

**CREATING A CONDUCIVE ENVIRONMENT FOR NUCLEAR BUILD PROGRAMMES IN SA AND AT
GLOBAL LEVEL**

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26th, 2014 in Cape Town, South Africa

Mr. Jacques Regaldo, Chairman, World Association of Nuclear Operators (WANO),
Representatives from the SA and other governments including state-owned entities,

Practitioners in the energy and infrastructure sector especially nuclear energy,

All participants,

Ladies gentlemen,

In the name of our struggle icon Nelson Mandela I greet you all.

I am absolutely humbled to be given this opportunity to share my views about the nuclear and
hope to inspire and provoke productive engagement throughout this august event. I further
thank the organisers of this event for having chosen SA as the venue thereof.

You came at the right time except for choosing days that are far from the weekend which would
have attracted you to Robben Island, the Table Mountain and a host of other scenic areas in this
beautiful part of the country.

Whilst I wish to share my thoughts on how to be pro-active and create this much-desired
conducive environment for nuclear energy programme I will also share a few unpopular thoughts
as well.

When considering global trends World Nuclear Association claimed as recent as last month that:

- “There are over 430 commercial nuclear power reactors operable in 31 countries, with
over 370,000 MWe of total capacity. About 70 more reactors are under construction.
- They provide over 11% of the world's electricity as continuous, reliable base-load
power, without carbon dioxide emissions.
- 56 countries operate a total of about 240 research reactors and a further 180 nuclear
reactors power some 150 ships and submarines.”

It is further claimed that African countries are also considering opting for nuclear energy.
Countries such as South Africa, Egypt, Kenya, Nigeria are currently planning to build nuclear
power plants in the next decades and there are other African countries are considering or
preparing for nuclear.

According to the Integrated Resource Plan South Africa has allocated 9600 MW for nuclear energy alongside other energy sources and such will comprise 23% of the total electricity generation. Notwithstanding artificial confusion sown in the public President Zuma, in his State of National Address just this month, confirmed the government's commitment to nuclear energy.

Egypt's nuclear plans are expected to generate 5,000 MW by 2027. Kenya expects to commission its first nuclear plant of 1,000MW in 2022 and three other nuclear plants with a combined capacity of 4000MW are expected to be commissioned by 2031. Nigeria plans 1,000MW from two proposed nuclear plants before 2019 and the country's quest for nuclear power is boosted by an abundance of uranium.

Development of nuclear energy is not as old as fossil-based energy sources whilst it has displayed its prowess in so far as being part of clean energy regime and its reliability is undoubted.

Every energy source has wide range of implications for a country, the choice of any source should be guided more by a number of factors that, inter alia, include:

- How does that source contribute to the national agenda of the country with regards to its socio-economic development.
- How does that source contribute to the desire by any sovereign state to enjoy a security of energy supply which is important to safeguard disruptions in energy supply particularly if the country depends on imported energy
- Value for money from the energy supply because, at times, a cheap source is not necessary value for money in the long term.

According to the Nuclear Industry Association of South Africa the case for nuclear energy in South Africa can be expressed as six basic propositions:

In coming decades we are going to need all the electrical energy we can generate. We may struggle to avoid further load-shedding. All environmentally acceptable generation options must be considered.

For environmental reasons and to conserve resources, the burning of coal, oil and gas ('fossil fuels') and the associated emission of carbon dioxide must be minimised.

Nuclear power is well proven in thirty-one countries including South Africa and can, in principle, provide essentially all the electrical energy required.

Currently viable renewable energy technologies are intermittent and expensive and will require nuclear or fossil-fired back-up.

Nuclear generation is both proven and still at an early stage in its development. It is here to stay. With breeder reactor technology and known reserves of uranium and thorium, nuclear fission will be a major source of energy far into the future.

All major means of generation impact our environment in one way or another. Impacts associated with nuclear energy are manageable and are diminishing as the technology evolves.

The contribution of nuclear to the security of energy supply for a sovereign state, has a resultant protection against changes which, in some instances, may be influenced from elsewhere.

HOW DO WE ENSURE THAT A CONDUCIVE ENVIRONMENT FOR NUCLEAR ENERGY PROGRAMMES IS CREATED?

Any country must have, amongst others, a stable environment that is conducive for the introduction of energy technologies and such includes:

- ① A functional policy and legislative environment in particular for nuclear energy
- ② Functional regulatory environment
- ③ A functional system at a political level, where the parliamentary committees provide the requisite oversight on the implementation of programmes, policy consistency, and even debates on technologies.
- ④ Experienced and committed industry that has been involved in nuclear technology for a sizeable time
- ⑤ Functional research and development infrastructure for nuclear technology

At least I can vouch that South Africa is amongst the countries that pass the above criteria.

