Making infrastructures more intelligent
Enhancing quality of life
“What makes life in Vienna so special? Come with us – we’ll show you!”

The Freimüller-Köhler family – Vienna, Austria
We love living in Vienna. As passionate city dwellers, we appreciate the high quality of life that our city offers. Vienna has lots of beautiful public squares, cultural offerings for every taste, excellent schools, a fantastic transportation infrastructure, plenty of green open spaces – and we feel completely safe here. Best of all: our city is further expanding its infrastructure for a sustainable, livable future.
“More quality of life or more economic growth? Vienna can have both.”

Dr. Michael Häupl – Mayor of Vienna, Austria

Vienna is the capital of classical music, a center of culture and the arts. I’ve made it my mission to make the city a hub for science, research, innovation and technology as well. We’ve improved the quality of life for Vienna’s residents by implementing new technologies – in the areas of traffic management and public transportation, for example. And we intend to keep building on our successes by implementing intelligent infrastructure solutions for mobility, power supply and building management.
Intelligent infrastructure is enhancing the quality of life

Environmental awareness and energy efficiency, Viennese style: Austria’s capital epitomizes what makes a city livable.
Vienna, Austria

“Back when our kids were small, it was really hard for me to get on the tram with a stroller. Today, parents with young children can easily board the ultra-low floor trams – now that’s what I call progress!” Julia Köhler loves living with her family in Vienna – a city that repeatedly ranks among the world’s most livable urban centers. She and her family regularly use public transportation. Mayor Michael Häupl knows how important the city’s buses, metros and trams are to the inhabitants of Vienna. Summing up the city’s formula for success, he says, “like any successful business launching a new product, we surveyed our customers. The feedback we received was that Vienna’s residents want public transportation that operates reliably and on schedule, and the system should also be attractive and comfortable.” That’s why the city opted, for example, for Siemens’ Ultra Low Floor (ULF) trams, with their extra-wide doors and floor height of just 19 centimeters.

State-of-the-art trams are just one small piece of the quality-of-life mosaic in this metropolis on the Danube. Mayor Häupl sees his city as “a mixture of grand classical traditions and innovative technologies. In addition to being steeped in history and abounding in culture, Vienna is a business and science hub.” For a more detailed picture, just ask the city’s residents. Julia Köhler appreciates “all the green spaces and the vibrant cultural scene. And Vienna is a family-friendly city – a wonderful place to raise children.” Her husband, Dr. Georg Freimüller, who’s an attorney, says that the quality of life in Vienna can also be attributed to the magnificent backdrop of the city’s many historic buildings and its safety and cleanliness. Their children – Carlotta, Max and Elsa – feel that Vienna can hold its own against any city in the world.

It’s no coincidence that the residents of the Austrian capital give their hometown such high marks for quality of life. Under Mayor Häupl, Vienna has taken systematic steps to enhance its livability over the past two decades. One focus has been on infrastructure, where Vienna has been rigorously implementing “intelligent” strategies. And Siemens has provided many of the city’s closely integrated infrastructure solutions: metro trains and their electrification, traffic management systems, power distribution solutions, energy-efficient building technologies and security systems for public squares, metro stations and stadiums.

Vienna’s decision-makers recognized early on that a healthy environment is a prerequisite for ensuring quality of life. Major investments in energy-efficient and environmentally friendly technologies and in public transportation are not inconsistent with a city’s prosperity. Mayor Häupl is convinced that a higher quality of life also fosters economic success. “Today, Vienna generates 48% of Austria’s total tax revenue,” he says. “We have a healthy, prosperous mix of industry, financial and other services, and highly creative businesses.” And it’s this mix that gives the city the flexibility it needs to implement innovative infrastructure solutions and thus further enhance its residents’ quality of life.
What’s being done to enhance the quality of life in Vienna?

