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Discurso del Dr. ElBaradei (Director de la AIEA) con motivo de la recepción de Doctorado Honoris Causa de la Universidad Nacional de Cuyo y la CNEA:

SECURITY AND DEVELOPMENT: THE TWO SIDES OF NUCLEAR

TECHNOLOGY

I am deeply grateful to receive this Honoris Causa Degree from Cuyo University, an institution that has for decades produced nuclear scientists and engineers that serve Argentina and the international community with great distinction. It is an honour to count you as colleagues. I would also like to thank the Dean of the University, Dr. María Victoria Gómez de Erice, and the President of CNEA, Dr. José Pablo Abriata, for their warm reception and gracious hospitality.

Two of the most daunting challenges facing modern society are the need for economic and social development in many countries — including within some developed countries — and the need for a more effective system of international security. What is not always understood is how these two challenges — development and security — are linked. When development needs such as poverty, hunger and disease remain unaddressed; the resulting misery often leads to conflict and violence, which in turn can impact national and regional stability.

In the energy sector, the linkage between development and security is particularly evident. Energy security is becoming a major concern for both developed and developing countries. If current consumption trends hold, analysts predict a 50% increase in global energy consumption by 2030 — and 70% of that increase is expected to come from developing countries. This growth in demand is understandable when we consider that nearly every aspect of development — from increasing food production to improving health care — requires reliable access to modern energy services.

But where will the increased energy come from? Here the picture becomes more complex. Many analysts predict a decline in the supply of oil and natural gas. The markets for these and other fuels are becoming more volatile. The competition for energy supplies is increasingly a driver of geopolitical tension. And fears of environmental impact, ranging from air pollution to climate change, are forcing a reevaluation of coal and other fossil fuels. Naturally, it is the least developed countries that are the least equipped to compete in this complex scenario.

Consider the current global energy imbalance. Roughly 1.6 billion people live without access to electricity, and 2.4 billion rely on traditional biomass because they have no access to modern fuels. In some African countries, for example, the per capita electricity consumption is around 50 kilowatt-hours per year. That translates to an average availability of 6 watts — less than a normal light bulb — for each person.

To put this in perspective: the developed countries that make up the Organisation for Economic Cooperation and Development (OECD), on average, consume electricity at a rate per capita of 8600 kilowatt-hours per year — roughly 170 times higher. Here in Argentina, the per capita rate is about 2800 kilowatt-hours per year — a factor of three less than the OECD average, but a luxury by comparison to many developing countries.

It is against this backdrop of development and security issues and energy security concerns that I would like to discuss a number of aspects of nuclear technology, and in particular nuclear power.

THE CURRENT GLOBAL STATUS OF NUCLEAR POWER

There are currently 439 nuclear power reactors in operation in 30 countries. These reactors supply just over 15% of the world's electricity. To date, the use of nuclear power has been concentrated in industrialized countries. In terms of new construction, however, the pattern is different; 15 of the 30 reactors 110W being built are in developing countries, and most of the recent expansion has been centred in Asia. China, for example, currently has four reactors under construction, and plans a more than five-fold expansion in its nuclear generating capacity over the next 15 years. India has seven reactors under construction, and plans roughly a seven-fold increase in capacity by 2022. Vietnam, intends to begin construction of its first nuclear power plant in 2015, and Thailand and Indonesia are seriously looking into the nuclear option.

But it is not only in Asia that we are witnessing a resurgence of interest in nuclear power.

Other countries such as Egypt, Jordan and Turkey are seriously considering the introduction of nuclear power programmes. And a large number of countries with existing nuclear programmes, such as Bulgaria, Finland, Japan, Russia, South Africa, and the USA, are working to expand their nuclear generation capacity.

Here in Argentina, construction has resumed on the Atucha II nuclear power plant. And the government is conducting a national assessment to consider adding nuclear capacity between 2010 and 2025.

The reasons for this resurgence of interest in nuclear power, here and elsewhere, are readily apparent. For many countries, nuclear power is a way to enhance the security and diversity of their energy supplies. Uranium costs make up only about 5—15% of the total costs of nuclear generated electricity, so fluctuations in uranium markets are of lesser concern. Nuclear power emits almost no greenhouse gases — about the same negligible emission rate as wind and hydropower — a critical advantage over fossil fuels in terms of environmental impact. And the progressively improved safety and economic performance of nuclear power plants in recent decades has been an especially important factor.

LOOKING FORWARD: A NUCLEAR RENAISSANCE?

What does the future hold for nuclear power? It seems clear that, for a number of the factors I have already covered, nuclear power will continue to be part of the global energy mix. But the degree to which we witness what some are already calling a “nuclear renaissance” will depend on a number of specific issues.

Addressing Key Concerns

First, the nuclear community will need to continue its strong performance — and in some areas improve its performance — in areas of public concern. Nuclear and radiation safety standards and operational practices must be maintained at the highest level, even as nuclear technology spreads to additional countries, as new reactor designs are developed and as the licenses of existing plants are extended. Nuclear security must be equally strong, ensuring that nuclear installations are protected against sabotage and other security risks, and that nuclear and radioactive materials are tightly controlled.