Some of the key reasons why SA government intends pursuing the nuclear option are that the nuclear power:

- Is a proven base-load electricity option;
- Can reduce greenhouse gas emissions;
- Could be used to improve local beneficiation of uranium and maybe in years to come thorium;
- Is economically competitive because whilst construction is expensive generation becomes competitive and reliable;
- Is safe if it is well managed.
- It can also be stated that South Africa has a proven history of safely operating the Koeberg Nuclear Reactor, hence a proven track record.

However it also concedes that the following issues have to be addressed as part of any nuclear programme:

- Disposal and storage of long term radioactive waste;
- Non-proliferation of nuclear technology
- Security of nuclear installations and materials
- Safety of people and protection of the environment – the National Nuclear Regulator is an entity dedicated on regulating the industry
- Public understanding of nuclear power – in fact there are moves afoot on public awareness to enhance the public's understanding of the nuclear energy industry
- Skills development which, at this stage needs intensification

In other words this above are amongst the factors that will create a conducive environment.

Demystification

Given the distortions that are, sometimes thrown into the public discourse, it is vital that any government that decides on nuclear ensure that demystification of nuclear energy is rolled out throughout the country in the most creative manner.

The various communities, especially where the nuclear power plants will be located have to be engaged with integrity and in empowering manner without mischievousness.

Skills development

The nuclear industry unequivocally demands high levels of skills which have to be built over a sizeable period. Expertise and experience have to be "bought" by those who qualify over time which unfortunately may compel importation of such skills at initial stages. The need for ensuring not only technology transfer but skills transfer for the less advantaged countries cannot be more emphasised. Particular reference is in the area of nuclear energy construction. The implication is that any nuclear energy programme must address skills demand in time ahead of initiating any programme.

Integrated long term planning including, primarily, socio-political-economic considerations, diversification which is essentially energy mix, is quite fundamental for a successful rolling out of any nuclear energy programme given the huge investment that this industry demands.

Appropriate regulations to ensure safety is firmly anchored at design stage as we are beginning to witness must be promoted with all the vigour they deserve. Regulators have to be properly capacitated in order to ensure high standards of operation and safety in all respects.

Safety and environmentally sensitivity

Experts claim that radiation is all around us. It comes from outer space and from radioactive materials in the ground under our feet, in the building materials that surround us, in the food we eat and particularly in the air we breathe. Notwithstanding our nuclear endeavours, we need to tread very carefully as to sustainability of the environment and that we leave a legacy that our children will be proud of. The aspect of safety culture needs to be firmly entrenched in the minds of all involved in this industry.

Whilst maintaining environmental sensitivity in the industry it would be wise to explore ways and means of streamlining of environmental approvals.

Nuclear waste management

Nuclear waste management is one of the key focal areas in this industry which, in my observations, has been given the requisite attention and will still get the commitment it deserves

in future. For example the SA Government is currently setting a National Radioactive Waste Disposal Institute (NRWDI) to address radioactive waste handling and disposal. The NRWDI is. Amongst other functions,, expected to involve the public at each stage in the waste disposal site selection and planning process as international experience has displayed. Of course the country's National Waste Management Strategy corroborates this practice since it is an institutionally inclusive strategy because its success depends on the participation by various stakeholders from the public sector, private sector and civil society.

Cost containment

We cannot run away from challenges of high construction costs due to, amongst other issues, compromised project management, high cost of inputs, etc. According to the World Nuclear Industry Status Report of 2012: "The lead time for nuclear plants includes not only construction times but also lengthy licensing procedures in most countries, complex financing negotiations, and site preparation. In most cases the grid system will also have to be upgraded—often using new high-voltage power lines, which bring their own planning and licensing difficulties. In some cases, public opposition is significantly higher for the long-distance power lines than for the nuclear generating station itself. Projected completion times should be viewed skeptically, and past nuclear planning estimates have rarely turned out to be accurate."

Appropriate institutional arrangements are also crucial such that existing entities, who are directly assigned on nuclear programmes do not get overburdened. Specific reference is on engineering and construction areas.

Ladies and gentlemen allow me to be controversial a bit by challenging the supposedly sacrosanct nature of input costs. Surely if there is a strong will to witness a rolling success of this industry there must growing commitment and subsequently evidence of serious attempts to contain costs. In this we need to carefully consider commercial risk aspects, e.g. procurement, currency fluctuations, short and long term financing, and contract management.

Localisation of manufacturing

One of the strategic ways of mitigating high input costs is strong emphasis on localisation including manufacturing. Of course localisation enhances job creation as well. In encouraging Black business to enter nuclear energy sector the Minister of Trade and Industry, Dr Rob Davies during his keynote address at the Nuclear Empowerment Conference at the Sandton Convention Centre on the 5 October 2012 claimed that the New Nuclear Build Programme presents a major opportunity for the development of a local supply and manufacturing industry to develop.

He further emphasised that the programme presents a massive opportunity for new investment and joint ventures to supply not only the local market but also the global market.