Ask the Viennese and you’ll hear lots of praise for their city’s transportation system. The Freimüller-Köhlers take the metro, trams and buses as often as possible, even though they have driver’s licenses and own several cars. “Public transportation in Vienna is fast, convenient, comfortable and cheap,” says Carlotta, a university student. “I only take the car when I have to.” Her mother, Julia, who works at the university, needs the car for her commute but leaves it at home when running errands. “I love the flair of Vienna’s markets and the variety they offer,” she says. “The bus and tram get me there a lot faster than my car. And it’s also cheaper since I don’t have to pay for parking.” Georg Freimüller also prefers to use his annual transport pass when commuting to his office or the courthouse or when running errands. “The city has done a lot for public transportation,” he says. “In recent years, the network has become denser, and the buses, metro and trams run more often.” And as the statistics show, ridership is up: thanks to Vienna’s master transit plan, the use of public transportation within the city limits rose to a worldwide record of 39% in 2012, up from 34% in 2001. Nevertheless, Vienna’s motorists are not at a disadvantage compared to their counterparts in other big cities. While Vienna makes it easy to travel by bicycle,
Vienna’s open-air markets are Julia Köhler’s favorite places to shop, and she gets there faster and cheaper by public transportation than by car. Today, she and her daughter Elsa are taking the metro to the city’s popular Naschmarkt. Thanks to our regenerative braking technology, the system’s trains are very energy-efficient and eco-friendly.

The Naschmarkt is one of Vienna’s most popular attractions, drawing residents and tourists alike with its wide range of products. Julia Köhler comes here to buy not only fruit and vegetables from Austria but also specialties from southern Europe and Asia.

Public transportation

In Vienna, 39% of all journeys are made using public transportation, well above the European average of 28%. The aim is to increase the figure for Vienna to 40% by 2020.

metro, bus and tram, state-of-the-art traffic management technology keeps the city’s car traffic moving smoothly. “We’re not anti-driver, we’re pro-people,” emphasizes Mayor Häupl. “We want the people in our city to live well and not be overwhelmed by the traffic.” In general, however, public transportation always takes precedence over private transportation in Vienna. In expanding its public transportation system, the city is investing heavily in innovative technologies such as real-time intermodal journey planners, smartphone-accessible timetable information and one of the world’s most advanced metro control centers.

We’re keeping the traffic moving

Traffic jams and delays are less frequent in Vienna than in other big cities, and Siemens technology is playing a pivotal role in this success. Both the city’s road traffic management center and its metro control center rely on our intelligent solutions. The metro control center manages both the system’s power supply and its operation, centrally monitoring all trains, platforms and display panels throughout the city. In addition, we’ve been supplying the local public transport operator, Wiener Linien, with trains, electrification systems, interlockings and automatic train control systems for decades.
Living well with less electricity and water

The emphasis on quality of life in Vienna dates back to the ancient Romans, who enjoyed bathing and relaxing in sulfur springs on the site of the present-day Theresienbad. One of the city’s oldest public swimming pools, the Theresienbad is more than a good place for quality leisure time; it’s also a model of energy efficiency and climate protection.

In 2009, we installed state-of-the-art building technology throughout the entire pool complex. As part of an energy performance contracting agreement, we made an upfront investment of €5.2 million, to be financed over 15 years through guaranteed water and energy savings. This arrangement was good for the city since Vienna didn’t have to contribute capital from its limited investment reserves. And the results were impressive: heating costs were cut by 52% and water consumption slashed by 76%. Savings have already exceeded the contractually guaranteed level of nearly €600,000 a year, benefiting not only city coffers but also the environment and thus all of Vienna’s residents. The Theresienbad complex now emits 457 metric tons less CO₂ each year than before the energy upgrades. Energy performance contracting has also reduced energy consumption, costs and CO₂ emissions at 23 public schools in Vienna.

In Vienna, as in many cities, buildings account for the lion’s share of the energy consumed. As a result, Mayor Michael Häupl has set up a city-wide energy-efficiency program in addition to implementing energy performance contracting solutions for municipal properties. “We’re promoting energy upgrades and thermal insulation – which is one of my pet projects because it means that more money stays in people’s wallets,” he says.

Creative solutions for climate protection

Energy-efficient buildings are a key factor when it comes to making cities more climate-friendly. On this front, there’s still room for improvement in Vienna, according to the European Green City Index, a Siemens-sponsored study that rates the environmental performance of 30 of the continent’s cities in the areas of sustainability, natural resource use and commitment to environmentally sound practices. Although Vienna achieved an admirable fourth place, the study found potential for improvement in the areas of carbon emissions and air quality. Vienna got the message: the city’s first climate protection program reduced annual CO₂ emissions by 3.1 million metric tons, and a second program is now aiming to cut another 1.4 million tons a year by 2020. Many of the planned initiatives are technology-driven: climate-neutral building construction, metro and tram cars that recover traction power, and electric buses for public transportation.

