Sustainable development for urban infrastructures

Sustainable Cities

www.siemens.com/cities
“Cities are the growth drivers of the future, yet also account for the biggest share of CO2 emissions. Worldwide, cities are the decisive factor for our climate. Our unique environmental portfolio makes Siemens the perfect partner for sustainable urban development.”

Peter Löscher,
President and CEO of Siemens AG
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**Our portfolio for sustainable cities**

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City managers are facing four global mega trends, which will shape the future for better or for worse: Urbanization, climate change, globalization and demographic change. Of these four trends, the first two have the largest impact on cities everywhere.

**Cities on the rise**

In 2010, the world’s urban population for the first time outnumbered its rural population; in the future, significantly more people will live in densely populated megacities with all the associated problems, mostly in Asia, Africa, and South America. In the developing world, every month more than 5m people move from the countryside to a city. Over the next 20 years, the global urban population is estimated to grow by 1.4bn people. Until 2025 the GDP of cities is expected to grow almost one percentage point faster than in rural areas (4.4% p.a. vs. 3.5% p.a.) while over 50% of the global GDP is generated in the 645 largest cities with more than 750,000 inhabitants.

Meanwhile, there’s a clear positive correlation of urbanization level and the overconsumption of our planet’s finite resources. A city’s ecological footprint is enormous and significantly contributes to climate change. At the same time, cities are the very places which could have the most significant positive impact on climate preservation: As the culprits responsible for 80% of global greenhouse gas emissions and 75% of energy consumption, they are the ideal focal points of strategies for cutting those emissions significantly. And cities are well advised to act: With their dense population and often fragile infrastructure they are extremely vulnerable to the effects of climate change.
In 2006, The Stern Review on the Economics of Climate Change impressively showed the cost of remaining inactive: It estimated the cost of unchecked climate change to run to 3% of global GDP by 2030. We desperately need to understand the benefits of “doing something”.

**Driving forces for national economies**

Increasingly, the general economic health of a country will be determined by the health of its core conurbations. Already, one-fifth of the world’s GDP is generated in the ten economically most important cities. To remain competitive however, it is estimated that cities globally will have to invest trillions of Euros in infrastructure over the foreseeable future, not least connected to the overarching goal of combating climate change. Over-used and rarely understood, sustainability here must be the watchword.

Some cities have acted already and have set themselves aggressive CO₂ reduction targets: Copenhagen is aiming to be carbon neutral by 2025 while London is heading for 60% fewer emissions. Setting these targets alone is a political achievement. However, realizing them is on another level altogether. Big action plans are needed, large investments have to be made and allocated, many stakeholders are involved, budgets are limited and any achievement may lie in the future and be difficult to measure.

**Paradigm shift**

Currently urban planners and architects find themselves in the midst of a paradigm shift towards integrated master planning which arises as a consequence of the new complexity involved in the field. Shaping urban futures now also involves social scientists, persons representing differ-
ent stakeholder organizations as well as experts from the private sector covering e.g. finance or technology from a very early stage in the discussion.

The aim is to create solution scenarios proving feasibility and to present tangible business cases which clearly show the economic, environmental, and social benefits of “doing something”, i.e. to justify the huge long-term investments required. Accordingly, collaboration models for good public-private partnerships are on the rise as is the appropriate policy framework which allows for the many different interests and legal issues of the involved stakeholders from the public and private sectors.

**Trends and consequences**

The global megatrends described above have tangible and considerable consequences for cities as the focal point of human existence on Earth. And it might no longer be viable to do what cities have done historically: Grow now, clean up later. In the context of climate change, old and new cities, small and enormous places will have to concentrate on extreme resource efficiency.

Cities are not alone in their journey for a better future: Sensing shared goals and opportunities, the World Business Council for Sustainable Development (WBCSD) has initiated the Urban Infrastructure Initiative (UII). This global, multi-company initiative, of which Siemens is one of the co-chairs, has been started in February 2010 with the aim of spending three years finding out how midsized cities can find better ways to develop sustainable infrastructure.

It wants to help understand where cities are coming from and help to generate ideas, cut through barriers,
mitigate risks and catalyze action. The initiative is most assuredly outcome-oriented: It is UII’s goal to help cities create a clear and compelling argument for prioritizing infrastructure investments; to identify solutions that are economically viable, socially acceptable and politically feasible.

