When a new international airport is being planned, when a doctor recommends a treatment to a patient, when political leaders and society want to ensure reliable energy supplies for the future, when a company wants to offer tailor-made service solutions, when the development of innovative products demands the creativity, experience and dedication of a wide range of experts, that’s when tough decisions have to be made – far-reaching decisions based on a strong sense of responsibility.

The success of our integrated technology company rests not only on our technological excellence, power of innovation and financial strength but also on our commitment to responsibility – a commitment that’s made us a strong partner of trust to people all around the world for 165 years.

Trust unites us –
Building strong partnerships for 165 years
Trust unites us – Building strong partnerships for 165 years

Ever since our Company was founded, we’ve stood for technological excellence, quality, reliability and international focus. Coupling innovative concepts and visionary ideas with a willingness to take calculable entrepreneurial risks in order to attain long-term success, our founder, Werner von Siemens, put us on track for achievement – as the following milestones from our history attest.

WWW.SIEMENS.COM/HISTORY


1848 Siemens & Halske wins the contract to build a telegraph line from Berlin to Frankfurt am Main – the longest communications link on the European continent.

1850 Siemens’ first sales office outside Germany is opened in London.

1855 Siemens’ first subsidiary outside Germany is established in St. Petersburg by Carl von Siemens.

1866 Werner von Siemens discovers the dynamo-electric principle.

1870 After only two years of construction, Siemens begins operation of the Indo-European telegraph line.

1872 Siemens establishes a pension fund for employees and their families.

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1870 After only two years of construction, Siemens begins operation of the Indo-European telegraph line.

1872 Siemens supplies important electrotechnical equipment for the Olympic Games in Munich.

1879 The world's first electric railway with an external power source is showcased in Berlin.

1897 To broaden its financial base, Siemens & Halske is reorganized as a publicly listed company.

1903 Siemens-Schuckertwerke is founded to conduct Siemens' electrical engineering business.

1925 The Irish Free State commissions Siemens to electrify the entire country.

1932 Siemens-Reiniger-Werke is established to bring all of Siemens' businesses in the area of medical engineering under one roof.

1938 Siemens scientists formulate the barrier layer theory, the springboard for modern semiconductor physics.

1938 In response to new technological developments and structural changes on the world market, Siemens combines its competencies and activities in a new organization: Siemens AG.

1951 Construction is begun on a 300-mega-watt steam power plant in San Nicolás, Argentina – marking Siemens' return to the world markets following World War II.

1959 Siemens launches the SIMATIC control system, enabling it to capture a leading position in automation technology.

1966 In response to new technological developments and structural changes on the world market, Siemens combines its competencies and activities in a new organization: Siemens AG.

1972 Siemens supplies important electrotechnical equipment for the Olympic Games in Munich.

1983 In Germany, Siemens installs a MAGNETOM scanner, the world's first magnetic resonance imaging system.

2001 The Siemens share is listed on the New York Stock Exchange.

2008 Siemens introduces its Environmental Portfolio.

2011 In Irsching, Germany, Siemens sets a world record for combined cycle power plant efficiency.

2011 In Germany, Siemens installs a MAGNETOM scanner, the world's first magnetic resonance imaging system.
People all over the world place their trust in Siemens because, as an integrated technology company, we’re poised to seize competitive advantages even in a challenging business environment. Siemens stands for:

**Proximity**

With activities in some 190 countries, we’re close to our customers worldwide. The construction of Bengaluru International Airport is a prime example. Siemens employees are on site, providing the airport’s operators with products and solutions from a single source. Our global presence – coupled with development, procurement and production activities at customer locations all over the world – makes us a strong local partner and is strengthening our position on tomorrow’s growth markets.

**Ideas**

Our research activities also span the globe. To create the technologies and innovations of tomorrow, the experts at our integrated technology company cooperate across organizational as well as regional boundaries, working closely with customers, universities, research facilities and industry partners worldwide. The Biograph mMR scanner – developed in collaboration with Tübingen University Hospital in Germany – is just one example of how our pioneering ideas are benefiting people everywhere.
As a company with a solid financial basis and an outstanding competitive position, we practice intensive portfolio management, focusing our portfolio and investments on attractive markets with high growth potential. The successful test of our new six-megawatt wind turbines in Østerild, Denmark and our strong partnership with the German utility EnBW Energie Baden-Württemberg AG show how this strategy is paying off: thanks to timely investments in offshore wind turbines and combined cycle power plants, we’re already profiting from the transition to a new energy system. Both technologies are part of our groundbreaking Environmental Portfolio.

In all areas of Company-wide relevance, we foster continuous knowledge exchange across our entire organization. Our service business is a good example of how our cross-business activities are creating value. The IT-supported services we’re providing for machine tool manufacturer Schwäbische Werkzeugmaschinen, for instance, not only improve processes; they also strengthen customer loyalty. Other cross-business activities bundle our expertise in procurement and foster the development of our employees.

We offer our highly qualified, international workforce a wide range of opportunities for further education and professional development. Our Company-wide training and continuing education programs – coupled with measures to make our teams more diverse – are strengthening our employees and our management culture and enabling us to rigorously leverage the power of Siemens across our entire organization. A specialized software platform allows us to effectively and successfully coordinate diverse teams across continents and time zones. We also conduct entry-level programs for university graduates and run a Company-wide idea management program that enables us to benefit from our employees’ suggestions.
We invite you to take a look at the five special reports that follow. In them, our partners, customers and employees talk about how they view their day-to-day cooperation with us and how this cooperation is deepening their trust in Siemens.

The reports provide a look behind the scenes at how we’re leveraging the potential of our integrated technology company and turning it into reality every day.
Trust through proximity

“Progress requires a high-performance infrastructure.”

Home to nearly 8.5 million people, Bangalore is India’s third-largest metropolitan area. Called the Silicon Valley of India due to the many IT, aerospace and biotech companies located in and around it, the city owes its success to an advanced infrastructure that's also driving progress across the entire state of Karnataka, which has a population of more than 60 million.

Bengaluru International Airport, which was built with the help of an innovative public-private partnership initiated and supported by Siemens, is part of this impressive infrastructure development. Close, trust-based collaboration ensured the huge project’s success. As Managing Director of the international airports in Bangalore and Mumbai, G.V. Sanjay Reddy is ideally positioned to understand the subcontinent’s infrastructure requirements. In the report that follows, he talks about his experiences.
The challenge for Bangalore

Population growth of roughly 50% between 2001 and 2011
India’s third-largest city

8.5 million inhabitants in 2011

The challenge for Bangalore

AFTER – Bangalore’s growth continues unabated. To meet the needs of its booming population – which already totals about 8.5 million – the Indian metropolis needs a high-performance infrastructure.

Aerospace industry

Overburdened transportation infrastructure

High levels of air pollution
G.V. Sanjay Reddy has a vision: to make Bangalore – or, as the local people call it, Bengaluru – the Gateway to South India. And he and his company, the Indian conglomerate GVK, are doing everything in their power to make that vision a reality. In 2011, GVK acquired a majority stake in Bangalore International Airport Limited (BIAL), the company that owns and operates Bengaluru International Airport. For Reddy, Vice Chairman of GVK and Managing Director of the airport, this transaction was much more than just a business venture. “Our plans are very ambitious and far-reaching,” he says. “In building and operating the airport, we have the interests and expectations of the city and the entire region before our eyes.”

The potential is endless. India is one of the world’s fastest-growing countries. Since 2004, its economy has expanded at an annual rate of over 8%. And the Bangalore area has been one of the big winners. Immigrants have poured in from other parts of India and from all around the world. Many of the newcomers, who now account for more than half of the city’s population, are highly qualified IT experts employed at the national and international computer and high-tech companies that have made Bangalore what it is today: a center of the country’s software industry and the Silicon Valley of India. Between 2001 and 2011, the population of the metropolitan area grew almost 50%. Home to some 8.5 million people, Bangalore is now India’s third-largest city after Mumbai and Delhi and one of the country’s key business and commercial centers. To find sustainable solutions to the challenges facing the booming conurbation, the local infrastructure will have to be substantially expanded.

G.V. Sanjay Reddy’s predecessors had to start virtually from scratch. At the turn of the millennium, political leaders in Karnataka realized that economic growth required a highly efficient infrastructure. However, the public funds available for its expansion were not sufficient. And the government needed a strong partner. Having already demonstrated in projects worldwide how innovative transportation solutions, efficient power supply and advanced healthcare facilities can create an environment in which economic growth benefits all of a region’s inhabitants, Siemens filled the bill.
“Public-private partnerships – The formula for India’s success”

Bengaluru International Airport is a prime example of how Siemens provides financing as well as technological solutions for future-oriented infrastructure developments. The project was launched in the early 1990s, when a public-private partnership was first proposed. G.V. Sanjay Reddy is convinced that cooperative efforts of this kind – partnerships in which governments and private companies work hand-in-hand to implement projects that benefit entire communities – are “the formula for India’s success.” Why? There are two reasons, Reddy explains. The first is financing: “The Indian government doesn’t have the ability to fund the huge infrastructure deficit that we have in India,” he says. “Over the next five years, the government expects that India will need around $1 trillion worth of infrastructure investment. And the public sector does not have the capability to invest that amount.” Therefore, the Indian government is relying increasingly on private investment. And the second reason why public-private partnerships are so important is that they offer major advantages for private companies: “The private sector has the ability,” says Reddy, “to benchmark to the global best practices and find the best solution.” In the case of Bengaluru International Airport, for example, that solution was Siemens.

Siemens paved the way for the public project’s private financing and also subsequently invested in BIAL, with Siemens Project Ventures (SPV), a business unit of Financial Services (SFS), acquiring a 40% stake in the new airport company. Other investors included Larson & Toubro Ltd., India’s largest engineering and construction company, and Unique Zurich Airport, a Swiss airport operator, each of whom acquired a 17% stake. To ensure that the state would also have a say in the running of this strategically vital infrastructure project, the remaining 26% was split between the government of Karnataka and India’s federal government. “And this still applies today,” says G.V. Sanjay Reddy, “because under Indian law, its 26% stake gives the government a minority veto.”

BIAL has primary entrepreneurial responsibility for the entire airport. To enable the company to recoup its investment, the Indian government has granted it long-term rights to collect airline and passenger fees.
About 12 million passengers in fiscal 2010/2011

India’s most advanced major airport

Innovative infrastructure solutions

Sharply increasing passenger numbers

LEFT/RIGHT – Its international airport is helping make Bangalore the Gateway to South India. All key airport data is collected in the airport’s control tower.
July 2004
Contract signed by the Indian government and the airport operator

July 2005
Construction begun

May 2008
Official opening

ABOVE — Countless planes take off from Bengaluru International Airport every day, linking South India with cities throughout the world.
New runway ready for takeoff in record time

After years of preparation, work on Bengaluru International Airport proceeded very quickly. Construction began 35 kilometers north of the city center in July 2005. Only 33 months later, in May 2008, the first commercial flight took off from the new runway.

Project implementation was smooth and rapid because Asia’s most advanced airport had selected a complete, customized technology solution from Siemens. For the project, Siemens fully leveraged its unique strengths as an integrated technology company. As in other major projects, we demonstrated locally the entire scope of our international expertise. For example, all sub-solutions were internally coordinated in advance. In line with the Siemens One approach, a key account management team advised the project company every step of the way.

We tackled the challenge head-on, delivering electrical systems on a turnkey basis, supplying energy for the airport buildings, installing customized IT solutions and providing suitable mobility solutions – all in record time. The service package covered everything from planning and delivery to installation and commissioning. And, as G.V. Sanjay Reddy recalls, our involvement didn’t end when the airport opened: “Siemens was very active in implementing the project from the beginning. The Company is solutions-oriented and views its tasks from a 360-degree perspective. That makes Siemens a strong, reliable and trustworthy partner.”

