is an urgent need to find alternative transport fuels, transport modes and approaches to mobility.

Annual per capita CO₂ emissions – South Africa compared to the rest of the world

World 4 tons
South Africa 8 tons
Rest of Africa 1 ton

The figure shows carbon emissions per person per year around the world. Although developed countries are the main global warming gas emitters, South Africa is the 11th highest contributor to global carbon emissions, and we can expect to come under increasing pressure to reduce our carbon emissions, and thus fossil fuel use, over the coming years.

1.4 Equity

Currently, there is a huge divide between the energy use patterns and problems of the wealthier and poorer sections of the population. The poor often are burdened with inadequate, unsafe and inconvenient energy sources while wealthier, particularly urban people consume high levels of energy and are inefficient in their use of energy.

1.5 Financial efficiency

Current inefficient energy use patterns mean that countries, cities and people have to spend more money than necessary for the energy service required (e.g. water heating, lighting

etc). Many more efficient and cost-effective appliances and practices are available, including efficient lighting, using solar water heaters and constructing buildings to use less energy for heating, cooling and lighting.



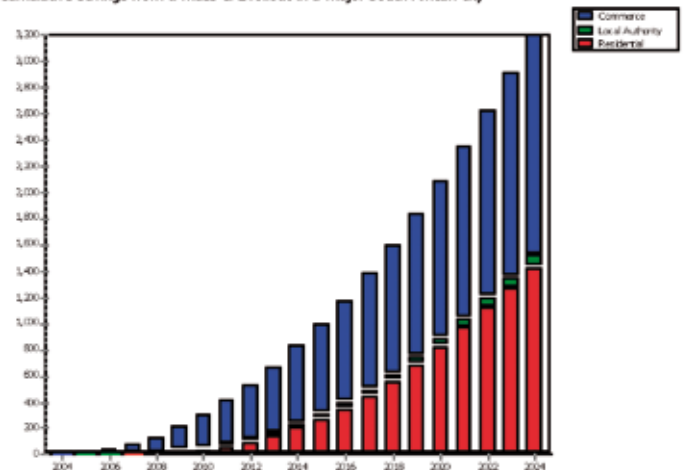
Some 16% of city households are not electrified, including those informal settlements around South African cities. Here they have to rely on less convenient, dirtier and often unsafe energy sources.

Fires caused by paraffin appliances, for example, are alarmingly common in South Africa, and destroy hundreds of homes at a time.

1.6 City development

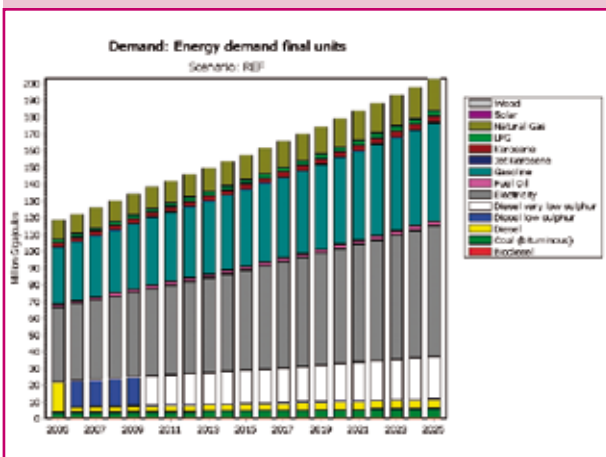
The energy sector in SA creates employment opportunities for about 250 000 people and contributes about 15% to the total GDP. However, it is highly centralized. Many sustainable energy initiatives could be undertaken locally, thus stimulating local economic development. Examples of this could be the manufacture and installation of solar water heaters, putting ceilings in houses, energy efficient building retrofits and small local power generation plants (wind farms etc).

Cumulative Savings from a mass CFL rollout in a major South African city



This graph shows the financial saving that is expected from implementing an efficient lighting programme in one South African city. This example uses CFLs – compact fluorescent lights – in place of the ‘traditional’ tungsten filament bulb.

2. Cities as energy leaders



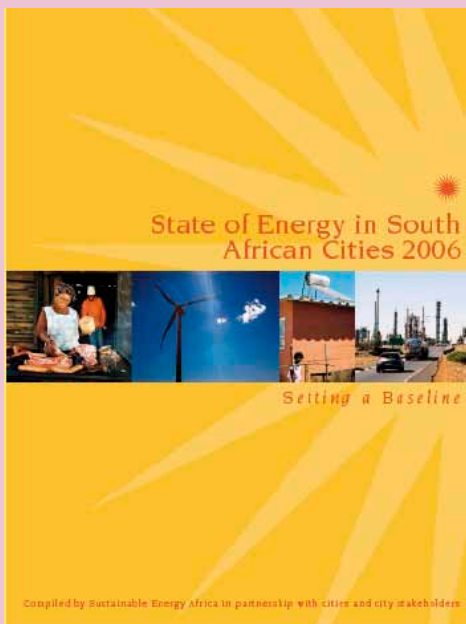
Cities are energy intensive nodes in a country. South Africa's seventeen biggest cities use about 50% of the country's energy. Fifteen municipalities recently studied (shown on the map alongside) use about 40% of the country's energy, yet occupy only 3% of the land area. Cities have an important role to play in the shift to a more sustainable energy picture in South Africa. This is all the more pertinent given the high rates of urbanization and population growth in many of our cities.

Modeling projections show us that unsustainable increases (a doubling of energy consumption) in city energy use are expected under the 'Business-as-usual' scenario. The projection alongside is for one of the larger cities in the country. The expense and emissions associated with these increases comprise burdens which will not be tolerable in the future.

