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Distinguished Guests,

Ladies and Gentlemen,

1. Good morning. Today, we mark a milestone in building our capability in understanding nuclear science and safety – the elevation of Singapore's nuclear safety research Initiative to a full-fledged Institute.

2. Our journey began in 2012 when after a pre-feasibility study, we concluded that conventional nuclear power plants were not suitable for Singapore.

    a. We then decided to build our capability in understanding nuclear energy and safety, for two key reasons:

        i. One, nuclear technology will continue to evolve, and we must have the ability to evaluate options as technology progresses.

        ii. Two, we must be able to respond effectively should there be a regional radiological emergency.

    b. Hence, in 2014, the National Research Foundation (NRF) launched a research initiative, Singapore Nuclear Research and Safety Initiative.

        i. Its mandate was to build expertise in nuclear science and safety research; and to develop scientific talent and expertise in Singapore.

3. This was prescient. Today, many more countries around the world are recognising the serious threat that climate change poses. For Singapore, as an island-nation, climate change is an existential challenge. The warming of our planet will lead to rising sea levels, threatening Singapore's low-lying coasts, key infrastructure and freshwater resources.

    i. The transition to alternative energy sources will be a critical challenge, as we commit to tackling climate change with the rest of the world.

    ii. Some countries are transiting from carbon-heavy fuels to cleaner, more sustainable sources such as biofuel, solar and other renewable sources of energy.

4. Several countries are also exploring nuclear energy more seriously, including our ASEAN neighbours.

    i. Given our close linkages in the region, deepening our understanding of nuclear safety will be important for us, and for the region.

    ii. Nuclear technology is also advancing - such as the emergence of Small Modular Reactors, or SMR, while more advanced, and safer technologies may emerge and be commercially deployable within the next one or two decades.

5. As the Prime Minister shared in his 2025 Budget Speech, Singapore is studying the potential for nuclear energy deployment. But before making any decision, we must have the ability to make a confident assessment on its safety and security, given our small land mass and high population density.

6. Countries in our region are considering nuclear energy as part of their energy portfolio. While no countries in ASEAN have an operational nuclear plant yet, some have announced plans for deployment, such as the Philippines by early 2030s and

Indonesia by 2040. Malaysia and Indonesia have experience in nuclear technologies and have operated research reactors for some time.

a. The operating contexts of our neighbours are different from Singapore's – in geography, exposure to natural hazards, and choice of technology, among others.

b. Given the potential diversity of nuclear technologies that may be deployed in the region, the expertise we develop in areas such as nuclear safety, impact analysis, emergency preparedness and response, and nuclear governance will contribute to regional efforts in developing robust safe and secure frameworks and norms.

c. Capability building will help us understand the implications of nuclear developments in the region and ensure that we are prepared if our neighbors choose to deploy nuclear energy.

7. Today marks a major milestone in our investment in nuclear safety research, in three major ways.

a. First, we are upgrading our research in nuclear safety from an "Initiative" to an "Institute". This is more than just a name change. It marks a change in identity and a reflection of how far SNRSI has come. SNRSI's work has grown from being a promising "initiative" to a full-fledged "institute".

i. It reflects our deepened commitment, expanded scope and long-term goal for research in nuclear safety. SNRSI is expanding its research focus to include areas such as modelling simulation of nuclear reactor designs and enhanced radio nuclide detection. We will build our capabilities to assess and respond to the growing needs.

ii. In the decade from 2014, we have invested more than $150 million in initiating research, developing talent and in setting up this new building that we are in.

b. We will build on this, and have committed an additional $66 million to nuclear safety research over 2.5 years from Dec 2024 under the Research, Innovation and Enterprise (RIE) 2025 plan.

c. As we draw up our RIE2030 plan, nuclear safety will also remain a key priority, given its strategic imperative for Singapore and the region.

d. Over the past decade, SNRSI has established collaborations with research partners around the world.

i. This includes partners with deep technical expertise internationally like the French Authority for Nuclear Safety and Radiation Protection (ASNR) and the International Atomic Energy Agency or IAEA.

ii. Within ASEAN, SNRSI is also an active member of the ASEAN Network on Nuclear Power Safety Research, engaging regional counterparts in research exchanges to promote cooperation on safety research on small modular reactors.

e. As a full-fledged institute, SNRSI will host regular visits by international experts to build expertise across our network of partnerships with other research labs and institutes, and Institutes of Higher Learning (IHLs) around the world. We will also tap on these experts to promote a better understanding by the public on nuclear technology and safety, as well as support decision making by the government on issues relating to energy transition.