Our Company-wide Siemens One approach enables us to offer complete, customized solutions – systematically and across business areas – for hotels, hospitals and airports, for instance. The idea behind Siemens One is simple: at an integrated technology company, the whole is greater than the sum of its parts.

In Siemens, we’ve found a strong, reliable and trustworthy partner. The company’s technology leadership – coupled with its strong focus on sustainability – has made its input into the project invaluable.”
Increasing passenger numbers make expansion necessary

In 2008, when the first flights took off from the new Bengaluru International Airport, Bangalore had about seven million inhabitants. Today, it has a population of nearly 8.5 million. And as the city has grown, so has its airport. In BIAL’s fiscal year 2010/2011, around twelve million travelers passed through the terminal – an increase of almost 12% over the year before. The original plans at the end of the 1990s were based on a figure of only 3.7 million passengers a year. An expansion is necessary, and we’re involved in this project too. The single-source infrastructure solutions for which we’re responsible include the provision of security and electrical systems – from design to commissioning.

As planned, we’re scaling back our own financial commitment in view of the airport’s successful business development. In fiscal 2012, we announced the sale of a 14% stake in BIAL to G.V. Sanjay Reddy’s GVK Power & Infrastructure Limited. However, we continue to hold a substantial 26% stake in the airport operator.

G.V. Sanjay Reddy is looking to the future. Throughout the continued expansion of Bengaluru International Airport, he intends to keep the focus on sustainability. “We as a company – and Siemens as well – have put a lot of emphasis on sustainability,” he notes. “For us, receiving the prestigious Golden Peacock Environment Award in 2012 is both a distinction and an incentive. It honors our joint activities in the past and sets a new benchmark for the future. We want to continue our efforts to maintain an environmental balance and minimize adverse environmental impacts. And it’s here that Siemens is making a very valuable contribution.”

WWW.SIEMENS.COM/AR/PROXIMITY
WWW.SIEMENS.COM/AR/PROXIMITY-MOVIE

[Image: Above – Thanks to innovative Siemens technologies, passengers can check in very quickly at Bengaluru International Airport.]
Our intelligent infrastructure solutions are proving their value worldwide.
The construction of Bengaluru International Airport is just one of many projects that
have enabled us to impressively demonstrate our capabilities as an integrated technology
company. In particular, our cross-Sector Key Account Management Program – as is usual
in large-scale projects of this type – provides support for managers on site, from the initial
planning phase to servicing and maintenance. Tapping the full extent of our knowhow,
our Key Account Managers combine solutions from a wide range of Siemens Sectors and
Divisions to create integrated, end-to-end solutions tailored to specific requirements –
thus saving customers valuable time and ensuring outstanding customer support around
the globe. We’ve bundled our extensive infrastructure portfolio in our Infrastructure & Cities
Sector, which supplies integrated products, solutions and services from a single source –
from mobility and logistics solutions to intelligent power distribution systems to highly
efficient building technologies. Financial Services (SFS) is an international provider
of financing solutions. With its financial and industry knowhow, SFS helps make infra-
structure projects like Bengaluru International Airport a reality.

Not only do we have the necessary technologies in our portfolio; we also have decades of experience
acquired in bringing hundreds of major projects worldwide to successful completion.

At the heart of our solutions for Bengaluru International Airport are our IT solutions,
which network all the applications of the airport’s IT landscape and link independent
IT solutions from different suppliers to create a structured, flexible whole. All participants
profit from a simplified data exchange with optimized, accelerated processes.

Bengaluru International’s surveillance and alarm management systems are
equipped with a Siemens danger management system, which bundles all the information
provided by security and fire protection subsystems in a central control room. These
subsystems include an access control system with 105 readers, an audio and voice
evacuation system with 650 loudspeakers, a fire detection system with 1,800 smoke, heat
and flame detectors, an intrusion protection system with 100 detectors and a video
surveillance system with 60 cameras.
Active worldwide –
At home around the globe

To be a strong and reliable local partner to our customers worldwide – this is our aspiration. Siemens employees are working around the clock, in all the world’s time zones and on every continent to provide trailblazing products and solutions tailored to individual customer requirements. This dedication has been our formula for success for 165 years.

As a local supplier with a global presence, we’re a trusted partner everywhere we do business. Our ten largest Regional Companies alone employ people from some 140 different countries – experts working for the benefit of our partners, customers and shareholders worldwide.

Local commitment creates trust and lays the basis for long-term customer relationships. That’s why we’ve maintained local development, procurement and manufacturing activities in many countries for decades. In addition to our more than 290 production facilities worldwide, we have office buildings, warehouses, R&D centers and sales offices in virtually every country in the world.

Over the years, we’ve captured outstanding competitive positions in the industrialized countries. Now, through a wide range of measures, we want to further strengthen these positions and expand our activities in the booming markets of the emerging countries.

Long-term customer relationships have been the hallmark of our business for 165 years. To support major customers, we’ve set up a Company-wide Key Account Management Program that enables us to tailor our products, solutions and services to local customer requirements and regional structures while ensuring that our Key Account Managers continuously expand and reinforce our customer relationships on a long-term basis. These managers, whose performance is measured in terms of customer-specific growth, report to our cross-Company Market Development Boards and Vertical Market Management teams, which are focused, in turn, on the requirements of individual vertical markets. Staffed by experts from many different business units, these organizations leverage our entire portfolio to provide a comprehensive range of industry-specific, single-source offerings for customers in the automobile, IT and power generation industries, for instance.

With 370,000 employees around the globe, we provide targeted and tailored solutions to customers worldwide on a local basis – giving us a virtually unparalleled competitive advantage.

Worldwide responsibility for revenue and profit generation has been assigned to our individual operating units. This decentralization of business responsibility benefits customers of all sizes – particularly the small and medium-sized businesses and organizations that comprise the largest part of our customer base – by enabling us to provide locally based support everywhere in the world. Our extensive international sales team, which is managed by our Regional Clusters and Regional Companies, ensures the implementation of business-specific sales strategies. For large-scale projects around the globe, direct customer support is provided via our headquarters units.
As part of Siemens’ Executive Relationship Program, our 100 most important customers are personally supported by members of Siemens’ Managing Board. To determine if this program is actually meeting our customers’ expectations, we conduct annual surveys. For us, the results of these surveys are crucial since we want to strengthen our customers’ trust – everywhere in the world.

To gear our activities even more closely to the needs of our customers and markets worldwide, we’re breaking new ground with innovative projects like our new urban sustainability centers. These centers provide a common platform where our experts can work together with scientists, urban planners and city officials to develop the infrastructure solutions of tomorrow. Our first sustainability center, the Crystal, opened its doors in London in 2012. Two more centers – one in Shanghai and another in New York – are set to follow.

A strong worldwide presence coupled with the power of a global technology company – that’s what’s made us successful and the strong local partner that we are today – around the world and around the clock.
Fifteen-year-old Christian from the town of Beuren in southwest Germany has been diagnosed with cancer. In the summer of 2011, doctors discovered a tumor in his pancreas. A combination of chemotherapy and radiation has given him new hope.

Our new Biograph mMR played a major role in Christian’s treatment. The combination of magnetic resonance imaging (MRI) and positron emission tomography (PET) technology enabled doctors at Tübingen University Hospital to observe the tumor’s shape and metabolism in detail and obtain vital information during the course of his therapy.
Certainty is the key factor. The therapy has been effective. “Luckily, the tumor’s gone,” says Christian. Finally, life can return to normal. Now, it’s out of the hospital and back to school. “What I want is to finish school and start an apprenticeship.” A joyful prospect a year after the big shock of the summer of 2011. At first, Christian felt ill. Then his eyes and face turned yellow. The diagnosis at Reutlingen Hospital: an advanced pancreatic tumor obstructing the bile duct. Christian’s mother remembers the fateful day: “I can’t describe it: tears, anger, rage, sadness – I couldn’t control my feelings.”

Examination with the Biograph mMR scanner
The specialists in Tübingen launched their attack on the tumor immediately. “I had chemotherapy for the first four months, then radiation, and then chemotherapy for four more months,” reports Christian. “After every second treatment, they stuck me into the tube to see how well the chemotherapy was working.” The tube, as Christian calls the Siemens Biograph mMR, is an innovative combination of MRI and PET technology that helps physicians monitor the impact of chemotherapy treatments. The system can simultaneously display structures in the body and their metabolic activity.
July 9, 2012
10:34 a.m. — Having ice cream in Beuren

A summer’s day
Confidence
Solidarity
Family
July 10, 2012
2:02 p.m. — Preliminary discussion at Tübingen University Hospital
The question now is: does Christian’s pancreas still contain tumor cells? And if so, how active are they? In their examinations, the Tübingen cancer specialists never lose sight of Christian’s particular situation. “Children aren’t just small versions of adults. That means we have to consider a wide range of factors when evaluating their symptoms and determining the length of their examinations,” says Christian’s doctor, Professor Dr. Jürgen Schäfer.

For Christian, the past year has been an anxious one, full of uncertainty. “I often wondered if the tumor was getting larger or smaller,” he says. “If it was smaller, that was good, of course, and a sign the chemo was working. That motivated me to keep fighting.” But he wasn’t going to give up anyway. After the first shock, Christian promised himself he’d stay optimistic no matter what. Fortunately, the examination results boosted his confidence. The images from the Biograph mMR showed the radiologist both how the tumor’s size had changed during treatment and how its metabolism was developing – key indicators of its activity.

Today, the young patient has a very important appointment: together with his mother and sister, he’s come to Tübingen University Hospital to find out if his cancer treatment has been effective. In his patterned hospital gown, Christian lies down on a table in the examining room before entering the Biograph mMR scanner once again.
The examination is over in half an hour. And a few days later, after a detailed evaluation of the images, Professor Dr. Schäfer has good news for his young patient. “Right now, it looks very good,” reports the head of pediatric radiology in the Department for Diagnostic and Interventional Radiology. “The functional and metabolic findings show that the therapy has been successful. The tumor is no longer showing increased metabolic activity.”

Greater certainty thanks to excellent imaging

At the last examination, small remnants of malignant tissue were still visible. But it’s now clear that they’re completely inactive. “This is exactly why we’re so happy to have this combination of morphological and functional findings,” says Professor Dr. Schäfer. “Since morphologically a very small remnant was still visible. But it’s no longer functioning, thank God.”

The doctors in Tübingen have been working with the Biograph mMR since March 2011. For Christian’s mother, it was clear from the beginning that she wanted to exploit this diagnostic opportunity for her son. “The doctors told us there was a new imaging system they could use to examine Christian,” she recalls. “I agreed immediately – and now I know for sure that the therapy’s worked.”

Christian

“I feel I’m well looked after in Tübingen. The doctors are very honest with me. And I think that’s good – because I want to know exactly what’s happening and why I’m doing all these things.”
July 10, 2012
4:17 p.m. — Biograph mMR examination
Professor Dr. Claus Claussen, Tübingen University Hospital

“Our cooperation with Siemens is based on enormous trust, which has grown continually over the years.”
Professor Dr. Claus Claussen is head of the Radiology Clinic at Tübingen University Hospital. Professor Dr. Claussen discusses the prospects for the innovative technology below.

**Professor Dr. Claussen, Tübingen University Hospital has been using the Siemens Biograph mMR since March 2011. In your experience, which applications is the system most suitable for?**

**Professor Dr. Claussen:** There are currently three fields of application for the Biograph mMR. About 90% of the applications relate to oncology, where we can identify what stage a tumor is in and monitor the course of treatment. The other fields are neurological diagnostics – in particular, neurodegenerative disease – and metabolic changes near the heart muscle. The Biograph mMR provides simultaneous, detailed images of the changes and processes taking place in living organisms. This is a tremendous advance. The simultaneous acquisition of MR and PET offers precise morphological and functional insights into the human body and makes it possible to pinpoint even the smallest pathological changes – for example, in the liver, the brain and bone marrow.

