GLOBAL CHALLENGES AND THE DEVELOPMENT OF ATOMIC ENERGY: THE NEXT 25 YEARS

Introductory Remarks by Chairman, Gareth Evans (President, International Crisis Group), IAEA Scientific Forum 2007, Vienna, 18 September 2007

I am honoured to have been invited to chair this Science Forum, meeting as it is alongside the IAEA General Conference, which has been given in this 50th anniversary year of the Agency the extraordinarily broad and daunting task of looking at how the world's nuclear future might unfold over the next quarter century and the technical, safety and security issues that will have to be addressed as it does.

I also feel privileged to be sharing this platform with Director-General Mohamed ElBaradei, who not only shares my taste for a little policy adventurousness from time to time – a high risk activity, as we both know! - but believes strongly, as I do, in the need to address technically complex policy issues in terms that can be clearly understood and debated by policymakers and publics. Issues relating to both the peaceful and non-peaceful uses of nuclear energy are among the hardest of all for laymen to grasp - including laymen holding high public and political office - and I hope very much that one of the achievements of this forum can be to produce ideas and analysis that will not only satisfy the scientific specialists among us, but cam be communicated effectively to non-specialists.

We meet at a time when – as a result of fears about energy security, fears about the environmental impact of fossil fuels and renewed fears about nuclear weapons proliferation - the whole spectrum of nuclear energy issues has never been more alive in international public debate. Certainly in all the years that I personally have been following these issues – as Australia's Minister for Resources and Energy and then Foreign Minister in the 1980s and '90s, for the last eight years as President of the International Crisis Group, and being involved in international panels from the Canberra Commission to the Blix Commission – I have never seen the nuclear debate in all of its manifestations occupying so much of the centre stage. Policymakers have never been in more need of guidance as to how to address the many challenges they are facing, and I hope very much that this Forum will give them just that.

We will be addressing, in the sessions ahead over the next two days, four big themes: the future of nuclear power in meeting the world's energy needs; new roles for nuclear technology in food, agriculture and health; meeting the challenge of safety and security in nuclear infrastructure; and – most challenging of all – holding the line against weapons breakout through effective safeguards and verification.

Nuclear Power

Fossil fuel presently provides 80 per cent of the world's energy supply, but it's hard to find anyone now who thinks that proportion sustainable, particularly with the growth in energy demand now being predicted - at least 50 per cent increase in the next 25 years. Two thirds of that increase will occur in developing countries, and necessarily so given huge present unmet needs - there are presently 1.6 billion people with no access to electricity at all, and gross inequalities in geographical access (with 36 million Tanzanians, for example, getting by with less than one-hundredth of the per capita annual energy available to the more than a billion people living in the OECD countries).

In relying on fossil fuels to meet even present demand – with an extraordinary 50 million new cars coming on to the road each year - let alone the huge upsurge predicted in the future, there are obvious problems: rising prices, energy security concerns due to the geographic concentration of oil and gas reserves in the Gulf States and Russia, and of course environmental concerns associated

with the increasing concentrations of carbon dioxide in the Earth's atmosphere. Improved access to affordable and clean energy, ensuring that *every* country's basic needs are met while causing minimal additional havoc to the global environment, is the name of today's energy policy game.

It is in this context it is hardly surprising that there has been recently a huge upsurge of interest not only in renewables, but the contribution that can be made by nuclear energy capable of providing huge amounts of energy, and just as clean as renewables in its climate impact, but with downsides we have to acknowledge - the need for elaborate and capital-intensive infrastructure, and the political risks associated with public anxiety in many parts of the world about nuclear safety, security and proliferation.

Today there are 439 reactors in operation in the world and 30 under construction. The IAEA each year releases two updated projections for nuclear power in the next few decades, a low and a high. The latest are that the number of reactors will increase to somewhere between 469 and 711 reactors by 2030: i.e., there could be a net gain of just 30 reactors, or – at the other end of the spectrum - of 272

So while there are rising expectations for nuclear power in the future, there is still enormous uncertainty how this will play out in practice, and it is the object of this part of the Forum to try and get some greater clarity into the picture. There will be a global overview, followed by perspectives on the likely course of nuclear power development in three key regions: East Asia, specifically China; South Asia, specifically India; and the Middle East, specifically Jordan.

