

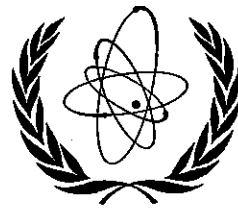
**SPEECH AT
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DISTINGUISHED SPEAKER PROGRAMME**

Atoms for Peace in the 21st Century

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INTERNATIONAL ATOMIC ENERGY AGENCY

Good morning, Ladies and Gentlemen.

I am delighted to be back in Singapore. It is an honour to speak to you as part of the Energy Market Authority's Distinguished Speaker Programme.

When I was last here in August 2010, I spoke at an international conference on nuclear power.

In my speech, I noted that nuclear power was enjoying growing acceptance in many countries as a stable and clean source of energy that could help to mitigate the impact of climate change. I said that this was an exciting time for nuclear power.

None of us could have anticipated the devastating accident at the Fukushima Daiichi nuclear power plant in Japan around seven months later, in March 2011.

Today, nearly four years after the Fukushima Daiichi accident, I have a number of observations.

First, the Fukushima Daiichi accident caused great distress and hardship for many people. It also undermined public confidence in nuclear power throughout the world.

Second, nuclear safety culture has been greatly strengthened throughout the world compared with the situation before the accident.

I have seen a strengthening in safety features in every nuclear power plant that I have visited since the accident. The idea that "Safety Comes First" is unchallenged.

Third, the basic situation concerning nuclear power has actually not changed that much since I spoke at that Singapore conference in 2010. Many new countries still plan to introduce nuclear power in the coming decades.

Global use of nuclear power will grow, although growth rates are likely to be slower than estimated before the accident.

It is still an exciting time for nuclear power. Remarkable research is being done on new generations of reactors which will be safer and generate less waste. Innovative work is also being done on long-term disposal of nuclear waste. Great progress has been made in improving safety.

Today, I will say a few words about the current status of nuclear power in the world and take a look at some of the technological innovations which are underway.

Ladies and gentlemen,

There are presently 439 nuclear power reactors in operation in 30 countries. The great majority of these are in just five countries: the United States, France, Japan, Russia and China.

However, if we look at growth in the use of nuclear power, the geographical focus is switching to Asia. Of the 69 nuclear power reactors under construction, around two thirds are in Asia.

This should not really surprise us. Asia has seen exceptional economic growth in recent decades. The World Bank expects China to become the world's largest economy within 15 years, with India possibly becoming the second largest.

Access to stable sources of energy is vital for these and for many other countries. Overall demand for energy is growing steadily as the world population increases. In order to meet that growing demand, we must make the best use of all the sources of energy at our disposal, in a clean, efficient and sustainable way.

Clearly, fossil fuels will play a central role for many decades to come. But we know they will not last for ever. Many countries are investing heavily in renewable energy sources such as wind and solar – not just as alternative sources of power, but also because of concern about climate change. It is clear that renewables will grow in importance in the coming decades.

As far as nuclear power is concerned, the setback that occurred after the Chernobyl disaster in 1986 – when the industry entered a prolonged period of global stagnation and no new power reactors were built for three decades – has not been repeated.

What has changed? I believe there are a number of factors. Demand for energy has grown steadily, as I mentioned, especially in large emerging economies such as China and India.

Technically and financially, access to nuclear power is no longer limited to developed countries.

Nuclear power can help to improve energy security, reduce the impact of volatile fossil fuel prices, mitigate the effects of climate change, and make economies more competitive. Nuclear can deliver the steady supply of baseload electricity needed to power a modern economy.

And, very importantly, improvements have been made to nuclear safety all over the world, especially in the aftermath of Fukushima Daiichi.

Ladies and gentlemen,

I am confident that technological developments already in the pipeline will make nuclear power even safer, and more efficient, in future. They could help ensure that the world can meet its electricity needs for thousands of years.

Fast reactors and closed fuel cycles, for example, have the potential to ensure that energy resources which would last hundreds of years with the technology we are using today will actually last as much as 6,000 years.

We cannot predict with any certainty when fast reactors will come into widespread use, which will depend to a significant extent on economic factors. But it is important to press ahead with the research and development.

Small and medium-sized reactors are another fascinating area of development in which I know Singapore takes a keen interest.

Around 45 innovative small and medium-sized reactor concepts are at various stages of research and development and four countries are already building them: Argentina, China, India and Russia.