**How long had you been dreaming about combining MRI and PET in this way?**

**Professor Dr. Claussen:** Computed tomography became well established in the 1970s, and ever since we’ve been dreaming of visualizing anatomical structures and forms in combination with their functions. Dynamic computed tomography, which involves injecting contrast agents, was developed in the early 1980s. This enabled us to monitor blood flow in organs and tumors. Positron emission tomography (PET) made it possible to obtain images of specific metabolic activities in the body but afforded very poor spatial resolution. Results improved when CT and PET technologies were combined in PET-CT scanners. Then, about ten years ago, the enhanced contrast achieved in images of soft tissue by using MRI technology awakened hopes of further improvement – and today we have the Biograph mMR.

**What is the special technical challenge of the Biograph mMR?**

**Professor Dr. Claussen:** The strong magnetic field of the magnetic resonance imaging systems interfered with the operation of conventional PET detectors. That’s why new detectors had to be developed for use with magnetic resonance imaging systems. At our lab for preclinical imaging, Professor Dr. Bernd Pichler performed very important preparatory work before we and Siemens tried out and tested this new technology in a first combined MRI and PET head scanner. This example highlights how important it is for an industrial company like Siemens, which is geared to research and development, to leverage its customers’ potential and pursue open innovation through joint research projects.
Tübingen University Hospital and Siemens have been cooperating for many years to develop innovative imaging technologies. How would you describe this partnership?

PROFESSOR DR. CLAUSSEN: It’s based on enormous trust, which has continually grown over the years. We were one of the first university hospitals to conclude a cooperation agreement with Siemens. Since then, we’ve tested many new Siemens products. The experts were very skeptical at first about the leading-edge molecular MR process, but Siemens was convinced that the new technology would succeed, and that conviction is paying off.

Which patients profit most from the Biograph mMR?

PROFESSOR DR. CLAUSSEN: Above all, this new system benefits children and young people since radiation exposure during imaging is substantially lower than with conventional exam methods. This is an enormous advantage since we have to monitor the effectiveness of medications frequently, particularly with young patients1, who are especially sensitive to radiation.

What new insights do you expect to gain for research?

PROFESSOR DR. CLAUSSEN: It’s still too soon to foresee the full potential of this hybrid MRI and PET technology. We have new therapy options and can now determine much earlier which therapies are effective – in terms of treatment quality, this definitely represents a big step forward. But it will certainly be years before we can measure this innovation’s full impact on healthcare.

If you could make a wish, what would you want from Siemens for the next generation of diagnostic imaging systems?

PROFESSOR DR. CLAUSSEN: Of course there are always things you can wish for – otherwise, we’d stop dreaming. The ability to visualize functional and physiological processes in living organisms is already an important advance. This was unimaginable just 20 years ago. However, we’re still just at the beginning, and that’s why I’d like the reliability of diagnostics to increase even more in the future. But the first step has already been taken. And that’s a major milestone for imaging and healthcare in general.

Innovative strength
The two imaging technologies complement one another perfectly: magnetic resonance imaging (MRI) provides millimeter-precise images of the body’s organs, while positron emission tomography (PET) displays, above all, the metabolic activity of cells. The Siemens Biograph mMR is the world’s first device to combine MRI and PET imaging in an integrated system – enabling clinicians to simultaneously capture data on organ function and metabolism as well as any changes in organs in a single scan.

For patients, this means diagnoses in less time and with less radiation exposure. Instead of having to perform several separate scans, clinicians can now acquire all images in a single process – thus shortening patient waiting times. The integration of MRI and PET technologies also reduces the amount of radiation that patients are exposed to, compared to conventional imaging technologies.

Until now, two separate devices were required for these examinations because the operation of conventional PET detectors is impaired by the strong magnetic fields generated by MRI scanners. Previously, the images generated had to be superimposed using special software. This second step reduced precision since patients – and thus organ positions – often shifted between scans. The Siemens Biograph mMR features new PET detectors whose operation is not disturbed by the MRI’s strong magnetic field. That’s why the innovative system can capture all data simultaneously, recording even the smallest details and functional processes. Healthcare facilities also profit from the Siemens Biograph mMR: the system streamlines processes and cuts costs for floor space and operation by eliminating the need for a second system. And that’s to the advantage of a growing number of patients around the world.
For us, progress means placing trust in people with a pioneering spirit

For 165 years, we’ve been providing answers to the challenges of our day – in the areas of healthcare, energy, industry and infrastructure. Few companies have more researchers and developers working to create innovative products and solutions worldwide. In a record number of research partnerships, our R&D employees are shaping technological progress more actively and openly than ever before.

Never completely satisfied, always looking for better solutions, taking personal responsibility for progress and blazing new trails in technology – this strategy has made us the powerhouse in electronics and electrical engineering that we are today.

The latest figures confirm our power of innovation. Our R&D employees are now reporting more than twice as many inventions per day as in 2001. In fiscal 2012, we filed 8,900 invention reports, some 5% more than a year earlier. During the same period, we increased the number of our patent first filings by about 7% to 4,600, making us once again a leader in the worldwide patent statistics and No. 1 in Europe.

Our innovations impact many areas of life – transportation, industry and healthcare, for instance. Today, people all around the world rely on trains, metros and light-rail systems from Siemens to provide them with safe, ecofriendly transport to and from their homes and places of work. In industry, our product lifecycle management (PLM) software is making it possible to develop, simulate and test products in the virtual world and to model entire production processes before a single screw is manufactured in the real world. In hospitals, our innovative liver fibrosis test is enabling doctors to examine patients suffering from chronic liver disease without having to conduct time-consuming, potentially dangerous biopsies. And last but not least, innovations from Siemens are helping shape the future of energy.

Corporate Technology (CT), our central research department, has overall responsibility for our strategic and cross-unit research activities. More than 7,000 CT experts cooperate across team and national boundaries to ensure that we maintain our technology leadership. Products with major profit potential on the world’s innovation-driven growth markets are developed and then incorporated into our day-to-day business operations. Our key research focuses today include electric mobility, sustainable urban development and next-generation biotechnology.

In fiscal 2012, we invested some €4.2 billion in research and development.

We’ve introduced a policy of open innovation. In more than 1,000 research partnerships, we’re facilitating targeted information exchange and cooperation with leading international universities and research institutes worldwide.

Technology and innovation – for us, that means securing our technological basis, helping shape the future with innovative solutions and strengthening our integrated technology company. The pioneering spirit of our employees is making us strong – every day and all around the world.
Patent applications: In 2011, we were No. 1 in patent applications at the European Patent Office and No. 3 at the German Patent and Trade Mark Office – where we were among the most active patent applicants. According to U.S. Patent and Trademark Office (USPTO) statistics, as published by the Intellectual Property Owners Association (IPO), we were No. 10 in the U.S. in the number of patents granted.

R&D employees: In fiscal 2012, Siemens had roughly 29,500 R&D employees working at some 188 locations in more than 30 countries worldwide to create and develop new solutions in the areas of energy, industry, infrastructure and healthcare.

Inventions and patents: In fiscal 2012, Siemens reported around 8,900 inventions and submitted about 4,600 patent first filings – an average of some 40 inventions and roughly 21 patents on each of the 220 workdays in the year. These inventions and patents were generated by all our Sectors as well as Corporate Technology, our central research department.

Siemens’ Environmental Portfolio: In fiscal 2012, our Environmental Portfolio, which features a large number of innovations, generated revenue of €33.2 billion and enabled our customers to cut their CO₂ emissions by 332 million tons – an amount equal to about 41% of the CO₂ emissions generated in Germany in 2010.
Creating trust through strength

“We care deeply about the future of energy.”

Jens Hald Jensen believes the time has come to create a new energy system. Why? Because he’s convinced that the transition to a sustainable energy infrastructure can stop climate change. And because he wants to pass on to future generations a world worth living in. Jensen, a Siemens employee who’s project manager at the test center for wind turbines in the Danish town of Østerild, is working every day to make our energy supply a little bit greener – one step at a time.

Making a successful transition to a new energy system will require implementing a complex puzzle of measures. As an integrated technology company, we offer a virtually unrivaled portfolio of products and solutions spanning the entire Power Matrix. On the following pages, Jens Hald Jensen describes how he’s taking personal responsibility to help shape the future of energy. And in an interview with Dr. Hans-Josef Zimmer, Chief Technology Officer for our key customer EnBW Energie Baden-Württemberg AG, you’ll learn how one of Germany’s major utility companies views that future.
The integrated technology company
A logistical tour de force was required just to transport the Siemens B7S rotor blades 320 kilometers from the Danish port of Esbjerg to Østerild.

Clear instructions for the team: Siemens engineer Jens Hald Jensen (left) oversees the assembly of the wind turbine with the longest rotor blade currently in operation worldwide.

The housing – or “nacelle” – for the generating components of the Siemens SWT 6.0 gearless wind turbine is 15 meters long and 6.5 meters wide.
“At 75 meters in length, the new rotor blades have nearly the wing-span of an Airbus A380.” When Jens Hald Jensen talks about his work, he makes generous use of superlatives. And today is a very fitting occasion for them: on this gorgeous August day, the Siemens engineer is supervising the assembly of the world’s largest wind turbine rotor. Sporting a white hardhat and neon-yellow safety vest, Jensen stands in the middle of a test center in the Danish town of Østerild, where we’re testing our latest products before they are commissioned on site. The test subjects arrived several days ago: our SWT 6.0 wind turbine, which has a capacity of six megawatts, and our B75 rotor blades, which, at 75 meters in length, are the longest blades of their kind currently in operation worldwide. And although Jens Hald Jensen has worked in the wind industry ever since earning his university degree, he sees this test as the highlight of his career to date. “It’s simply incredible to stand here between these gigantic rotor blades – just look at these unbelievable dimensions,” exclaims the engineer from the Danish town of Brande. “It really is a technical tour de force to be able to manufacture something this imposing in one piece.”

More than just an impressive rotor

For decades, Jensen has dreamed of an energy infrastructure that relies more heavily on renewable sources such as wind. “The wind delivers an unbelievable amount of energy around the clock, especially offshore,” says the engineer enthusiastically. “The transition to a new energy system is offering us the opportunity to help shape the future of energy – and that’s where I feel a very personal responsibility to future generations.”

It’s no wonder that Jensen is excited about combining the SWT 6.0 turbine with the B75 rotor blade: a single turbine will be able to supply green energy to 6,000 European households – emission-free and without the use of fossil fuels. And the first customers are already lining up to make large-scale use of the new technology: plans call for installing 300 SWT 6.0 turbines with a total capacity of 1,800 megawatts off the coast of the UK between 2014 and 2017.
Years of offshore experience
Once the turbines and rotor blades have successfully completed the test phase, two giant cranes lift the housing for the SWT 6.0’s generating components into the air. Under Jensen’s watchful eye, the housing – or the “nacelle” – is moved in slow motion to the top of the 120-meter tower. The culmination of more than 20 years of experience in offshore projects, the SWT 6.0 is remarkable not only for its output but also for its new drive technology, which is entirely gearless. Such innovations have enabled our engineers to reduce the number of components by about 50%. The streamlined design facilitates maintenance while also cutting down on weight: the SWT 6.0 is by far the lightest wind turbine in its class. And this, in turn, lowers costs for the foundation and the tower – making wind energy more competitive and moving us a step closer to Jensen’s vision of a greener energy future.

