

Which legacy will you leave?



Image of sustainable decentralised city ¹



Chernobyl liquidators after explosion

We, as patriotic and committed South Africans, claim our right to take our lead and mandate from the ANC's Polokwane Resolutions at the 52nd Congress, and call upon all leaders to engage with us on the matters raised below. We are of the opinion that the current IRP2 electricity plans do NOT follow the resolution below, namely:

"To further integrate climate change considerations with sustainable development strategies, the science and technology agenda, integrated energy planning, transport policy and industrial policy. In this context to maximize the integration of a full cost accounted economy in which product life cycle of products is internalized and the goal of zero waste production is pursued. "

Members of Parliament are presently being asked how we as a nation should address electricity supply challenges through the Integrated Resource Plan 2010 (IRP 2010), a 25 year electricity plan. The fundamental flaw with IRP2010 is that it has been drafted by those with vested corporate and economic interests, and the decision making panel does not include representation by Civil Society and Labour.

The decisions being made now regarding our energy future will have major consequences, for current and future generations of South Africans. These decisions must have a firm moral footing, be bound by social and environmental justice and be unafraid to confront the scrutiny of future generations.

This briefing has been produced to give you, as an important decision maker, a deeper understanding of what a possible nuclear future holds for our country. As parliamentarians you need to consciously decide if you wish to assist in the development of a Nuclear State or if you wish to direct this country onto a more sustainable path.

We ask you to remember the words of Nelson Mandela, which also apply in this case:

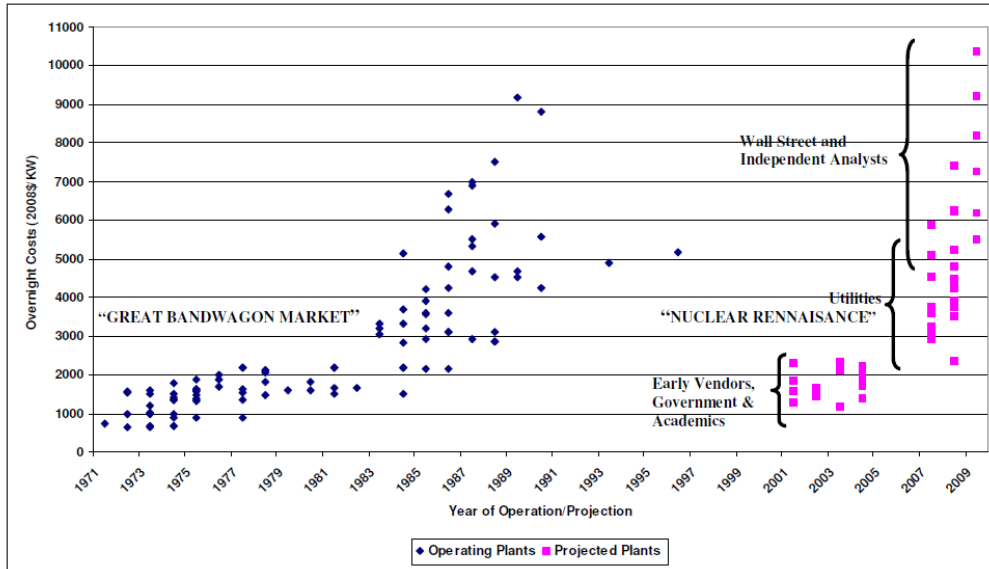
"Our policy must rest on the solid moral foundation of dedication to the primacy of people and their long-term well being. We have to be on guard against temptations of short-term benefits and pressures from powerful forces at the expense of the long-term interests of all. We cannot afford to bargain away the birthright of future generations."

Nelson Mandela, opening the 5th session of the World Commission on the Ocean

The Myth: Nuclear energy is a low-cost alternative

One of the major reasons why nuclear power should not be favoured against renewables and energy efficiency is that it is too expensive. The UK's Citigroup did a study in 2009 on the economic viability of new-build nuclear which is aptly entitled "New Nuclear- The Economics Say No".