Although individual companies have been active in this field for some time, this is the world’s largest and most comprehensive project of this type, with fourteen major companies contributing funds and expertise in a quest to find actionable, integrated solutions to the generic and specific challenges each city faces.

**Good governance driven by numbers**

How then can a city achieve the good governance which can drive the creation of a sustainable city? Sometimes numbers are the key to complex problems: A pragmatic cost-benefit analysis can be a most useful instrument in prioritizing potential initiatives. Each individual measure is assessed with regard to its implied economical, social, environmental, and political cost and benefit. Such an analysis should be seen for what it is: A powerful tool for political decision making. Conclusions are easier drawn when underpinned by clear numbers and transparency – even if they are driven by quality – and good governance comes with firm, well-informed and consensus-based decision making. It is central to a city run along the lines of sustainability – different stakeholder interests must be integrated to achieve a degree of cohesiveness which allows a city to develop organically even in the face of adverse conditions.

Whichever way your city chooses to go, Siemens offers the green technology, the expertise and the financial models to support you on your way forward.
Our research – your success

For years, Siemens has recognized the immense challenges that cities face in a highly urbanized world. It is clear that cities hold the key to controlling climate change. And it is equally clear that the intense competition which cities find themselves in will not diminish. Economic, intellectual, and creative power is fought over on a global level. City managers have a duty to guide the development of their cities favorably – in some cases, old cities need reinventing; in other cases, new, sprawling cities need a central soul and purpose, exemplified by a holistic planning strategy.

Original research gives us the edge

Not content with relying on second hand wisdom, we have teamed up with independent research partners to produce a wide body of original research into the state of cities worldwide. Many city managers who were happy to share their thoughts on the state of cities today gracefully contributed to the success of these studies. Mayors, city planners, urban developers, engineering firms, health officials and transport managers were interviewed and provided a wealth of insights. Every nook and cranny of running a city has been looked into and we have been reinforced in our belief that many areas require urgent attention. While transportation is often cited as the highest priority, safe drinking water, energy efficiency, healthcare supplies or efficient buildings are just some of the many concerns voiced.

We have used the intelligence gathered to inspire the world-class engineers who work for us to optimize our already impressive portfolio of technology solutions for cities. We have created solutions which use existing technology to greatly improve energy efficiency and to make cities more competitive in the light of the global trends mentioned earlier.

A future-proof portfolio for cities

We offer a unique portfolio of technology which can achieve several goals in one strike: Increase quality of life and overall attractiveness, greatly increase the efficiency with which your city is run and contribute to the effort to control climate change. We see high-density living not as a scary prospect...
but as an opportunity to make life better, in cities and on the planet as a whole.

**In-depth studies provide real insights**

We engage in several levels of research on the subject of cities. Studies such as “Megacity Challenges” allow for a general insight into the challenges faced by cities worldwide and feature interviews with leading experts. For more detailed insights, the Green City Index study series has been developed together with the Economist Intelligence Unit. It analyzes more than 100 cities for best practices and makes their environmental performance over several infrastructure areas, such as transportation, waste treatment, air quality or green governance measureable and comparable. Using this index, city stakeholders can have an at-a-glance view of where they are leading the way and where they are lacking behind and need to invest.

Finally, there are studies on individual cities such as London, Dublin or Yekaterinburg. These describe a series of technological levers of varying effectiveness, and with different cost implications, which can all contribute to saving energy and reducing CO₂ emissions. Seemingly obvious, the results of such detailed calculations are often surprising and serve as a major decision-making tool, making difficult and often politically charged discussions just a little bit easier. They clearly show the benefit of investing in infrastructure technology.

As a result of our intensive research we are uniquely positioned to assist cities in their sometimes difficult journey to a sustainable future. We see ourselves as partners in a city's daily struggle for excellence, supporting you in your quest to make the right infrastructure investments. Our expertise, our technology and our financial solutions are there to help you make sure you reach your goal.

**Take a closer look:**
All our studies are available for download. For more details please see [www.siemens.com/greencityindex](http://www.siemens.com/greencityindex)
Let’s talk about money

We can help you get around the empty purse

Even if they usually pay for themselves over a number of years, initially all infrastructure improvements have to be financed. The general need for financing is immense: The OECD estimates the required investment into road, rail, telecoms, electricity and water infrastructure worldwide to reach €41 trillion by 2030, about 3.5% of global GDP. The lion’s share of this investment will go into assuring water supplies and dealing with waste water, closely followed by investments into power generation and transportation. Although cities in developed countries may have different priorities than those in emerging economies or developing markets, they share an overall need for serious infrastructure investment.