BELOW – Once installed, the gigantic rotor will sweep an area equivalent to two-and-a-half soccer fields. An enormous amount of space is also required for unloading the rotor blades and mounting them on the hub (pictured on the left).
“The transition to a new energy system is Germany’s project of the century. It’s the right strategy, and it’s feasible. But we still have a long way to go in order to make it happen. The greatest challenges are the tight schedule and the required expansion of the power grid. The world is watching closely to see how Germany tackles these challenges.”
The largest single-cast fiberglass component

But Jens Hald Jensen has no time for visions today. Because once the turbine is assembled, it’s time to hoist up the three giant rotor blades with steel cables. “This is the biggest rotor blade we’ve ever installed,” notes Jensen. “It’s a monumental challenge to hoist up the blades – which have a total rotor diameter of 154 meters – and attach them to the turbine.” Each rotor blade looks a bit like a beached whale, and people standing beside it look as small as they would next to one of the giant creatures of the sea. After all, the B75 is the largest single-cast fiberglass component ever constructed. And it’s innovations like this one that Jensen always finds exciting. “Our intense involvement in this field demonstrates very clearly that we intend to be pioneers in shaping the future of energy,” he says during a break. “The products shown here in Østerild underscore our commitment to leadership.”

Our technologies are bringing the future of energy closer

Siemens offers its customers not only wind power installations but also a broad portfolio of other products and solutions that will facilitate the transition to a new energy infrastructure: long-distance low-loss high-voltage direct-current transmission systems, components for the smart grid of the future, gas turbines with record efficiencies, and high-efficiency electric motors that cut energy consumption. Only an integrated technology company with a broad portfolio can provide such a complete range of offerings – thus strengthening public confidence that the transition to a new energy system can indeed be achieved. Because rebuilding our energy infrastructure will require much more than “just” phasing out nuclear energy. Many individual innovations along the entire energy chain will have to fit together perfectly like the pieces of a puzzle in order to make tomorrow’s energy supply both reliable and sustainable. And it’s here that our Environmental Portfolio is equipping us to play a key role.

In Østerild, we’ve just taken another step forward. After hours of exacting work, two crane operators and a handful of our technicians have attached the three rotor blades to the wind turbine. Jens Hald Jensen looks up with rapt attention, captivated by the imposing sight. “These rotor blades have a very special magic for me,” he says pensively. “I saw them while they were still on the ground, I was there when they were raised up, and now I’m watching them rotate and produce energy – it’s simply magical.” Nothing more stands in the way of the exhaustive testing that will follow in the weeks ahead. But for now, Jensen has called it a day. “We did it!” he exclaims, making no attempt to hide his feelings. “We’ve just installed one of the world’s largest wind turbine rotors – now that’s something you just have to be proud of.”

Dr. Felix Ferlemann, CEO, Siemens Wind Power

“Every second that the rotor, which has a total diameter of 154 meters, operates at a wind speed of ten meters per second, it captures the energy of 200 metric tons of air.”
LEFT – A job well done: after two huge cranes have positioned the rotor – which has a total diameter of 154 meters – specialists connect it directly to the generator shaft.

ABOVE – Smiles all around following the successful assembly of the wind turbine: Dr. Felix Ferlemann, CEO of Siemens Wind Power (center), and Jens Hald Jensen, project manager in Østerild (back right), share a proud moment with colleagues.
“Renewables will be a vital pillar of our future energy supply. As an energy company, we need strong, reliable partners for the challenges ahead.”
“Building a new energy system is a huge challenge.”

Providing energy for the future will require innovative solutions and strong partnerships. Siemens and the energy company Energie Baden-Württemberg AG (EnBW) have been cooperating closely for years. Dr. Hans-Josef Zimmer, Chief Technology Officer of EnBW, talks about the steps that must be taken to usher in a new energy era.

Dr. Zimmer, the future of energy is currently a hot topic in Germany.

What stance is EnBW taking?

Dr. Zimmer: Building a new energy system is a huge challenge for Germany. And as one of the country’s largest energy companies, we’re tackling it head-on. In terms of our strategy, this means we’re continuing to safeguard our position as a low-carbon energy producer. In addition to supplying power from highly efficient conventional plants, we intend to double the amount of power we generate from renewable energies by 2020. We already have a relatively large share of hydropower-based renewables in our portfolio. By 2020, we want to further expand our installed capacity from renewables by about 3,000 megawatts.

One step in this direction is certainly the EnBW Baltic 1 wind farm, Germany’s first commercial offshore wind installation. Your company partnered with us on its construction in 2011. How did the idea for this project develop, and what conclusions have you drawn from the operation of the wind farm?

Dr. Zimmer: We on EnBW’s executive board decided in fiscal 2007/2008 that we wanted to invest more heavily in renewable energies. Complementing our traditionally strong involvement in hydropower, we’ve defined wind energy as a further focus. Following extensive analyses, we concluded that wind turbines and wind farms, both onshore and offshore, could be particularly profitable. That’s why in 2008 we bought four licenses for offshore installations – two in the Baltic Sea and two in the North Sea – and now we’re in the process of developing these projects. The EnBW Baltic 1 wind farm has 21 wind turbines from Siemens and a total capacity of up to 48.3 megawatts. We’re very satisfied with its current performance. Availability is very good, and we achieved quite gratifying overall results the first year.

How’s the partnership with Siemens worked out?

Dr. Zimmer: When planning and implementing projects of this magnitude, we need reliable partners who keep their promises. Since the very beginning of the EnBW Baltic 1 project, the cooperation with our colleagues at Siemens has been characterized by great trust. And this trust is also based on our experience in other major projects on which we have partnered.

EnBW Baltic 1 is quite far from your home region in southwestern Germany. How is the electricity generated there distributed throughout the country?

Dr. Zimmer: Our wind farm in the Baltic feeds directly into the 50-hertz grid. From there, the energy is further distributed within Germany via an extensive interconnected grid. If we build more wind farms on the coast and offshore, where there’s lots of wind, we’ll have to transport large amounts of energy to the southern part of the country. By 2030, offshore wind farms operating off Germany’s coasts are expected to be supplying 25,000 megawatts of electricity. That’s why we’ll also need low-loss high-voltage direct-current (HVDC) transmission in the future. The grid development plan prepared by our
subsidiary Transnet BW and three other grid operators foresees HVDC transmission lines along several corridors. However, I’m assuming the approval process will take a very long time. There are also technical challenges to be mastered – because, even though HVDC lines have already been installed in countries like China and India, that doesn’t mean such routes can be planned and implemented overnight in Germany. On the contrary, the process will take several years. But we must address this challenge if we want to succeed in restructuring the energy system.

**In our view, highly efficient power plants like our combined cycle plants are another factor that can facilitate the transition to a new energy infrastructure:** Stadtwerke Düsseldorf, a municipal utility in which EnBW holds a majority stake, plans to build just such a plant at the Lausward site in Düsseldorf. As with the EnBW Baltic 1 and 2 projects, Siemens will be the supplier. What criteria played a role in your investment decision?

**DR. ZIMMER:** Combined cycle power plants of the type supplied by Siemens are highly efficient systems that generate low-carbon power. They have fast-start capability and are highly flexible in terms of startup and shutdown – which makes them particularly suitable for an energy market moving toward fluctuating renewable energies. Of course, in addition to boasting high efficiency and rapid startup, every new plant must also be economically viable.

Another concern is reducing energy consumption, in other words, saving electricity. What can an energy company like EnBW contribute here?

**DR. ZIMMER:** A couple years ago, our slogan was “Empowered to cut consumption.” Now you could, of course, say that a utility company should be happy if its customers use lots of energy. But quite the opposite is true: we want to help our customers conserve energy and boost energy efficiency. For years, we’ve been offering tailored solutions that make our customers’ operations more energy-efficient. One thing is clear to us: at EnBW, we can be competitive only if we provide our industry customers with energy that is so affordable that they can keep their production in Germany.

**Smart grids are one option for flattening consumption peaks. To what extent is EnBW involved here?**

**DR. ZIMMER:** We’ve been testing smart grids in trial communities for several years now. We’re also analyzing how our customers can benefit from intelligent electricity meters. We want to help our private, business and industry customers consume less energy. For example, appliances and equipment that require a lot of energy should be operated at night, when electricity is less expensive, rather during the day, when demand is high.

**That sounds like a business field with lots of potential for EnBW. How can Siemens provide support here?**

**DR. ZIMMER:** Siemens is a technology leader in many fields. Since the entire development process for the production, distribution and consumption of energy is extremely complex, system providers like Siemens have major market opportunities.

**In your view, what factors are most crucial for the successful transition to a new energy system?**

**DR. ZIMMER:** We need a wide range of technical solutions to make the new system a success. In addition, a very stable legal framework for marketing renewables must be in place. We also need to expand the grid so that energy from the generation centers, which in the future will be in northern Germany, can be transported to the consumption centers in the south. We’ll need a greater number of highly flexible power plants, such as the combined cycle plants I’ve already mentioned. In addition – and this is very important –
we’ll need a public consensus to implement all of these things. Grid expansion will entail installing hundreds of kilometers of transmission lines all across Germany. And the construction of additional pumped-storage hydropower plants to store energy temporarily will also have an impact on the environment. We have to convince people and make it clear that the transition to a new energy system cannot be accomplished from one day to the next but will require a great deal of patience, money and effort.

**In which of these fields do you anticipate major advances?**

**Dr. Zimmer:** We need highly efficient plants, but it will take time to develop them. After all, Siemens didn’t develop its high-efficiency combined cycle plants overnight. And we’ll also need time to install HVDC transmission lines and smart grids throughout Germany. Until that happens, coal-fired plants will also be a component of the evolving energy system. While such power plants will still be necessary as a backup for many decades to come, they’ll be more efficient than before, delivering the same output while consuming much less fuel.

**Now you’ve brought up the topic of the energy mix. How will the energy mix at EnBW look ten years from now?**

**Dr. Zimmer:** While EnBW will also still be operating conventional plants in ten years, we intend – compared to today – to double the share of renewables by 2020, expanding their capacity by about 3,000 megawatts. Renewable energy sources include offshore wind, onshore wind, photovoltaics, biogas and water. To obtain an economically viable mix, all types of renewable energies will have to be combined. That’s how the restructuring of the energy system will succeed.

**What do you expect of Siemens in this context?**

**Dr. Zimmer:** We expect that Siemens will always be at the cutting edge of technology and that we can count on Siemens as a technology leader who provides us with efficient solutions – solutions that make sense from both an economic and an environmental perspective. We value Siemens’ power of innovation. And we value the trust that we have in Siemens, which has evolved over many decades, just like the plants that we built together and are successfully operating today. We expect Siemens to continue pursuing this strategy and to offer us the best solutions on the market. And we at EnBW wish Siemens every success in this endeavor.
Northern Ireland’s Strangford Lough is home to the world’s first commercial tidal current power plant. Since November 2008, two turbines have been producing a combined output of 1.2 megawatts – enough electricity to meet the needs of 1,500 households. To date, the installation has fed more than five gigawatt-hours of electrical energy into the grid, making it the world’s largest tidal turbine project. Further tidal farms are now in the planning phase: the eight-megawatt Kyle Rhea project in Scotland and the ten-megawatt Anglesey Skerries project in Wales.

We’re building a record-breaking combined cycle power plant in Düsseldorf, Germany. Boasting an electrical output of 595 megawatts, the facility will set a new world record for a single power plant in combined cycle operation. With a net efficiency of more than 61%, it will also surpass the previous world record of 60.75%. And the plant will set a third record as well: never before has it been possible to extract 300 megawatts of thermal energy from a single combined cycle plant for use in a district heating system.

Renewables

Security of supply

Smart grids

Conventional power plants

Efficient energy use

Power superhighways

Demand management

Financing

Energy storage
Ensuring a reliable power supply

The foremost aim of all the measures that are being taken to bring about sustainable change in the energy system must be to ensure the reliable availability of energy at all times and at prices that are affordable for all. Blackouts must be avoided, and the international competitiveness of industry must not be endangered by excessive energy costs. That’s why the various measures comprising the pieces of the energy puzzle require careful planning and implementation. Only if these measures find broad public acceptance and fit together perfectly will the restructuring of the energy system be a success and the solutions deployed succeed on international markets.

