

Taipei (Taiwan), July 28, 2011

### **Siemens helps TAIPEI 101 to become the tallest 'green' building in the world**

**Siemens has assisted the management team of TAIPEI 101, the tallest building in Taiwan and the second tallest building in the world, to achieve platinum certification in Leadership in Energy and Environmental Design, Existing Buildings: Operations and Maintenance (LEED-EBOM), the top accreditation for existing 'green' buildings. The internationally recognized certification system provides third-party verification that a building uses strategies intended to improve performance in energy savings, water efficiency, CO2 emissions reduction, indoor environmental quality and better stewardship of resources. The Siemens Building Technologies Division has played a key role in supporting TAIPEI 101 to attain the certification. Over the past two years, TAIPEI 101's building automation and energy efficiency were optimized to achieve a 10% saving in electricity usage, water consumption and waste. The building's energy consumption became 30% more efficient in comparison to that of an average building. All of this results in approximately 700,000 USD of savings in annual energy costs.**

### **The most iconic building in Taiwan**

Until the opening of the Burj Khalifa in Dubai in 2010, the landmark skyscraper in Taipei was the world's tallest building and was created as an architectural symbol of the evolution of technology and Asian tradition. It has served as an icon of modern Taiwan ever since its opening. TAIPEI 101 is a multi-purpose complex of prestigious offices, retail shops and restaurants owned by the Taipei Financial Center Corporation (TFCC) and managed by its own staff. It has a total floor space of 357,721 m<sup>2</sup>. The postmodernist architectural style incorporates many traditional, eastern Asia design elements and combines them with the latest high-quality building technologies. The 198,348 m<sup>2</sup> office tower (which comprises 101 floors above ground with a further five floors underground and is capable of accommodating 12,000 people) is designed to withstand typhoons and earthquakes. The multi-level shopping mall of 74,711 m<sup>2</sup> adjoining the tower, houses hundreds of fashionable and brand name stores. It was designed by C.Y. Lee & Partners and constructed primarily by KTRT Joint Venture.

## **Siemens' systems throughout TAIPEI 101**

As buildings account for 40% of the world's energy consumption and 21% of global greenhouse gas emissions, LEED certification encourages reductions of both, in ways that are already technologically feasible, straightforward, long-lasting and most importantly, both environmentally and financially beneficial. Obtaining the LEED 'Platinum' certification means that the building meets the highest standard of the rating system and is 30% more energy efficient than the average building. Also, in taking responsibility in the fight against global warming, its efforts are internationally recognized.

Siemens played a major role in the LEED-EBOM (Existing Buildings: Operations & Maintenance) application within two of seven categories: "Energy and Atmosphere", and "Indoor Environment Quality", acting as consultants and implementing the strategies and engineering works needed for energy saving and for improving indoor air quality. The company collaborated in the process with Steven Leach Associates, one of the leading interior design firms in Asia and long-time advocate of sustainable architecture, along with EcoTech International, one of the leading experts in the international, high-performance, 'green' building movement. The LEED-EBOM certification was developed to help operators of existing buildings measure operations and maintenance on a consistent scale, with the aim of maximizing efficiency whilst minimizing environmental impact. It addresses whole-building cleaning (including use of chemicals), recycling programs, exterior maintenance issues and systems upgrades.

When it was constructed in 2004, TAIPEI 101 was originally conceived as an eco-friendly building, as well as a super tall landmark. The building management naturally wanted to ensure the safety of users and assets within the building, to have an effective cost management and to offer a world-class quality environment. A great deal of effort was invested in improved energy efficiencies and the reduction of carbon emissions within the building, with various relevant management systems in place. Siemens was a chosen supplier because of its proven reputation, reliability and ability to provide comprehensive building solutions. An Apogee fully integrated energy management and control system was installed, its intelligent connectivity enabling the integration of power monitoring, generator management, chiller control, lighting control, zone pump variable speed drive security management, fire alarm systems and car parking management.

