Speech by Professor Tan Eng Chye, NUS President
at SERIS' 10th Anniversary Celebration
Thursday 5 April 2018, 9.30 am, Shaw Foundation Alumni House, Level 2

Professor Armin Aberle, CEO of the Solar Energy Research Institute of Singapore

Emeritus Professor Joachim Luther, Founding CEO of SERIS

Distinguished Guests, Colleagues, Ladies and Gentlemen

I am very happy to join you at this happy occasion, to celebrate the 10th anniversary of the Solar Energy Research Institute of Singapore, or SERIS. On behalf of NUS, I would like to welcome all guests to our campus here this morning.

We are living in a rapidly changing world, much of it brought about by technological innovations. Developments in big data analytics, digital health, autonomous vehicles, robotics, social media, cryptocurrencies, cybersecurity etc will disrupt our world and our lifestyles. In particular, Artificial Intelligence is set to bring about substantial change to life and society. Apple's Siri and Samsung's Bixby may be our friends some day; helping us to manage our schedules, source and book the best flights, restaurant reservations, shop online and so on.

Change is also underway in the energy sector, which is a positive and much needed development. Since the first Industrial Revolution in the 18th century, the **global energy system** has primarily relied on **fossil fuels**, starting with coal, and subsequently, oil and natural gas.

Unfortunately, the use of fossil fuels releases greenhouse gases and pollutes the environment, including the air which we breathe. These in turn have serious consequences on the climate and environment. As a result of atmospheric pollution, the Earth's temperature is rising, deserts are expanding, fresh water supplies are dwindling, and sea levels are rising.

To reduce our impact on climate change and to create a sustainable energy future, we urgently need **a new energy system that is based on clean and renewable energies**. Fortunately, there is hope from a technological perspective. Through research, development and test-bedding, enormous progress has been made in the last decade with reducing the costs of solar and wind power, which in turn has opened up opportunities for massive changes on a global scale.

Solar power is slowly but surely becoming a mainstream reality. Since 2008, the globally deployed generation capacity of solar photovoltaic, or PV, systems has grown exponentially and now stands at more than 400 Gigawatt-peak. It will overtake the global installed capacity of nuclear power plants in the year ahead, exceeding 1,000 Gigawatt-peak by 2022, and will reach tens of Terrawatt-peak by 2050.

Grid parity for solar power has now been reached in many countries, including Singapore, and every year its costs are being reduced further. I sincerely hope Prof Armin's take on the costs of solar electricity in Singapore falling to below 10 cents per kilowatt-hour by 2025 will become a reality.

Of course, in spite of the excellent progress, the global transition to renewables is not without challenges. The sun doesn't shine at night, or in some places, year round, and the sun's intensity also varies with cloud cover. Further research and development is needed to mitigate these limitations, and to improve efficiency yields. Hence, there continues to be many interesting areas for SERIS to work on. By implementing and combining clever monitoring, energy weather forecasting, power demand management, electric energy storage and flexible gas-powered generators, the transition to smart energy grids and a cleaner-and-smarter energy world will be possible.

The threat of global warming is real and alarming. The last 3 years were by far the hottest since the start of global measurements some 140 years ago. As the world's population is projected to approach 9 billion people in about 20 years, energy use worldwide will increase by nearly 35%, elevating risks and the negative impact associated with greenhouse gas emissions.

Building a **sustainable future** is thus a real and pressing global challenge. NUS, as a research intensive university, is actively contributing to knowledge discovery in providing sustainability solutions. Sustainability challenges are sophisticated and require multidisciplinary approaches towards formulating a solution. While science, engineering and technology provide the backbone to these solutions, other aspects such as behavioral sciences, public policy, economics, and law are equally important. The NUS Sustainability cluster brings together faculty members, students, and staff across NUS to work together, adopting a holistic approach to solve critical issues on sustainability, focussing on water, energy, environment, waste and food.

Sustainability is a core value at NUS. The University is committed to protecting the environment and seeks to incorporate sustainability in all aspects of campus life – from research, education, operations, planning, construction, and instruction to public service. NUS is on track to achieve 23% reduction in carbon emissions against Business-As-Usual, by 2020. And we are working towards reducing our Energy Use Intensity by 20% (against 2012 baseline) by 2020. When completed in early 2019, the purpose-built Net-Zero Energy Building at the School of Design and Environment will add to our stock of green buildings and will harvest solar energy using more than 1,200 solar photovoltaic panels installed on the roof.

NUS also aims to **help Singapore achieve greater sustainability** through our partnerships with external organisations, our community outreach, and through the use of our own campus as a testbed. In this endeavour**, SERIS plays a key role**, by developing novel technology solutions to make the harnessing of solar power more efficient and economical, as well as working closely with public and private sector partners to address the challenges of optimising solar power systems to local conditions. SERIS is also a fine example of our university's efforts to ramp up its **research translation and enterprise activities**, and to shorten the time to bring our research discoveries to industry.

Through the past 10 years, SERIS has successfully collaborated with solar companies in Singapore and abroad. A clear testimony of the relevance of its research work to industry is how SERIS has garnered **30 million dollars of research funding** from companies in Singapore and around the world. Of all the research institutes and centres at NUS, **SERIS ranks first among them in terms of annual research funding from industry**. This speaks of the relevance and impact of the work SERIS does. You will have the opportunity to view the various solar cells, modules, systems and services developed by SERIS at the Exhibition area.

SERIS has also contributed towards training and nurturing expertise for Singapore's Cleantech sector. Since its inception, SERIS has admitted 110 PhD students, many of whom have graduated and are working in Singapore and the region.

On this note, I would like to convey my appreciation to all our partners, particularly the National Research Foundation, the Singapore Economic Development Board and our many industry partners, for the strong support you have given to SERIS and its work.

Ladies and gentlemen, NUS is very proud to have SERIS as one of its university-level research institutes. My heartiest congratulations to SERIS on the many fine achievements in its first ten years and I wish SERIS every success in the decade ahead. I look forward to SERIS making even greater strides in powering the future! Thank you.