



NEWS RELEASE

Solar Frontier and State University of New York CNSE Investigate Potential Joint R&D and Manufacturing

MOU initiates feasibility study to bring advanced Japanese CIS solar photovoltaic technology to U.S.

Tokyo—April 23, 2014 —Solar Frontier and the State University of New York College of Nanoscale Science and Engineering ("SUNY CNSE") have signed a memorandum of understanding to conduct a technical and economic feasibility study for potential joint R&D and manufacturing of CIS thin-film modules in Buffalo, New York. This move is part of Solar Frontier's future plans to establish production bases for its proprietary technology outside of Japan, the company's home market that currently accounts for 100% of its production.

"Solar Frontier will continue to advance itself as a global leader in the solar energy segment, and establishing overseas production bases is at the core of our mid-term growth plan," said Hiroto Tamai, President and Representative Director of Solar Frontier. "We are honored to work with the CNSE to study the potential for joint R&D and manufacturing of our proprietary CIS technology in New York State."

"Governor Andrew Cuomo challenged the State of New York to become a leading high-tech knowledge economy. Our feasibility study with Solar Frontier, the holder of a proprietary CIS thin-film solar photovoltaic technology, is a step toward unveiling that vision – toward the reality of new high-tech jobs, new economic growth, and to becoming a center for advanced nanotechnologies," said Dr. Alain Kaloyeros, CEO of CNSE.

CNSE is a global education, research, development, and technology deployment resource supporting New York's job creation and growth agenda for emerging high-tech industries. CNSE has made more than \$20 billion in high-tech investments since its foundation in 2004, representing the world's most advanced university-driven research enterprise. CNSE's Solar Energy Development Center in Halfmoon provides a prototyping and demonstration line for next-generation CIGS thin-film solar cells and supports CNSE's leadership of the U.S. Photovoltaic Manufacturing Consortium (PVMC).

Under the leadership of Governor Andrew Cuomo and the New York State Assembly, New York is making multi-billion strategic investments in high-tech programs, ranging from long-term innovative R&D to workforce development and product commercialization. Public-private partnerships are a cornerstone of this program, inviting foreign investment and driving economic development and job creation across the state.

Solar Frontier is the world's largest provider of advanced CIS solar energy solutions by shipments and revenue, conducting operations from Tokyo, Japan. It has developed its CIS technology for over 20 years, achieving world-record 20.9% conversion efficiency on CIS solar cell (0.5 cm²). In 2007, the company entered commercial production in southern Japan before ramping up its 900MW Kunitomi manufacturing plant in 2011. Its advanced production process has enabled it to achieve the highest level of mass production thin-film efficiencies at world-class production costs. The upcoming 150 MW Tohoku Plant, a model for future overseas manufacturing facilities, is the latest step in Solar

Frontier's mid-term growth plan, enabling production of CIS at higher conversion efficiencies and best-in-class cost levels.

"Solar Frontier's proprietary CIS technology is unlike today's standard solar module technologies. Our CIS generates a higher electricity yield than crystalline silicon modules in real operating conditions – where environmental factors show that labelled efficiency isn't everything. Together with high-quality, high-precision manufacturing, Solar Frontier is creating cost-competitive and reliable returns on investments in the solar energy market," concluded Charles Pimentel, Chief Operating Officer of Solar Frontier Americas.

About SUNY CNSE

The SUNY College of Nanoscale Science and Engineering (CNSE) is the world leader in the emerging disciplines of nanoscience, nanoengineering, nanobioscience, and nanoeconomics. CNSE represents the world's most advanced university-driven research enterprise, with more than \$20 billion in high-tech investments and over 300 corporate partners. The 1.3 million-square-foot Albany NanoTech megaplex is home to more than 3,100 scientists, researchers, engineers, students, and faculty. CNSE maintains a statewide footprint, operating the Smart Cities Technology Innovation Center (SCITI) at Kiernan Plaza in Albany, the Solar Energy Development Center in Halfmoon, the Photovoltaic Manufacturing and Technology Development Facility in Rochester, and the Smart System Technology and Commercialization Center (STC) in Canandaigua. CNSE co-founded and manages the Computer Chip Commercialization Center (Quad-C) at SUNYIT, and is lead developer of the Marcy Nanocenter site in Utica, as well as the Riverbend Green Energy Hub, High-Tech Manufacturing Innovation Hub, and Medical Innovation and Commercialization Hub, all in Buffalo. For information, visit www.sunycnse.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 for more information.

Showa Shell Sekiyu K.K.

Showa Shell Sekiyu K.K. is listed on the Tokyo Stock Exchange and has roots dating back more than 100 years in the downstream energy business.

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