

PRESS RELEASE

Sembcorp Industries Ltd
CO REGN NO 199802418D
30 Hill Street #05-04
Singapore 179360
Tel (65) 6723 3113
Fax (65) 6822 3254
www.sembcorp.com

SEMBCORP TO TEST- BED NEW EMERGING WATER TECHNOLOGIES WITH MITSUBISHI ELECTRIC AND SCINOR (ASIA)

- *Potential benefits include significant energy savings, better performance and lower life cycle costs*

SINGAPORE, July 11, 2016 – Sembcorp Industries (Sembcorp) is pleased to announce that it has signed memoranda of understanding (MOUs) today with Mitsubishi Electric and Scinor (Asia) respectively, to test-bed new technologies for water, under the Sembcorp Industrial Living Lab initiative. These technologies will be tested at Sembcorp’s facilities, enabling them to be proven in an industrial setting and allowing Sembcorp to apply new and disruptive solutions. They are:

a) **Mitsubishi Electric’s Eco-MBR, a novel ozone backwashing membrane bioreactor (MBR)**

This patent-pending technology provides better membrane permeability, higher flux, and requires less membranes to be utilised, making for more energy-saving, compact, wastewater treatment and water reuse plants that cost less in the long run. Eco-MBR will be applied at Sembcorp’s plants together with next-generation ozone-resistant membranes made by Asahi Kasei.

b) **Scinor (Asia)’s newest polyvinylidene fluoride (PVDF) membranes**

Made using thermally induced phase separation (TIPS), these proprietary membranes for microfiltration and MBR plants offer significant energy savings of up to 30% due to higher flux, as well as improved performance and shorter backwash durations. In addition, the technology also allows for longer membrane life and extended plant life cycles.

The MOUs were signed during Singapore International Water Week 2016, by Siah Keng Boon, Chief Technology Officer of Sembcorp Industries; Eiichiro Mitani, Senior General Manager of Kobe Works at Mitsubishi Electric; and Edmund Wong, General Manager of Scinor (Asia). The signings were witnessed by Tang Kin Fei, Group President & CEO of Sembcorp Industries; Sachio Asanagi, Senior General Manager, Microza & Water Processing Division, Asahi Kasei Corporation; Zhao Jie, CEO of Beijing Scinor Membrane Technology; and Goh Chee Kiong, Executive Director for Cleantech, EDB. Please refer to the [Annex](#) for further details on the collaborations. These collaborations are the first under the umbrella of the S\$8 million Sembcorp

Industrial Living Lab initiative, launched by Sembcorp and EDB in 2015. Under this initiative, Sembcorp will grant selected technology providers access to its facilities for late-stage test-bedding and co-innovation in areas such as water and cleantech solutions.

Quotes

“As a global water company with a rich history of being innovation-driven, Sembcorp looks forward to working with Mitsubishi Electric and Scinor to testbed new and novel technologies. These represent advancements over the current state of art, and have the potential to bring about significant benefits, such as energy savings, better performance and lower life cycle cost.”

– Siah Keng Boon, Chief Technology Officer, Sembcorp Industries

“It is our great pleasure to collaborate with Sembcorp, a global leader in industrial and municipal water solutions. We believe our advanced membrane bioreactor can contribute to more sustainable water recycling worldwide, and that test-bedding it with Sembcorp will be mutually beneficial to both our companies.”

– Eiichiro Mitani, Senior General Manager of Kobe Works, Mitsubishi Electric

“It is our honour to be chosen by Sembcorp Industries to participate in the Sembcorp Industrial Living Lab initiative. This initiative will enable Scinor to demonstrate how our proprietary TIPS membrane technology can improve plant performance, and help Sembcorp’s facility and other membrane plants elsewhere become more energy-efficient and have lower life cycle cost.”

– Edmund Wong, General Manager, Scinor (Asia)

“We are pleased that Sembcorp’s Industrial Living Lab initiative has garnered significant interest from international players looking to capture value from industrial water solutions. These two collaborations with Sembcorp are a testament to Singapore’s position as a global hydrohub where companies are able to effectively pilot and commercialise new water innovations.”

