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## JOINT NEWS RELEASE

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22 June 2015

### **PSA Singapore Terminals installs Solar Frontier's Prototype Ultralight and Bendable CIS Modules at new Terminal Building**

*PSA demonstrates cutting-edge technology developed by world's largest provider of CIS thin-film solar energy solutions*

**Singapore, June 22, 2015** – Solar Frontier and PSA Singapore Terminals have completed the first ever installation of Solar Frontier's prototype ultralight and bendable CIS thin-film modules. The new modules, designed and engineered in Japan, were installed at PSA's newest Terminal Building in Singapore: Pasir Panjang Terminal Building 3.

"PSA is pleased to be involved in a project that underlines our commitment to green energy technologies. Alongside our electrically powered automated Rail Mounted Gantry cranes at our new terminals, these solar modules will also help to reduce PSA's carbon footprint as we continue to promote environmental sustainability," said Tan Chong Meng, Group CEO of PSA International.

"Solar Frontier's prototype modules show the far-reaching potential of our CIS technology. These modules are ultralight, thin and bendable, increasing the ways in which solar energy can be used and opening the way for potential new markets. We thank PSA for the opportunity to jointly-demonstrate what solar energy can do in the future," said Atsuhiko Hirano, CEO of Solar Frontier.

The prototype modules were developed at Solar Frontier's Atsugi Research Center in Japan. The Atsugi Research Center has been at the forefront of advancing CIS thin-film technology, driving forward CIS conversion efficiency in research and mass-production, and creating advanced products with the potential to unlock new markets.

Unlike crystalline silicon technologies, the properties of CIS enable it to be used to create ultralight, thin and bendable products. Solar Frontier has developed a new production process to achieve this. Compared to standard modules, the glass substrate layer has been replaced with a bendable and thin metal substrate, the cover glass has been replaced with a high-performance resin film cover, and the frames have been removed. These changes enable a thickness of only 1.5mm and 1/3 of the weight of standard modules.

The new features of Solar Frontier's prototype modules enable them to be used for a wider range of applications, making solar energy more accessible in the future. With the unveiling of its latest technology in Singapore, Solar Frontier continues in its pursuit of a world where solar energy enables a cleaner, more comfortable life for all.



Photo: Solar Frontier's Prototype Ultralight and Bendable CIS Modules installed at PSA's new Terminal Building

## Background

### About PSA Singapore Terminals

PSA operates the world's largest container transshipment hub in Singapore. It links shippers to an excellent network of major shipping lines with connections to 600 ports globally. Shippers have access to daily sailings to every major port in the world at this mega hub. PSA Singapore Terminals handled 33.55 million TEUs of containers in 2014. Please visit us at [www.singaporepsa.com](http://www.singaporepsa.com)

### About Solar Frontier

Solar Frontier K.K., a 100% subsidiary of Showa Shell Sekiyu K.K. (TYO:5002) ("Solar Frontier"), has a mission to create the most economical, ecological solar energy solutions on Earth. Building on a legacy of work in solar energy since the 1970s, Solar Frontier today develops and manufactures CIS (denoting copper, indium, selenium) thin-film solar modules for customers in all sectors around the world. Solar Frontier's gigawatt-scale production facilities in Miyazaki, Japan, integrate compelling economical and ecological advantages into every module: from lower energy requirements in manufacturing to the higher overall output (kWh) of CIS in real operating conditions. Solar Frontier is headquartered in Tokyo, with offices in Europe, the U.S.A., and the Middle East. Visit [www.solar-frontier.com](http://www.solar-frontier.com) for more information.

**ENDS**

**Jointly issued by PSA Singapore Terminals and Solar Frontier**

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