Figure ES-1: Overview Cost of Completed Nuclear Reactors Compared to Projected Costs of Future Reactors



Sources: Koomey and Hultman, 2007, Data Appendix; University of Chicago 2004, p. S-2, p. S-8; University of Chicago estimate, MIT, 2003, p. 42; Tennessee Valley Authority, 2005, p. 1-7; Klein, p. 14; Keystone Center, 2007, p.42; Kaplan, 2008 Appendix B for utility estimates, p. 39; Harding, 2007, p. 71; Lovins and Shiekh, 2008b, p. 2; Congressional Budget Office, 2008, p. 13; Lazard, 2008, Lazard, p. 2; Moody's, 2008, p. 15; Standard and Poor, 2008, p. 11; Severance, 2009, pp. 35-36; Schlissel and Biewald, 2008, p. 2; Energy Information Administration, 2009, p. 89; Harding, 2009. PPL, 2009; Deutch, et al., 2009, p. 6. See Bibliography for full citations.

Nuclear power's poor economics make it impossible to finance in the private capital market. For solely economic reasons, even the World Bank does not finance nuclear energy developments.

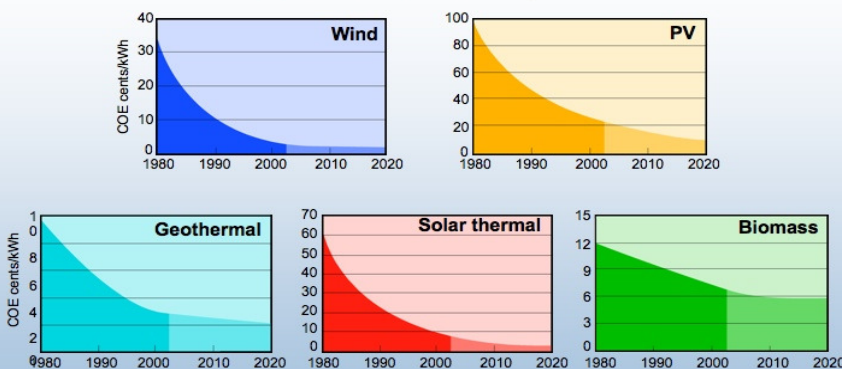
New nuclear is only possible with large government guarantees and subsidies. Nuclear power requires central planning, and even the world's most impressively

planned nuclear enterprise, in France, suffered 3.5-fold real capital cost escalation and nearly doubled construction times (1970–2000). Doing exactly as nuclear advocates urge does not prevent spiraling costs and bad economics. Nuclear is conventionally costed with distant future liabilities discounted at a rate designed to make future costs seem deceptively small in current terms. This practice of discounting away future liabilities is not only immoral but inaccurate.

The costs for nuclear energy persist for hundreds of thousands of years after the plant has ceased operation. These

Renewable Energy Cost Trends

Levelized cents/kWh in constant \$2000¹



Source: NREL Energy Analysis Office (www.nrel.gov/analysis/docs/cost_curves_2002.ppt)
¹These graphs are reflections of historical cost trends NOT precise annual historical data.
 Updated: October 2002

EAO Energy Analysis Office
 Understanding Energy Issues

NREL National Renewable Energy Laboratory

include managing of radioactive waste, guarding closed reactors, and decommissioning the reactors following "cool-down" period, where the costs exceed the cost of construction and often, the income generated. For example, the UK's nuclear waste clean-up programme could cost more than £70bn, (R764.95 billion) according to the Nuclear Decommissioning Authority (NDA).

By contrast, costs for really renewable energy are dropping, and will easily outstrip both coal and nuclear before the first proposed nuclear plant comes on line in the projected 12 year period, and can be deployed in as

little as 4 years.

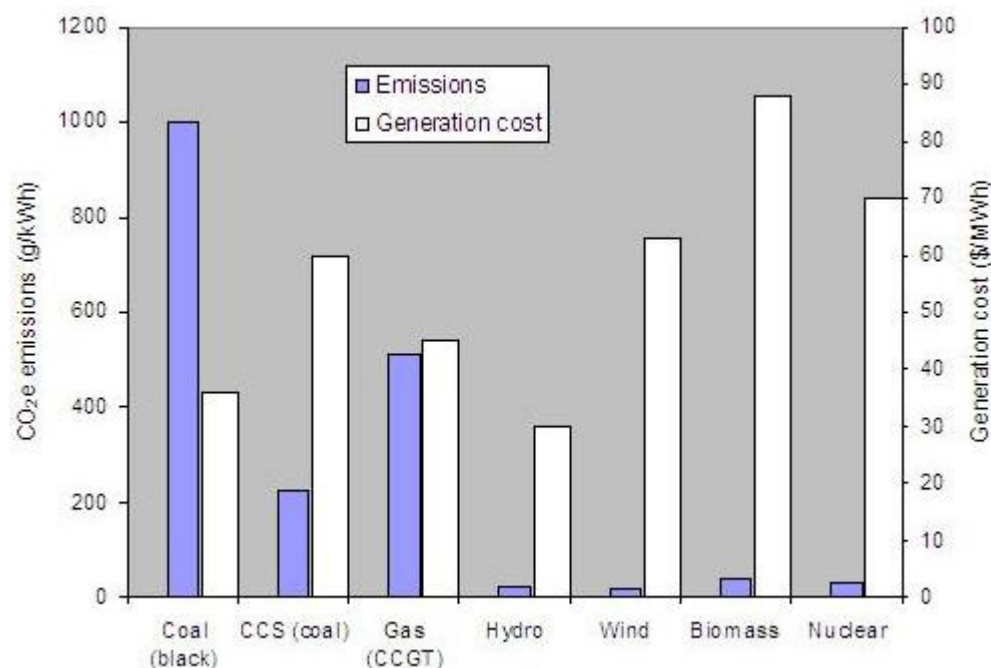
This year, PM Makwana, the then Interim Chair and CEO of Eskom agreed that wind power baseload would be cheaper than nuclear, and solar power at roughly the same cost, without the lifelong fuel costs or decommissioning and waste issues,. He also confirmed the deployment timelines of 4 years for wind and solar power.