Boosting the efficiency of conventional power plants

When the wind subsides or clouds cover the sun, fluctuations in power output must be offset fast – for example, by using combined cycle power plants. In less than 30 minutes, such plants can be generating enough power for a city the size of Berlin. As the world’s most efficient model – from Siemens – shows, combined cycle plants can reach an efficiency of almost 61% when converting natural gas into electricity, and waste heat can be used for heating. In many countries, coal will remain a key pillar of power generation for years to come. Coal-fired plants can also be made much cleaner and more efficient. What’s more, CO₂ can be separated from waste gas, stored underground or used for industrial purposes. Researchers are working on converting CO₂ into methane and the raw materials needed to produce biofuels and bioplastics.

Saving electricity and using it more efficiently

The cleanest energy is always the energy that’s not used. Industry offers considerable potential for savings. Electric motors – for pumps and drives, for example – account for nearly two-thirds of industrial power consumption. Our energy-saving motors and intelligent controls slash power consumption by up to 60% and pay for themselves in under two years. In the area of transportation, electric motors – in buses, trains and cars – are about three times as efficient as combustion engines. In buildings, which consume 40% of the power required worldwide, substantial savings can be achieved by using insulation, heat pumps, intelligent building technologies and efficient lighting systems. Household appliances also harbor huge savings potential. Today’s advanced models use less than half the power needed by their predecessors in the 1990s.

Making renewables competitive

If half of Germany’s energy is to come from renewable sources by 2030 (and some 80% by 2050), then these must be competitive without being subsidized. For wind power in particular, this goal will soon be reality. We’re currently pushing innovations that are expected to make electricity from wind power as economical as energy from coal. Our innovations range from scimitar-shaped rotor blades and gearless turbines to adaptive software that optimally adjusts wind loads, automated production processes and the longest rotor blades currently in operation worldwide for the most efficient offshore wind turbines on the market.

Offering intelligent financing solutions

If companies, towns and cities are to cut their energy consumption even when budgets are tight, they’ll need intelligent financing solutions. One proven approach is our energy-saving performance contracting – a combination of consulting, installation and financing services. Customers are not required to make any upfront investment; project costs are amortized with the energy savings achieved. Using this model, we’ve upgraded more than 4,500 facilities worldwide – generating savings of roughly €1 billion.

Developing and expanding energy storage facilities

When the weather changes, so does the output of wind and solar installations. That’s why facilities that can store excess energy for hours or even weeks are indispensable. One promising technology is electrolysisis, which uses surplus energy to produce hydrogen, an energy carrier that can be fed into the natural gas grid, stored in subterranean caverns, reconverted into electricity and used in industrial processes or fuel-cell vehicles. Batteries in buildings and electric cars can also act as intermediate energy storage devices. We’re conducting research in all these fields.
Our solutions — shaping the future of energy

We’re convinced that the transition to a new energy system will succeed. It will unleash a wave of innovation and create an exemplary energy infrastructure. Our technologies are making it possible to increase the share of renewables in the energy mix and slash greenhouse gas emissions. To make the transition a success, a variety of measures will have to be implemented – measures that fit together like the pieces of a puzzle. Here are some examples of how our technologies are already shaping the future of energy.

www.siemens.com/future-of-energy

1. Smart grids: Making power grids more intelligent

- 20 MW current capacity
- Can be virtually expanded at any time
- ~90% predictive accuracy over a 72-hour period
- ~€200,000 in annual savings

2. Ensuring a reliable power supply

- 24/365 hours/days
- Grid forecast software
- Better forecasts for electricity production

Munich, Germany

We’ve partnered with Stadtwerke München, Munich’s municipal utility, to develop and implement a so-called virtual power plant in which a number of small-scale, decentralized power generation installations are networked and operated as a single system. In the first stage, cogeneration plants with a total output of eight megawatts were virtually combined with renewable energy generating units with a capacity of 12 megawatts. The main aim of the virtual power plant is to improve the reliability of planning and forecasting for the decentralized power generation systems in the area served by Stadtwerke München. Operation is more efficient and economical than when the individual units are deployed separately. What’s more, the virtual power plant can serve as a key element of a smart grid, maximizing the benefits for both the operators of the decentralized energy installations and the power suppliers. The core component of this virtual interconnection is our Decentralized Energy Management System (DEMS), which is enabling the Munich utility not only to optimize the deployment and operation of decentralized power generation facilities and power loads but also to create value through enhanced marketing scope.

Laufenburg, Switzerland

Our self-learning software system is stabilizing the power grid operated by Swissgrid in Laufenburg, Switzerland. The program can forecast the electrical output of renewable energy sources over a 72-hour period with more than 90% accuracy. This information helps grid operators calculate power demand in their networks and achieve the greatest possible precision when determining the amount of additional electricity to be ordered in advance.
**STRANGFORD, IRELAND**

Northern Ireland’s Strangford Lough is home to the world’s first commercial tidal current power plant. Since November 2008, two turbines have been producing a combined output of 1.2 megawatts – enough electricity to meet the needs of 1,500 households. To date, the installation has fed more than five gigawatt-hours of electrical energy into the grid, making it the world’s largest tidal turbine project. Further tidal farms are now in the planning phase: the eight-mega­watt Kyle Rhea project in Scotland and the ten-mega­watt Anglesey Skerries project in Wales.

**DÜSSELDORF, GERMANY**

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**ALFONSINE, ITALY**

Italy’s most advanced brick-making plant, located in the town of Alfonsine, showcases the potential of energy-efficient technologies. Thanks to our highly efficient asynchronous motors, the amount of power consumed by the factory’s electric drives – 170 motors with a total capacity of 1,065 kilowatts are in operation on the drying line alone – has been slashed by 500,000 kilowatt-hours. Investment costs were amortized within a short time. The result? Not only have costs been cut; the plant’s environmental footprint has also been reduced.

**Saving electricity and using it more efficiently**

- **Efficiency class**: IE2
- **Connected load**: 5,000 kW
- **Electric motors for a brick factory**
- **Annual savings**: 500,000 kWh
- **Cost amortization**: after only six months

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**HUNTERSTON/CONNÁH’S QUAY, UNITED KINGDOM**

We’re building the first submarine direct-current grid connection in the Irish Sea. With a voltage of 600 kilovolts, this link will surpass the previous record of 500 kilovolts. The low-loss high-voltage direct-current (HVDC) transmission system will connect Hunterston, near Glasgow on Scotland’s western coast, with Connah’s Quay, in northwestern England. The link, which will have a capacity of 2,200 megawatts, is scheduled to go into operation at the end of 2015.

**Building low-loss power superhighways**

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**IRVING, TEXAS, U.S.**

With more than 1,000 stores in North America, Michaels is the largest supplier of arts and crafts merchandise in the U.S. Energy is the company’s second-highest line-item expense, after labor costs. With this in mind, Michaels has equipped nearly all its stores with our RCS energy management platform. Intelligent sensors and software operate on a real-time basis to monitor and regulate heating, cooling, lighting and humidity – resulting in energy savings of some 25%.
The town of Vellinge, in southern Sweden, has implemented a self-financing energy modernization project for its municipal properties. Thanks to our advanced building technology systems, energy consumption and costs for the town’s administrative buildings, schools, retirement homes and public swimming pools have been slashed. Under our energy-saving performance contracting model, we covered all upfront costs. The community of Vellinge will pay for the modernization through contractually guaranteed energy cost savings within the next few years.

It’s a promising solution for storing electricity generated by wind and solar power: electrolysis is used to split water into oxygen and hydrogen. The hydrogen is then stored and later used to power vehicles and turbines or for applications in industrial processes. A test unit with a peak power rating of 0.3 megawatts produces two to six kilograms of hydrogen an hour. When electricity from renewable sources is used for electrolysis, hydrogen production is virtually climate-neutral. The next generation of electrolyzers, which will have a rated power of two megawatts, is expected to be ready for use in the medium term. Researchers are aiming to develop an electrolyzer that has up to a triple-digit-megawatt maximum power rating and can accommodate the surplus energy generated by a large wind farm.
A strong portfolio – Geared to tomorrow’s growth markets

The world is being transformed: the parameters of daily life and economic activity are changing faster than ever before. This development is providing us with tremendous opportunities to continually improve our position in growth markets worldwide. Intensive portfolio management is enabling our innovation-driven Company to identify new business fields early on and capture leading market positions.

We can generate sustainable growth only if we focus on attractive future markets. That’s why we practice intensive, systematic portfolio management.

All our business activities have the same ambitious goal: we want to capture a No. 1 or No. 2 position in all our markets – because that’s the only way to generate profitable growth and increase our Company’s value in the long term. A look at our past confirms that we’ve always been particularly successful when we’ve been a market and technology leader.

And we want our pioneering achievements to continue driving our business success in the future. With this in mind, we’re continually adapting our portfolio to major global trends through both organic growth and acquisitions, for which we apply strict criteria. Our policy of intensive portfolio management is enabling us to move into attractive future markets quickly and capture leading competitive positions.

In the IT field for example, we’re already one of the largest software companies in Europe – a position we’re steadily expanding through targeted acquisitions. In 2012, for instance, we acquired RuggedCom Inc. of Canada, a leading supplier of communications and network solutions for industry. This acquisition is strengthening our position in the areas of industrial Ethernet and industrial routers and switches.

Over the last few years, we’ve introduced a large number of energy-efficient, low-carbon solutions that enable customers to slash their CO2 emissions and, by reducing their energy costs, increase their competitiveness.

Our future-oriented portfolio strategy is strengthening our Company’s profile and sharpening our focus on innovation-driven growth markets.

These solutions are part of our Environmental Portfolio which, like our activities in the IT field, is one of our strategic growth drivers. In fiscal 2012, we generated revenue of €33.2 billion with Portfolio offerings, an amount equal to around 42% of our total sales. Here, too, we’ve set ambitious targets: we want to achieve revenue of €40.0 billion with our green technologies by the end of fiscal 2014. And this target remains unchanged, although our planned disposals of OSRAM, our Water Technologies Business Unit and our solar business will make its achievement considerably more challenging. We’re already one of the world’s largest suppliers of ecofriendly technologies. By rigorously pushing the development of these technologies, we’re making a major contribution to sustainable climate and environmental protection while ensuring our long-term
business success. Our commitment to sustainable development is also being recognized by external observers: at the end of fiscal 2012, Siemens was named Supersector Leader in the Industrial Goods and Services category of the Dow Jones Sustainable Index (DJSI) for the first time. We also won the top spot for sustainability in the Diversified Industrials category.

As a technology leader, we’re helping shape the future of energy. The conventional energy chain – comprising the generation, conversion, distribution and effective use of power – is evolving into a multi-layered system with many new participants. Power generation is becoming more decentralized, with energy increasingly coming from renewable sources. At the same time, more power is being used by new consumers, for example, in the area of electric mobility. Our portfolio offers innovative and sustainable solutions for key areas of this new Power Matrix – solutions that will be vital to a successful transition to a new energy system.

IT, our Environmental Portfolio, our contribution to the future of energy: these are just three examples of how we’re actively geared our portfolio to attractive growth markets while equipping our Company for market leadership and sustainable growth.