Annual reduction in CO₂ emissions

At the Theresienbad pool complex, our technologies have slashed heating use by 52% and water consumption by 76% while reducing carbon emissions by 457 metric tons a year.
1 – Located on the site of Vienna’s oldest public bath, the city’s Theresienbad swimming pool complex is equipped with leading-edge technologies from Siemens.

2 – Carlotta and Max enjoy a swim at the Theresienbad. The metro trip to the pool is fast, comfortable and ecofriendly.
WienIT is the IT service provider for Vienna’s public utilities and all associated enterprises, such as Wien Energie and Wiener Linien. And the demand for IT solutions on the part of WienIT’s customers is booming – in part because infrastructure solutions are becoming more and more intelligent. In 2013, WienIT completed its new Floridsdorfer Datacenter – FloriDa for short – and Siemens delivered the facility’s systems and solutions for building management and power distribution. In the future, FloriDa will be operated with the help of a data center infrastructure management (DCIM) software solution. Linking facility management with IT control, our innovative software integrates information from individual data center areas that until now have often been operated separately. Here, too, the results are impressive: the installation of a cold aisle containment system can increase the data center’s cooling efficiency by as much as 30%, thus enabling it to achieve an efficiency level unmatched by other same-size facilities.

The Viennese love their metro system. And thanks to state-of-the-art Siemens technology, the system’s trains are very energy-efficient and environmentally friendly. For example, when they brake, traction power is recovered and fed back into the metro’s power supply, cutting power consumption by 30%-35% compared to that of conventional metro systems – thus helping Vienna conserve precious natural resources. We provide the bulk of the metro’s power supply equipment.
Vienna’s grid operator, Wiener Netze, intends to create 100% transparency for consumers and energy producers alike. Plans call for equipping every household with a smart meter by 2020, enabling Vienna’s residents to monitor their current energy consumption online and plan their future energy use. The data gathered will also allow Wiener Netze to forecast demand more accurately, plan its operations more efficiently and optimize grid expansion. Our software solutions, which have already been implemented in more than 70 million smart meters around the world, are being used to record consumption data in this pilot project.

In the area of power supply and distribution, maximum efficiency can be achieved only if a system’s components, software and related services are optimally geared to one another. Vienna’s airport embraced this single-source approach when expanding its power distribution system. Our planning software, known as SIMARIS design, supported the selection of the facility’s electrical equipment, most of which we also supplied, and ensured that the components worked together perfectly. Our technology is thus helping ensure the smooth operation of Vienna’s airport, which accommodates some 22 million passengers each year.
“The Viennese want their public transportation to be attractive and comfortable.”

Dr. Michael Häupl has been the mayor of Vienna since 1994. It’s not just the city’s economy that has blossomed in recent decades. Ranked one of the world’s most livable cities in international surveys, the Austrian capital has also attracted a large number of new residents. But the city isn’t resting on its laurels. To ensure continued development, systematic investments are being made in intelligent infrastructure solutions.

Mayor Häupl, what makes Vienna so livable?

Dr. Michael Häupl: Vienna is a mixture of grand classical traditions and high-tech innovations. The city stands for lifestyle and culture, on the one hand, and for business and science, on the other. The Viennese are very hard-working, but they also know how to enjoy life. Maybe that’s what makes us a little different from other Europeans: we work to live, we don’t live to work.

According to a recent international study, Vienna is the “smartest” major city in the world.

Dr. Michael Häupl: When I took office nearly 20 years ago, I saw it as my mission to turn Vienna into a city of science, knowledge, research, innovation and technology. I consider our ranking as the “smartest” major city to be the fruit of our ongoing efforts to create intelligent solutions for our residents in various areas – energy, public transportation and road traffic management.
Our answers to the challenges of urbanization

In 2011, for the first time ever, the number of people around the world living in urban areas exceeded the number in rural areas – and this trend is continuing. Increasing urbanization and its consequences are putting strains on infrastructure systems worldwide – infrastructures that are the backbone of economic growth and prosperity. As a result, cities and companies that fail to invest in their infrastructures will quickly lose their competitiveness in a globalized world.

And that’s where Siemens comes in. With our broad portfolio and decades of experience and expertise, we’re making infrastructures and cities smarter, greener and more competitive. Our products, services and solutions are helping customers around the globe make better use of their existing infrastructures, improve efficiency, cut operating expenses and enhance safety and resilience while minimizing environmental impact. And it’s here that our city account managers are playing a vital role by supporting municipal decision-makers worldwide in the critical planning phase of infrastructure projects.