Don’t postpone your projects

Postponing these investments or settling for half measures may well mean a significant loss in competitiveness and many cities cannot afford to lag behind. To meet the requirements, cities need to devise new financing programs, especially as central governments are increasingly unable and sometimes unwilling to shoulder the costs. Simultaneously, banks are growing ever more reluctant to extend loans for large infrastructure projects.

At Siemens we understand the difficulties that city managers face when deciding on new investments, especially in times of empty public coffers. Ever changing legal requirements, fluctuating and often unpredictable public income and not least the wish to please the voting public all interfere with fiscal planning. Interestingly, many policy makers are not fully aware of the various possibilities that exist for project financing.

Most have heard about Public Private Partnerships (PPPs) which are among the better known models for financing large infrastructure investments. In countries such as the U.K. and the Netherlands, over 15% of such endeavors are now being financed by PPP. Overall, private lending for infrastructure has increased almost fivefold over the
past ten years, a figure that is expected to grow over the next few years.

**Tailored financing to meet your needs**

To assist our clients in the difficult quest for financing large public projects, Siemens Financial Services (SFS), the finance arm of Siemens, has created a number of attractive financing models. Together with our partners we strive to offer you the best possible financial products. Our experts have designed these models in close collaboration with our customers, making sure we know exactly where city managers need support, where they see their priorities and what their ideal financing situation would be.

Our offerings include asset finance and leasing, structured finance, banking business (loan financing) and of course project and equity participations, better known as PPPs. The latter typically see average project volumes ranging from €100 million to over €1 billion.

**SFS – an integral part of Siemens, your advantage**

For city managers and developers, working with SFS has many advantages: We know our markets and we are certainly a reliable partner; Siemens has been actively involved in public infrastructure projects for over 160 years in nearly every country the world has known. Our vast experience helps us guide you in the right direction, benefiting your coffers as well your city’s competitiveness on a global scale. Direct access to key Siemens markets and related industries means better qualified decision making and greatly increases the chances of devising a successful finance solution for your requirements.

Our long experience in the public infrastructure sector means we are able partners to all kinds of cities, be it sprawling cities in emerging economies, established European centers with creaking infrastructure or growing megacities in sometimes difficult circumstances. We’re here to help you achieve a better future.
Airports

The “green and efficient airport” of the future is about much more than optimized individual parts of the airport. Siemens can help design the architecture, technology and logistics for environmental compatibility. Our products and systems incorporate ecological concerns – featuring health-friendly, recyclable materials and low resource consumption.

Harbors

Our SIHARBOR solution, based on the SIPLINK grid coupling, enables ships docked in port to connect to land-based power grids. As a result, docked ships can shut down all diesel generators and cut off all emissions, soot, fine dust and noise, which are associated with their use. SIHARBOR saves fuel and reduces air and noise pollution, making the harbor “greener”.

Buildings

Siemens is the leading provider of energy efficiency and sustainability solutions for buildings worldwide. We maximize the life cycle performance of new and existing buildings, using innovative technologies and products to drive holistic solutions without compromising comfort.

Public administration

For cities, eGovernment is the way forward. We support the modernization and transformation of city administrations by combining our extensive process expertise in the public sector with our holistic experience in the computing sector. We plant the seeds for improved cost-effectiveness and enhanced service quality.

Healthcare

Sustainable economic and social development relies on the provision of effective and reliable healthcare. Siemens brings together innovative imaging and laboratory diagnostic equipment, information technology, management consulting and services to help customers achieve positive and sustainable clinical and financial outcomes in order to improve human health.

For more information:

www.siemens.com/cities
Energy

Siemens concentrates on clean and efficient power generation and its transmission, covering the distribution of power via smart grid to the consumer, including smart metering. The right energy mix generated with renewable and very efficient fossile power plants is transmitted to the grid with very low losses. Our products and services cover the entire energy conversion chain.

Water and wastewater

Siemens combines the industry’s broadest portfolio of technologies with strong technical expertise and proven installation experience to help consulting engineers develop best treatment options for municipalities. For projects requiring multiple technologies, Siemens recommends integrated approaches that achieve tough performance standards at lowest energy and life cycle costs.