City authorities have a much greater influence over energy use patterns within their boundaries than is often realized. This is through:

- ☀ Building regulations
- ☀ Urban layout
- ☀ Transport planning
- ☀ Bylaws
- ☀ Standards & codes
- ☀ Air quality control measures
- ☀ Electrification

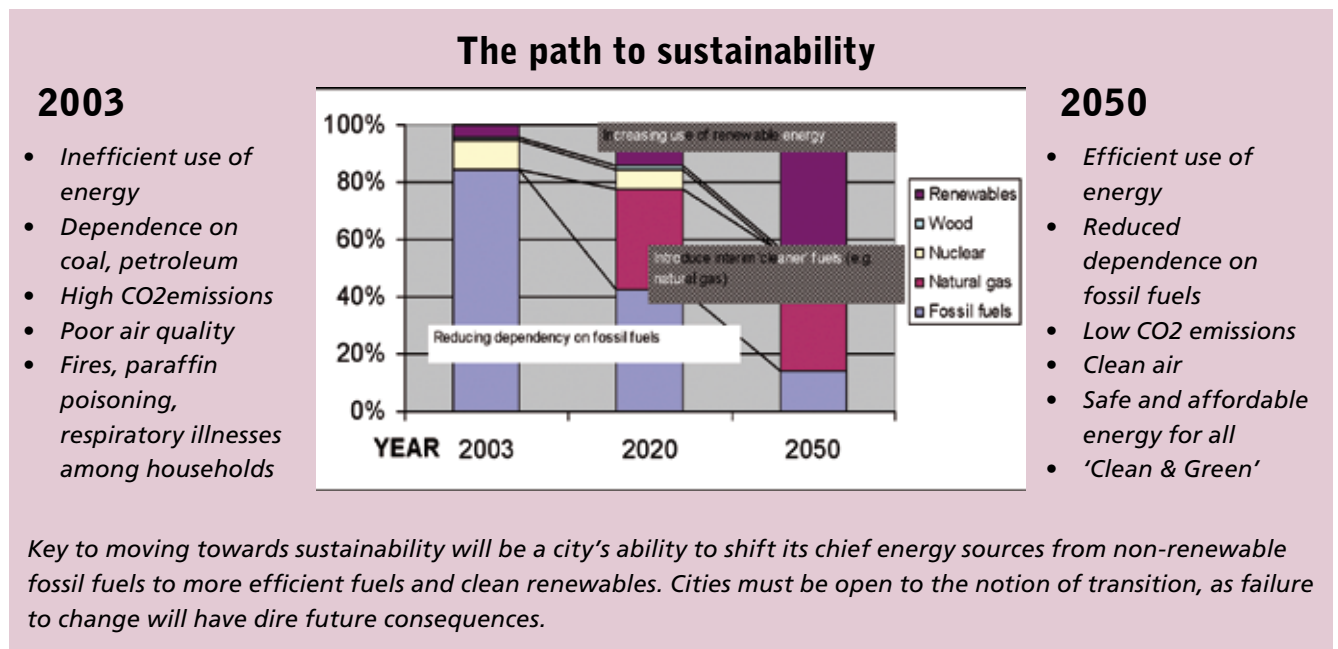
If the country is to move towards more sustainable energy paths, cities will be essential partners in this process. Achieving the targets set by national government, for example around energy efficiency, will be largely reliant on the actions of cities.



To download the *State of Energy in SA Cities Report*, go to www.sustainable.org.za

3. City action towards a sustainable energy path

It is the responsibility of leaders in all spheres of government, commerce, industry and civil society to promote action towards more efficient and renewable energy use. The focus here is on what cities can do to promote action.



3.1 A sustainable energy strategy for your city

Energy is the lifeblood of a city and runs through every area of a city's functioning. Departmentalization within local government often means that cities do not have a complete understanding of energy use, energy issues and energy initiatives within its boundaries. These need to be gathered and understood in order to inform longer term energy planning.

- Step 1:** Develop a State of Energy Report. This summarises current energy use, energy supply and key energy issues in a city. For information around State of Energy Reports - examples, TOR for the development or an introductory presentation go to www.cityenergy.org.za/resources/state-energy-reports
- Step 2:** Develop a Sustainable Energy Strategy. This will coordinate energy planning with an overarching city energy vision and set realistic renewable and energy efficiency targets based on current data. For an example of a city energy strategy go to www.cityenergy.org.za/resources/energy-strategies

- Step 3:** Develop an Action Plan. This maps out how the targets are going to be achieved. This is where this manual, in combination with the City Energy Efficiency Tool (explained below) can be used effectively to assist Cities to move forward towards implementation

3.2 The first steps within the action plan

It makes sense to begin with those sustainable energy interventions which are proven and cost effective within the current environment. SEA has developed an Energy Efficiency Tool to assist Cities to understand the impact each intervention will have on their overall energy consumption levels.

This tool takes a city through available energy efficiency options and allows the city to develop a three year action plan to achieve their energy efficiency targets. The tool with supporting documentation is available for download at www.cityenergy.org.za/resources/energy-efficiency

The tool does not indicate how to achieve these targets though. This manual is aimed as a support to cities once they have decided to pursue a particular intervention. Each of the following chapters will go into some detail around a particular intervention on what the best approach or approaches may be within the current context. The manual is also available online at www.cityenergy.org.za/implementation, and will be updated with relevant new information as it becomes available, making it a 'living' document.

Are you a City on the move?

	YES	NO
Are we steadily moving from dirtier fossil fuels?		
Are we promoting interim cleaner options such as natural gas?		
Are we promoting renewable energy "low hanging fruit" such as solar water heaters?		
Are we pursuing energy efficiency aggressively in all sectors?		
Are we promoting passive solar / efficient design of buildings?		
Are we improving access to safer and healthier energy sources for the poor?		
Are we keeping the cost of energy affordable for the poor?		
Are we balancing these concerns with economic growth?		