We’re aiming to blaze new trails with cutting-edge infrastructure solutions. The following pages illustrate how we’re living up to this aspiration in the areas of power supply, mobility, logistics and building technologies.
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Making infrastructures more intelligent

Enhancing quality of life

Reliable and efficient power supply

Automated grids are safeguarding the power supply

A reliable power supply is critical for economic growth and energy security. But existing grids are often ill-equipped to meet the growing demand for power, and the increasing share of fluctuating supplies from renewable sources are a further challenge. Around the world, power outages caused by storms, overloads and aging infrastructure are taking a significant toll on households and businesses alike. Studies have found that storm-related power outages cost the U.S. economy between €15 billion and €41 billion each year.

Our end-to-end solutions ensure the reliable and efficient distribution of low- and medium-voltage power. In addition to switchgear, distribution systems and protection and monitoring equipment, we also supply energy storage units for better integrating electricity from renewables into power grids. Our intelligent software solutions link power distribution installations to building and industrial automation systems. And smart grids are also playing a key role in power distribution. Our products and solutions for smart grids are making it possible to achieve a better balance between energy supply and demand by managing the bi-directional flow of power and data between suppliers and consumers, even as more and more consumers are also producing power.
Moving people and goods – quickly, safely, reliably and cost-effectively

As the world’s population continues to boom, trends like increasing globalization and urbanization are creating an urgent need for mobility solutions. Today’s transportation systems are often operating beyond capacity, negatively impacting people’s quality of life. Businesses too have an interest in finding solutions to these challenges. Each year, the price tag for traffic congestion is some €5.3 billion in the UK and about €74 billion in the U.S.

Urban and interurban mobility is being greatly enhanced by the use of intelligent, automated systems. And it’s here that our infrastructure solutions are helping. In the rail segment, we supply trains, metros, locomotives, trams and light-rail vehicles for local and long-distance passenger services as well as for logistics transport. Rounding out these offerings, our customized hardware, software and service packages are optimizing road, rail, harbor and airport transportation networks.

1 – Dr. Michael Häupl has been the mayor of Vienna since 1994. After completing his university studies in zoology and biology, he began his career at Vienna’s Natural History Museum. From 1988 until his election as mayor, Dr. Häupl headed the city’s Office of Environmental Protection and Sports.

2 – “aspen Vienna’s Urban Lakeside” is one of the largest urban development projects in Europe. The Vienna Business Agency, which, in keeping with its charter, provides support for the city’s economic development, is the project lead. One of the first buildings constructed in the community was the aspen IQ technology center, pictured above. The Center is home to Aspern Smart City Research, a joint project of Siemens, Wien Energie and Wiener Netze. The project’s experts are looking for ways to intelligently network environmental, energy and building technologies in order to promote sustainable urban development.
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## Making infrastructures more intelligent

### Enhancing quality of life

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### Increased efficiency, safety and competitiveness

![](image)

Around the world, people want to feel comfortable in their homes, workplaces and public spaces. And they want to live in energy-efficient, low-emission buildings – a daunting challenge, given that buildings today account for some 40% of worldwide energy consumption and 21% of CO2 emissions.

We’re a trusted technology partner for safe, energy-efficient, ecofriendly building infrastructure. Our integrated systems automate the control of heating, air conditioning, lighting, fire safety and security systems. By making buildings intelligent, we’re helping ensure workplace safety and business process security, which in turn promotes entrepreneurial productivity and competitiveness.
In Vienna, 39% of all travel is via public transportation, well above the average of 28% for the rest of Europe’s cities. What’s your formula for success?

Dr. Michael Häupl: We listen carefully to the wishes of our city’s residents, and they want public transportation that not only runs frequently and on schedule but is also attractive and comfortable. That’s long been part of who we are in Vienna. What’s more, we take the long view with our pricing policies: we sold an additional 100,000 annual passes simply by lowering the daily price to €1.

This report opens with a question: “More quality of life or more economic growth?” Is it possible to have both?

Dr. Michael Häupl: We see it happening here in Vienna, where 48% of Austria’s tax revenue is generated. A flourishing economy is the basis for our success. In the end, you can only have a high quality of life if there’s a very healthy economic foundation.

The Siemens Green City Index gave Vienna high marks for sustainability but saw room for improvement in CO₂ emissions. What is Vienna doing to protect the climate?