8. In line with its designation as an Institute, SNRSI will also broaden and deepen its scope of research.

    a. SNRSI has built up basic simulation capabilities to understand reactor designs and accident analysis in conventional and small modular reactors. As an Institute, It will now partner international laboratories to develop expertise in reactor simulation and modelling to analyse the safety of reactor designs. This will enable it, over time, to build capabilities to assess aspects of the safety of SMR designs and their suitability for domestic deployment. These capabilities in nuclear safety analysis will also support the assessment of risks and impact from radioactive releases from potential regional deployments.

    b. SNRSI has also joined the IAEA's research programme to study and identify viable options to manage spent fuel and waste from different SMR technologies, since waste management will likely be a critical factor for public support for domestic nuclear deployment, if and when pursued.

    c. SNRSI has honed expertise implementing various models suitable for long and short ranges of radionuclides atmospheric dispersion. Further explorations in modelling how radionuclides disperse in different environmental conditions will enable better understanding of the impact of radiological incidents. This is a critical piece both to assess any potential deployment of nuclear energy in Singapore, and to understand the implications of regional developments.

9. Second, the launch of this new building will provide the physical space and facilities for SNRSI's expanded mandate and long-term growth.

    a. This new SNRSI building is nearly 5 times larger than SNRSI's previous space at CREATE.

    b. The building also includes new facilities.

i. The planned gamma irradiation facility will enable studies into the biological effects of radiation exposure. SNRSI will ramp up research on the effects of low-dose radiation on human health by studying the impact on our local population with our unique ethnic and geographical landscape.

ii. The high-performance computing cluster will enable more computationally-intensive research such as detailed modelling tasks for radiological impact and safety analyses.

c. The facilities of the National Environment Agency or NEA will continue to be co-located within this building.

i. NEA's National Radiochemistry Laboratory, Secondary Standards Dosimetry Laboratory, and advanced ambient radiation monitoring station are also in this building.

ii. This will facilitate further collaborative research where expertise can be deepened collectively.

d. To ensure that experiments can be carried out safely in this expanded facility, we have designed the labs with proper shielding.

i. Radiation levels will be closely monitored around the clock and lab workers will wear dosimeters to monitor their exposure.

ii. The facilities are also subject to strict regulations and safety oversight.

iii. Safety is paramount, as it has been and as it should be.

10. Third, with an expanded mandate and facilities, SNRSI will expand its pool of nuclear scientists and researchers.

    a. Today, SNRSI has about 50 researchers. We will double this base to 100 research experts by 2030, by growing at a steady pace of adding 10 researchers each year.

    b. SNRSI has also been awarding scholarships – not just for Singaporeans but also to talent from the region.

        i. More than half of the 34 scholars have returned to work in areas of nuclear safety analysis, radiochemistry and radiobiology.

        ii. Among them is Dr Joyce Ang, a Research Fellow who obtained her PhD in radiochemistry at the University of Helsinki, where she completed her thesis on environmental nuclear forensics and accident response. She is now working on optimising radiation detection methods using a combination of experimental and computational techniques. Her work contributes to the development of more effective radiation detection methods, which can enhance Singapore's capabilities in nuclear safety and emergency preparedness.

        iii. Dr Theodore Ong, another SNRSI scholar, is part of the safety analysis team at SNRSI and writes computer codes for nuclear safety simulations. Dr Ong also trained the Singapore national team that participated in the inaugural International Nuclear Science Olympiad (INSO) held in the Philippines last year. The team delivered an outstanding performance and secured four gold medals.

    c. The development of talent is critical to deepening our understanding of nuclear technology and safety. With the setting up of the Institute, we will enhance our efforts to reach out to young people who have a keen interest in

playing a role in this critical energy transition. The Institute will send our scholars to universities around the world with expertise in this area, to pursue postgraduate studies.

11. We are all delighted to be here to witness this milestone in our nuclear safety research, to witness the evolution of an initiative into a full-fledge institute and to mark the opening of this new building!

12. This is a major step forward not just for SNRSI but also for Singapore. I express my deep appreciation to everyone who has contributed to building the foundation in the earlier years of the Initiative.

13. Let us build on this foundation, to deepen our understanding of nuclear safety, to keep abreast of technological advances which will open our options. Let us collaborate with partners in the region and around the world, to do our part to tackle climate change and to make a successful energy transition.

Thank you.