IAEA Scientific Forum:
“Nuclear Power and the Clean Energy Transition”
Closing Session
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Remarks by ITER Director-General

Thank you for inviting me to participate in this Scientific Forum. The urgent need for a Clean Energy Transition is every day clearer to an increasing part of the society. We need to identify a carbon-free replacement for fossil fuels; and while the development of the renewable energies is part of that solution, due to their fundamental physical characteristics, they cannot provide the concentrated, continuous, demand adjustable and reliable baseload energy needed to supply power to industry and the mega-cities of the world. I do believe that fission and fusion are complementary options to consider.

Like those who have spoken earlier today and yesterday, I am a strong advocate for the benefits of nuclear fission power. As we have heard, advancements in nuclear power plant design are providing increased safety, efficiency, and versatility. And we are seeing more countries engaged in nuclear fission plant construction. The key challenge presently is to reduce time and cost for construction of the new safe fission nuclear power plant.

But as we look toward the future, we should also understand the progress being made toward demonstrating the feasibility of harnessing the “other” nuclear reaction that offers several clear long-term advantages: that is, hydrogen fusion.

Fusion power is inherently safe: it uses only 2-3 grams of hydrogen fuel at a given time– deuterium and tritium – with no chain reaction and no possibility for a meltdown accident. Also, hydrogen fusion does not create any long-lived, highly radioactive waste and has no impact on

climate – as with fission technology. And the fuel for fusion is virtually unlimited, with enough to supply human society for millions of years.

So am I advocating for an immediate shift away from fission to fusion power? The answer is no, because, first, they can easily co-exist, and second, fusion development will still take some time. The science and engineering challenges of creating an industrial-scale Tokamak – a magnetic confinement fusion reactor– are significant, requiring several decades. But to have this option available in the foreseeable future is everyday more credible.

Since 12 years, the seven ITER Members – China, Euratom in Europe, India, Japan, Korea, Russia, and the United States – are working together toward a common goal: to make hydrogen fusion a credible option, and to ensure a large appropriation of the fusion technology by all ITER Members, Each member is contributing a selected portion of the high-precision components that will make up the ITER machine. During the past 7 months, despite the challenges of the Covid-19 pandemic, these components have begun to arrive - from all over the world – to the ITER worksite in the south of France. On 28 July this year, we celebrated the start of the Tokamak assembly.

Recently, we have successfully inserted the Cryostat Base and Lower Cylinder – two high-precision components 30 metres in diameter and weighing a combined 1,650 tonnes – into the Tokamak Pit, with a precision of millimetres. We have also begun the pre-assembly of the first Vessel Sector with the Thermal Shield and Toroidal Field magnets.

The next few years will be critical at ITER as we assemble the machine and prepare for integrated commissioning and initial operations: First Plasma in 2025, followed by a staged approach until we reach Full Fusion Power in 2035.

Based on the remarkable advancements in fusion science and engineering, and the multinational commitment to success, I feel confident that we will solve the remaining challenges and make fusion a reality on schedule. Some time remains before we will be ready to construct the first commercial fusion facilities, but we are closer than ever. We are committed to offering the advantages of hydrogen fusion as part of a clean energy future for generations to come.

Thank you for your attention.