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Sustainable Manufacturing Centre at SIMTech to Reduce Environmental Footprint

A one-stop green manufacturing knowledge hub, the centre brings together 7 government agencies and 8 industry associations, research community and industry to collaborate in R&D and implement sustainable manufacturing technologies and methodologies as well as provide expertise and transfer knowledge to the manufacturing industry.

1. Singapore, 4 November 2009: The Sustainable Manufacturing Centre, spearheaded by the Singapore Institute of Manufacturing Technology (SIMTech), a research institute of the Agency for Science, Technology and Research (A*STAR), is launched today by Dr Yaacob Ibrahim, Minister for the Environment and Water Resources, at SIMTech.

Objectives of Sustainable Manufacturing Centre

2. The Sustainable Manufacturing Centre or SMC aims to showcase and promote the concept of sustainability in manufacturing and create a platform to converge relevant government agencies, industry associations, research community and industry to engage in R&D and

implementation of sustainable manufacturing technologies and methodologies. The centre will work with the manufacturing industry to develop and implement innovative technologies that reduce emissions, wastes and toxicity in manufacturing, promote the recycling and reuse of resources and strengthen the global competitiveness of Singapore's manufacturing industry in the world where environmental issues have become a major concern.

3. SMC also showcases exhibits of sustainable manufacturing technologies, best practices, capabilities, success stories and an array of products to inspire innovations in green manufacturing technologies and products (Annex 2 refers).

4. Dr Lim Ser Yong, Executive Director of SIMTech said, "It is timely to set up the Sustainable Manufacturing Centre at SIMTech because we have received strong interest and feedback from the industry in sustainable manufacturing. The institute has been working with industry since 2007 in life cycle assessment and environmental impact analysis; eco-efficiency analysis and optimisation of manufacturing systems, and sustainable materials and green product developments. These capabilities have been extended and applied in the industry, achieving successful green products for the local and global markets, for example, Alpha Synovate, a local biodiesel producer from waste cooking oil; Nanyang Optical, an environmentally friendly eyewear development and retail chain, and Winrigo, a local producer of recycled and degradable polymers and associated products."

About the Sustainable Manufacturing Centre

5. One of the four strategies of the National Inter-Ministerial Committee on Sustainable Development (IMCSD) to ensure Singapore's continued sustainable development is to build up Singapore's technologies and capabilities in order to realise the country's sustainable development targets, spur economic growth and export our expertise. SMC, which fits into the Singapore Sustainable Blueprint, will play an important role to help achieve these national objectives through technology and capabilities development and knowledge transfer to industry.

6. With the establishment of SMC, a one-stop green manufacturing knowledge hub in Singapore, the manufacturing industry can now access a spectrum of support through relevant government agencies and industry-related associations to develop technical competency and business networks. They can tap on A*STAR's R&D resources and infrastructure, NEA's (National Environment Agency) sustainable development activities and incentives, such as the Energy Efficiency Improvement Assistance Scheme and the Grant for Energy Efficient

Technologies. Other avenues of support include BCA's (Building and Construction Authority of Singapore) drive for green buildings and the Green Mark certification programme; the vibrant industry ecosystem for sustainable development created by EDB (Singapore Economic Development Board) Singapore Workforce Development Agency's (WDA) support to build manpower capabilities in sustainable technology and manufacturing; technology networks and resources from SPRING (SPRING Singapore) as well as accessing overseas markets with International Enterprise (IE) Singapore.

7. "BCA is proud to work in collaboration with SMC to promote sustainability through demonstration, knowledge transfer and research. Areas of collaboration include development of sustainable construction materials and green building products to reduce environmental burdens. Going forward, BCA and SMC will build a strong partnership to ensure Singapore's continued sustainable development through technology and capabilities development and knowledge transfer to industry, " commented Mr Ang Kian Seng, Director (Research), BCA.

8. "Manufacturing is a strategic economic pillar in Singapore. This newly formed SMC will be a key resource to help the manufacturing sector develop innovations in sustainability and enhance the competitiveness of our industry clusters. The SMC will also able to leverage our existing clean and environmental technology capabilities that we have built over the years", said Mr Goh Chee Kiong, Director of Clean Technology at the Singapore Economic Development Board.