Finance

Financing plays an increasingly important role in facilitating infrastructure investments. We offer various financing options to enable investments in innovative technology and sustainable infrastructure through efficient financial solutions, among them asset finance & leasing, structured finance, banking business (loans) and project and equity participations (PPPs).

Sports venues

Sports and event venues challenge urban infrastructures in many ways. For their integration into the urban infrastructure they require highly sophisticated networked solutions both inside and outside the area. Siemens delivers world class event solutions as part of its long term global commitment to drive forward the boundaries of technological innovation.

Security and safety

Our broad range of security and safety solutions protect cities against today’s growing threats. From crisis management, seamlessly integrated with innovative command and control platforms, to intelligent video surveillance, they provide a substantial increase to public safety while safeguarding a city’s critical infrastructure and public facilities.

Mobility

Siemens’ cutting-edge “Complete mobility” solutions meet the challenges of growing global population, rapid urbanization, climate change and resource conversation. With “Complete mobility” we offer integrated solutions for urban and interurban transportation and logistics, affording significant benefits for people, industry and the environment.
Our portfolio for sustainable cities
When asked, city administrators overwhelmingly cite transport as the most urgent infrastructure investment to enhance their city’s sustainability. This is for two reasons: Cities cannot function without a fast, efficient and affordable system of mass transit. A city in gridlock is a city that loses billions of dollars worth of productivity over the course of a year. Also, the use of private vehicles is one of the main contributors to CO₂ emissions which cities are eager to curb.

Transport is a big field and the obstacles to improving a city’s situation often seem prohibitive, a lack of resources (funding) first among them. However, new technology will often pay for itself over a surprisingly short time. With its “Complete mobility” solutions, Siemens has answers to the challenges of growing urban populations, rapid urbanization, climate change and resource conservation.

“Complete mobility” stands for efficient mobility solutions realized as an integrated traffic system that moves people and goods economically, quickly, and safely. For more on this, see our “Sustainable Urban Infrastructure – Vienna Edition” study, available on our website. In a city context, we offer integrated mobility solutions which make traveling on public transport easy, safe and attractive.
Moving goods and people from road to rail is one of the key challenges for an integrated mobility solution. We are the only company with the competence to develop such concepts and implement them with our cross-sector portfolio. To advise our customers comprehensively, we now offer mobility consulting from strategic orientation and the optimization of mobility processes to commercial evaluations and the implementation of new and customer-oriented infrastructures and technologies, such as the complete infrastructure for e-cars.

Transport obviously extends far beyond immediate urban transportation: We have expert and cutting-edge technologies devoted to airports, harbors and road and rail transportation. Air traffic with its exponential growth is a prime concern and Siemens is one of the few companies in the world to offer a comprehensive portfolio of products, solutions and services for all airport-related processes. Emissions caused by ships docking in harbors can be cut significantly using Siemens Siharbor technology, resulting in 35% less CO2 and around 97% less nitrogen oxide emissions. We are continuously investing in R&D for innovative solutions, tapping into the great energy saving potential still present in all harbor operations.

We are also widely associated with excellent rail infrastructure equipment and rail vehicles, providing absolutely cutting-edge solutions to rail companies in many countries, greatly increasing their energy efficiency, enabling CO2 neutral growth or a significant improvement on current emissions. Siemens has all the necessary experience and expertise for making public transport an attractive option, saving cities money and reducing their ecological footprint as they go along.

Intermodal traffic management

In Halle, Germany, more than 50% of drivers have switched to trams since the introduction of an intermodal traffic concept. Drivers are informed of the current traffic situation, free parking spaces, and tram departure times. As a result, the intelligent networking of Sitraffic system modules has optimized traffic flow and made using public transportation even more attractive.
Our portfolio for sustainable cities

CITIES

Our portfolio for sustainable cities

Energy

Individual action and technological advances generate big savings

Cities account for 75% of global energy demand and generate 80% of all greenhouse gas emissions. Meeting the ever-growing energy demands of businesses and private households without increasing CO₂ emissions beyond any acceptable level is one of the main challenges cities face today. Sustainable energy should be envisaged as in terms of technologies that enable management of demand, very efficient use of energy as well as cleaner and more efficient generation of power.

Managing demand will require tamper-resistant control and security systems such as distribution monitoring and secure payment devices as well as power plant protection. Intelligent power grid management allows for more efficiency and reliability. And hybrid devices can deal with multiple power sources as well as with variable currents.

