

NATIONAL RESEARCH FOUNDATION

PRESS RELEASE

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SINGAPORE SET TO BECOME A CENTRE FOR RESEARCH IN ENVIRONMENTAL SUSTAINABILITY

- *High-level delegation visiting Europe's leading organisations in water and clean energy research, led by National Research Foundation (NRF) Chairman, Dr Tony Tan, affirmed the Republic's aim to become a centre for research in environmental sustainability*
- *This follows the recent decision by the Government to invest substantially in R&D in clean energy in addition to clean water technologies*

Dr Tony Tan, Chairman of the National Research Foundation (NRF), announced that the government plans to develop Singapore as a centre for research in environmental sustainability. His comments were made during a media briefing held at the conclusion of a high-level NRF-led study trip to several top research organisations in Europe with expertise in water and clean energy technologies from 15 to 20 April 2007. With growing concerns about the global environment, Singapore, like other developed nations, needs to have long term sustainable solutions for the supply of water and clean energy. Being a compact city state, Singapore is also an ideal test-bed for new technologies in these areas.

2. The delegation visited three leading water research organisations in the Netherlands - Delft Hydraulics, the Netherlands Organisation for Applied Scientific Research (TNO) and KIWA Water Research. In the area of clean energy, the delegation visited the Energy Research Centre of the Netherlands, SolarWorld, a leading manufacturer of solar energy systems, and the Fraunhofer Institute for Solar Energy Systems (ISE) in Germany. The delegation also visited the zero energy building of the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland, and the *Maasland Kaering*, a large storm water barrier built to protect South Netherlands from North Sea surges.

Singapore and the Netherlands are at the forefront of research in water technologies

3. Singapore and the Netherlands are both small nations which face significant challenges in ensuring the supply and security of water. Both

nations have invested heavily in research and are collaborating actively to overcome these challenges. For example:

- Singapore's Public Utilities Board (PUB) is working with KIWA Water Research on a new osmotic membrane bioreactor that uses a novel forward osmosis technology to reduce the cost of producing NEWater;
- Singapore's Keppel Seghers is working with TNO to pilot test Memstill®, which makes use of industrial waste heat to distill seawater through membranes; and
- The National University of Singapore, PUB and Delft Hydraulics are partners in the Singapore Delft Water Alliance (SDWA), formed in February 2007 to work on water quality modeling and urban water resource management. Delft Hydraulics is also involved in water quality modeling for the Singapore Marina Reservoir Project.

4. The delegation gained three key insights from discussions with experts in the three Dutch water research organisations. These will guide our efforts to grow Singapore into a global hydrohub by 2015, with value added of S\$1.7 billion and the creation of 11,000 jobs:

- Globally, leadership in water technologies is concentrated in a small number of research organisations which are the principal partners in all major water research programmes. Singapore is acknowledged as one of the leading innovators in this area. Building on our existing strengths, and working with other top research organisations, there is thus good potential for Singapore to be a leader in water technologies in Asia;
- With these traditional public sector markets opening up and increased private sector participation in water treatment and supply, there are immense opportunities and markets worldwide for Singapore companies in the water business. Indeed, several have already made significant inroads into the Middle East and China markets; and
- Water research is becoming an increasingly multi-disciplinary endeavour. For example, knowledge of biology and chemistry are needed in new water treatment methods and water monitoring technologies. NRF's initiatives which support specialised manpower development and inter-disciplinary research platforms will give Singapore a strong competitive advantage in developing new technologies.

Insights from top European clean energy research organisations offer good starting point for Singapore's future work

5. The visits to the three clean energy organisations in the Netherlands and Germany have affirmed the recent decision by the Research, Innovation

and Enterprise Council¹ to fund Clean Energy as a new research initiative under the S\$500 million Environmental and Water Technologies (EWT) strategic research programme². The global market for clean and renewable energy is growing very rapidly, driven by concerns about the impact of fossil fuels on the environment as well as the desires of major economies to diversify their energy sources to reduce dependency on oil and gas.

6. Singapore has the necessary competitive advantages to undertake R&D in clean energy, in particular solar energy, and to commercialise the R&D output. For example:

- This industry plays to our existing cluster strengths in electronics, chemicals and process engineering;
- Singapore also possesses manufacturing automation and supply chain management competencies which are important ingredients in the rapid scale-up of the industry; and
- We have begun building up R&D capabilities in our education institutions such as the National University of Singapore (NUS), Nanyang Technological University (NTU) and the University of New South Wales Asia (UNSW Asia), and the attraction of new competence centres from foreign R&D organisations.

7. In the near term, Singapore can play the role of an effective springboard for European companies that wish to serve the fast-growing Asian markets for clean, renewable energy. By attracting these companies to set up test-bedding and manufacturing facilities in Singapore to serve the Asian markets, we will be able to develop this industry while concurrently building up our own R&D capabilities in this field.

8. The following learning points derived from this trip will be of great help in shaping Singapore's developmental blueprint for this industry.