To minimize the building's use of electricity and its impact on the environment, TAIPEI 101 boasts the largest water-distribution system in Asia. Its temperature and climate is controlled by over 3,400 terminal box controllers, located throughout the building. At night time when external temperatures are lower – and cheaper, off-peak, power rates are available – the same system produces ice and stores it to reduce cooling-load during the day. The Osram lighting system

2 / 6

originally comprised 125,00 fluorescent lamps, 3,800 energy-saving lamps and 2,400 halogen lamps, all centrally controlled by Siemens' building automation system. For further savings, it interfaces with the air volume system so that when premises are not inhabited, air conditioning and lighting systems automatically shut off. The air volume system itself, which includes fifty terminal boxes on each of the 101 floors, is set up to deliver an even distribution of air in the podium and office tower automatically. Tenants are able to adjust the temperature for their own location within certain controlled limits.

### **Upgrading the application to 'platinum' standard**

LEED, having been conceived in 1998 and developed by the U.S. Green Building Council (USGBC,) was not well known throughout Asia at the time that TAIPEI 101 was erected. It has since evolved to incorporate recent 'green' building technologies more accurately and gained global acceptance. LEED version 2009 today consists of a suite of rating systems for the design, construction and operation of buildings, homes and neighborhoods. Buildings can qualify for four levels of certification: Certified, Silver, Gold and Platinum. The initial application process for TAIPEI 101, which took twenty-one months in total, began in November 2009, and was aimed at achieving 'Gold' standard certification. But, the anticipated LEED score for the complex was already high and, after an initial evaluation substantiated this belief, it was decided to upgrade the level of application from 'Gold' to 'Platinum'.

In applying for this US-based standard, one of the major challenges facing the project team involved obtaining credits for certain equipment and materials which are not yet available in Taiwan. Another problem revolved around the sheer size and occupancy of the building. In making the application in the EBOM category, the team had to garner the support and commitment of every tenant and organization affected within a building that already housed 10,000 employees and visitors. This meant a major exercise in communication and coordination, especially in educating the facility managers about the interrelation between the fifty-six steps of the whole process and also in informing the tenants about the process being undertaken, encouraging them to embrace the concept of a 'greener' approach to life. The needs of the tenants also had to be accommodated throughout the project, minimizing the disruption to the daily activities within the building.

As heating, ventilating and air conditioning systems (HVAC) are known to use more than 40% of a building's total energy consumption, optimizing the operation of the HVAC plant was critical. Time controls were placed on extractor fans that previously ran continuously. The location of every thermostat and variable air volume (VAV) box was identified and tenants instructed exactly how to adjust the space temperature - and the implications of doing so. Siemens' Energy Monitoring and

3 / 6

Control System (EMCS) facilitated the streamlining of the operation and control of the HVAC equipment throughout the complex, optimizing the entire energy usage. Applying improved algorithms for the chiller plant and changing the sequence of operation, also considerably increased the efficiency of the cooling system. Furthermore, Siemens' EMCS, energy modeling, energy audits, commissioning services and additional sensor installations allowed that TAPEI 101's indoor air quality is now meeting the highest standards as laid out by LEED, while indoor air control simultaneously became 30% more efficient than in average buildings.

### **Financial savings as well as environmental**

In gaining LEED Platinum certification, the building now achieves annual savings of 2,995 metric tons in reduced CO2 emissions from electricity, gas and oil use - the equivalent of preserving over 9 acres of woodland from deforestation, or 239 cars being driven for the whole year. 28,000 metric tons of water as well as 1,261 metric tons of garbage are now saved each year along with 4.8 million kilowatts of electricity. This reduction in use of electrical power (by exhaust fans, lighting, chiller and air-handling plant and variable speed drives), translates to cost-savings of NTD\$20 million or 700,000 USD annually.

Siemens is also responsible for the security systems within the building. SiPass, Siemens' scalable security management solution, interfaces with access control, video surveillance, digital video recording, communication, lift, fire detection, metal detection, fiber-optic transition, guard tour system and visitor access kiosk systems. It provides automated monitoring of 4,000 doors via 300 card readers and surveillance of all major entrances and exits through 545 cameras. The visitor access kiosks are integrated turnstiles and visitor access card dispensers. The system records the digital image of visitors and, upon identification and authorization by tenants being visited, access cards are automatically issued and entry granted. A dedicated interface panel is installed in risers on every floor to accommodate expansion and upgrading of the security system according to changing tenancy requirements. The functions of SiPass can be extended to integrate with human resources software, time and attendance recording, biometric readers, photo ID for card printing, video verification and alarm paging via mobile phone.

