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SPEECH BY MR K SHANMUGAM, MINISTER FOR LAW AND 2ND MINISTER FOR HOME AFFAIRS, AT THE AWARD PRESENTATION CEREMONY FOR THE NATIONAL WEATHER STUDY PROJECT COMPETITION 2009, ON 30 JUNE 2009, 11.20 AM, AT THE SCIENCE CENTRE SINGAPORE

Mr Roy Adair, President and CEO of Senoko Power,

Prof Leo Tan, Chairman of the National Weather Study Project (NWSP) Advisory Committee,

Distinguished guests,

Ladies and gentlemen,

Boys and girls,

Good morning. It gives me great pleasure to be present here with you this morning for the National Weather Study Project Competition Awards Ceremony.

The National Weather Study Project

2 The changing patterns, increasing severe storms, hurricanes and typhoons have made many of us take notice of the effects of climate change that can cause havoc to the livelihoods of many.

3 Cyclone Nargis moved across southern Myanmar on the evening of 2 May 2008, leaving a trail of death and destruction before petering out the next day. It devastated much of the fertile Irrawaddy Delta. Nearly 85,000 people died. A year later, an additional 54,000 people are still listed as missing. It blew away 700,000 homes in the delta. It killed three-fourths of the livestock, sank half the fishing fleet and salted a million acres of rice paddies with its seawater surges. On 25 May 2009, Cyclone Aila battered Bangladesh, burst dams, left 500,000 homeless in India and Bangladesh, and claimed over 264 lives.

4 Today, climate change is recognised as one of the most important issues needing the attention of us all. The NWSP was launched to create awareness among students by engaging them in weather monitoring activities. It has reached

out to over 240 primary, secondary and junior colleges since its inception - almost two-thirds of all our schools and junior colleges in Singapore. It promotes learning by doing and encourages the students to engage the various stakeholders in problem solving.

5 I commend Senoko Power for its efforts in championing this weather project. I would also like to acknowledge the support given by the various government agencies such as the Ministry of Education (MOE), National Environment Agency (NEA), National Parks Board, Building & Construction Authority, Nanyang Technological University (NTU) and Science Centre Singapore in facilitating implementation of the programme. Equally, it is good to see NGOs such as Singapore Environmental Council and Nature Society actively assisting NWSP.

6 NWSP 2009 has again generated much excitement among the participating schools and that a total of 235 projects were submitted. The judges noted the increase in project quality and were especially impressed with the high standards of submissions. A good number of the participating teams were able to make good use of the weather data generated from the mini weather stations installed in their school compounds and from mini-weather stations of other schools connected to the NTU Central Data Depository. Many of the projects submitted had shown potential for further research purposes. Let me give a few examples.

7 Singapore is known for its network of 3,300km of well maintained roads. Anglo-Chinese Junior College explored the viability of using roads to capture solar energy and then harness the energy gathered. The team envisages a Road Energy System involving transport of cooler water through solar-powered pumps to the pipes lying beneath the asphalt layer to be heated. The heated water can be stored in a reservoir or used immediately for various commercial applications. Such a road energy system is already in construction in Netherlands. Through hands-on experiment and research, the team is convinced such a road energy system could work in the Singapore road network.

8 Singapore parents put great emphasis on learning efficiency. Previous studies have shown that one of the factors affecting performance is the learning memory

capacity of an individual. A team from Nanyang Girls' High School was keen to experiment whether ambient temperature has a direct influence on learning prowess of local students and attempted to determine the optimal temperature range for maximum memory learning ability. From their experiment involving a range of memory tests performed on 30 secondary one students at ambient temperatures ranging from 18°C to 30°C, the team came to their inference that the optimum temperature range for memory work is 25.9°C to 27.3°C.

9 Between 1995 and 2005, there were 822 heat-related injury cases to Singapore Armed Forces. The hot and humid weather in Singapore is a known contributor to heat stress, especially on young students undertaking outdoor activities without drinking adequate fluids prior to the event. Using mannequins wearing different fabric materials under the hot sun and measuring the change in temp below the fabric, Unity Primary School set out to determine the suitable material for their school's PE T-shirt based on absorption and evaporation efficiency of the perspiration. Their recommendation to their principal was one that considers the needs of poorer families which may be unable to pay for the more expensive T-shirts.

10 Using weather data from the mini-weather station in its school premises and adjacent schools via the NTU Central Data Depository, Paya Lebar Methodist Girls' School (Primary) found a correlation between the hotter and humid weather with the number of cases of Hand, Foot and Mouth Disease recoded in the school. The same correlation existed when the students compared the data obtained from NEA and MOH. The study heightened the importance of personal hygiene and constant vigilance against EV71 virus.

Climate Change

11 The NWSP has enabled participating students to probe deeper into global phenomena of climate change and global warming. The World Meteorological Organisation reported that the 10 hottest years since global records were first kept in 1850 have all been since 1997, with the warmest in 2008.