In particular we will be looking at what motivates investors and government policy makers in different parts of the world. Is it energy supply security? Hard-nosed economics? Greenhouse gas mitigation? Is it simply booming energy demand? A mixture of all of the above? And what will be the impact of possible new measures to multilateralise aspects of the fuel cycles both front-end and back-end? What is the likely impact of new R& D in fission technologies throughout the fuel cycle, and what progress will be made over the next quarter-century on fusion research?

Nuclear Safety and Security

Expanding, and perhaps even maintaining, the role of nuclear power in the overall energy mix of countries over the next 25 years will require significant and increased attention to nuclear safety and security. At least since Chernobyl, and with the awful warning of 9/11, we all know that safety and security chains are no stronger than their weakest links: identifying those areas of weakness and what is needed to address them will be the subject of a full session tomorrow morning.

Nuclear power plants require particularly sophisticated safety and security infrastructure, including all the needed legal and regulatory capabilities, educated and trained manpower, a stable electrical grid, and access to financial and industrial resources as well as an appropriate safety culture.

We need to be concerned not only about getting this right for new plants, but with addressing some real problems in the current fleet of nuclear power plants, some of which fall well behind in safety performance either due to limited resources for upgrades, lack of awareness of the deficiencies, or simply because of complacency and a lack of proper safety culture.

This session will therefore focus on the need to establish and maintain a global safety and security framework supported by appropriate, and widely adhered to, international legal instruments relating to safety and security, the application of IAEA safety standards and security guidelines, national safety and security infrastructures and effective global and regional networks for knowledge sharing and operational experience feedback system. Attention should also focus on the harmonization of regulatory requirements and the resulting greater international standardization, which serves both safety and economic objectives. I hope that in all of this we can come out with some messages cast less in terms of these comfortable abstractions and more in terms of sharp-edged, concrete, conclusions and recommendations.

And in this context I hope that particular attention will also be paid to the issue of radioactive waste management, which – as policymakers are acutely aware – remains one of the most politically dare-I-say radioactive issues of all those with which supporters of nuclear energy have to deal: not least in my own country, notwithstanding its great size and geological stability, which makes it an obvious candidate for underground storage. Technical specialists are capable of being clear, succinct and persuasive, but sometimes they need to work a little harder to convince lesser mortals about the balance of risks involved.

Nuclear Sciences and Applications

It should be easy to tell a persuasive and compelling story when it comes to this afternoon's session on likely developments in nuclear sciences and their applications to food, agriculture and health, particularly in the context of the major humanitarian problems still facing the developing world, and in the face of a technology gap which has every prospect of growing rather than reducing in the decades ahead.

Increased food production can come about through an intensification of known and effective technologies, for example *plant mutation breeding*, where the development of nutritious crops that are adapted to drought or other hostile conditions (altitude, heat, cold) can make huge areas of currently non-productive land available and environmentally attractive. Another example is the reduction of food wastage caused by microbiological contaminants and insect pests, through a wider application of *food irradiation* technologies.

The cautionary note that needs to be sounded here, to which technical specialists are sometimes oblivious, is that to scientific laymen – which includes nearly all policymakers and the publics with which they have to deal – these kinds of technologies often sound very spooky indeed, not least when they are being advocated by rich developed countries as appropriate strategies for poor and undeveloped ones. So I make again a plea for particular thought and emphasis to be given in our deliberations as to how best to communicate information and ideas with clarity and sensitivity.