Dr. Michael Häupl: Our record isn’t so bad. Vienna, a major metropolis, has lower CO₂ emissions per capita than all the Austrian states – but even that’s too high for us. That’s why we’ve defined emission limits for all new and renovated buildings and why we’re pushing alternative energy sources. I have high hopes for even smarter technologies that will enhance traffic management, for example, or enable public transportation to run at more frequent intervals. But since our investment budget is limited, we also need creative financing concepts – above all, ideas we can implement in cooperation with businesses.

What is the optimal energy mix for Vienna?

Dr. Michael Häupl: About 75% of the electricity we use is generated in Vienna. In the years ahead, we’ll greatly expand the amount of electricity we produce from hydroelectric, wind and solar sources. At the same time, we’ll introduce smart grids, which will allow us to better balance fluctuating supplies of power with actual demand.

What initiatives would you like to launch in Vienna in the coming years?

Dr. Michael Häupl: Our city’s growing, and that’s a very good thing. We’re building housing and roads, and we want to safeguard Vienna’s high quality of life for future generations. One example of the initiatives we’ve launched is an urban development project called “aspersn Vienna’s Urban Lakeside.” It’s a brand new community where a wide range of technological innovations will ensure intelligent power distribution and maximum energy efficiency. Our local power provider, Wien Energie, and our grid operator, Wiener Netze, are cooperating with Siemens in an accompanying project focused on intelligently networking environmental, energy and building technologies in order to promote sustainable urban development.

What contribution would you like to see Siemens make to the future of Vienna?

Dr. Michael Häupl: Siemens has had a profound influence on Vienna ever since the late 19th century and remains without a doubt the flagship of industry in our city. I hope we can continue our joint projects in the areas of transportation and energy as well as partnerships with universities in the field of healthcare. Things are going well, but from my perspective, we could pick up the pace in some areas.
1/2 – Austria’s progressive capital is one of the few cities in the world to deploy battery-powered electric buses in regular service. Dr. Georg Freimüller never ceases to be amazed by how quiet and comfortable it is to ride the city’s 2A and 3A electric bus lines.

3 – The Freimüller-Köhler family on the way to the Karlsplatz metro station. From there, home is just a short, comfortable metro ride away.
Vienna is growing – and its quality of life is increasing

Many Viennese don’t realize it, although they experience it every day: Siemens is creating real quality of life in their city. One prime example is the twelve zero-emission electric buses running on lines 2A and 3A in the city center. In 2013, this very well-received electric fleet earned Wiener Linien accolades that included the State Prize for Mobility, the highest honor awarded by Austria’s Ministry of Transport, Innovation and Technology. Georg Freimüller sees the buses as a crowning achievement for public transportation in Vienna. “The electric buses are quiet, comfortable and fast – and they emit no carbon dioxide,” he says. Thanks to our drive concept, the buses consume some 25% less energy than diesel or natural-gas buses. What’s more, the electric buses run on green electricity. About 75% of the energy consumed in Vienna is produced in the city – at facilities which include one of Europe’s largest biomass power plants. Plans call for increasing the share of renewables in the city’s energy mix to 50% by 2030. And that target entails a new set of challenges, since the amount of energy derived from the wind and the sun naturally fluctuates. Reinhard Brehmer, one of the managing directors at grid operator Wiener Netze, is already working on the solution: “To achieve a balance between supply and demand, we’re introducing smart grids in Vienna,” he says. “A pilot project to test smart electricity meters and their integration into the grid is already underway.” Siemens is supplying the software that manages the consumption data – one more intelligent infrastructure solution for Vienna.

A living laboratory for the city of the future

Wien Energie, Wiener Netze and Siemens are working together on the smart infrastructure of the future at a new community called “aspen Vienna’s Urban Lakeside.” The new district, which is being developed on the site of a former airfield, will be home to 20,000 people and create 20,000 jobs by 2030. Reinhard Brehmer, who’s also the managing director of Aspurn Smart City Research, has high hopes for the “living lab.” As he explains, “In aspen, we have a unique opportunity to try out smart new ideas for energy-efficient urban infrastructures on a community-wide level. Working with Siemens, we’ll test new types of links to the low-voltage grid and integrate schools, homes and offices in the power grid.”

Vienna is a growing city that’s optimally equipped for the future. Mayor Michael Häupl sees the aspen community and the research project with Siemens as steps clearly geared toward further enhancing the city’s quality of life by introducing smart, automated infrastructure solutions: “This isn’t just about building roads and housing. We also want to ensure that future generations enjoy the same high quality of life that Vienna has already achieved.” ←