SA has abundant natural and genuinely renewable resources, the use of which will put into place something that will be blessed by current and future generations.

The Myth: Nuclear energy is the best way to respond to climate change.

It is accepted that the world needs to reduce its greenhouse gas (GHG) emissions as fast as possible to reduce the negative effects of Climate Change. If we are truly concerned about climate change, it is essential that the fastest and most effective climate solutions are implemented. It takes 10-15 years for a nuclear plant to become operational, at an unquantifiable cost, thus disqualifying it as a realistic climate change solution.

In addition, the mining, milling, processing, conversion, enrichment and transportation of uranium fuel for reactors are all carbon-intensive processes, as are the construction and decommissioning of the plant. Routine emissions associated with nuclear power plants make nuclear power a more polluting alternative, when compared to DSM (demand side



management) or renewable energies. (See graph ²). It is an untruth to call it "clean".

It is important to remember that nuclear power is specifically excluded from the Climate Change Kyoto Protocol.

In comparison to renewable energy, nuclear power releases 3-4 times more CO2 per unit of energy produced taking account of the whole fuel chain.

Nuclear plants situated along the coast are particularly vulnerable to unalterable global climate change predictions which will result in a rise in sea levels and an increase in the intensity and frequency of storm events. We need to ensure new projects take into account increasingly variable and extreme weather, as global warming continues. The increasing unpredictability of weather patterns spells disaster for nuclear power stations. During a record-breaking heat wave in 2003, France was forced to power off 17 nuclear reactors due to the risk of overheating and a nuclear accident occurring, costing the country about U.S. \$408 million.

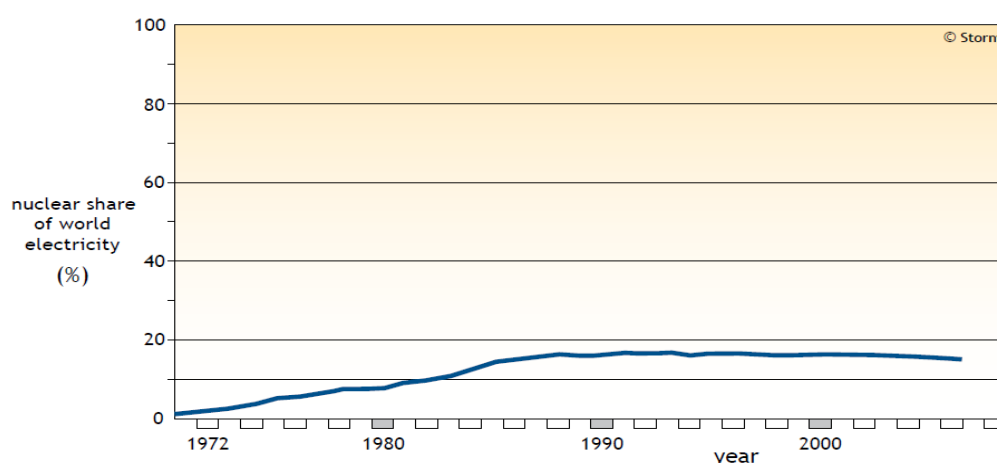
International studies confirm that a 100% renewable energy future is possible by 2050, while countries like China have been able to add 25GW of power to their grid (the same as our total baseload) from wind alone in less than a decade. Local studies further state that renewable energy "comprising wind and solar thermal energy, particularly if combined with partner programmes such as an energy efficiency programme, will provide significant greenhouse gas mitigation, together with air quality, health and ecosystem service co-benefits to South Africa".