The story is probably easier to tell in the context of health, where nuclear medicine, in particular radiotherapy, tends to be much better understood and accepted, and where the real issue is how to ensure that its benefits are more equitably distributed. Certainly additional resources will need to be mobilised to respond to the predicted large increase in the numbers of cancers in developing countries by increasing the provision of basic *radiotherapy* treatments and exploring the advances in *imaging* tumours for accurate treatment. Nuclear medicine will also play an increasing role in the *treatment of cardiovascular diseases,* which today are a greater killer than cancer.

Nuclear Non-Proliferation and Verification

The last session of this Forum will assess the current state of play, and likely and necessary future developments, in safeguards and verification. The immediate context is that of international peace and security – ensuring nuclear non-proliferation - but of course, as was well understood by the founding fathers of the IAEA in implementing the 'atoms for peace' trade-off, the expansion of the peaceful use of nuclear energy will be very much facilitated by international confidence in an effective nuclear verification system.

In the words of the 2004 UN High Level Panel on Threats, Challenges and Change, on which I had the honour of serving, the IAEA is at the heart of an extraordinary international bargain. Its safeguards system, providing assurances about the peaceful nature of national nuclear programs, is a widely recognized confidence building tool in the hands of the international community. It is critical in this context that the Agency be provided sustained and predictable resources for all its mandated activities – with state-of the art technology particularly in analytical capability, notably with regard to isotopic sample analysis, satellite imagery and information management generally.

However, in order for the Agency to be able to continue to fulfil its verification responsibilities in a credible manner, it can't stop with the system we now have. It must continuously perfect the strengthening of its safeguards system, which was initially spurred by the discovery of clandestine nuclear weapons programmes in Iraq in the early 1990s. Among other things, this will require that the all States bring into force the safeguards agreements they committed to and conclude Additional Protocols with the Agency, enabling more intrusive investigative procedures. Only then will the IAEA have the basic tools it needs to draw safeguards conclusions about the absence of undeclared nuclear material and activities. Lessons must also be drawn from the discovery of covert nuclear supply networks, and relevant information must be furnished to the IAEA to assist the Agency in drawing its safeguards conclusions.

But effective implementation of the Additional Protocol regime – and reinforced inspection resources – are not necessarily the end of the verification story. Hard cases call for stronger measures, and strong, specifically tailored 'Additional Protocol Plus' measures are going to have to be part of any negotiated solution of the kind that I, for one, think is both desirable and achievable with Iran, and for the kind of verification system that will finally persuade the world that the DPRK is serious about giving up its nuclear weapons.

The general case for non-proliferation would be well served by the existing nuclear weapons states under the NPT committing themselves to sustained further cuts in their nuclear arsenals and the implementation of further steps toward a genuinely nuclear weapons free world. Nobody likes double standards, and there are few areas of international public policy where they are more obvious than in the weapons states' indifference to what the rest of the world regards as their commitments under Article VI. It may be beyond the scope of the IAEA's mandate to do anything very directly about this unhappy state of affairs with disarmament, but – in an environment where the whole NPT regime is presently under real stress - discussions at forums such as this should never be slow to point out the obvious.

I am not sure how willing the government and non-governmental experts in our last session will be to engage in full-blooded debate of these delicate and sensitive issues, involving not just general principles but the behaviour of specific member countries. But I hope we won't avoid them altogether, because unless these issues are satisfactorily resolved there is a risk that the whole NPT regime will collapse, and with it any hope we might have of a world in which we have – to our huge mutual advantage – both atoms *and* peace.

I look forward, particularly given the outstanding quality of the panelists that have been assembled, to some really stimulating discussions over the next two days. I also look forward – though maybe this is a little too much to ask - to having some conclusions and recommendations to report back to the main Conference which are just a little bit meaty, and a little bit juicy. Let's try in these sessions to not just observe and analyse the world, but to see what we can do to make it a little bit better. The issues we are talking about really are at the cutting edge of international policy debate, and the world's policymakers – on the evidence of their less than brilliant performance in recent years in meeting the challenges of energy security, equitable development, environmental protection, non-proliferation and disarmament - need, as I suggested at the outset, all the help we can possibly give them.

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