## Siemens Launches Employee Test Fleet of Electric Cars


Siemens has begun building up its own fleet of electric cars at their headquarters in Munich and Erlangen. Wolfgang Dehen, CEO of the Energy Sector and member of the board of Siemens AG, handed over the first 20 vehicles at the end of November in Erlangen to the employees who will drive the cars as part of the testing phase. The company fleet will eventually be expanded to 100 vehicles. "This test fleet will help us to further develop intelligent charging stations and power train technology in the future, and our employees are the pioneers in this effort – which corresponds perfectly to our corporate philosophy," Dehen said at the handover, adding, "Siemens has been a pioneer in public electromobility since 1879 with the first electric train, and since 1905 in individual electromobility with the electric Victoria vehicle. With the most comprehensive portfolio of products and solutions in this area, we are well equipped to meet the challenges of the future of public and individual electromobility. Our solutions range from the charging infrastructure to components in the electric car to the necessary information and communications technology."

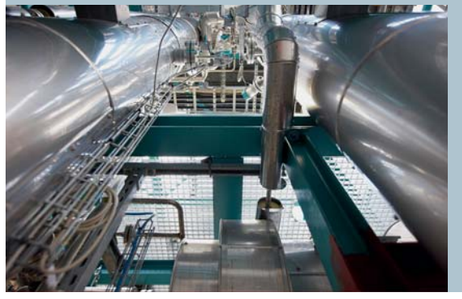
The city of Erlangen's Department of Works will supply the "green" electricity for the vehicles and will support the project during installation and operation of the charging stations. "Sustainable mobility and a sustainable power supply come together in electromobility," Dehen noted.

Says Richard Hausmann, CEO of the corporate project "Smart Grid Applications and Electromobility" at Siemens, "Electric vehicles and the available charging infrastructure from Siemens are the ideal complement to the smart grid – the intelligent power supply system." Since personal vehicles are usually only driven for one or two hours a day, electric cars can be connected to a power supply the rest of the time and charging can be controlled in such a way that surpluses of sun and wind energy can be used for it for the most part.

As quick charging is also important for the market success with electric vehicles, Siemens is aiming to develop within four to six years a fast-charge process that would take 15 minutes at most.

## Breakthrough $CO_2$ Reduction with Siemens' PostCap Process

Photos: Siemens



The Staudinger pilot plant sets new benchmarks in $CO_2$ capture for fossil fuel power plants.

Siemens has successfully completed the first phase for testing a new $CO_2$ postcombustion capture technology at the Staudinger power plant in Germany's Rhein-Main region, operated by E.ON. Process efficiency, the long-term chemical stability of the scrubbing agent, and emissions were all investigated in the pilot facility under real power plant conditions. Test results showed that after 3,000 hours, the postcombustion capture process developed by Siemens (PostCap) attains a $CO_2$ capture efficiency of over 90 percent, with practically zero emissions and a power plant efficiency loss of less than 6 percentage points – a breakthrough in efficiency and environmental friendliness.

The high level of stability of the solvent and the extremely low losses achieved with the PostCap process will have a very positive impact on the operating costs of carbon capture facilities. "For us, a major requirement of our process is to produce no new emissions during $CO_2$ capture and to provide simple handling for power plant operators," says Nicolas Vortmeyer, CEO for New Technologies Fossil Power Generation at Siemens Energy.

## New Efficiencies for Distribution Transformers

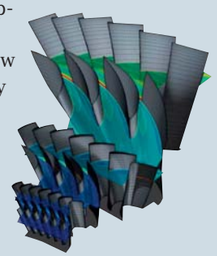
Distribution transformers are the last link in the energy chain and are connected to the medium-voltage network. In addition to the existing portfolio, Siemens also offers models with an amorphous core. Tests have shown that amorphous core material can reduce no-load operation losses by 50 percent.
The transformer industry has long known about core materials that can meet such high standards, including amorphous steel that can be especially beneficial when integrated into a wound core. Siemens currently offers transformers of this type up to 1,000 kVA. In addition, Siemens is partnering with its suppliers to develop even more efficient types of grain-oriented steel sheets for low no-load loss application purpose.

Transformers with amorphous steel cores have very low no-load operation losses.

There is increasing demand for distribution transformers with significantly lower no-load operation losses in many areas of Europe, North America and Asia. "Moreover," says Thomas Hammer, Vice President for Technology and Innovation in Siemens' Transformers business unit, "it's obvious from the development of no-load operation assessments that this trend is sure to continue in the future."