The businesses and markets associated with the energy system are a key focus of our portfolio management activities. Looking to the future, the role of decentralized power generation will continue to grow – as will the complexity of the power grid. The linear energy chain is currently evolving into a many-layered system with a large number of new participants – we call it the Power Matrix. This transformation is opening up huge new market opportunities for us. With our innovative products and solutions, we’re already supplying key elements of the Power Matrix.
Creating trust through networking

Everyone’s a winner

Downtime is every manufacturer’s nightmare – particularly when delivery schedules are tight. To minimize it, we’ve joined forces with customers to develop ePS Network Services – an IT-supported service offering that maximizes transparency in manufacturing processes and creates added value. With ePS, everyone’s a winner – as the network linking a German manufacturer of highly specialized machine tools with its Dutch partners illustrates. In the following report, Johannes Zuckschwerdt and Ton de Bruine talk about their experience with ePS.
No problems overnight
Checking his machines first thing in the morning, Johannes Zuckschwerdt finds everything running smoothly: no error reports in the last few hours. Zuckschwerdt is responsible for developing new services at the medium-sized company Schwäbische Werkzeugmaschinen (SW). Headquartered in southwestern Germany, SW specializes in producing top-quality multi-spindle machining centers and manufacturing systems – primarily for customers in the automobile, hydraulics and aviation industries. Specially designed for series production, these machining centers and manufacturing systems enable customers to process, for example, the cast parts from which components like the high-precision hydraulic valve blocks installed in virtually all of today’s cars worldwide are manufactured. Around-the-clock operation with minimal downtime is vital for optimal large-scale production.

Availability and world-class service are the key factors in SW’s success. Wherever the machines are – in Mexico, Brazil or China – Zuckschwerdt and his colleagues can monitor their operation precisely – thanks to Siemens’ remote ePS Network Services, which permanently link SW’s machines to their developers in Germany via an encrypted Internet connection. Experts can now work proactively. “We can see early on when a part needs changing,” says Peter Siegel, initiator of online services at SW. The company’s specialists access the machines’ centrally-stored status information, initiate analyses and isolate problems online to forestall expensive failures. And this is just one side of the coin: SW also uses the collected data to help customers run their machines more efficiently.

Ten years ago, Siegel was searching for ways to expand SW’s services, improve customer support and intensify customer loyalty worldwide. Then, in 2002, he met Jochen Heinz from Siemens. Heinz had the solution Siegel was looking for. “Siemens’ ePS Network Services were market-ready at that point,” Heinz explains. “We’ve continued developing them with partners like SW ever since.”

Lifecycle management
Collecting and analyzing machine data enables users to enhance machine productivity.

- Around-the-clock monitoring – lays the basis for reliable production processes
- Detects faults early on and prevents machine downtime
- Systematically manages improvements

- Diagnostic services – optimize capacity utilization
- Accelerate fault processing
- Enable in-depth error diagnoses

- Scheduled maintenance – optimizes maintenance processes
- Schedules preventive and status-oriented maintenance procedures
- Reduces machine failures
- Increases machine uptime
- Improves capacity utilization
- Prevents costly unplanned repairs
Quickly spotting a chance to move to the forefront of IT-supported services, Peter Siegel put his trust in Siemens. “Close collaboration was an obvious choice since Siemens had already been a reliable partner for years,” he recalls. “We’ve been outfitting most of our machine tools with Siemens controls for more than 20 years. For example, we’re currently using SIMODRIVE and SINAMICS converters and SINUMERIK control systems.”

**Competitive advantages thanks to Siemens technology**

Siemens’ online services provide SW with a key competitive edge – beyond maintenance and servicing. “Using a machine’s diagnostic data, we can show customers how to increase their output by improving their processes, for example,” explains Siegel. The payoff is closer customer relationships, increased revenue and valuable ideas for new machine development. And Siemens profits too: “ePS enables us to support our customers and our customers’ customers,” says Jochen Heinz. The result: new business opportunities for everyone concerned.

**LEFT** – SW equips most of its machine tools with our SINUMERIK control systems, which operate perfectly with ePS Network Services.

**BELOW** – Jochen Heinz from Siemens (left) and Peter Siegel from SW have been refining ePS Network Services for many years.
Johannes Zuckschwerdt, head of new services development at Schwäbische Werkzeugmaschinen

“As a highly specialized medium-sized company, we can’t maintain a local presence worldwide. But with Siemens’ outstanding online services, we can still keep very close to our customers.”
Schwäbische Werkzeugmaschinen (SW) supplies customers in 29 countries with innovative machining centers, which are networked with the company’s headquarters in southwestern Germany via Siemens’ IT-supported services.

Siemens’ IT-supported services

Its partnership with Siemens is enabling Schwäbische Werkzeugmaschinen to offer services worldwide. “As a highly specialized medium-sized company with around 300 employees, we obviously can’t provide local customer support in every country,” explains Johannes Zuckschwerdt. “But we don’t need to. Thanks to ePS Network Services, we can support customers in China, the U.S. and everywhere else directly from our headquarters in Germany.”

Online diagnostic analysis saves time and money – especially in the very rare cases in which machines break down. In the past when this happened, a specialist would have to be dispatched to the customer to conduct detailed on-site diagnostics. Today, things are easier – instead of travelling halfway around the world, SW experts can analyze failures online. Using log files, causes can be pinpointed and customers provided with precise instructions for remedying defects. “This is how we boost reliability for our customers and help them maintain production around the clock,” notes Zuckschwerdt.

The idea is actually very simple. But putting it into practice required an intensive exchange of knowledge and a large measure of trust. “Engaging in joint development with Siemens, we’ve naturally had to share sensitive data about products and services,” says Zuckschwerdt. “However, this hasn’t been a problem for us. We’ve been working with Siemens for a long time. So we’ve built a very close relationship based on trust. That’s the only way to create innovative products that benefit both partners.”
“We have great trust in Schwäbische Werkzeugmaschinen’s online services and the Siemens technology that backs them up. They’re making our processes more reliable and our cost calculations more accurate.”

Value-creating services
Siemens’ IT-supported services also create value for SW’s customers. Brinks Metaalbewerking B.V., located in the Dutch town of Vriezenveen, is a prime example. The company’s 150 employees produce parts mainly for the car industry. Via systems suppliers, numerous top-of-the-line carmakers source components like valve blocks for convertible top controls and active spring systems from Brinks. Leading manufacturers of agricultural machinery are also on Brinks’ customer list.

Operating around the clock, SW’s machines in Vriezenveen manufacture tens of thousands of identical components in series production – components that Brinks’ customers want at the right time and in the right quantities for their assembly lines. Top quality is essential. “If one of our machines shuts down unexpectedly, we immediately have problems meeting our delivery deadlines,” says company owner Ton de Bruine. “Because our production lines run 24 hours a day, there’s little extra machine capacity to compensate for any breakdowns that may occur.”
So there’s no room for error. That’s why Brinks has been using SW’s online services for several years now. “It’s not just that SW provides us with immediate support from Germany in the event of an acute problem,” explains de Bruine. “The company also helps us improve the scheduling of servicing and maintenance for our machines across their entire lifecycles.” Thanks to the detailed information that these services provide about the condition of spindles, axles and other key machine components, Brinks employees always know exactly when parts need replacing.

Planned downtime instead of unexpected failures – that means no missed delivery deadlines. “Working closely with Johannes Zuckschwerdt over the last few years, we’ve learned to value the many possibilities that ePS offers,” says Ton de Bruine. And even though he’s not a computer freak himself and doesn’t even have a PC on his desk, de Bruine doesn’t intend to dispense with the tried and tested services in the future. “We’re equipping all our machines with this system.” The issue of data security also played a key role in his decision. “I’m 100% sure that our data is in good hands with Siemens and Schwäbische Werkzeugmaschinen.”
Secure and reliable processes create trust

Other SW customers are also on board. “Around 90% of our customers now rely on ePS Network Services,” reports Peter Siegel, who’s now reaping the benefits of his early commitment to the innovative services. “With ePS, we can keep a close eye on machine status data and provide optimal customer support. The online services have proven to be a decisive factor in generating long-term customer loyalty over the past few years, helping us build up a solid customer base.” So it’s no wonder that SW intends to further enhance its competitiveness in the areas of customer support, consulting and, above all, proactive services that help manufacturers keep their production lines running smoothly.

Jochen Heinz, Siegel’s Siemens partner for many years, sees huge potential in online equipment monitoring. “Using the system with machine tools has taught us which algorithms, architectures and business models we need,” he says, summing up his experience. “Precise, online equipment monitoring is important for many Siemens customers. In the fields of industry, infrastructure, energy and healthcare, there are already a large number of similar applications that are making machines and systems more productive and more reliable.”
Costs are a decisive factor across the entire lifecycle. Machine downtime and unplanned maintenance are much-feared cost drivers in manufacturing. Consequently, more and more industrial companies are basing their investment decisions on total operating costs. And it’s not just procurement and consumption costs that they’re taking into account. They’re also considering machine availability and productivity. Companies with technologically advanced and optimally organized maintenance and production processes have a clear competitive edge. That’s why Siemens provides its customers with comprehensive industry services like ePS Network Services.

The data provided by ePS Network Services enable companies to calculate machine operating costs for complete lifecycles.

Online platform with maximum data security. Offering customers an advanced status monitoring system, our ePS Network Services provide manufacturers with the information they need to improve service and maintenance processes worldwide and increase machine productivity and uptime. Service processes are managed via an underlying online platform. A multilevel access protection system and high-availability servers maximize data security and availability. Siemens’ ePS Network Services comprise:

> **ePS Diagnostic Services**, which enable manufacturers to monitor the status of their equipment worldwide. Machines automatically report their diagnostic and measurement data to the ePS server at regular intervals. Supported by appropriate algorithms and automatic features, manufacturers can identify and analyze the causes of faults more quickly.

> **ePS Condition Monitoring**, which closely monitors machine status and wear. Potential faults can be detected at an early stage so that service personal have time to take appropriate action. Key parameters can be monitored online. When threshold values are exceeded, specialists are automatically notified by e-mail or text message. Complete machine overviews facilitate preventive and status-oriented maintenance. Maintenance schedules can be optimized to increase system availability and productivity.

Everyone’s a winner. Our innovative IT-supported services benefit machine operators as well as machine manufacturers. By making machine utilization more effective, enhancing competitiveness and enabling companies to tap lucrative new business fields, these services create value all along the value chain – for our customers and for our Company.
Many areas, one goal – Optimal knowledge transfer Company-wide

By ensuring a continuous transfer of knowledge and information in all areas that concern Siemens as a whole, our cross-business activities are playing a vital role in our drive to unleash the full potential of our integrated technology company. Our commitment to expanding our service offerings via innovative IT solutions is just one example of how knowledge transfer is benefiting us and our customers.

*We talk to each other. We learn from each other. And all of us get a little better every day thanks to our wide range of cross-business activities, initiatives and programs that address topics relevant for our entire organization.*

Our search for the talented individuals we’ll need to conquer the markets of tomorrow is one of our key cross-business activities. To assess our employees’ expertise and potential, we use transparent, uniform criteria across all our Sectors and Divisions and in all our businesses worldwide. Siemens’ Learning Campus (LC) – a Company-wide organization that fosters lifelong learning and personal development – is where it all begins. Our Divisions contribute their knowhow, and LC ensures that best practices are communicated to our people around the globe. Every year, more than 100,000 Siemens employees participate in seminars, training programs, workshops and global e-learning initiatives, accelerating knowledge transfer within the Company and making us that much smarter. Our commitment to education is also receiving external recognition. In fiscal 2012, for example, we were again awarded the highest possible number of points in the Human Capital Development category of the Dow Jones Sustainability Index (DJSI) – the third time we’ve received this distinction.

Siemens Leadership Excellence is our continuing education program for managers. Here – as well as in the related Siemens Leadership Framework – we apply Company-wide standards that help us foster the development of our future top managers in an individual, targeted manner, while motivating them to work toward our common goals.

Continuous knowledge transfer and information exchange are making a vital contribution to our Company’s success.