9. Said Mr Thian Tai Chew, Director of Technology Business Division at IE Singapore, "With the global spotlight on green business practices and MNCs developing baseline standards for their suppliers, the setting up of the Sustainable Manufacturing Centre is indeed timely. IE Singapore looks forward to a fruitful collaboration with the Centre to promote sustainable manufacturing concepts and practices to Singapore-based companies, so as to achieve cost-savings, garner greater market share overseas, and help save the environment."

10. "The manufacturing sector is a major consumer of energy and other resources in Singapore. We are glad that SIMTech is taking this step to play a bigger role in national efforts to build capabilities and competencies in the industry sector, as energy and resource efficiency can help improve the cost competitiveness of our industries," said Mr Andrew Tan, Chief Executive Officer, National Environment Agency, Singapore

11. Victor Tay, Director of Industry Development Group at SPRING Singapore, explained, "Sustainable manufacturing is an important emphasis to differentiate Singapore's manufacturing capability from the regional economies. We had jointly launched the Sustainable Manufacturing Programme with SIMTech and SMA in April 2009. The set up of Sustainable Manufacturing Centre today will complement the programme to encourage all local enterprises to embrace the sustainable technologies into their manufacturing processes, and seek certification with the newly launched Sustainable Manufacturing Label. Collectively, these initiatives will establish Singapore as a regional Environmental Hub."

12. To build up our workforce's capability in sustainable manufacturing, SMC is working with WDA to develop a post-graduate programme under the Process Workforce Skills Qualifications (WSQ) Programme. To be rolled out in the first half of 2010, the Process WSQ Graduate Diploma in Sustainable Manufacturing will cover areas such as carbon footprint assessment and reduction; resource recovery and recycling; alternative and renewable energies; eco-product design; eco-material; and green supply chain.

11. "Through this and other programmes, we will help our professionals equip themselves with the knowledge and skills to achieve both environmental sustainability and cost advantages in manufacturing. We also aim to facilitate the entry of new talent into the growing clean technology industry in Singapore," said Mr Chan Heng Kee, Chief Executive of WDA.

Sustainable Manufacturing Centre and Industry

12. Over the next 5 years, SIMTech will spend S\$10 million in the development of sustainable manufacturing technology and manpower, and spur many times of that amount by the industry. Some areas for collaboration have already been identified with industry partners to develop sustainable manufacturing capabilities in the areas of remanufacturing; recovery of resources from manufacturing waste and sustainable packaging.

13. Today, 4 companies, namely Cadbury Enterprises, LHT Holdings, Prima Limited and Screentech Display are signing Project Agreements and a Memorandum of Understanding with SMC (Annex 3 refers).

14. LHT Holdings is a local manufacturer of wooden pallets, boxes and crates as well as the first company to recycle wood as products in Singapore. The project with SMC will enable LHT

Holdings to better understand the environmental impacts of their products to better position and market their products in markets with more environmentally-conscious consumer. The project team will map and model the applications of the technical wood in doors and pallets from cradle to end-of-life to quantify the environmental impacts. LHT Holdings can use the results to develop strategies for improvement and make efforts to reduce environmental burdens of their products through R&D in technology and innovation. In addition, the carbon footprint of the products can also be useful in markets which impose carbon taxes or require carbon footprints declarations.

Moving Forward

15. To create innovative technologies and methodologies for a cleaner environment and to strengthen the global competitiveness of Singapore's manufacturing industry, SMC will be launching two research consortia in remanufacturing and sustainable manufacturing next year. In May 2010, Sustainable Manufacturing will be the theme for the SIMTech Annual Manufacturing Forum to provide further insights in the opportunities and challenges in sustainable manufacturing.

End

NOTES TO EDITOR

Sustainable manufacturing is more than recycling materials and renewable energy sources as commonly perceived. It encompasses a wide spectrum of manufacturing issues such as environmental considerations throughout the life cycle of a product from raw material stage and the rate of energy efficiency during production and usage among others.