As the global verification body charged with preventing nuclear proliferation, the International Atomic Energy Agency must be given strong support — meaning clear authority, state-of-the-art technology, access to all relevant information, and sufficient resources. And progress must be made on nuclear waste recycling and disposal, by developing proliferation resistant fuel reprocessing methods, and by establishing geological waste repositories.

Technological Innovation

The future of nuclear power will also be greatly impacted by technological innovation — the development of new reactor and fuel cycle technologies. As might be expected, current

nuclear R&D projects are focused on enhancing nuclear safety, reducing proliferation risks, minimizing waste generation and improving economic performance.

The IAEA's International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) works to ensure that the future needs of all countries, in particular developing countries are understood and taken into account when innovative nuclear systems are evaluated and developed. Argentina has been a strongly supportive member of INPRO.

Many developing countries have been particularly interested in efforts to develop small and medium-size reactor designs. These designs allow a more incremental investment than is required for a big reactor, and provide a better match to grid capacity in many developing countries. They are more easily adapted to applications such as district heating and seawater desalination. Many countries are currently working on developing new reactor designs in this size range, which may well be in high demand in the future. As one example, the IAEA has been providing technical cooperation in support of Argentina's development of the low power CAREM reactor by Argentina's National Atomic Energy Commission.

Policy Innovation: Proliferation Concerns and the Nuclear Fuel Cycle

Innovative approaches are also needed to deal with the proliferation sensitive parts of the nuclear fuel cycle. At the same time that we are seeing rising expectations for nuclear power, we are equally witnessing concerns regarding the spread of nuclear weapons and of sensitive nuclear technology. Last year's nuclear test by North Korea and the ongoing international concern about the nature of Iran's nuclear programme are but two cases in point.

As more countries industrialize, controlling the spread of technology is becoming increasingly difficult. Particularly sensitive are nuclear operations such as enrichment and spent fuel reprocessing — activities that are part of a peaceful nuclear programme, but also can be used to produce the high enriched uranium and plutonium used in nuclear weapons. For some time, I have been advocating that we should consider a multinational approach to enrichment and reprocessing — to ensure that no one country has the capability to independently produce sensitive nuclear material. This would occur in two steps.

The first step would create a mechanism for the 'assurance of supply' of nuclear fuel, possibly including a fuel bank to be managed by the IAEA. For countries that use nuclear fuel for electricity generation, this mechanism would serve as a supplier of last resort, thereby removing the risk of having their fuel supply interrupted for non-commercial reasons. It would also reduce the motivation for new countries to invest in these proliferation-sensitive operations — a clear benefit, considering the expected expansion in nuclear power use globally.

The second step would seek to bring any new operations for uranium enrichment and plutonium separation under multinational control. Over time, these multinational controls would also be extended to facilities that already exist — to ensure that all countries are treated equally in terms of their nuclear capabilities.

ARGENTINA AND THE IAEA: AN ACTIVE PARTNERSHIP

For many years, Argentina has been a strong and supportive partner of the IAEA. On the non-proliferation front, Argentina is party to the Nuclear Non-Proliferation Treaty. In the field of nuclear and radiation safety, Argentina is a party to all of the safety related conventions.

Argentina has also become a leader in research reactor development, as seen in the sale of the 20 megawatt OPAL reactor that came online last year in Australia, as well as research reactors sold earlier to Algeria, Egypt and Peru. And Argentina's technological leadership has been particularly noteworthy in the conversion of research reactors to use low enriched uranium, thereby reducing proliferation risk. I would note with appreciation that Argentina is the first

country in the world to fully convert its domestic production of molybdenum 99 to use LEU targets.

Argentina has made key contributions to leadership in the nuclear community. A good example is the late Dr. Dan Beninson, one of the principal architects of the IAEA safety standards that are now applied worldwide. Dr. Beninson was both a national and international leader, serving not only as the president of Argentina's national nuclear organizations but also as the Chairman of the International Commission on Radiological Protection and other international bodies. I would also highlight the contribution of Dr. Abel Gonzales, whose decades of dedicated service and scientific leadership have left an indelible footprint at the IAEA and on international radiation safety.

Finally, I would like to note with gratitude the ongoing contributions made by Cuyo University and the Balseiro Institute to the nuclear community. As you may know, the Government of Argentina has recently offered this institute to become an IAEA Regional Centre in Nuclear Education. The IAEA is in the process of establishing appropriate procedures for the formal recognition of such centres. I am confident that once these mechanisms are in place, the Balseiro Institute will be among the first of such centres to be designated in your region.

CONCLUSION

In closing, the need to ensure adequate and reliable energy supplies is directly relevant to development, and to national and international security. As such, global energy security — fulfilling the energy and other development needs of all countries and peoples, including the two billion people now existing on less than \$2 per day — will continue to be an important part of the international agenda for the foreseeable future.

As a regional technology leader, and as a country working to enhance its energy security, Argentina has great future potential in the area of nuclear power and other nuclear technology. At the IAEA, we look forward to your continued support, and we stand ready to cooperate with you in finding the solutions best suited to your needs and priorities.