12 Another report presented in 2008 showed that the Arctic ice cover had dropped to its second lowest extent during the year's melt season since satellite measuring began in 1979. In April 2009, satellite pictures from the European Space Agency showed that a 40 km long strip of ice, believed to pin the Wilkins Ice Shelf in place, had splintered at its narrowest point. The Wilkins, which is about the size of Jamaica, is one of 10 shelves to have shrunk or collapsed in recent years on the Antarctic Peninsula, where temperatures have risen in recent decades.

13 In its report in 2007, the United Nations' Intergovernmental Panel on Climate Change (IPCC) predicted the seawater level would rise by between 18 and 59mm by 2100. With more accurate data coming in each day, nine out of 11 scientists of the same IPCC panel believe that the Arctic late summer sea ice could vanish before 2050, and that the sea level rise could reach up to 140cm by 2100. The remaining two had even worse predictions.

14 Closer to home, in its April 2009 report entitled 'The Economic of Climate Change in Southeast Asia: A Regional Review', the Asian Development Bank highlighted that Southeast Asia is one of the world's most vulnerable region to climate change due to its long coastlines, high concentration of population and economic activity in coastal areas. The regional is experiencing increased frequency and intensity of extreme climate events such as heat waves, droughts and floods. It predicted the worst is yet to come and that Southeast Asia will suffer more from climate change than the world average, because its energy sector is the fastest growing contributor of the region's emission.

15 Climate change has now consistently dominated the agenda of the United Nations and G8 gathering of the world's leaders.

16 Many experts believe that unless something is done, there is a 75 per cent chance global temperature will rise by two to three degrees over the next 50 years, and a 50 per cent chance of a five-degree rise. The Himalayan glaciers are the most important source of water for some 1½ billion people. The "water towers of Asia", as Indian Prime Minister Manmohan Singh calls them, are under threat.

17 We are familiar with dramatic rising food prices before the economic recession. Some of this is due to rising demand in rapidly growing countries like China and India. Some of it is due to the knock-on effects of rising oil prices. But some of it is due to climate change: both the impact of adverse weather conditions, and the result of diverting crops into bio-fuels. Today, global oil prices have again risen to above US$60/barrel and could bring inflationary pressure before the economy is fully recovered.

18 As an economist, UK's Lord Stern looked at the costs of adapting to climate change in future if we do nothing now. He found there would be a huge impact, potentially as much as five to 20 per cent of global GDP. But he concluded that the costs of doing something about it now, would be much cheaper, amounting to less than one per cent of global GDP.

19 As our understanding of the impact of climate change develops, it is clear that Singapore could see dramatic and fundamental changes. Instead of taking place over millennia or centuries, they could occur over decades. And they are beginning to happen now. The impact of man-made climate change will jolt and shock our environment far faster and more radically than any natural processes. We must continue to understand and assess the impact of climate change.

20 Speaking at the ASEAN-South Korea Summit on 2 June 2009, Prime Minister Lee cautioned that even as the governments focus on fixing the economy, they must not neglect long-term issue of climate change, as measures introduced take a long time to show results. Collectively, governments need a deal on climate change beyond 2012, when the existing international commitments expire. The international community, meeting in Copenhagen in December 2009, will have to answer a number of questions. For Singapore, we must prepare for a carbon-constrained world.

21 The electricity generation industry in Singapore is already making great strides in energy efficiency. In this aspect, Senoko Power's efforts in carbon emission reduction are very apparent and commendable, as reported by Washington DC-based CARMA.org. Compared to 1990, Senoko Power now generates 30 per

cent more electricity and yet the carbon emission has fallen by 20 per cent during the same period.

22 The report by Inter-Ministerial Committee on Sustainable Development (IMCSD) in April 2009 highlighted the need to improve the way we use key resources such as energy and water, and seek to expand the use of renewable resources so that Singapore can remain an economically vibrant yet liveable city - and is able to do more as a responsible global citizen to combat the challenges posed by climate change. The Committee on sustainable development pledged to accelerate investment in green technology.

23 Climate change is a great challenge to humanity - it also offers great opportunities - opportunities for new industries and technologies, to think differently and creatively, as well as collaborate with communities, groups and individuals in entirely new ways.

24 We cannot resist these changes so we must be ready to deal with and manage them. The time is right for us to start to formalise our approach to adaptation. What the students have done in their projects are in the right direction in securing a better understanding of climate change and the adaptation strategy for our long term economic, social and environmental sustainability.

Conclusion

25 In closing, let me once again applaud the public-spiritedness of Senoko Power for taking the lead in promoting climate change awareness among the schools and students. The NWSP is, without a doubt, a novel way of imparting environmental care knowledge to our students. Let me congratulate all the winners as well as all participating teams for your enthusiasm and I sincerely hope that you will make caring for the environment your life-time commitment.

26 Thank you.