Among A*STAR's key achievements in sustainable manufacturing technologies is SIMTech's assistance to help companies gain global recognition and financial success from sustainable manufacturing and development. SIMTech assisted Winrigo, a local producer of recycled and degradable polymers and associated products, to conduct a comparative carbon footprint assessment to verify the eco-friendliness of the material, R3Plas™. R3Plas™ is able to reduce carbon emission by 30% compared to virgin plastics without increasing in cost. The developed sustainability assessment tool equipped Winrigo with a reliable approach to simulate and analyse eco-friendliness of products before committing resources to development and production as well as to identify improvement opportunities in product sustainability. Arising from

this, plastic waste and agricultural by-products can be revived into new products for diverse applications in consumer products and construction for export to Japan and Southeast Asia.

Another notable green project is with Alpha Synovate, a local biodiesel producer from waste cooking oil, to assess and recommend optimisation for improvement in their manufacturing operations for Alpha Biodiesel. Life cycle assessment by SIMTech has shown that there is a net significant net reduction in carbon emissions of 62% due to the carbon recycling of waste cooking oil when producing Alpha Biodiesel. This recycling effort is able to reduce a potential amount of 20,000 tons of waste cooking oil being disposed into Singapore's sewage system annually.*

*According to AgriFood & Veterinary Authority (AVA), of Singapore, 172,128 tons of cooking oil is consumed in Singapore in 2008 (Source: AVA Annual Report 2007/2008).

Annex 1

About Singapore Institute of Manufacturing Technology

The Singapore Institute of Manufacturing Technology (SIMTech) is a research institute of the Science and Engineering Research Council (SERC) of the Agency for Science, Technology and Research (A*STAR).

SIMTech develops high value manufacturing technology and human capital to contribute to the competitiveness of the Singapore industry. It collaborates with multinational and local companies in the precision engineering, electronics, semiconductor, medical technology, aerospace, automotive, marine, logistics and other sectors. For more information, please visit <http://www.SIMTech.a-star.edu.sg>

About the Agency for Science, Technology and Research

The Agency for Science, Technology and Research (A*STAR) is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A*STAR oversees 14 biomedical sciences, and physical sciences and engineering research institutes, and seven consortia & centre, which are located in Biopolis and Fusionopolis, as well as their immediate vicinity.

A*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, hospitals, research centres, and with other local and international partners. For more information, please visit <http://www.a-star.edu.sg>

About Building and Construction Authority of Singapore

The Building and Construction Authority (BCA) is an agency under the Ministry of National Development, championing the development of an excellent built environment for Singapore. "Built environment" refers to buildings, structures and infrastructure in our surroundings that provide the setting for the community's activities. Our mission is "we shape a safe, high quality, sustainable and friendly built environment". For more information, please visit: www.bca.gov.sg

About Singapore Economic Development Board

The Economic Development Board is the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre and grow the Singapore economy. We dream, design and deliver solutions that create value for investors and

companies in Singapore. In so doing, we generate economic opportunities and jobs for the people of Singapore; and help shape Singapore's economic future.

'Host to Home' articulates how EDB is sharpening its economic development strategies to position Singapore for the future. It is about extending Singapore's value proposition to businesses not just in helping them improve their bottom line, but also in enterprises export, develop business capabilities, find overseas partners and enter new markets. At the same time, we work to position Singapore as a base for foreign businesses to expand into the region in partnership with Singapore-based companies. For more information, please visit: www.sedb.gov.sg

About International Enterprise Singapore

International Enterprise (IE) Singapore is an agency under the Ministry of Trade and Industry spearheading the development of Singapore's external economic wing.

Our mission is to promote the overseas growth of Singapore-based enterprises and international trade. With a global network in over 30 locations and our 3C framework of assistance – Connections, Competency, Capital, we offer services to help enterprises export, develop business capabilities, find overseas partners and enter new markets. At the same time, we work to position Singapore as a base for foreign businesses to expand into the region in partnership with Singapore-based companies. For more information, please visit www.iesingapore.gov.sg

About National Environment Agency

Formed on 1 July 2002, the National Environment Agency (NEA) is the leading public organization responsible for improving and sustaining a clean and green environment in Singapore. The NEA develops and spearheads environmental initiatives and programmes through its partnership with the People, Public and Private sectors. It is committed to motivating every individual to take up environmental ownership and to care for the environment as a way of life.

By protecting Singapore's resources from pollution, maintaining a high level of public health and providing timely meteorological information, the NEA endeavours to ensure sustainable development and a quality living environment for present and future generations.