Sustainable energy means finding a balance between a secure supply, affordability and environmental impact, not forgetting that both the number of applications and our consumption of electricity will continue to grow. There is also the increasing scarcity of natural resources, which calls for a more responsible use of these resources.

Due to its greater efficiency, the world’s most innovative gas turbine saves fuel and thus around 40,000 tons of CO₂ per year.

This is equal to the CO₂ emissions of 10,000 cars with an annual mileage of 20,000 kilometers.
Our innovative gas turbine, the world’s largest, now implemented at E.ON's Combined Cycle Power Plant in Irsching, is a case in point.

To meet the growing demand for power, an intelligent and flexible grid infrastructure will be essential. Fluctuating feed-in from renewable energy sources changes the traditional topology of the grid – a smart grid is bi-directional. It levels out generation and consumption to ensure a balanced energy system. Smart devices and IT systems monitor and manage the grid everywhere and at any time for everybody. A recent Siemens study on London found that if all recommended technology levers available today would be applied, the city’s overall emissions could be reduced by 44% by 2025. In energy, just as with all other aspects of sustainability, behavioral change can make a real difference; each megawatt avoided is the cheapest and cleanest way to cut emissions and save resources.

However, behavioral change is not an easy feat to achieve. Cities must also leverage all technical possibilities for increasing energy efficiency.

London Array wind farm

Recently, Siemens was awarded the contract to connect the London Array wind farm situated in the Thames estuary to the power grid. We will provide the electrical equipment for two offshore substation platforms, which are to be installed right at the wind farm. The substations bundle the power generated by the 175 Siemens wind turbines before it is transported via high-voltage subsea cable to the coast. This is also an important step in preparing London’s power supply for the 2012 Olympics’ challenges.
Our portfolio for sustainable cities

Buildings, lighting, security and safety

Often overlooked, buildings harbor massive energy saving potential

Usually, we don’t really think about buildings. We just use them. If you’re charged with making your city sustainable, it’s worth taking a closer look: Buildings are responsible for an astonishing 40% of global energy consumption. Lighting alone makes up nearly 50% of this number.

Siemens believes that buildings should provide a maximum of comfort, use energy efficiently and react automatically to external climate influences. And they should protect people and assets against intrusion, theft and fire. Our innovative building automation and control systems can be retrofitted into existing buildings, resulting in substantial increases in energy efficiency and associated cost savings. Any such investment in your buildings will pay for itself in a matter of a few years, leaving a permanent positive effect on your balance sheet, not to mention the planet.

Increases in energy efficiency as well as safety and security rest on several pillars, one of which being our Total Building Solutions (TBS) which stands for integration of building automation, safety and security systems, low-voltage power distribution, electrical installation technology and lighting. TBS provides more comfort, safety, security, flexibility and energy efficiency, while reducing CO₂ emissions.

Intelligent building technology helps reduce the energy consumption by up to 50%
Siemens Osram innovative lighting solutions work with the latest in LED technology and can bring up to 80 percent energy savings compared to conventional bulbs. Automatically monitoring the use of rooms and regulating the use of light accordingly is another key factor in making lighting much more efficient.

Our fire safety and security solutions and services deliver all encompassing protection for people, assets and processes that contribute toward maximizing operational efficiency and business continuity: They draw on innovative technologies and concepts to optimize incident prevention, detection, intelligent response and mitigation making our future cities safe places to live. In addition, they can also interoperate with our HVAC (Heating, Ventilation and Air Conditioning) and lighting systems to both further improve the effectiveness of incident response and recovery and enable a more efficient energy use in daily operations.

**Your buildings can save you money**

Together with energy and transport, buildings form the most important basic triangle that holds the key to a city’s sustainability. To set you on the right path, Siemens can analyze your buildings for lighting, shading, ventilation, heating, air conditioning and refrigeration, water distribution, compressed air and process systems control and maintenance. Our Siemens Energy Saving Performance Contracting will even guarantee you agreed energy cost savings.
Our portfolio for sustainable cities

In most cities, we tend to take our water supply for granted. City managers, however, know about the vast amount of problems associated with water supply. It’s expensive: Typically, 35% of a municipality’s electricity bill goes to water and wastewater treatment. It’s outdated: A large percentage of the world’s associated infrastructure is over 30 years old. It’s not always just there: A growing number of cities are facing supply shortages.

