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## **Knowledge Sharing for Sustainable Development of Nuclear Power: An Investment for Future Generations**

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It gives me great pleasure to be here this afternoon among a galaxy of highly successful nuclear professionals. We are gathered here for the purpose of sharing our experiences, working together, and helping each other in order to more effectively utilize nuclear energy for sustainable development. We believe that increased use of this energy resource is bound to lead to a more prosperous, peaceful and secure world.

Ladies and Gentlemen, this Symposium is of special significance. It began with homage to a great visionary, affectionately called 'Ike'. Due to unforeseen commitments, I could not join you in remembering President Eisenhower and his famous "Atoms for Peace" speech on the opening day of this Symposium. I would like to take this opportunity to recall what 'Ike' said while proposing the creation of what we now call the IAEA. He said, and I quote, "The most important responsibility of this atomic energy agency would be to devise methods whereby this fissionable material would be allocated to serve the peaceful pursuits of mankind. Experts would be mobilized to apply atomic energy to the needs of agriculture, medicine and other peaceful activities. A special purpose would be to provide abundant electrical energy in the power-starved areas of the world". This was in December 1953. If we look around, we do find a large number of nuclear power plants, but we still find in the world power-starved areas, with its attendant poverty; we also see smoke, smog and NO<sub>x</sub> gases and we talk of carbon dioxide and climate change!

Pakistan has only recently joined the World Nuclear Association. We were reluctant to join earlier. We are active members of the IAEA, WANO and COG and appreciate the tremendous sharing of knowledge that takes place in these fora. But we also have to face embargoes, restrictions and denial of information and technology. We have joined the WNA to interact with a more diverse nuclear community and further enhance cooperation, particularly in nuclear power. It also provides us an opportunity to share our views. We hope that we, all of us together, can change the situation for the better of all of us, I repeat 'all of us'.

I must here acknowledge the zeal and persistence of WNA Director General, Mr. John Ritch and other founding fathers to create this World Nuclear Association. I

am sure that it will be effective in its aims and objectives and will give a fillip to resurgence in the peaceful use of atomic energy that we all are looking forward to.

The saying “Knowledge is Power” is well known. Sharing of knowledge multiplies its advantages manifold, and the benefits that accrue from this sharing increase in geometric proportions. If we go back, the accident at Chernobyl (1986) gave birth to WANO and the sharing of nuclear power experience worldwide. WANO, as well as the IAEA, developed into great “hubs” where all of “us”, i.e. nuclear operators, get together to share operational and safety related information. Safety breeds reliability. Greater reliability leads to greater revenues and greater viability. The nuclear power industry worldwide has seen tremendous improvements in reliability, availability and sustainability. In the OECD countries, for example, where embargoes on technical and material exchange do not apply, in the period 1986 to 2002, while the number of operating nuclear power plants increased by 10%, from 324 to 355, the electricity generated increased from 1372 TWh to 2309 TWh, an impressive increase of 68%<sup>1</sup>. This is the advantage of knowledge sharing. And this improvement is in spite of the difficulties created by the so-called anti-nuclear organizations.

I do not need to talk of the advantages of nuclear power for electricity generation to this august audience. It is economical, eco-friendly and an energy source of the future. The OECD countries are investing some US\$2700 million per year in public sector research and development in nuclear fission and a comparable amount is also being invested by the private nuclear industry<sup>2</sup>. The West, it seems, is waiting impatiently to increase on a large scale its share of nuclear power generation. The reduction in greenhouse gases, the economic advantages, the impetus to industrial development and the resulting increase in well being and happiness of the people needs no elaboration. In East Asia, nuclear power plants continue to be built to meet the ever increasing demand for electricity.

On the other hand, countries like Pakistan are finding it difficult to develop nuclear power. According to our current assessment, based on official economic growth targets, the projected electricity generation capacity requirements in Pakistan by the year 2020 will be some 44 000 MWe, up from 18 000 MWe installed presently. The plans are to build an additional 10 000 MWe hydro capacity, leaving a gap of some 16 000 MWe, which could be met by burning coal, nuclear power or imported gas. Use of imported oil for power generation is prohibitively expensive. This is the situation in a country which has a large population and a small per capita energy consumption but good experience in operating nuclear power plants. The choice is between polluting fossil fuels or environment friendly nuclear power.

Pakistan is very fortunate in having the support of the international community in its efforts to apply nuclear energy in agriculture, medicine and industry. As a result of this international collaboration and knowledge sharing, Pakistan has benefited tremendously in the development of new varieties of various

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<sup>1</sup> Source: Nuclear Power Reactors in the World, IAEA, 1997 and 2003.

<sup>2</sup> Source: Energy for Sustainable Development: A Policy Agenda, UNDP 2002 and Energy Technologies for the Twenty-First Century, World Energy Council, 2001.

agricultural crops. Our cotton and rice exports have increased and contributed significantly to increase our gross national product. Additional income of some US\$100 million per year is estimated from crops developed by nuclear techniques at our four nuclear agriculture institutes. With this kind of money, a small-to-medium-sized nuclear power plant can be added every 5 to 6 years. In the field of agriculture, Pakistan has shared its development with many countries through the IAEA.