The Myth: Nuclear power is a good way to respond to growing energy demands.

While there is a lot of industry hype about a ‘new wave’ of nuclear power, this has not resulted in an increase in nuclear reactors being built. Michael Dittmar, a physicist with CERN, Geneva has said that “the hard facts about nuclear energy are inconsistent with the possibility of a worldwide renaissance of nuclear energy. Indeed, they point toward a continuing slow phase-out of civilian nuclear energy in most of the large OECD countries”.³

In 2006 the contribution of nuclear to the world’s energy was less than photovoltaics, a tenth of wind and 30-40 times less than micro-power. A projection of current declining trends suggest there will be no nuclear power left around 2050. See graph below.⁴

An argument used by the coal and nuclear industries is that renewable energy will not be able to meet baseload electricity demand. Simply put, the baseload supply is the steady constant level of power available from the grid on a permanent basis. Globally, it has been proven that it is possible to have reliable baseload without



coal or nuclear, using distributed renewables, cogeneration and micropower.

In fact renewables are so much cheaper than nuclear that the same baseload power can be met by renewables for less money after adjusting for the fluctuating but predictable nature of renewables, with zero fuel and decommissioning and waste costs, while providing greater overall energy production and more decent work for South Africans. In addition to this, moving away from large centralised power to smaller decentralised systems would also help counter the “baseload” argument, as well as improve energy security, access and affordability. Even more critically, the time it takes for a plant to provide more energy than it used in construction, is clearly proven – wind power pays back in less than a year; gas and oil in about one year; Solar PV in less than 3 years, and nuclear between 10 and 18 years.

Myth: Nuclear technologies have reliable construction times.

There are four types of commonly used commercial nuclear plant:

- Generation I – Built in the 50’s and 60’s and largely decommissioned now
- Generation II – The vast majority in use today
- Generation III & III+ – The heavily promoted nuclear reactors of the future

The only Generation III Reactors currently in operation are the Advanced Boiling Water Reactors (ABWR) developed in Japan. By the end of 2006, four ABWRs were in service and two under construction in Taiwan.

No Generation III+ plant has yet been completed. This type of technology is the kind being considered in the EIA for Nuclear-1 and consists of Areva’s European Pressurised Water Reactor (EPR) or the Westinghouse AP1000. The EPR is the only Generation III+ plant under construction, one at the Olkiluoto site in Finland (expected to take 4 years to build. After 4 years, 4 years late and 90% over budget) and one at Flamanville in France (under construction for 2 years: 2 years late and >50% over-budget).

The Myth: Nuclear Power is Safe

In 2009 Britain's Health and Safety Executive reported that it could not recommend plans for new EPR reactors⁵ because of wide-ranging concerns about their safety (referring to both EPR and AP1000). No insurance company will bear the risk of a nuclear accident indicating that the risks are substantial. In SA the National Nuclear Regulator is ostensibly responsible for protecting the public, however they carry virtually no liability which will ultimately be borne by South African society.

It is irrefutable that exposure to low doses of radiation causes damage to the DNA of the exposed individual/foetus which can result in birth defects and cancer. The UK's National Radiation Board stated in 1995 that "there is in fact no threshold dose under which one would not risk growing a cancerous tumour - in other words even a small dose could make you ill". Nearly one million people around the world died from exposure to radiation released by the 1986 nuclear disaster at the Chernobyl reactor, a new book from the New York Academy of Sciences published this year confirms.⁵

There is a growing body of irrefutable scientific research showing the link between proximity to nuclear power stations and cancer incidences in the surrounding populations.^{6 7 8}

That the industry continues in spite of growing evidence of its harmful effects is not an indication that it has been accepted by society but reveals the flaws inherent to public utilities and top heavy government structures able to be influenced by powerful industries.



Is our collective memory so short?

"You need to understand the real causes of the disaster in order to know in what direction you should develop alternative sources of energy."

In this sense, Chernobyl has not taught anything to anyone... (It's) not just us: the Americans, the French, the English, the Japanese, are all hiding the real causes of accidents at their own nuclear power stations."