One of our goals is to expand our businesses in the emerging countries, where the demand for economical products and solutions has not yet been completely met. For these countries, we’ve launched our SMART (simple, maintenance-friendly, affordable, reliable and timely-to-market) initiative to develop new, entry-level products tailored to local requirements – for the benefit of our entire Company. In the emerging markets, SMART has made our Healthcare Sector, for example, the leading supplier of entry-level imaging systems. In China, we’re the market leader in intelligent rail signaling systems – posting annual growth of some 25% over the last five years. As part of our Company-wide top+ initiative, we provide our business units with methods and tools for implementing the SMART initiative and systematically improving their businesses. The top+ initiative also entails organizing cross-Sector and cross-Division knowledge transfer and awarding prizes for outstanding projects.
Our responsibility doesn’t end when we complete a sale. With both conventional product services and new, trailblazing service offerings, we want to further increase customer loyalty. As a key component of our growth strategy, services generate reliable revenue with less capital intensity than other business activities. We’re rigorously exploiting our strengths as an integrated technology company in order to expand our innovative services.

We’re also exploiting our Company-wide expertise in the area of procurement. We’ve established a uniform system of supply chain management to realize synergies, cut costs, guarantee high quality, ensure on-time delivery, provide efficient logistics and better utilize our suppliers’ power of innovation. The system – which includes on-site reviews of supplier operations and an energy efficiency program for suppliers – is also helping us achieve our ambitious sustainability goals by minimizing sustainability-related risks and enabling us to actively leverage opportunities in our supply chain.

Company-wide cooperation across organizational boundaries creates a vast range of opportunities: close collaboration generates the trust we need to power our integrated technology company faster and more effectively into the future.

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**Cross-business activities:** To optimally leverage the potential of our integrated technology company, we ensure that knowhow is continuously shared Company-wide in all areas that concern our organization as a whole. A few examples of our many cross-business activities are highlighted in the illustration above.

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**COMBINED MANAGEMENT REPORT, PAGES 101-102 AND 126-127**
Creating trust through diversity

Partnering across borders

Diversity provides inspiration, unleashes creative potential and expands horizons – all of which makes it vital to our success. That’s because people from different cultural and educational backgrounds approach problems completely differently – and when working together as a team, they often find the best solutions. Of course, it’s all the better when people find it easy to engage in dialogue across borders, languages and cultures. At Siemens, our Teamcenter software solution is promoting international cooperation at many company locations.

What are the aims of Teamcenter? To better leverage the opportunities presented by diversity, increase work efficiency, develop the best solutions and bring them to market faster. Allen Wang, James D. Palasek, Tesha Best and Christian Mellenthin (left to right) experience what this means in practice every day. Thanks to Teamcenter, they can work closely with colleagues around the world without leaving their offices in the U.S. city of Tucker, Georgia. Read on to learn how this software platform is making them feel even more closely integrated into the Siemens family.
On the ground in key markets worldwide

“It doesn’t matter where at Siemens you work or what culture you call home: we all share the same goals. That’s probably the best thing you can learn at the Company.” James D. Palasek speaks from experience.

The engineer from Tucker, Georgia has worked at Siemens for twelve years, partnering closely with colleagues in Mexico, Germany, China and India. His specialty is developing components and modules for control cabinets. Here — as in all our business fields — we’re aiming to achieve a leading position in all our markets worldwide. But only very few components are truly universal: technical regulations, industry standards and even climate conditions vary too much from place to place. That’s why we have developers working close to our customers, on site in key markets. And that includes Tucker, Georgia, one of the 15 worldwide locations of Control Components and Systems Engineering (CE).

Siemens Control Components and Systems Engineering (CE) is a business unit in the Industry Automation (IA) Division of Siemens’ Industry Sector. CE specializes in products for industrial control systems, industry-specific products and systems based on industry platforms, and related services.

BACKGROUND
Following assignments in the German cities of Erlangen and Nuremberg as well as in the Vietnamese capital of Hanoi, Amber Sherman began managing Siemens key accounts in South Carolina, Georgia, Florida and the Caribbean in 2012. Sherman holds a master’s of international business in marketing degree from the University of Erlangen and Georgia State University in Atlanta. She’s especially proud to be working with major customers, for example, at the U.S. manufacturing plants of renowned European carmakers. What Sherman particularly appreciates about Siemens is the opportunity to collaborate on successful projects with colleagues in other countries.
But like the employees at the other facilities, James D. Palasek is active beyond the borders of his home market. “Our colleagues in Germany help us market our U.S. products in Europe, for example. By the same token, we reciprocate when they want to bring products developed for Europe to the U.S. market.”

Teamcenter – Collaborative software

Helmut Stauffer from CE’s product management center in Fürth, Germany goes even further: “New and redesigned products should work in lots of markets or must be easily adaptable. I’m continually discussing this issue with our international developers – by web conference, phone and e-mail.” In this context, optimizing the pushbuttons of our SIRIUS series for various markets is just one of many examples. Xu Huihui, a development engineer in Suzhou,
near Shanghai in China, who’s been charged with this task, uses Teamcenter to consult with Staufer and colleagues in different countries. Teamcenter’s benefits immediately won over the eager networkers in Fürth, Tucker, Suzhou and elsewhere. Xu Huihui is thrilled: “With Teamcenter, I can work with anyone, anywhere, any time, using a single platform. There’s no better way to share information, blueprints, CAD data and 3D views.” At Siemens in West Chicago, Illinois, U.S., Jayne Beck has been using Teamcenter from the very beginning. What she appreciates most are the uniform processes: “Our development teams used to work with lots of different software solutions. That made data transfer much more difficult. Now Teamcenter gives us a single platform for sharing product and design data and managing the entire product lifecycle – from the initial idea to the design, manufacture and ongoing development of our products.”

BACKGROUND
Helmut Staufer is an electrical engineer who joined Siemens in 2010. He’s been responsible for control and signal devices at CE’s global product management center since 2011. Staufer’s earlier assignments included a six-month stint in Suzhou, China, where he was inspired by the optimism and curiosity of his Chinese colleagues and also pleased by their keen interest in European soccer.

CLARIFYING AVAILABILITY – FÜRTH
Helmut Staufer looks into Jayne Beck’s inquiry. And what does he find? Siemens produces a suitable pushbutton in China, but it lacks the UL safety certification that’s required in the U.S. Via Teamcenter, he asks his colleagues in Suzhou if it would be possible to obtain UL certification for the pushbutton. Jayne Beck will automatically be kept up-to-date on any new developments.

PROPOSING A SOLUTION – SUZHOU
Xu Huihui uses Teamcenter to call up the inquiry on his screen – including product data, blueprints and 3D views. He concludes that the pushbutton would meet all U.S. specifications if a different material were used and passes this information on to Helmut Staufer and Jayne Beck.

To learn more, please see: TEAMCENTER: TURBO DRIVE FOR TEAMWORK, PAGE 75
Benefits across the board – for employees and customers

What are the advantages of using Teamcenter? Streamlined workflows, no more reduplicated processes and even faster solutions. And something that wasn’t a primary objective but may just be Teamcenter’s greatest benefit: a feeling of belonging that keeps on growing, transcending national and cultural boundaries. Every day, all around the world, employees at CE and many other Industry Sector units are experiencing how Teamcenter improves collaboration among women and men with different skills, knowhow and qualifications – and enables them to get to know one another better. Jayne Beck values diverse teams for yet another reason: “Our customers, like our employees, come from a wide range of cultural backgrounds. All around the globe, we have colleagues who are especially good at putting themselves in our customers’ shoes. And their knowledge and insights equip us to develop better products and solutions.”
Embracing diversity as an opportunity

At Siemens, our unwavering commitment to diversity is firmly anchored in our corporate strategy. For a company that’s active in some 190 countries and generates more than two-thirds of its revenues outside its home market, diversity is more than simply a business necessity. Our people see diversity as offering great opportunities for their professional and personal development. “Working with colleagues around the world expands my horizons and changes my perspective. I can learn a lot at Siemens,” says Xu Huihui’s colleague Wang Yan Qin. Helmut Stauffer draws particular inspiration from working with his Chinese counterparts: “They’re always very optimistic, positive and committed to their work.” James D. Palasek also feels a very personal gain: “I learn a lot about other cultures and their working style and can apply these insights to my own work.” Today, countless employees throughout our Company are passionate and motivated about networking and learning from one another in their day-to-day work.

BACKGROUND

Wang Yan Qin earned a master’s degree from Hefei University of Technology before joining Siemens in Suzhou in 2007. Her responsibilities include vetting and evaluating suppliers and monitoring the quality of the components they supply. Wang Yan Qin is very interested in other cultures. Since visiting Germany, she raves about potato dumplings, even though they taste much different from the dumplings she’s familiar with from home.

Suzhou, China

CHECKING THE MATERIAL – SUZHOU

In Teamcenter, Wang Yan Qin has all the details at her fingertips. She determines that the material is suitable for the U.S. market. Further review shows that the material can be processed problem-free using the equipment and machinery at our facility in Suzhou. Wang changes the status of the part in Teamcenter to “approved.”

WORKING OUT THE DETAILS – SUZHOU

Xu Huihui finalizes the design drawing and product description for the pushbutton. However, through the Teamcenter data pool, he discovers that the material intended for use has not yet been approved for production at Siemens. Xu Huihui uses Teamcenter to initiate approval of the material by Wang Yan Qin.

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The global Siemens family

Despite all the differences in cultural and educational background, the members of the extended Siemens family have many things in common. Helmut Staufer enjoys having a brief personal conversation with his colleagues before every web conference. And James D. Palasek has even gotten swept up in European soccer fever: “I root for the German team, unless they happen to be playing against the United States.” Close collaboration strengthens the feeling of being part of the global Siemens family. Amber Sherman from Industry Sales in Atlanta experienced a sense of community at her international posts: “Wherever Siemens takes me today, I find that we basically speak the same language.” And that language isn’t German, English or Chinese. Philipp Bierschneider, who is responsible for implementing Teamcenter at CE, comes from Amberg, Germany, but has experienced the language of the Siemens family at locations around the world: “My colleagues are really friendly and very helpful. We work not so much on an organization-to-organization basis but more hand-in-hand and person-to-person.”
As soon as she finished her bachelor’s degree in mechanical and electrical engineering at Northwestern University in Evanston, Illinois, Jinglu Wen started gaining hands-on experience at Siemens in West Chicago, where her job involves constructing various 3D models and modules. Jinglu uses Teamcenter to discuss the results of her work with experienced colleagues around the world — and she’s very gratified to receive their strong support.

**Background**

As soon as she finished her bachelor’s degree in mechanical and electrical engineering at Northwestern University in Evanston, Illinois, Jinglu Wen started gaining hands-on experience at Siemens in West Chicago, where her job involves constructing various 3D models and modules. Jinglu uses Teamcenter to discuss the results of her work with experienced colleagues around the world — and she’s very gratified to receive their strong support.

**West Chicago, Illinois, U.S.**

Jinglu Wen, Development (right)

**Ordering the Product – West Chicago**

Via Teamcenter, Jayne Beck is also notified of the UL certification for the U.S. market. She orders the necessary number of redesigned pushbuttons directly in Suzhou and sends the control cabinet blueprints to production.

**Adding the Product – Fürth**

Helmut Staufer learns through Teamcenter that the pushbutton now meets all requirements for the U.S. market. Staufer adds the button, together with all the relevant data and 3D views, to the global database of Siemens products. Effective immediately, the new product can be officially ordered anywhere in the world.

**Completing the Project – West Chicago**

Once the control cabinet has been shipped, Jayne Beck closes her inquiry. Together with her colleagues around the world, she will always have online access to all the details of the project through Teamcenter. This will make it possible to respond quickly to requests for service, spare parts and follow-up orders, which in turn will increase customer satisfaction.

Brigitte Ederer, Member of the Managing Board of Siemens AG, Head of Corporate Human Resources and Labor Director

“The diversity of our people – with their wide range of backgrounds and skills – fosters the wealth of ideas at our company and strengthens our power of innovation.”
Reach the customer twice as fast. Produce and bring to market while the competition is still in the planning phase. Put innovation on the fast track. And all this with 280,000 product variants, 60,000 employees and production facilities around the world. This is the ambitious vision of our Drive Technologies and Industry Automation Divisions. Integrate Enable Collaborate (IEC) is what we call our program for greater speed and maximum efficiency. The goal for the years ahead is to bring new products to market much faster, in some cases even twice as fast as in the past.

