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**“MOVING AHEAD ON SOLAR ENERGY INSTALLATIONS  
IN SINGAPORE” BY MR DAVID TAN, DEPUTY CHIEF  
EXECUTIVE, ENERGY MARKET AUTHORITY AT THE  
QUALITY AND STANDARDS 2009, 17 NOVEMBER 2009**

Dr Amy Khor, Senior Parliamentary Secretary, Ministry of  
Environment and Water Resources

Mr Png Cheong Boon, Chief Executive, SPRING Singapore

Mr Alan Bryden, Ingénieur Général of the High Council for Industry,  
Energy and Technologies

Distinguished Guests,  
Ladies and Gentlemen,

1. Good morning. I am happy to join you at the Quality and Standards 2009 event today to talk about the solar landscape in Singapore and outline some of the initiatives that we have put in place to encourage the development of solar energy.

WORLDWIDE PUSH TOWARDS RENEWABLE ENERGY – SOLAR ENERGY

2. While the global economic recession has dampened energy demand and resulted in lower energy investments, the renewable energy sector has proven to be a bright spot. Despite the downturn, investments in the renewable energy market continued to grow. Though a far cry from its historical growth rates of over 50% per annum, it still managed to grow by around 5% last year. <sup>1</sup>

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<sup>1</sup> “Global Trends in Sustainable Energy Investment 2009” by New Energy Finance/UN Environment Programme

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3. Today, renewable energy accounts for 18% of global electricity production. By 2030, the International Energy Agency estimates that renewable energy will account for 22% of global electricity production<sup>2</sup>.

4. While there is a wide range of renewable energy options worldwide, solar energy is one of the most promising technologies. This is reflected in the size of the solar industry today and the amount of investments it has and continues to attract. In fact, amongst the various renewable energy sources, solar made the largest gains last year in terms of new investments attracted – US\$33.5 billion.<sup>3</sup>

5. At the global level, the International Energy Agency estimates that solar energy (both solar photovoltaic and solar thermal) contributed just 0.02% of the global electricity produced in 2007. This is expected to increase to 1% by 2030.<sup>4</sup>

6. Recognising the potential for solar energy to serve as one of the solutions for a low-carbon future and the economic spin-offs it generates, governments around the world are making a big push into the solar energy sector.

7. In Europe and Africa, the Desertec project was launched earlier this year under the Mediterranean Solar-Plan. This US\$400 billion project involves twelve European companies seeking to build concentrated solar power (solar thermal) located across a 17,000 km<sup>2</sup> area in the Sahara Desert. Electricity generated by these systems will be transmitted to European and African countries by a super grid of

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<sup>2</sup> World Energy Outlook 2009

<sup>3</sup> “Global Trends in Sustainable Energy Investment 2009” by New Energy Finance/UN Environment Programme

<sup>4</sup> World Energy Outlook 2009

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high-voltage direct current cables and could potentially provide up to 15% of continental Europe's electricity needs.

8. Separately, plans have been unveiled in China for the construction of a 2,000-megawatt PV farm in the Inner Mongolian desert. When completed, this will be the world's largest solar PV power plant project.

#### SOLAR ENERGY LANDSCAPE IN SINGAPORE

9. Unlike other parts of the world, Singapore's renewable energy options are limited – we are alternative energy disadvantaged. Singapore's average wind speeds are too low for the economical use of large wind turbines. Wave, tidal and ocean thermal have limited application as much of our sea space is anchorage and shipping lanes. Singapore's geography also does not present opportunities to harness renewable energy from hydro or geothermal technologies.

10. At the moment, solar energy is the most promising renewable energy option for Singapore. We are located in the tropical sun belt and there is potential to tap on solar energy for power generation. But we are cognizant of the fact that there are limitations to solar potential. Our heavy cloud cover means that energy from the sun would be intermittent and highly variable in nature. In addition, our land constraint means that there is a physical limit to how much solar energy we can tap.

11. At present, there is a total installed capacity of 1.1 MWp of grid-connected solar PV installations in Singapore. Another 4 MWp are

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under construction. Some of the more notable local solar PV projects include the BCA Academy's Zero Energy Building, Solar Park at Marina Barrage, Tampines Grande, Zero Energy House and a private residence at Sentosa Cove.

#### PROVIDING AN ENABLING INFRASTRUCTURE

12. As solar is a non-traditional generating source of electricity in the region, there were initially some challenges hindering its adoption in Singapore. To address these issues, we have put in place various measures to provide a more conducive environment and infrastructure for the uptake for solar PV installations. For example, EMA has set up a Market Development Fund to help defray the costs associated with selling electricity from clean and renewable sources into the grid. Residential consumers with solar PV can also export their excess electricity into the grid, and receive credit offsets in their utility bills.