## Joint Research Project Wins International Prize

In July 2010, the Institute of Thermal Turbomachinery at the University of Stuttgart and Siemens Energy were recognized by the Institute of Mechanical engineers in the UK with the **Edwin Walker Prize** for best publication in the energy and mechanical engineering sector. Conducting experiments and simulations on the blades of the last turbine stage (made of titanium) of the SST-5000 series, the project determined that technologically optimized blading substantially improves flow during part-load operation. Along with the new Siemens SGT5-8000H gas turbine, the capacity of the combined-cycle power plant Irsching 4, Germany is being enhanced in this way.



Computational fluid dynamics (CFD) simulation for the last three stages of a low-pressure steam turbine.

## Stabilizing Power Grids in Brazil with FACTS

Brazil's energy needs are growing rapidly, with the most critical demand concentrated in the south. However, most of the power production comes primarily from hydroelectric plants in the north. Until 1999, Brazil was divided into two autonomous power networks – one supplying consumers from the middle west to the southeast, and another one installed in the north and northeast. But due to the country's increased energy needs, another solution had to be found. The Tocantins River Basin, the São Francisco River Basin and the Amazon River Basin are all particularly suited for new hydroelectric power plants, and Brazil does have plans to increase the number of these plants in the future. However, like all renewable energies, hydroelectric power production means varying power generation throughout the year. Therefore, a flexible power exchange between the two grid systems was needed. The solution? Siemens' flexible alternating-current transmission system (FACTS), which improves the voltage quality and stability of existing power grids and increases their transmission capacity. Siemens has been contracted to supply two FACTS devices to Brazil. The first order is for the erection of a 230-kV SVC PLUS (Static VAr Compensation) system in Rio Branco, 75 kilometers north of Brazil's border with Bolivia, for Rio Branco Transmissora de Energia (RBTE). The system boasts a rating of –20/+55 MVAr in Siemens' cutting-edge SVC PLUS technology. The second project – which aims to secure clean, reliable energy for the industrial region of Manaus, in the state of Amazonas in the far northwest of Brazil – entails erecting ten 500-kV Fixed-Series Compensation systems (FSC) and three "Classic" Static VAr Compensation systems (SVC) – two for 500 kV and one for 230 kV – at the Xingu, Jurupari, Oriximiná and Macapá locations for the Spanish group Isolux Corsán's utility, located in Rio de Janeiro. The two projects are expected to be completed in 2012.

Mei Wei Cheng, CEO of Siemens North East Asia and President and CEO of Siemens Ltd China (left), and Wolfgang Dehen, CEO of the Energy Sector and Member of the Managing Board Siemens AG, at the opening ceremony of the company's new blade manufacturing site in Shanghai, China.

## Wind Power Business Expanded in Leading International Markets

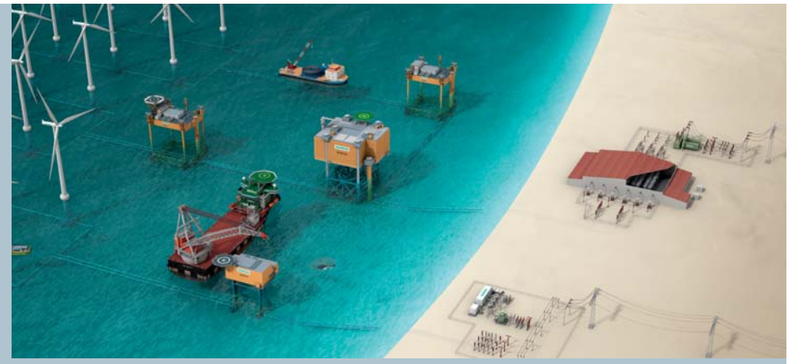
Siemens continues to expand its international manufacturing network in the rapidly growing wind power business: In December, the company opened its first rotor blade manufacturing plant in Shanghai, China, and a new nacelle production facility in Hutchinson, Kansas. In addition, Tillsonburg, Ontario, will be the new Canadian rotor blade manufacturing site. Total investment for the three new locations is around €100 million. Siemens has already announced the construction of other wind turbine production facilities in the UK, India and China, and a joint venture for the production of wind turbine components for the Russian market. "Eco-friendly energy sources such as wind power offer excellent prospects," says Wolfgang Dehen, CEO of the Siemens Energy Sector. "The global wind power market will grow from about €30 billion annually to as much as €216 billion by 2030. We see major growth potential in particular in the USA and China." Over the last five years, the average annual growth rate of wind power installations in the USA was 39 percent. With 10,000 MW in newly erected wind turbines and a total installed capacity of 35,000 MW in 2009, the USA was the world's most important wind market, followed by the Chinese market, with 26,000 MW. Since 2005, the installed wind generating capacity in China has doubled every year. By 2020, China wants to have wind turbines with a combined capacity of 150,000 MW online, which equals three times the installed wind power capacity of all of Europe today. "With a record order backlog of more than €10 billion, and the rapid expansion of our international manufacturing network, we are in an outstanding position to become one of the world's top three wind turbine providers by 2012," adds Dehen.
Internationalization is one of the main pillars of Siemens' wind power strategy. Currently, the company has seven manufacturing facilities in three countries. Great efforts are also being made to further reduce costs through the industrialization of production processes and innovations such as the direct-drive wind turbine. Over the last two years, Siemens has tripled its wind power R&D budget and in 2011, it will be increased even more. Siemens' mid-term aim with wind power is to achieve full grid parity with fossil fuels.