- The trip has affirmed that the industry is a good fit with Singapore due to its high level of knowledge and innovation content. Hence, the push by Singapore to develop R&D capabilities is timely.
- This industry provides skilled, good-paying jobs in R&D and high-value manufacturing activities which are in line with Singapore's drive to develop new economic sectors. Due to the rapid global growth, organizations in this industry are facing shortages in quality manpower for R&D and management. Therefore, Singapore's emphasis on manpower development, especially in Science and Technology, would help us create value for this industry.
- While Europe, Japan and US are the main markets now, clean energy organisations are increasingly turning to Asia as a new growth market as well as a source of talent. Singapore is well-

¹ The RIEC is chaired by Prime Minister Lee Hsien Loong, comprising several Cabinet Ministers and distinguished local and foreign members from the business, science and technology community. Dr Tony Tan is Deputy Chairman of the RIEC.

² The RIEC had approved the allocation of S\$170 million to develop the Clean Energy research programme.

positioned to serve this need, especially in terms of hosting world-scale operations in manufacturing and R&D, as well as providing the springboard to the Asian region, which includes the promising off-grid market.

- By providing financial incentives for generating power from alternative energy sources and feeding in to the national power grid, the German Government has not only been successful in catalysing the growth of its solar energy industry but has helped to diversify the country's energy sources.

Energy conservation is an important part of environmental sustainability

9. The visit to Forum Chriesbach, the zero energy building at ETH has allowed the delegation to appreciate the challenges temperate countries face in building environmentally friendly buildings. Forum Chriesbach was carefully designed to employ all available means to minimise direct energy usage such as using natural lighting, insulating walls, solar energy sources, etc. Direct energy consumption has been successfully reduced to a fraction of that required by similar sized conventional buildings. While the end goal is to minimise energy consumption, the zero energy building seeks to keep heat in, whereas Singapore's challenge is to keep heat out. Besides building up capabilities in clean energy sources, developing knowledge in reducing the energy consumption of a modern, high-density city will add to our efforts to be a centre for environmental sustainability.

10 The NRF has been in active discussion with ETH to establish a significant research presence in Singapore. ETH has proposed the establishment of a research centre to focus on Global Environmental Sustainability. Partnership with top research establishments such as ETH will allow us to tap on ETH's considerable expertise in environmental research (see **Annex**).

Conclusion

11. Rounding up the trip, Dr Tony Tan said, "Although Singapore is a small, compact island, we have been able to maintain a high standard of living with our limited resources, and turn our constraints into our strengths. We are known to be a garden city, and have been used as a showcase for being clean and green. We have been able to provide potable and industrial water even when our limited land area provides for storage of only 50% of our water needs. Although we have done less in renewable energy research, we do have a competitive advantage in solar cell technology. We will build on our efforts in environmental sustainability to develop knowledge and technologies for addressing global concerns."

UPDATE ON THE SINGAPORE-ETH CENTRE

Background

1. A team of 13 distinguished scientists and academics from ETH Domain visited Singapore from 8 to 13 October 2006 at the invitation of the National Research Foundation (NRF). The visit by the scientists was a follow-up to Chairman NRF, Dr Tony Tan's trip to Switzerland in April 2006, during which ETH's participation in CREATE was broached. CREATE, endorsed by the Research, Innovation and Enterprise Council (RIEC) in July 2006, aims to foster joint research programmes between the world's top research universities and Singapore-based research institutions.
2. A Steering Committee, jointly chaired by Professor Alexander Zehnder, President of the ETH Board, and Mr Teo Ming Kian, Permanent Secretary, National Research and Development, was set up to work out the details for the establishment of the research centre.

Update

3. The Steering Committee has made good progress on the proposed Singapore-ETH Centre (SEC) to be set up in CREATE. At the committee's meeting last month in Zurich, it was agreed that SEC will carry out research on the theme of global environmental sustainability. This was in line with the research focus on Environmental and Water Technologies, one of three strategic research programmes³ identified by the NRF in 2006. ETH will present the framework for the SEC to the NRF Board for approval in June 2007.
4. The SEC's focus on global environmental sustainability will unify multidisciplinary research in various science and engineering fields, including life sciences, clean water, clean energy, environmental monitoring and urban design. It will bring together Singapore researchers from the local universities and research institutions with the universities and research organisations in the ETH Domain.
5. Professor Alexander Zehnder, President of the ETH Board, said, "I am pleased that we have made significant progress on the set-up of the SEC. SEC will be ETH's window to Asia. Research on global environmental sustainability will benefit not just ETH and Singapore but also contribute to the global knowledge base of this critically important area."

³ The other two strategic programmes are Biomedical Sciences Phase II and Interactive and Digital Media.

6. Chairman of the NRF, Dr Tony Tan said: “ETH is a well respected education and research institution in Europe and I am glad to have ETH establish a strong research presence in CREATE. ETH will present its plans for SEC for approval at the NRF Board meeting in June 2007. The theme for the SEC resonates well with our findings during this study trip to Europe. The SEC will reinforce Singapore’s drive to develop into a knowledge centre for global environmental sustainability.”