Over the years, Siemens has become one of the world’s foremost suppliers of water and wastewater technologies. We supply the solutions for cities to deal with aging plants, increasingly stringent regulations, rising energy costs, shrinking options for biosolids disposal, and sometimes sheer shortages in source water supply.

We draw on our seasoned technical experts, our extensive portfolio of established and cutting-edge products, and the world’s largest installation base of successful applications to help engineers tailor solutions to cities of all sizes. We offer all of the core process technologies needed to create purified drinking water, treat municipal waste water and biosolids, and prepare industrial process and ultra high purity waters. Importantly, we are also particularly good at water treatment.

Every day over 1 billion m$^3$ of water is treated and returned to the environment.

Water and wastewater
The most vital of commodities needs careful management
at retrofitting existing plants; a service that is much in demand as cities need to meet increasing environmental standards with shrinking budgets.

Our expertise, experience, and portfolio allow us to recommend integrated solutions that link related equipment with advanced control algorithms in a manner that saves design engineers time and effort, and municipalities capital investment and operating expenses. As a means to facilitate the financing of such investment, we also offer performance contracting.

Our R&D efforts are directed at creating environmental technologies which allow cities to deal with the ever-increasing strains on their water systems as well as to meet environmental targets. Our technologies allow cities to save substantial amounts of energy, reducing the costs of water and wastewater treatment.

Siemens supplies solutions in the areas of drinking water, wastewater, waste to energy, biosolids reduction, nutrient removal and water reuse. In one of the largest such systems worldwide, Siemens supplied arid Orange County, California, with Memcor® ultrafiltration membranes as a pretreatment to a reverse osmosis (RO) unit. This groundbreaking water treatment facility now recycles 87 MGD (329 MLD) of water and will soon be expanded. Orange County chose Siemens based on a life cycle cost analysis of the Memcor® submerged membrane system.

Similar technology has also been employed to help Singapore recycle water as it moves towards water supply independence (Singapore NEWater).

No matter how basic or advanced your needs, Siemens Water Technologies has an ideal solution for your city’s specific problem.
Growing and ageing populations exert an ever growing strain on public health facilities. Centers of excellence, large teaching hospitals and research institutions are usually located in cities, helping to attract the very best medical brains of the country plus a large population of care providers and administrative staff.

Municipalities are therefore advised to invest in healthcare for several reasons: Providing adequate care to the populations is not only a social and ethical necessity but also a strong factor in the global competition which cities are increasingly subject to.

**Healthcare**

*Combining technologies with efficiency and quality*

Siemens has developed the Green+ Hospital concept, thus helping healthcare providers not only to save energy and lower emissions but also to optimize efficiency and increase quality of care and patient experience. A focus on quality and efficiency allows us to design an optimized sustainable healthcare facility, tailored to your needs.

We contribute to planning your hospitals by considering future workflows. We deliver building management, building automation, power supply, security systems and
patient/asset tracing. Our integrated healthcare solutions cover medical imaging, laboratory diagnostics, therapy systems, and healthcare IT, enabling you to gain significant workflow improvements and provide high quality care.

**Efficient and delivering high quality**

More than just an ecologically efficient building, a Green+ Hospital reflects our holistic view on efficiency. Process planning includes equipment, system integration, IT, and operation. Last but not least, improvements in quality means less invasive and more precise diagnostics as well as improved communications and media offerings and highly adaptable facilities which take into account the special needs of hospital patients.

By refurbishing medical systems, based on the Siemens Proven Excellence quality process, we can assist greatly in a city's journey to becoming greener, resulting as it does in a reduction of 20,000 tons of CO₂/year. Studies have shown this to approximate the power consumption of 5,700 households or the CO₂ storage of around 32 hectares of tropical rain forest. Siemens Healthcare contributes its share to making sustainable cities a reality.

**A winning combination**

Hospitals and patients are set to win by using the latest in Siemens integrated healthcare facilities. The great savings in energy, time and space made through increased efficiency benefit everyone and assist cities in meeting the ever growing requirements in the healthcare sector.
Mindful of the increasing difficulties in financing any large public infrastructure project, Siemens is keen to help its customers achieve the best possible financing deal. To that end, our experts at Financial Services (SFS), the financial arm of Siemens, have created a portfolio of financial tools and offerings which include the sectors asset finance and leasing, project and structured finance, public and equity participations (PPP), and banking.