## Eco-Friendly Power Plant in the UK for DONG Energy

Siemens Energy recently handed over the Severn Power combined-cycle power plant near Newport, Wales, to the customer DONG Energy. Thanks to Siemens advanced burner technology the plant's nitrogen oxide emission levels are very low at approximately 15 ppm. The 834-MW plant achieves full output after only 30–35 minutes and its high operating flexibility quickly compensates for fluctuating feed-in from wind turbines. The air-cooled condenser and innovative wastewater concept mean very low water consumption. Severn Power boasts 58 percent efficiency and will supply more than 1.5 million households with eco-friendly electricity. "With this power plant, we have again succeeded in supplying a master class combined-cycle station," says Lothar Balling, Head of GT Power Plant Solutions in the Fossil Power Generation Division of Siemens Energy. "This plant impressively demonstrates how assured supply, cost-effectiveness and environmental compatibility can be harmonized. It also exceeds the guaranteed performance demanded by the customer on all counts."
Severn Power also fulfills the stringent requirements of the UK grid code. In terms of health and safety, too, the project is exemplary. More than 3 million working hours were clocked up without a Lost Time Accident. "This is a top result and at the same time a benchmark for the entire construction sector for power-generating facilities," said Balling. At peak times there were over 1,200 workers on the Severn Power construction site.

Photos: Siemens

## New Wind Power Offshore Substation from Siemens

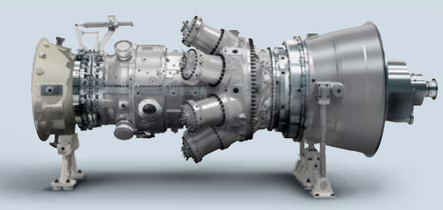


The WIPOS self-lifting platform system.

To help meet the challenges of ever-increasing demands on electrical power networks, Siemens is continually developing and introducing new products and technology to the energy market. One of the latest additions to the company's comprehensive portfolio of reliable, efficient and proven grid access solutions is the new Wind Power Offshore Substation (WIPOS™). With WIPOS, Siemens presents an innovative concept for the design, engineering and installation of offshore wind farms. Serving as an interface between offshore wind farm and the mainland, WIPOS passes power harvested from wind through cables to reach the point of common connection onshore.
Siemens offers three unique WIPOS solutions, providing the flexibility to meet various offshore weather, tide and seabed conditions: a self-lifting solution, a topside/jacket solution and a floating solution.
The self-lifting platform solution requires minimum installation effort, and heavy crane vessels are not necessary. It will be installed for the BorWin2 cluster connection project in Germany – connecting two wind farms that will begin operation in 2013. In the topside/jacket solution, the topside and foundation structures are two separate entities. This solution is being used for the Greater Gabbard project in the UK, roughly 25 kilometers off the coast of Suffolk (see *Living Energy* November 2009). The floating solution incorporates a floating facility with exceptional buoyancy that could either float entirely, or be held in place by anchors connected to a catenary mooring system on the seabed, depending on water depth.
Europe is moving more and more toward a leadership position in the offshore wind energy field – particularly with the North Sea Offshore Grid Initiative Declaration by nine European countries. With WIPOS, Siemens could play a major role in these efforts – supplying comprehensive turnkey solutions ranging from first feasibility and power system studies to the engineering procurement, construction and commissioning of entire grid connections.
For more information, go to: www.siemens.com/energy/wipos