This will require perfect teamwork: developers, product managers, designers, production planners and many other specialists will have to work as one. And they’ll have to enrich the data pool with their product and process knowhow – whether in the area of computer-aided design (CAD), office applications (such as word processing) or computer-aided manufacturing (CAM). This is the only way to make all information available anywhere, anytime – including everything from the initial idea for a product to production planning, user instructions and service feedback. The cycle ends when development of the next product generation begins.

Teamcenter is the name of the Siemens software that makes smart product lifecycle management (PLM) across borders and time zones a reality. Some seven million users around the world are already working with Teamcenter or other products from Siemens PLM Software in Plano, Texas, U.S. – including nearly all major automotive manufacturers. It comes as no surprise that we’re also deploying this successful software platform in-house. Roughly 20,000 employees at our Drive Technologies and Industry Automation Divisions will soon be using Teamcenter at 90 locations in 15 countries.

The IEC program is unique in its size, its complexity and its broad range of applications. That’s why Teamcenter developers are eagerly awaiting feedback from those who are introducing and using the software. This feedback will be taken into account when developing the next generation of Teamcenter. And our interest is actually twofold, because at Siemens we don’t just sell our products and solutions; we use them.
Employees – The source of our strength

We’re mastering the major challenges of our time, continuously breaking new ground and making technology history. But these achievements are only possible because we have outstanding employees who – through their expertise, abilities and dedication – have made our Company the global powerhouse that it is today. That’s why lifelong learning, continuous personal development and the fostering of diversity and employee commitment are the foundations of our employee and management culture.

Siemens is only as strong as its employees. We expect outstanding performance from our people. In return, we support them in unleashing their full potential.

Our employees’ creativity and pioneering spirit are the source of our strength. To build on this foundation and grow even further, we have to attract and retain the best minds in the world. By providing them with additional opportunities to increase their expertise, we also create an atmosphere of trust and constructive cooperation that enables us to break down professional, linguistic and national barriers throughout our organization.

To outperform our competitors in the global battle for talent, we’re partnering with the most prestigious universities in the world’s most important markets. Our Siemens Graduate Program, for example, provides top university graduates with an ideal springboard for launching their professional careers. We give these young talents – and all Siemens employees – the chance to continuously develop their capabilities, master new challenges and assume ever-greater responsibility. As part of our educational offerings, we’ve set up uniform Core Learning Programs worldwide to make cooperation within our integrated technology company even more effective by enhancing employee knowhow in key areas like project management, software development, procurement and human resources. Our central intranet education portal alone offers our global workforce more than 1,000 business-oriented courses and programs.

Our employees are as diverse as the customers we serve – all around the world. People from some 140 different countries work at our ten largest Regional Companies alone. Our employees’ diverse languages, cultures and religions are a source of great strength. Multi-cultural teams with a broad range of expertise and perspectives promote the wealth of ideas within our Company and enhance our power of innovation.

With their wide array of skills, experience and qualifications, our people give us a decisive competitive edge in the global arena.

To foster diversity throughout our organization, we’ve launched our Diversity Initiative, which bundles targeted measures and projects for ensuring and further enhancing diversity at all levels of our Company. Examples include our global network of about 160 Siemens Diversity Ambassadors, who identify diversity issues Company-wide, and our Global Leadership Organization of Women (GLOW). To help our employees better understand one another, we’ve also established intercultural training programs and initiatives aimed at eliminating unconscious prejudices.
To leverage our employees’ wealth of ideas for the benefit of our entire organization, we’ve launched the Ideas, Impulses, Initiatives (3i) Program – a Company-wide idea management initiative. And it’s paying off: we’ve put over 500,000 employee suggestions into practice over the last five years – achieving savings of more than €1.1 billion.

But we want to do even better. That’s why we conduct world-wide surveys every year to measure employee satisfaction and pinpoint areas for further improvement. We take the survey findings very seriously since we know that only highly motivated employees who identify with our Company can achieve the excellent results we need to remain successful. Our employees’ commitment, expertise and performance are one of our greatest strengths.

Worldwide presence: We’re active in all regions of the world. And our workforce reflects it. The number of Siemens employees outside Europe has grown continuously in recent fiscal years.

Employee shareholders: We’re proud that roughly 127,000 Siemens employees took part in employee share programs in fiscal 2012. This is a clear sign of our employees’ trust in our values, our vision and, in short, the future of our Company.

Continuing education: We provide employees at all levels of our Company with an opportunity to unleash their full potential. In fiscal 2012, we again increased our total expenditure for continuing education as well as our educational outlays for each individual employee.
One Siemens – Our path to sustainable value creation

As an integrated technology company, we have a strong setup. One Siemens – which defines metrics for revenue growth, capital efficiency, profitability and the optimization of our capital structure – is the framework for our Company’s sustainable development.

Framework for sustainable value creation

To increase our revenue, use our capital more efficiently and more profitably and optimize our capital structure – these are our goals. Goals that we’ve further defined with the clear metrics of our One Siemens framework. Taken together, these metrics comprise a balanced system that provides the basis for generating a sustainable increase in value. We have three concrete objectives. First, we want our revenue growth to outpace that of our key competitors. Second, we want our growth to be capital efficient. That’s why we’ve defined an ambitious target corridor for return on capital employed. At the Sector level, we want to continuously achieve top margins compared to our competitors across industry cycles. And third, we’ve set a target for our capital structure that will enable us to achieve sustainable, strongly based profitability.
Focus on innovation-driven growth markets

Revenue growth
Growth > most relevant competitors

Use the power of Siemens

Get closer to our customers

Capital structure
Adjusted industrial net debt/EBITDA

Capital efficiency/Profitability
Return on capital employed/top margins throughout business cycles
Focus on innovation-driven growth markets

Our pioneering spirit is a basis of our success. Our activities are focused on innovation-driven markets – markets with long-term growth potential. To play a leading role in these markets, we’re continuously strengthening our portfolio and further expanding our Environmental Portfolio.

Be a pioneer in technology-driven markets
We’ve been delivering innovative engineering achievements for 165 years, continuously tapping new markets and occupying new growth fields. To enhance this special strength, we’re concentrating on innovation- and technology-driven growth markets – on markets with potential for our future core business. We’re strengthening our power of innovation by leveraging synergies worldwide and increasingly utilizing external expertise. We’ve opened our lab doors to universities, research institutes and industry partners. More than 1,000 cooperative research projects a year enable us to respond quickly to the new requirements of local and global markets.

Strengthen our portfolio
Only by keeping our portfolio focused on attractive future-oriented markets can we achieve profitable long-term growth. That’s why we practice intensive, systematic portfolio management. The cornerstone of our portfolio policy is the principle that our businesses must capture and maintain No. 1 or No. 2 positions in their respective markets. The prerequisites for profitability and growth, these leading positions enable us to sustainably increase Siemens’ value. As the history of our Company proves, we’ve always been successful when we’ve been at the forefront of technological innovation. Size alone is not enough to ensure long-term success. This is the guiding principle of all significant changes in our portfolio.

Provide a leading environmental portfolio
Our Environmental Portfolio, which bundles products and solutions that contribute to environmental and climate protection, has captured an outstanding position on the technology market worldwide and is one of our strategic growth drivers. In fiscal 2012, the Portfolio generated revenue of €33.2 billion and made a substantial contribution to climate protection. At the same time, our ecofriendly products and solutions enabled customers worldwide to slash their CO₂ emissions by 332 million tons – an amount equal to some 41% of the CO₂ emissions generated in Germany in 2010.

To learn more, please see: www.siemens.com/one-siemens
Get closer to our customers

We want to be close to our markets and a strong local partner to our customers throughout the world. That's why – besides playing a leading role in the industrial countries – we're also successfully developing and producing more and more innovative products and solutions in the emerging countries. The professionalization and expansion of our service offerings is another of our strategic aims since innovative services harbor a wealth of new business opportunities and intensify customer loyalty.

Grow in emerging markets
The so-called BRIC countries (Brazil, Russia, India and China) and the up-and-coming nations of Asia, South America and the Middle East are achieving high levels of economic growth, in which we intend to participate. Over the past few years, we've achieved strong growth in the emerging countries. The demand for economical products and solutions tailored to local customer requirements is particularly strong in these countries. To meet this challenge, we've launched our SMART (simple, maintenance-friendly, affordable, reliable and timely-to-market) initiative, which offers new products targeted for the entry-level segment.

Expand our service business
To get closer to our customers – for us, this means providing outstanding services that increase customer value. With our comprehensive service offerings, we want to achieve the kind of long-lasting customer satisfaction that makes us the first choice for follow-up investment. It's not only our sales organization that nurtures close relationships with our customers and fosters their loyalty: above all, it's our local service employees, who – in some instances building on relationships that go back decades – have detailed knowledge of our customers' needs and requirements. For these reasons, we want to consistently expand our service business in order to leverage additional potential for profitable growth.

Intensify our customer focus
Our customers expect comprehensive, single-source consulting that's geared to their individual needs. And it's our goal and obligation to meet this expectation everywhere in the world. For us, a strong customer focus doesn't just mean having an in-depth understanding of our customers’ unique requirements; it also means providing them with customized solutions. Successful customer support requires excellent employees, an efficient setup and effective methods. Only when these three factors have been fully integrated to form a unified whole can we expand our strategic partnerships and create value for our customers.
Use the power of Siemens

To rank among the best, you have to excel – in everything you do. And that means you need an outstanding team. At Siemens, we have extraordinarily dedicated employees. And we go to great lengths to continuously expand their knowledge while promoting equal opportunity and nurturing cooperation among men and women from different countries and cultural backgrounds. Our clear and unambiguous commitment to integrity guides us in our ongoing pursuit of business success. Our actions are governed by binding principles to which we expect our customers, suppliers and employees to adhere.

Encourage lifelong learning and development
One of our greatest strengths is our outstanding workforce. Our employees’ expertise, skills and dedication have made Siemens the company it is today. Building on this foundation, we’re aiming to grow even further. And one means to achieving this strategic end quickly and effectively is continuous learning, which not only enhances our people’s knowhow but also directly fosters their pioneering spirit, initiative and willingness to assume increasing responsibility. All around the world, we give our people at all levels the chance to fully develop their potential.

Empower our diverse and engaged people worldwide
Siemens is a global powerhouse with a highly diverse workforce. People from some 140 countries work at our ten largest Regional Companies alone. That’s why we take a systematic approach to diversity. Multifaceted teams of employees with a broad range of skills, experience and qualifications promote the wealth of ideas at our Company and strengthen our power of innovation. To find out how we can further boost workforce motivation, we regularly conduct employee surveys worldwide in 40 languages. The survey input is systematically applied to enhance our processes.

Stand for integrity
We’re committed to fair competition. In our efforts to succeed on the world’s markets, we aim to comply with all applicable laws and regulations. Ethical business conduct is a non-negotiable component of our corporate culture. We’ve formulated transparent and binding principles of behavior and taken a clear and unmistakable position in the battle against corruption. We also fulfill our responsibilities to society, the environment and our employees. For us, occupational safety, health management and the conservation of natural resources are all part of ethical business conduct.

To learn more, please see: www.siemens.com/one-siemens
We will emerge from the current economic crisis with renewed strength. Supported by our new Company-wide program to reduce costs, increase productivity, enhance efficiency and improve our processes and market access, One Siemens – our framework for sustainable value creation – is pointing the way forward.

As an integrated technology company, we have a virtually unparalleled position in our global markets – a position that’s made us a true partner of trust to our customers, our shareholders and our employees worldwide.

**Trust unites us –**
Building strong partnerships for 165 years