**Water treatment for Colorado City**

This US city was looking for a water treatment provider who could bundle third-party engineering, construction and equipment costs into one financing structure. They found the ideal partner in Siemens as we were able not only to offer the most convincing and cutting-edge technological solution (Siemens Water Equipment Memcor®) but also the finance and leasing solution that best suited Colorado’s needs.

Thanks to Financial Services, the financial division of Siemens, arranging for the provision of pre-approved tax-exempt financing, Colorado City was able to apply greater project planning efficiency, foregoing the need to wait for financing from the state revolving fund. The project costs of €1,25m were financed by SFS, saving the taxpayer dollars and greatly accelerating the pace of the project.
Modern trains for Russia’s railways

RZD, the Russian state railways, was looking for a partner for modernizing the existing fleet on the St. Petersburg-Moscow-Nizhny Novgorod line. The project value was estimated at €318 million and Russian Railways was looking for a solution comprising project planning plus the delivery and 30 year maintenance of eight high speed trains while reducing overall lifecycle costs. SFS arranged favorable long-term financing using Euler Hermes covered and uncovered loans with very attractive terms and conditions for RZD. Euler Hermes is a large credit insurer and one of our preferred partners. This solution, an example of our project and export finance deals, won the Trade Finance Magazine’s “Deal of the Year” award for the fleet financing.

In another attractive financing model SFS financed the traffic management center of Neue Messe Stuttgart (Stuttgart Fair). SFS provided a tailored solution based on the hire purchase model. For added convenience, the model allowed the customer to delay repaying installments until the Messe took up operations, increasing the rates only with increasing use.

The center includes a dynamic parking-lot routing system, traffic computers, a signaling system as well as a static sign system supplied by the Industry Sector of Siemens.

Energy saving partnership, Berlin

Berlin reduced the €17.2 million per annum energy costs incurred by the 185 public buildings the city is responsible for by asking Siemens to provide a energy management system covering heating generation & distribution, water technology, controlling, monitoring and maintenance. The finance structure and support by Financial Services involved sales of receivables, a favorably termed framework agreement and accounting and tax clarification. The result: Guaranteed savings of €5.3 million per annum and a 25% (29 kiloton) annual reduction in CO₂ emissions. Total investment for this project: €28.5 million. Contract terms valid for nine to twelve years.
Major events

A unique chance to renew your infrastructure

Major Events, from the Olympics and World Cup Soccer to congresses and other cultural or sports events increasingly serve as a trigger for investments in infrastructure improvement. Public transport, energy generation, security, and healthcare can all be considered. Siemens develops, coordinates, and implements fully integrated, sustainable solutions for major events. Sports venues benefit from our latest building technologies, airports receive temporary extensions, major new transport links are established. The latest in highly advanced lighting, security and healthcare solutions are applied. We are experts at securing power supplies and distribution. We deal with wastewater and make water potable. We offer financial assistance and improve administrative processes. We passionately believe that the preparations for such events are the ideal opportunity to invest in sustainable urban infrastructure and we always make sure the extremely high standards and cutting-edge technologies that are at the heart of our work will benefit our customers for a long time into the future.

Yas Marina Circuit, Abu Dhabi

The new race track in Abu Dhabi benefits from Siemens external and internal architectural lighting, access control systems, building management and public surveillance systems. A 22 kilovolt medium voltage network and low voltage primary power distribution secures power supply. We were also responsible for system integrations and the installation of all race track systems.
City administrations around the world are concerned by increasing urbanization and demographic development. These are only two aspects causing numerous administrative challenges to run a city effectively. A smoothly run administration is crucial to any possible competitive success in attracting businesses and citizens. While citizens’ expectations are rising – looking for enhanced quality of life, business investors are expecting smart, fast and transparent e-government services that can be used to drive efficiencies and make interactions between businesses and city officials easier. Officials have to meet these challenges using appropriate and sustainable solutions. Flexible smart city solutions such as the Virtual City Hall and the City Cockpit are innovative solutions to achieve this. While Virtual City Hall allows citizens and businesses to access a full range of services anytime, anywhere, at own convenience, the City Cockpit will support city administrations in meeting their set targets through a modern management information and decision support system. Providing a full range of comparable cutting-edge solutions for administrations and city authorities, we support city administrations in making a difference with providing integrated and cost-efficient administrative processes that have a positive impact on citizens and businesses alike.

**E-government, Szeged**

The Hungarian city of Szeged uses an integrated information platform, largely eliminating the need to call on agency offices in person. The solution significantly increased efficiency and productivity and improved the consistency of the data inventory. Citizens and businesses benefit from time-independent accessibility of local authorities for about 30 different interactive services.