Furthermore appropriate incentives for localization of manufacturing and services ought to be introduced to attract investments. The local industries have to be bolstered so that they can form part of the value chain in terms of local procurement. Here there needs to be links established

with international players with experience. Any country that is driving a nuclear programme needs to ensure that there is an adequate base of local suppliers to the nuclear industry.

International cooperation - whether in terms of cooperation, financing, skills or other factors – is essential for success in this industry.

The recent incident at Fukushima has made many countries to rethink their positions regarding nuclear energy. It is important for the global energy community to continue creating a conducive environment, amongst other;

① Open sharing of experiences at global stage about incidents in each country, as the saying go, an injury to one is an injury to all – the IAEA is the most appropriate body for such a task

② Strengthening global collaborations and partnerships at various sectors impacting on the nuclear industry – there is a plethora of bodies that exist and whose work needs to be promoted to the highest levels ever.

International cooperation may, at times, beckon managed competitive relations as compared to the current fierce competition that obtains the industry. Unfortunately there is an undeclared low- intensity war by certain protagonists of different energy technologies, sources and carriers. Such a subtle war manifests itself in various forms such as disinformation, undermining efforts to introduce and promote a specific energy technology, inconsistencies in the implementation of energy programmes, highly pitched campaigns against specific technology, etc. The impact of such wanton behaviour leaves some of us aghast when weighing the missed opportunities and losses in human advancement. He or she who controls or dominates sources and technologies in energy wields enormous power over human development.

As much as it may appear a wishful thinking sharing whatever information that may be shared is one of the factors that would propel a conducive environment.

Focus of peaceful means as espoused by the IAEA

Without any doubt focus in this regard is using nuclear technology for peaceful and productive purposes. Such even strengthens the need for a resolve for all stakeholders to make all endeavours to contain costs.

Locally the ANC government here in SA has generally endorsed the stance on non-proliferation of nuclear weapons in Africa expressed in Treaty of Pelindaba and promoted the expansion of nuclear energy industry.

Technological advancement through research and development

Once again research and development keeps on proving itself by introducing better methods of generating power the nuclear energy. This must then be bolstered by complementary policies,

laws and regulations. Technological advance without requisite advancement of an enabling environment will unfortunately be quite limited.

Sharing successes especially the Generation IV prospects

Given the relatively short period of developing nuclear energy technology the fact that research and development have advanced to levels of Generation IV such must be a cause for motivating those centrally involved in the industry and countries enjoying such successes must share them with those countries interested to include nuclear energy in their energy arsenal.

Sharing the SA dream with the rest of Africa is laudable especially when taking cognisance that political will is essential since the role and contribution of government and public support are fundamental for the nuclear energy industry to thrive.

Recognise the role of regionalisation and inter-dependence

Regionalisation of such industries given the unavoidable inter-dependence amongst neighbours has to be favourably explored where possible. Such efforts ought to extend to collective approach in addressing challenges such as raising capital, developing local skills, to lessen the burden on one country. This would obviously extend to harmonisation of policies, laws and regulations for the much-needed synergies for nuclear energy programmes.

In concluding enhancing investment climate through incentives and PPP's, conducive policy and legislation has to be a serious consideration. Such also extends to creation of funding mechanisms for countries desiring to introduce nuclear technology including nuclear energy.

What appears as the most propelling is a package of factors that will create this conducive environment for nuclear energy. Emphasis cannot be on the economic and environmental aspects only – the political will through appropriate legislation, endorsement by the public through demystification of nuclear energy, strong cooperation between government and the industry, are some of the features. Whilst governments are expected to provide leadership on a number of aspects at the end of the day cooperation amongst the various players in the industry is just as paramount.

The role, contribution and vitality of science, engineering and technology in development generally and the energy spheres specifically has to, inter alia, address any unintended consequences of any advancement in the industry. In other words it is the very science, engineering and technology that will provide solutions to such as cost overruns, environmental considerations, project management challenges, etc. Moreover every energy technology has its pros and cons – what remains a challenge is what solutions we have for the cons.

Acknowledgement of the vital role of nuclear technology and therefore of nuclear energy technology is a fact that we need not dispute but whose veracity we need to further interrogate because as James Lovelock the Founding Father of Gaia said "We live at a time when emotions

and feelings count more than truth and there is a vast ignorance of science.”

Notwithstanding the competitive relations amongst stakeholders and role-players what is paramount is the imperative for all and sundry to raise the flag of the nuclear energy industry and make sure it earns as well as retain its rightful place in the energy sphere. Such is a daunting task that demands we all rise above any parochial interests.

I WISH THIS CONGRESS A RESOUNDING SUCCESS

THANK YOU FOR YOUR ATTENTION

[i] ACKNOWLEDGEMENTS:

Nuclear Industry Association of South Africa

World Nuclear University

World Nuclear Association

International Atomic Energy Agency

Department of Energy – South Africa

Parliament of South Africa