Work is well advanced in a number of countries on high temperature gas cooled reactors, which are inherently much safer than previous generations of reactors.

I am proud of the work being done by the Agency to help bring about innovation, for example through INPRO – the *International Project on Innovative Nuclear Reactors and Fuel Cycles*.

INPRO, which is 15 years old this year, brings together technology holders and users so they can consider what action is needed to achieve innovation.

INPRO focuses on innovation in nuclear systems in seven key areas: economics, infrastructure, waste management, proliferation resistance, physical protection, environment and safety.

Finally, I must mention nuclear fusion, which holds the promise of an inexhaustible, clean and safe source of energy – one of the dreams of humankind.

When this dream is finally realised, it will have dramatic implications for the future on many levels, from economic growth to climate change and fighting poverty.

However, controlling thermonuclear fusion for energy production is a complex and challenging undertaking. We are not there yet.

The IAEA played the role of godparent to a project known as ITER, which is building the world's largest experimental nuclear fusion reactor at Cadarache in the south of France.

The challenge is huge. But I have faith in the ingenuity of human beings and the ability of brilliant scientists and engineers to overcome even the most daunting technological hurdles.

Ladies and Gentlemen,

Waste disposal is often cited as one of the major problems facing nuclear power. In fact, the nuclear industry has been managing waste disposal for more than half a century. Dozens of facilities for low-level and intermediate-level nuclear waste are in operation throughout the world.

As far as the management of high-level radioactive waste and spent fuel is concerned, good progress has been made in recent years, especially in Finland, Sweden and France. I have had an opportunity to visit the ONKALO facility in Finland, where a repository for the final disposal of spent fuel is being built deep underground. I also visited the Hard Rock Laboratory in Sweden. They are impressive sites.

The first deep geological repositories for nuclear spent fuel are likely to become operational after 2020. The progress that is being made in this area deserves to be better known.

The high cost of building a nuclear power plant is seen by some as an obstacle to future development. Nuclear power plants are indeed expensive to build, but once they are up and running, they are relatively inexpensive to operate throughout a life cycle of 30 or 40 years – or even more.

A number of innovative new financing models have been developed. I expect to see other creative approaches to the high start-up costs of nuclear power emerge in the coming years.

Ladies and Gentlemen,

Before concluding, let me explain the role of the IAEA in the nuclear power area.

I should stress that it is the sovereign decision of each individual country whether or not to add nuclear power to its energy mix.

The Agency is there to serve our 162 Member States and we do not try to influence their decisions in any way. But for countries that choose nuclear power, our job is to help.

We advise on how to put the appropriate legal and regulatory framework in place and how to ensure the highest standards of safety, security and safeguards.

We offer know-how on the construction, commissioning, start-up and safe operation of nuclear reactors. We establish global nuclear safety standards and security guidance. We offer expert peer review missions to assess the operational safety of nuclear power plants and the effectiveness of nuclear regulators – and in many other areas.

We can help with the decommissioning of plants at the end of their natural lifetimes and with waste disposal.

The end-result, we hope, is that countries will be able to introduce nuclear power safely, securely and sustainably.

Needless to say, safety is key to the future development of nuclear power. The Fukushima Daiichi accident was a painful reminder that a terrible accident can happen anywhere, even in a developed industrial country.

To prevent anything like it ever happening again, plant operators, nuclear regulators and governments must demonstrate total and visible commitment to the principle of “safety first.” Complacency in the area of nuclear safety must be avoided at all costs.

The IAEA brings together countries with advanced nuclear power programmes and what we call “newcomers.”

This sharing of knowledge and experience means newcomers are not condemned to repeat the mistakes of pioneers. They can benefit sooner from the shorter construction times, more profitable performance, and higher safety levels of today’s best plants. There may be potential for smaller countries to cooperate regionally on nuclear power projects which might be too expensive for any one of them on its own.

Ladies and Gentlemen,

Let me conclude by expressing my great appreciation to Singapore for its excellent cooperation with the IAEA in all areas of our work. I also congratulate you on your country’s 50 years of independence.

Singapore is an important partner for the Agency. Later this morning I will be signing with Minister Grace Fu an agreement that will enhance our cooperation in providing training to assist countries in the region in important areas of nuclear applications, safety and security.

I wish Singapore continued success in the coming decades in using nuclear science and technology for the health and well-being of its people.

Thank you.