**Public administration**

Adaptable IT solutions for increasing complexity of administrative tasks
The key to a successful future

Why cities must embrace green growth

Green growth means nothing more and nothing less than achieving classic economic growth with the highest possible levels of energy efficiency and a substantial cut in CO₂ emissions. To date, this was often thought to be mutually exclusive, but we hope to have shown in this brochure that the technology to do just that exists today – and should be seen as a fundamental tool in helping your city meet the challenges ahead.

There is no reason why city stakeholders should take a back seat as the need for action becomes ever more urgent. Indeed, they must assume a stronger voice in the climate change/resource efficiency debate, join the associated initiatives, and articulate the need for direct access to the appropriate sources of funding. We have identified four critical areas of actions for cities wishing to compete successfully.

Acknowledge the paradigm shift

Today, urban planning is evolving from master planning towards being an integrated process, involving different stakeholders from stage one as well as calling on industry expertise. Technical feasibility under budget constraints should be on the agenda from the outset. Siemens is keenly aware of this and offers a wealth of products and solutions aimed at meeting the challenges ahead. Wind power can help reduce costs, smart grids, solar power and energy storage increase efficiency, and performance and innovations such as CO₂ recycling present new opportunities.

Unlock new business potential

Efforts and costs involved in setting your city on a new path can seem forbidding. That’s why there’s an urgent case for the conception of new business models. Cities must take leadership here, too, and support such developments by unlocking funds, e.g. through energy performance contracting, and reforming procurements guidelines which should also include life-cycle considerations. New revenue models such as e-cars, new markets and
new public-private collaboration models are all part of the equation. Finally, it is useful to perceive cities more like a business, with a clear strategy, key performance indicators and balance sheets.

**Create the right regulations**

Current regulatory frameworks need adjusting if cities wish to make the most of the green growth potential. There is a whole range of areas to be covered here, such as paving the way for innovative funding (the EU’s SET-Plan is an excellent funding instrument for large-scale infrastructure investments) and generally adapting fiscal rules. Price externalities such as CO₂ markets must be considered and used. Infrastructure economists can help assess proposed sustainable solutions from a holistic cost-benefit standpoint and thus defuse potential political conflict. The early engagement of the private sector’s technology expertise is recommended to improve early planning.

**Build consensus**

Whatever you are planning to do: A successful modern city is run on consensus and the inclusion of the population. This can be achieved by including the public in new business models, in building consensus on long-term targets and by facilitating open discussions on options/necessities in controversial areas such as power transmission. Overcoming public inertia is important – the best public transport system is of little use if everyone still feels the private car is a better option.

At Siemens, we see green growth as a clear business opportunity today. With a projected growth rate of 10% annually, our Environmental Portfolio was responsible for about 36% of our total revenue in 2010 (€27.6bn). We don’t intend to lose out on this immense opportunity. Make sure your city doesn’t either.
Cities of all shapes and sizes are the focus of this brochure for a reason: if we can take cities toward a sustainable future, mankind will have a sustainable future on this planet. The challenges are many, the obstacles are high, but the technology to tackle the problems already exists. Behavioral change is ultimately critical, but human inertia sometimes stands in the way of our best intentions. Modern technology can guide citizens toward this required change without infringing on their liberties. We should put it to use wherever possible. At Siemens we strive to develop more intelligent products and solutions to make cities truly sustainable living spaces, places where dreams can come true, where successful lives can be lived and where climate change is effectively combated without infringing on people’s liberty. Let us help you make your city truly sustainable.

For Further information on the Sustainable Cities within Siemens
www.siemens.com/cities
Ecofriendly production

In line with our strong commitment to the responsible management of natural resources and the goals of the Forest Stewardship Council (FSC) – which was founded in 1993 to promote the environmentally appropriate, socially beneficial and economically viable management of the world’s forests – this Sustainabile Cities brochure has been produced using chlorine-free materials and climate-friendly production processes.

In accordance with FSC guidelines, all the paper used in this brochure comes from recycled materials or controlled sources such as sustainable forests. The mill in which the paper was produced is certified in accordance with ISO 14001 environmental guidelines and the Eco Management and Audit Scheme (EMAS). The pulps used are totally chlorine-free and were partly bleached without the use of chlorine gas. The inks used in the printing process were all made from renewable raw materials.

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