13. Last year, EMA and BCA put out separate technical handbooks on solar PV systems covering information on licensing, market and technical requirements, and building and structural issues that are related to the implementation of solar PV systems in a building environment. This year, both agencies have upgraded and integrated their two manuals into a new Handbook for Solar Photovoltaic Systems.

14. On this note, I am pleased to announce the launch of a new Handbook for Photovoltaic Systems. This joint project by the Energy Market Authority and the Building and Construction Authority, which

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also involved industry partners and other government stakeholders, updates and integrates existing solar manuals previously issued by EMA and BCA. You can pick up copies of the Handbook, which are available at the foyer.

15. Through this integrated and revised handbook, we hope to be able to provide a comprehensive guide to owners, developers, engineers, architects, Licensed Electrical Workers and electricians on the key issues, requirements and processes pertaining to the installation of solar PV systems. Besides being more reader-friendly and accessible to the layman, it provides new information on the installation requirements for solar PV systems, operations and recommended preventive maintenance works, and various schemes to promote solar PV systems in Singapore.

16. Efforts have also been made to improve existing regulatory standards for the growth of the solar PV industry. Firstly, a new section (Section 612) on solar photovoltaic power supply systems has been inserted to *CP5* in 2008 to include the technical requirement for the installation of a solar PV system.

17. Secondly, recognising that solar PV power supply systems require regular inspection and maintenance to ensure they remain efficient and safe for operation, EMA is working with SPRING Singapore on a standard for the maintenance of grid-tied solar PV systems. The standard is expected to be ready in 2010, and may adopt some of the requirements in international standards such as IEC 62446<sup>5</sup>.

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<sup>5</sup> IEC 62446:2009 defines the minimal information and documentation required to be handed over to a customer following the installation of a grid connected PV system. Also describes the

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18. In terms of incentives to encourage the development of solar capabilities, our partner agency, the Economic Development Board (EDB) has put in place the Solar Capability Scheme to spur demand and build up expertise for this nascent but growing field. The scheme – one of the latest by the Clean Energy Programme Office (CEPO) – is meant to encourage businesses to diversify their energy sources and develop more innovative approaches in constructing and integrating solar panels on green buildings. With an overall budget of \$20 million, this scheme provides funding of up to \$1 million per project or up to 40% of total capital cost of solar technology, whichever is lower.

19. Through its Green Mark Scheme, the Building and Construction Authority (BCA) is also incentivizing the adoption of solar energy technologies for buildings. Bonus points are granted to buildings with solar energy systems. For example, new residential buildings are granted 1 point for every 3 kWp of installed solar energy up to a maximum of 20 points.

20. Other than promoting regulatory standards and offering incentives, the government has also invested in solar energy research. The EDB and National University of Singapore (NUS) have set up the Solar Energy Research Institute of Singapore (SERIS) to conduct industry-oriented research and development as well as user-inspired basic research in the field of solar energy conversion. SERIS and Singapore Polytechnic have also jointly established the National Solar Repository (NSR) in May 2009. Amongst other things, the

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minimum commissioning tests, inspection criteria and documentation expected to verify the safe installation and correct operation of the system. It is written for grid connected PV systems only.

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repository will proliferate best practices and know-how in solar PV system installation and integration in Singapore and maintain a database of performance of solar PV installation.

CONCLUSION - SOLAR ENERGY AND WHAT THIS MEANS FOR YOU

21. In line with developments at the global level, we can expect to find solar energy and its applications become increasingly integrated into our daily economic activities. Solar energy will no longer be just a scientific concept, but will begin to feature in our everyday lives, be it as an alternative source of energy for power generation, an integral part of “green” buildings or in terms of the new job and investment opportunities that it will bring to our economy. The government recognizes this and its long-term commitment to the development of the sector is reflected in the numerous and wide-ranging initiatives that have been put in place to develop our solar capabilities and to promote its adoption.

22. As the lead agency overseeing the development of a dynamic energy sector in Singapore, EMA will be playing a key role in this endeavour. We will work on putting in place an enabling infrastructure to create a more conducive environment for the growth of the solar industry, including creating greater public awareness and understanding of the requirements and procedures for PV installation and facilitating the upgrading of our licensed electrical workers’ capabilities to handle solar installations.

23. As I conclude this presentation, I would like to take the opportunity to call upon all our stakeholders, be it industry, small enterprises, building developers, system integrators, engineers and

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residential dwellers to work in partnership with EMA, as we continue on this journey to develop smart energy solutions to address the energy challenges of today and tomorrow.

24. Thank you.