– Goh Chee Kiong, Executive Director, Cleantech, EDB

– END –

For media and analysts’ queries, please contact:

Fock Siu Ling (Ms)

Assistant Vice President

Group Corporate Relations

DID: +65 67233011, +65 91053654

Email: fock.siu ling@sembcorp.com

Joya Chang (Ms)

Executive

Group Corporate Relations

DID: +65 67233153

Email: joya.chang@sembcorp.com

ABOUT SEMBCORP INDUSTRIES

Sembcorp Industries is a leading energy, water and marine group operating across five continents worldwide. With facilities of over 10,000 megawatts of gross power capacity and close to nine million cubic metres of water per day in operation and under development, Sembcorp is a trusted provider of essential energy and water solutions to both industrial and municipal customers. It is also a world leader in marine and offshore engineering as well as an established brand name in urban development. The Group has total assets of over S\$21 billion and employs over 7,000 employees. Listed on the main board of the Singapore Exchange, it is a component stock of the Straits Times Index and several MSCI and FTSE indices.

Note to Editors: Please refer to the company as “**Sembcorp**” (with “**S**” in upper case and “**c**” in lower case), or “Sembcorp Industries” in full. Please also note that “Sembcorp” is not an abbreviation of “Sembawang Corporation” but a brand name in itself, and it is therefore incorrect to refer to our company as “Sembawang”, “Sembawang Corporation” or similar.

ABOUT MITSUBISHI ELECTRIC CORPORATION

With over 90 years of experience in providing reliable, high-quality products, Mitsubishi Electric Corporation is a recognized world leader in the manufacturing, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, energy, transportation and building equipment. Embracing the spirit of its corporate statement, Changes for the Better, and its environmental statement, Eco Changes, Mitsubishi Electric endeavours to be a global, leading green company, enriching society with technology. For more information visit <http://www.mitsubishielectric.com>.

ABOUT SCINOR (ASIA)

Scinor (Asia) is a subsidiary of Beijing Scinor Membrane Technology, and a member of the Scinor group of companies. Scinor is a global supplier of hollow fiber membranes, modules, systems and plants used for industrial and potable water applications. Through ten years of research at China's prestigious Tsinghua University, it developed proprietary hollow fiber filter membranes made from polyvinylidene fluoride (PVDF) using thermally induced phase separation (TIPS), and it remains the leader in such membranes today. These ultrafiltration membranes feature higher flux, a homogeneous crystallised structure and high mechanical strength, and provide much longer service life than conventional membranes. For more information visit <http://www.scinormem.com>.

ANNEX

Technologies to be test-bedded and commercialised under Sembcorp's MOUs with Mitsubishi Electric and Scinor (Asia)

1. Novel Backwashing System for Membrane Bioreactor (MBR) plants by Mitsubishi Electric

This is a novel ozone backwashing MBR system developed by Mitsubishi Electric. Key to the system is the use of regular backwashing with highly concentrated ozonated water to remove virtually all foulants, which increases membrane permeability. This system is to be test-bedded at Sembcorp's existing facilities to compare it against conventional membrane technology.

Possible benefits of this technology are:

- Increased flux (i.e. an increase in quantity of water treated per unit of membrane filter surface area) due to increased membrane permeability
- Reduced power consumption and lower lifecycle costs due to higher flux
- Smaller plant and system footprint due to less membranes being used
- Less usage of chemicals such as sodium hypochlorite, which is used in the backwashing of conventional MBRs, given the use of ozonated water instead

2. Novel Membrane Technology for Microfiltration and MBR plants by Beijing Scinor Membrane Technology

This is an advanced PVDF membrane developed by Beijing Scinor Membrane Technology for use in microfiltration and MBR plants. The technology will be test-bedded at Sembcorp's facilities in Singapore for 2 years.

Possible benefits of this next-generation membrane are:

- Longer membrane life and superior membrane strength, given its homogeneous structure
- Higher permeability resulting in significant energy savings of up to 30%
- Lower fouling rate
- Greater chemical tolerance
- Shorter backwash durations
- Stronger membrane recovery (i.e. an improved ability to revert to original permeability after cleaning)