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Siemens publishes study on Munich's progress toward a carbon-free future

Further contribution to developing sustainable urban infrastructure solutions

A city like Munich can cut its CO₂ emissions by up to 90 percent by mid-century without impairing the quality of life for its inhabitants. This is the main finding of a new study entitled “Sustainable Urban Infrastructure: Munich – Paths toward a Carbon-Free Future.” Commissioned by Siemens, the Wuppertal Institute for Climate, Environment and Energy examined how a modern metropolis like the Bavarian capital can drastically reduce the amount of CO₂ it emits. Using a specific model urban district, the analysis concretely demonstrates how the transformation to a virtually carbon-free metropolis can be accomplished in terms of infrastructure and technology. Key levers for cutting CO₂ emissions are high-efficiency energy applications, in particular in buildings; infrastructure modifications in the areas of heating, electricity and transportation; and a transition to renewable and low-carbon energy sources wherever possible.

Today, 50 percent of the world's population lives in cities – a figure that is expected to climb to 60 percent by 2025. “That's why cities must lead the way when it comes to climate protection. Not only are urban areas the major culprit in terms of climate change; they're also the place where the consequences will be felt most clearly,” explains Reinhold Achatz, Head of Corporate Research and Technologies at Siemens AG. Having published a study on sustainable infrastructure solutions for the London metropolitan area last year, Siemens is now presenting an infrastructure analysis for Munich. With its Environmental Portfolio – which generated revenue of roughly €19 billion in fiscal 2008 and is, thus, the largest portfolio of its kind in the world – Siemens can and will play a major role in the discussion. As Achatz observes, “Increasing urbanization and climate change are two megatrends for which our technologies can contribute valuable solutions.”

Overview of the main findings

A major city like Munich can not only meet but also exceed the target, set by EU environmental ministers, of reducing annual global greenhouse gas emissions by 50 percent to less than two tons per person by 2050 compared to 1990.

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Reaching this ambitious goal will not require a reduction in living standards. However, a comprehensive paradigm change in terms of buildings, heat generation, power grids, power generation and transportation will be necessary.

The key levers for reducing emissions include optimizing the insulation of buildings, low-carbon renewable power generation and the efficient use of heat and power cogeneration, energy-saving electrical devices and lighting systems. In the area of transportation, the increased use of public over private transport and the switch to electrical vehicles for inner-city transportation harbor the greatest savings potentials.

Savings in the heating area will create new challenges for utilities. Optimizing building insulation will cut heating needs enormously, so that it will become difficult to profitably operate district heating grids. For this reason, new solutions for low temperature networks will have to be rigorously developed.

Using examples, the study demonstrates that many investments in efficiency measures are, in fact, cost-effective. For instance, to meet the requirements of the energy-saving passive house standard – which is stricter than the 2007 Energy Savings Ordinance now in force – Munich will have to invest an additional €13 billion by mid-century in the renovation of old buildings and the construction of new ones. This amount comes to roughly €200 per city resident per year – about one third of an annual gas bill. However, these added costs will be offset in 2058 by energy cost savings of between €1.6 billion and €2.6 billion – that is, of some €1,200 to €2,000 per resident. If all savings potentials in the area of electrical power are realized, the lion's share of the city's electricity needs can be met by renewable low-carbon sources. Although relatively high at first, initial investments in efficient energy-saving technologies generally pay for themselves through energy savings.

Low-carbon urban districts could be a reality in only 30 years

Professor Manfred Fishedick, Vice President of the Wuppertal Institute, explains the study's approach this way: "Of course, it's up to cities to implement the concrete measures required. Our goal was to show what alternatives are available and how they can be intelligently bundled to form sustainable solutions." Taking Munich as an example, two scenarios for the period from 2008 to 2058 – the 900th anniversary of the city's founding – were examined: a relatively optimistic Target Scenario and a Bridge Scenario, which is based on more conservative assumptions about residents' behavior. According to the Target Scenario, emissions will have been reduced by 90 percent to around 750 kilograms per resident per year by 2058. According to the Bridge Scenario, Munich will still be on the way to becoming a largely carbon-free city. Nonetheless, CO₂ emissions will have been reduced by 80 percent to 1.3 tons per person – and, thus, will still be much lower than the two-ton-per-person level advocated by the EU environmental ministers. In a second step,

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the study extrapolates from the case of one model urban district to illustrate how the levers identified can help transform Munich into a virtually carbon-free city. A quick look at the analysis reveals that it is theoretically possible to reduce the CO₂ emissions in an individual urban district to extremely low levels within a period of only 30 years.

Government has to create the right conditions

The study also shows that transforming a city into a virtually carbon-free urban environment will be a major challenge – one that can only be mastered if achieving this aim is a top priority for all participants: decision-makers, bureaucracies, utilities, urban planners and, particularly, investors and residents. Hep Monatzeder, the city official responsible for climate protection, looks at it this way: “To achieve our ambitious CO₂ goals, Munich residents will have to be supported and encouraged, for example, by financing and remuneration strategies as well as by targeted information campaigns to invest more consistently in efficient and low-carbon technologies and to increase the use of ecofriendly means of transportation.” Monatzeder adds: “It will one of our key responsibilities as government leaders to make the advantages and financial benefits of energy-efficient technologies even more transparent and to remove existing impediments to their successful implementation.”

Further information on the study “Sustainable Urban Infrastructure: Munich – Paths toward a Carbon-Free Future” is available on the Internet at www.siemens.com/sustainablecities.

Siemens AG (Berlin and Munich) is a global powerhouse in electronics and electrical engineering, operating in the industry, energy and healthcare sectors. The company has around 430,000 employees (in continuing operations) working to develop and manufacture products, design and install complex systems and projects, and tailor a wide range of solutions for individual requirements. For over 160 years, Siemens has stood for technical achievements, innovation, quality, reliability and internationality. In fiscal 2008, Siemens had revenue of €77.3 billion and a net income of €5.9 billion (IFRS). Further information is available on the Internet at: www.siemens.com.