Viktor Bryukhanov
(Chernobyl director at time of accident) Interview 2006

The number of children and grandchildren with cancer in their bones, with leukaemia in their blood, or with poison in their lungs might seem statistically small to some, in comparison with natural health hazards, but this is not a natural health hazard--and it is not a statistical issue. The loss of even one human life, or the malformation of even one baby--who may be born long after we are gone - should be of concern to us all. Our children and grandchildren are not merely statistics toward which we can be indifferent.

President Kennedy, June, 1963 (speaking about nuclear hazard)

The Myth: Nuclear waste can be managed or even recycled

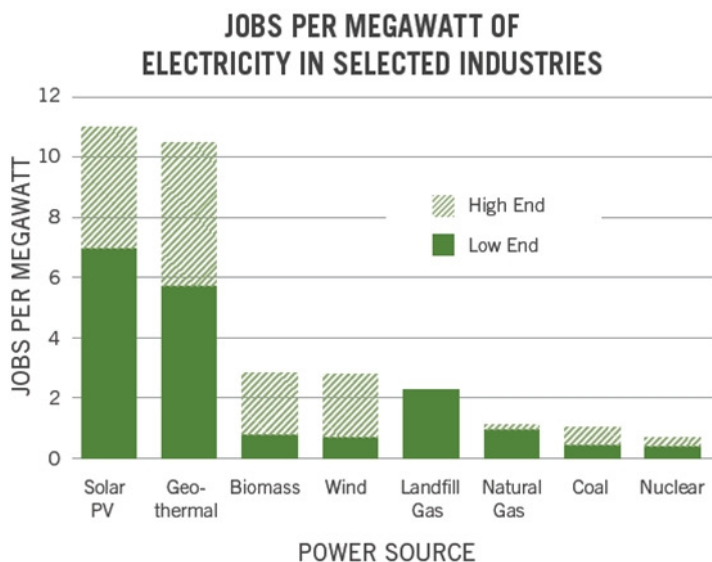
Often when nuclear energy is discussed, only the waste at the end of the fuel cycle is seen as a threat. However, the creation of nuclear energy involves various industrial processes, each of which has a specific hazardous potential. Uranium in its natural form is both chemically toxic and radioactive. Uranium mining and milling poisons watercourses and affects miners and surrounding communities. Radioactive exposure continues in the enrichment phase and also in the normal operation of a plant, due to both routine and accidental gaseous and liquid emissions of radioactive isotopes. Lastly there is the unsolved problem of a final repository for radioactive waste, which has to be safely isolated from people and nature and safely managed for its radioactive lifespan which is hundreds of thousands of years. This has not been achieved anywhere in the world.

Our sole nuclear power plant, Koeberg, outside of Cape Town already has 1800 tons of highly radioactive waste for which there is no long term plan. For the supposed benefit of the production of electricity, the real product of the nuclear fission process are substances which remain toxic and dangerous for hundreds of thousands of years. Even the person after whom the radiation measure is named, radiologist R. M. Sievert, confirms that **“There is no known tolerance level for radiation.”**⁹

Recycling of nuclear waste sounds appealing yet remains as costly and technologically unfeasible as when it was banned in the USA 30 years ago due to the generation of dangerous waste streams.

The Myth: Nuclear power is good for Labour.

COSATU is against nuclear power for every reason contained in this document, and more. Sustainable alternatives will create more decent work for lesser skilled South Africans, stimulate the South African economy, and could take advantage of massive proven export opportunities in renewable energy, growing at tens of percent per year.



Job estimates are attributable to the manufacturing, installation, and operations of each power source. Variance between high and low end estimates are a function of deployment scale, and whether or not equipment is manufactured domestically.

Sources: Renewable Energy Policy Project, Renewable Energy and Appropriate Laboratories, Nuclear Energy Institute, and The State of California.

The notion of job creation through renewable energy was reiterated by a separate study conducted by Greenpeace SA that suggests a low renewable energy uptake could be a major employment creator in South Africa, creating 78,000 direct jobs and thousands of other indirect jobs in less than 20 years.

Government studies confirm that solar water heaters alone could generate well over 100 000 decent jobs.

The Myth: Radiation affects us all equally- (Courtesy of the Pelindaba Working Group)

Presently, many radiation protection standards are based on average lifetime exposure, or on "Reference Man," a hypothetical adult "Caucasian" male who is 20 to 30 years old, weighs 70kg's, is five feet seven inches tall, and is "Western European or North American in habitat and custom." "Reference Man" is widely used to set regulatory rules and regulations, for instance, limits on how much residual radiation will be allowed in radioactively contaminated soil. In doing so regulatory agencies are not protecting those most at risk from exposure to radiation and/or toxic chemicals, be they pregnant women, the embryo/foetus, infants, children and/or different ethnic groups.