## New State-of-the-Art Gas Turbine from Sweden

Siemens recently launched a new SGT-750 industrial gas turbine in Finspång, Sweden. Its 37 MW capacity will close a gap in the company's industrial gas turbine portfolio, which currently offers a power range between 5 and 50 MW. The twin-shaft SGT-750 turbine can be used both for power generation and as a mechanical drive. As a mechanical drive, it attains an efficiency level of 40 percent. Outstanding serviceability and dependability are two other hallmarks of this new machine. The capacity for on-site maintenance minimizes downtime, reducing it to just 17 days in 17 years! Maximum dependability is ensured with the use of components from other gas turbines in the Siemens fleet that have a proven track record, including burners, a dry low-emission (DLE) combustion system that reduces $NO_x$ emissions, and high exhaust energy which – when used in cogeneration with combined-cycle power plants – results in low fuel consumption and lowers $CO_2$ emissions. The new SGT-750 represents a perfect model of economic viability and eco-friendliness as well as a high level of availability and reliability.



The new SGT-750 industrial gas turbine.

## Handover of New Combined-Cycle Power Plant in Singapore

Siemens officially handed over units 30 and 40 of PowerSeraya's combined-cycle power cogeneration plant on Jurong Island in southwest Singapore in October 2010. Siemens built the turnkey, 800-MW plant as the consortium leader, along with Siemens Pte. Ltd. Singapore and Samsung C&T Korea. The high-efficiency, combined-cycle units are configured for cogeneration, supplying both power to the grid and process steam to the neighboring refinery, owned by Petrochemical Corporation of Singapore Private Ltd. As a result, fuel utilization of the new units will be better than 75 percent.
In 2002, Siemens and Samsung Corporation constructed two combined-cycle 370-MW units for PowerSeraya on the same site. These units were also converted to cogeneration during the new construction project. With the new units, PowerSeraya now has four combined-cycle units on Jurong Island with a total installed capacity of 1,540 MW. Siemens supplied two SGT5-4000F gas turbines, two hydrogen-cooled generators, the heat recovery steam generators, and all the electrical systems for the new units, as well as the SPPA-T3000 control system. Siemens was also awarded a service contract for these units.
In fall 2010, the trade magazine *Asian Power* honored PowerSeraya with the Asian Power Plant of the Year 2010 Silver Award. "These units will play a major part in meeting Singapore's increasing energy requirements in an environmentally friendly and cost-effective manner," says Rainer Hauenschild, CEO of Energy Solutions for the Fossil Power Generation Division of Siemens Energy.

The winners of the Silver Award at the Asian Power Plant of the Year 2010 presentation ceremony: Thomas Hagedorn, Director of Sales for Asia-Pacific, Siemens Energy; John Ng, CEO of PowerSeraya; Shih Chi Lai, Head of Projects of the Utilities Group PowerSeraya; Tim Charlton, President and Publisher, Charlton Media; and Quek Khai Hor, Senior Vice President of Utilities PowerSeraya.


Photos: Siemens

Environmental awareness plays a big role in the Eni Norge project, including respecting the natural habitat of the reindeer grazing in the onshore transmission area.

## Siemens Signs History-Making Contract with Eni Norge

Siemens has signed a landmark contract with Eni Norge for building of an onshore electrification system for the oil- and gas-rich Goliat offshore field in the Barents Sea, 110 kilometers northwest of Hammerfest, Norway. The contract has a value of about €30 million and is the largest that Siemens (Norway) ever received in this business area in its 100-year history.
The contract gives Siemens responsibility for delivery of all of the onshore equipment that will provide electricity to Goliat. The contract also includes a new overhead line between the new station and station Hammerfest, dismantling of old existing overhead lines, and installing a land cable that will be connected to the sea cable for the Goliat field. Onshore works have to strictly consider environmental issues, since the construction site is located in a sensitive arctic area.
The new system will provide Goliat with electricity and strengthen the local supply network as well. Civil works will start in April 2011, and the first part of the system will be in operation by the end of 2012. Siemens is making a great effort to hire members of the local workforce as external suppliers on the project.
"This solution will lead to more sustainable and eco-friendly oil production," says Siemens Division Director Olav Rygvold. The planned electrification of Goliat will reduce $CO_2$ emissions by 50 percent compared to the current traditional solution, whereby Goliat's electricity is produced by gas turbines located on the platform.