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## Siemens HCPV module partner Semprius achieves world record for photovoltaic module efficiency

The solar company Semprius, in which Siemens has invested as a strategic partner in June 2011, achieved a world record for photovoltaic module efficiency of 33.9 percent. This result was externally certified after measurement under standard test conditions at the Instituto de Energía Solar (IES) at the University of Madrid (Universidad Politécnica de Madrid).



Semprius, headquartered in Durham, North Carolina, develops high concentrating photovoltaic (HCPV) modules. The latest prototypes achieved a major milestone with 33.9 percent solar module efficiency. In a joint collaboration with the Spanish Institute of Concentration Photovoltaic Systems (ISFOC) and the University of Madrid, this testing was performed by the IES institute of the university. For the first time a photovoltaic module converted more than one-third of the energy of the solar irradiation on the module area into usable electricity. Depending on the specific location and irradiation, the HCPV modules can deliver an energy output per square meter that is two times higher than common polycrystalline modules. Leading module manufacturers of conventional PV technologies achieve a maximum module efficiency of approximately 20 percent with monocrystalline PV modules and about 16 percent with polycrystalline technology.

In June 2011, Siemens acquired a 16-percent stake in Semprius to scale up the innovative HCPV technology to market maturity. The Semprius HCPV systems bundle the sunlight on the modules with the aid of integrated lenses on small photovoltaic cells. HCPV is a prime alternative to conventional photovoltaics especially suitable for sunbelt regions with high direct irradiation.

Semprius as a leader in HCPV modules shows us that we have bet on the right technology, said Martin Pfund, CEO of the Siemens Energy Photovoltaic Business Unit. The world record is a breakthrough in module efficiency. Combined with our expertise in turnkey solutions business it has the potential to become a game changer for the solar markets in regions with high irradiation. With Semprius as a partner we will further broaden our portfolio in the photovoltaics market. We are very pleased to be working together with Semprius to commercialize this technology globally.

While Semprius will further develop its modules, Siemens is focusing its research and development activities on optimizing system components such as the trackers, field design and inverters. Together with Semprius Siemens will provide the best possible integrated solution and is ramping up global deployment of first test systems with Semprius technology this year. The first full test installation has been operational in Arizona since August 2010. Furthermore, Semprius is completing the construction of a pilot plant in Henderson, North Carolina, to validate the technology for larger installations. Ramp up of the first pilot line production of HCPV modules there will begin during the second half of 2012.

This is the culmination of our emphasis on bringing smart design to solar, said Joe Carr, Semprius President and CEO. Our world record efficiency modules combined with our low cost manufacturing processes and Siemens PV system expertise will deliver a best-in-class global solution for utility-scale solar plants.

Components for photovoltaic installations are part of Siemens Environmental Portfolio. In fiscal 2011, revenue from the Portfolio totaled about 30 billion, making Siemens one of the world's largest suppliers of eco-friendly technologies. In the same period, our products and solutions enabled customers to reduce their carbon dioxide (CO<sub>2</sub>) emissions by nearly 320 million tons, an amount equal to the total annual CO<sub>2</sub> emissions of Berlin, Delhi, Hong Kong, Istanbul, London, New York, Singapore and Tokyo.