SPRING Singapore

SPRING Singapore is the enterprise development agency for growing innovative companies and fostering a competitive SME sector. We work with partners to help enterprises in financing, capabilities and management development, technology and innovation, and access to markets. As the national standards and accreditation body, SPRING also develops and promotes internationally-recognised standards and quality assurance to enhance competitiveness and facilitate trade. For more information, please visit: www.spring.gov.sg

About Singapore Workforce Development Agency

The Singapore Workforce Development Agency (WDA) enhances the competitiveness of our workforce by encouraging workers to learn for life and advance with skills. In today's economy, most jobs require not just knowledge, but also skills. WDA collaborates with employers, industry associations, the Union and training organisations, to develop and strengthen the Continuing Education and Training system that is skills-based, open and accessible, as a mainstream pathway for all workers - young and older, from rank and file to professionals and executives - to upgrade and advance in their careers and lives. For more information, please visit <http://www.wda.gov.sg>

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SUSTAINABLE MANUFACTURING CENTRE

Objectives

The Sustainable Manufacturing Centre (SMC) at SIMTech aims to showcase and promote the concept of sustainability in manufacturing and create a platform to bring together government agencies, industry associations, research community and industry to work in R&D and implementation of sustainable manufacturing technologies and methodologies. The centre will facilitate the development and implementation of innovative technologies that reduce emissions, wastes and toxicity in manufacturing, promote the recycling and reuse of resources and strengthen the global competitiveness of Singapore's manufacturing industry in the world where sustainability and the environmental issues have become a major concern.

Partners and Supporters

Government agency partners of the SMC include Building and Construction Authority of Singapore (BCA), the Singapore Economic Development Board (EDB), International Enterprise (IE) Singapore, National Environment Agency (NEA), SPRING Singapore (SPRING) and the Singapore Workforce Development Agency (WDA). SMC is supported by industry-related associations such as the Singapore Environment Council (SEC), the Singapore Manufacturers' Federation (SMa), Singapore High Technology Association (SHTA), Singapore Industrial Automation Association (SIAA), Singapore Packaging Agreement (SPA), Singapore Precision Engineering and Tooling Association (SPETA), Sustainable Energy Association of Singapore (SEAS) and Waste Management and Recycling Association of Singapore (WMRAS).

Roles

The SMC works locally and internationally with researchers and industries across sectors to promote sustainability through demonstration, knowledge transfer and research. The core activities of the centre are:

- Research and Development
- Industry Development and Technology Transfer
- Knowledge Transfer

Showcase

SMC also showcases exhibits of sustainable manufacturing technologies, best practices, capabilities, success stories and array of sustainable products. The centre is categorised into these areas:

- | | |
|----------------------------|--------------------|
| -Redefine Satisfaction | -Rethink Resources |
| -Re-engineer Manufacturing | -Revive Waste |

COLLABORATIONS WITH INDUSTRY

Title:

Carbon Footprint Assessment of Cocoa Production for Cadbury Enterprise

Brief:

To quantify the carbon footprint of cocoa production at Cadbury manufacturing plant, the assessment aims to assist the company to improve the carbon footprint by adopting a better resources management strategy, and to broaden the corporate social responsibility.

Title:

Sustainability Assessment of LHT Holdings' Technical Wood throughout the Entire Lifecycle.

Brief:

To map and model the applications of the technical wood in doors and pallets from cradle to end-of-life to quantify the environmental impacts. Benchmarked against using virgin wood in the same applications to derive the pros and cons of technical wood, decision making is based on quantified benefits and strategy for improvement especially in sustainability of the operations.

Title:

Sustainability Analysis for Eco-Efficiency Improvements and Development of Sustainable Materials from Organic By-product for Prima Limited

Brief:

To apply life cycle environmental sustainability concept to identify potential areas where the company can improve the eco-efficiency. Studies based on the carbon footprint analyses will offer the possible strategies for Prima to achieve eco-efficiency in its operation. A feasibility study on the value-add creation to organic by-product from flour milling processes as new sustainable materials and for resources for energy recovery will also be conducted.

Title: MOU between SMC and Screentech Display

Brief: To adopt SIMTech's Liquid Forged (LF) technology into Screentech's LED (Light Emitting Diode) lightings. With the integration of LF technology, the performance and reliability of High-Power High-Brightness LED product range will be significantly enhanced.

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