According to the National Research Council (NRC) of the National Academies, cancer mortality risks for women are 37,5 percent higher than for men for the same radiation exposure. The work of Dr. Alice Stewart, a British epidemiologist, established in the 1950's that children born to women who received even one abdominal x-ray during pregnancy were four times more likely to suffer childhood cancer as a "post-birth defect." Often the most vulnerable period is not in adulthood but rather in infancy, childhood, puberty, or when the ova are developing in a female foetus. Prenatal exposure to certain toxic chemicals or radiation can increase the risk of certain disorders, like breast cancer, later in life. In addition to this the combined effects of chemicals and radiation are little understood.

Children and the unborn are especially susceptible because of their rapid cell division during physical growth. DNA is most vulnerable to radiation impact while cells divide. In addition to cancer and birth defects, evidence exists that radiation is permanently mutating the gene pool and contributing to its gradual weakening, resulting in "developmental deficiencies in the foetus, hereditary disease, accelerated aging, and such nonspecific effects as loss of immune competence" (New Scientist)¹⁰

The use of "Reference Man" is not in accord with policies on the protection of children from environmental health risks and safety risks which are endorsed in the Constitution and are contained in the National Environment Management Act (NEMA). Women and children are disproportionately vulnerable to environmental hazards.

It is urgent that these problems be addressed systematically and broadly. Today, public water bodies used for drinking, irrigation, and recreation are polluted with radio-nuclides, such as Tritium, that can cross the placenta and toxic materials, such as mercury, which affect developing foetuses, children and their mothers.

The Myth: The Nuclear Industry can be trusted

The World Bank's Environmental Assessment Sourcebook Vol 3 notes:

"Further complicating the issue is a perception of secrecy and lack of candor that characterizes the operation of nuclear power plants. In recent years, a number of accidents have raised doubts in the public mind about the competence of the industry and the safety of the process. Many doubt the credibility of the industry"¹¹

The deception, secrecy and lies that permeate this industry have been evident in our own country. Although large amounts of money have been spent on supporting all manner of groups which try to convince the public of their false claims, some of these claims remain blatantly false.

Even the nuclear protagonist's ideal, France, in its marketing ventures into the developing world, has sidestepped the issues of its own nuclear waste legacy which it will need the capital to solve soon.

Conclusion:

While Earthlife Africa and many other civil society formations have repeatedly published information on why nuclear energy is not the wisest and most sustainable option for South Africa, the renewed focus on nuclear energy warrants a stronger, louder NO!

- The promotion of nuclear as being the panacea to tackle climate change, economic development, energy security and decent work creation is dishonest.
- Technologies such as Generations III, III+ and IV have not assisted with reducing costs nor with speeding up development times.
- After more than half a century, the world still has not found a way to deal with radioactive waste.
- South Africa needs to learn from previous global mistakes and consider the reasons that many of those who chose nuclear originally are now phasing it out.
- Focusing on non-renewable and dangerous nuclear energy will not solve our problems but will bring us back to where we are now.
- Given the 40 year life span of nuclear power plants we will be facing these choices again soon, however, next time, not only with a lot more radioactive waste; damaged air, water and soil resources; negative health issues of large sectors of our population to contend with, but with the unquantifiable costs of managing these problems forever.

Let us remember the final statements from the **ANC** Environment Desk concluding the 3 day national **Nuclear Conference in 1994**:

“...nuclear power impacts negatively on the environment and is a perpetual threat to human health. The natural ecosystem, which is the source of life, is endangered by exposure to ionising radiation. The nuclear industry should be phased out in the shortest possible time”¹¹

We must not postpone the shift to long term, renewable, clean energy solutions. We cannot afford to wait.

We call upon all patriotic South Africans to reject unsustainable responses to our future energy security, and call upon our decision makers to take the high and moral road. South Africa must be seen as a world leader in sustainable energy, and not as supporter of non-solutions like nuclear power.

We call on you, our leaders, to support a parliamentary debate involving civil society presentations, and for you to speak out on behalf of the public to reject nuclear power plans.



For a full list of references, please go to www.earthlife.org.za.

Issued by Earthlife Africa Cape Town, in the interests of a positive future for all South Africans; improved creation of decent work; and a future energy security that will not be dependent on dangerous technologies, but utilise the abundant natural resources that South Africa is blessed with.

Earthlife Africa Cape Town