### **Encouraging 'green' to grow in Asia**

Today's unprecedented pace of urbanization, particularly in the developing countries of Asia, accentuates the need for more sustainable buildings and energy efficiency. In a research project entitled 'The Asian Green City Index' and commissioned by Siemens, the Economist Intelligence Unit (EIU) compared twenty-two major Asian cities in terms of their environmental performance and policies based on nearly thirty environmental sustainability criteria. With urban population in Asia increasing by 37 million each year and the proportion of the population living in cities

4 / 6

expected to reach 50% by 2026, the research was undertaken as part of a Siemens' initiative to raise awareness amongst local politicians and decision-makers and to encourage Asia's emerging conurbations to achieve a good balance of economic competitiveness, environmental health and quality of life - as well as sustainable growth. After the success of Siemens' contribution in helping TAIPEI 101 to achieve platinum LEED-EBOM certification, other developers have shown interest in improving energy efficiency, thereby saving costs and achieving a faster return on investment (ROI). The project bears all the hallmarks of industry 'best practice' in motivating others to follow its lead and become advocates of 'green' and sustainable buildings.

The Energy Monitoring and Control System (EMCS) is part of Siemens' Environmental Portfolio. In fiscal 2010, revenue from the Portfolio totaled about €28 billion, making Siemens the world's largest supplier 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 270 million tons, an amount equal to the total annual CO<sub>2</sub> emissions of the megacities Hong Kong, London, New York, Tokyo, Delhi, and Singapore.

**Siemens AG** (Berlin and Munich) is a global powerhouse in electronics and electrical engineering, operating in the industry, energy and healthcare sectors. For over 160 years, Siemens has stood for technological excellence, innovation, quality, reliability and internationality. The company is the world's largest provider of environmental technologies. More than one-third of its total revenue stems from green products and solutions. In fiscal 2010, which ended on September 30, 2010, revenue from continuing operations (excluding Osram and Siemens IT Solutions and Services) totaled €69 billion and net income from continuing operations €4.3 billion. At the end of September 2010, Siemens had around 336,000 employees worldwide on the basis of continuing operations. Further information is available on the Internet at: [www.siemens.com](http://www.siemens.com).

The **Siemens Industry Sector** (Erlangen, Germany) is the worldwide leading supplier of environmentally friendly production, transportation and building technologies. With integrated automation technologies and comprehensive industry-specific solutions, Siemens increases the productivity, efficiency and flexibility of its customers in the fields of industry and infrastructure. In fiscal 2010, which ended on September 30, 2010, revenue from continuing operations of the Industry Sector (excluding Osram) totaled around €30.2 billion. At the end of September 2010, Siemens Industry Sector had around 164,000 employees worldwide without consideration of Osram. Further information is available on the Internet at: [www.siemens.com/industry](http://www.siemens.com/industry).

The **Siemens Building Technologies Division** (Zug, Switzerland) is the world's leading provider of safe, secure and energy efficient solutions for buildings („Green Buildings“) and building infrastructure. As a service provider, system integrator and product supplier Building Technologies offers building automation, HVAC, fire safety, security, low voltage power distribution and electrical installation technology. With around 42,000 employees worldwide (September 30), Building Technologies achieved a turnover of €6.9 billion in fiscal year 2010. [www.siemens.com/buildingtechnologies](http://www.siemens.com/buildingtechnologies)

## **Note to editors**

LEED (Leadership in Energy and Environmental Design) is the most important Green Building rating system in the world. Developed by the US Green Building Council (USGBC), LEED is a voluntary, consensus-based, international standard that certifies high-performing green buildings and interiors.

LEED-EBOM (Existing Buildings: Operations and Maintenance) is the rating system geared towards existing buildings seeking to become “green”. LEED-EBOM is the global benchmark for all existing properties looking to become more sustainable, efficient and environmentally friendly.