In the field of health care, knowledge sharing has increased our grasp of nuclear diagnostic and therapeutic techniques. In the process we have set up 13 nuclear medical centres all over Pakistan. Over a million patients have been treated at these centres in the last 4 years. And, I might add here, a sizable fraction of the patients in the centres located near the Afghan border were refugees from that country. The fees charged at these medical centres are very nominal and in most cases the treatment is *gratis*. All this, I feel, is a realization of the dream of President Eisenhower. We are in the process of setting up five additional such centres. We are sharing our knowledge by training professionals from many countries at these hospitals. In addition, many foreigners have received M.Sc. Nuclear Medicine degrees at our training centres.

A popular saying amongst nuclear operators is that a “nuclear accident anywhere is a nuclear accident everywhere”. On the same analogy, one could say that a “nuclear power plant anywhere avoids greenhouse gases everywhere”. In our region, where economic development is picking up, we are experiencing a unique phenomenon during winters. A huge cloud of smog covers the vast area along the Himalayan mountains from near Islamabad in Pakistan to Calcutta in India. It badly disrupts life and economic activities. According to some experts, this recent phenomenon, which is getting worse with time, is a direct result of increased burning of coal in our neighbouring country as its economy is growing. And we will soon join them in burning coal from our recently discovered vast coal fields at “Thar”!

Pakistan started work on its first nuclear power plant as long ago as 1965. This plant “KANUPP”, a CANDU-type, is now undergoing re-lifing after having completed its design life in December 2002. While we can boast of being amongst the oldest generators of nuclear electricity in the world, we wish KANUPP had a higher availability factor. While we have had access to operational experience and safety related information, KANUPP’s availability has been low because of the denial of equipment and services.

We welcome the safety-related information and exchange of operating experience. However, we feel that denial of equipment is not reasonable. We are left with no option but to operate and maintain KANUPP on our own. Nevertheless, KANUPP has been self-sufficient financially for over 25 years and is carrying out the refurbishment required for re-licensing indigenously and from its own financial resources. The safety-related assistance provided by IAEA, WANO and COG is highly appreciated.

Our second nuclear power plant, CHASNUPP, began operation in September 2000 and is presently operating quite well. We have plans to start work on its twin in the near future. During the construction of the first unit, as many as 3000

workers were directly involved. It has contributed significantly to the local economy and the advantages to the community continue to accrue. Installation of the second unit at Chashma would boost the economy, creating many more jobs.

During the last three years, our nuclear power generation has avoided the release of about 4 million tonnes of carbon dioxide; a small, but nevertheless significant figure. The share of nuclear power in the past year was nearly 2.7% of total electricity generated.

We recognize that nuclear power needs special handling. We have a meticulous record in safety, safeguards and security. Both of our nuclear power plants are under IAEA safeguards and we have fully cooperated with the IAEA in the implementation of these safeguards.

We have demonstrated the capability to operate nuclear power plants safely. We need to set up many more. We know that these plants will help generate jobs, accelerate economic development and bring smiles to our people. Poverty and unemployment breed hopelessness, frustration and anger. We feel that, for lasting peace in this world, no people should be denied the advantage of economic development.

How can we enhance sharing of nuclear energy and associated knowledge? In addition to cooperation in the related fields of agriculture, medicine and industry, the greatest impact of international cooperation is in nuclear power generation. This is a huge industry. There is, and has been, substantial cooperation in nuclear power technology between, among others, industrial giants in the USA with utilities in France, Japan and Korea. Subsequently, there was cooperation between France and China also. We in Pakistan look forward to such cooperation.

We do understand the concerns that some governments have on nuclear proliferation in the world. Many countries desperately need nuclear power. So we need to find a way out.

We would like to suggest joint ventures for setting up nuclear power plants in Pakistan. To alleviate proliferation and other concerns, nuclear power plants can be treated in a special manner. Several NPPs could be constructed in a designated zone, the boundaries of which are specially secured to the satisfaction of all concerned. It can be ensured that the plant and associated facilities are fully safeguarded. This could be a solution for Pakistan.

Before I end, I would like to talk about the World Nuclear University. Although, I was not present at the Session in which it was formally launched yesterday, I wholeheartedly support the idea. I am convinced that the University will play a vital role in disseminating knowledge about the peaceful uses of nuclear energy. The Pakistan Atomic Energy Commission (PAEC) has a full-fledged University, PIEAS (Pakistan Institute of Engineering and Applied Sciences), which imparts education at Masters and Ph.D. level, in fields of nuclear engineering, nuclear medicine and systems engineering and at the B.S. level in Computer Science. Up to now, it has produced more than 1200 graduates, most of them are involved in different activities of PAEC, including safe and efficient operation of nuclear

power plants. I request that PIEAS be associated with WNU. We believe such international linkages play a crucial role in imparting and sharing of knowledge globally for the good of humanity.

Distinguished guests, knowledge sharing leads to a win-win situation for all, with benefits to the world as a whole. Knowledge sharing increases business worldwide. Egalitarianism is enhanced through reduction in the rich-poor gap, which will enhance peace, prosperity and security all over the world. The “Global Village” concept could be realized much earlier.

May I therefore suggest that we resolve to usher in an era of cheap and safe nuclear electricity for posterity. This needs knowledge sharing and will boost industrial output, create more jobs, and contribute to peace, prosperity and security worldwide. President Eisenhower’s dream was to harness the tremendous energy in the atom for the benefit of mankind. This is my dream too, and I am sure that we all share it.

In the end let me thank you, Mr. President, for providing this opportunity for sharing my views. I wish the World Nuclear Association great success and a glorious future in serving humanity.