Assuming that the journey is the reward, how can we make it more efficient?

The Siemens answer: Complete mobility.
Integrated solutions for urban and interurban transportation and logistics
Where are we heading?
Demographic change, urbanization and climate change are shaping our future and posing daunting global challenges. The world population is soaring and steadily getting older. Current forecasts indicate that by 2050, some 9.2 billion people will live on our planet – up from 6.6 billion today. At the same time, the process of urbanization will continue to accelerate. In 2008, humankind passed a new milestone: For the first time in history, half of the world’s population now lives in urban centers. And there is a clear trend here, too: Experts predict that 90% of the future population growth will be concentrated in cities. In the course of these developments, global trade and the demand for individual mobility will continue to soar – intensifying the need for increased transport. At the same time, the mounting use of fossil fuels will have an impact on the global climate, helping drive climate change and greenhouse effects. Growing motorization in threshold countries alone will lead to an additional 1.9 billion metric tons of CO₂ emissions by 2030.

The growing population and its increasing concentration in urban centers is fuelling worldwide passenger and freight volumes: By 2030, passenger traffic is expected to grow at 1.6% a year worldwide, while freight volume will expand at 2.5% annually. Even now, the steadily increasing need for mobility in and among urban centers is being acutely felt.

These trends will further intensify in the coming years:
- The number of cars will grow from 700 million worldwide in 2000 to 1.3 billion by 2030.
- Worldwide freight volume will double from 15 trillion tons/kilometers in 2000 to 30 trillion by 2030.
- Air passenger and freight volumes will grow annually at a rate of 5–6%.

These trends and numbers underline the fact that mobility is the biggest challenge when it comes to ensuring sustainable growth for the future.
Mobility that serves everyone – is that possible?
Our answer: “Complete mobility” with efficient mobility and logistics solutions for an integrated traffic system – to move people and goods economically, quickly and safely. With its “Complete mobility” solutions, Siemens has answers to the challenges of growing global population, urbanization, climate change and resource conservation. To ensure mobility in the future, we need closely networked transport and information systems. Whether transport takes place within urban centers or in cities and countries – the multiple challenges can only be mastered only if all transport modes are sensibly coordinated and function smoothly.

To meet these needs, Siemens offers integrated mobility solutions that ensure safe, economical and environmentally compatible passenger and freight transport. Siemens has all the necessary experience and expertise for the job – ranging from operating systems for rail and tram systems, rail electrification systems, rolling stock for mass transit, regional and long-distance rail lines, to airport logistics and postal automation systems.

**Complete mobility. Integrated solutions for efficient people and freight transport.**
How can we meet the growing demand for mobility and protect the environment?
Our answer: With environmentally compatible and sustainable mobility solutions that reduce pollutant emissions and conserve valuable resources. Three key elements play an important role here: integrated transport and logistics solutions that incorporate all transport modes, intelligently network them, and optimize their use; an holistic view of product life cycles, from development and manufacture and subsequent recycling or disposal; and innovative products and systems that set new standards for energy and resource efficiency. Our work in numerous national and international organizations, listing in the Dow Jones Sustainability Index, and the worldwide certification of company labour, health and environmental standards underline Siemens’ deep commitment to climate and environmental protection.

Complete mobility.

Traffic management
The Sitraffic Scala traffic control computer is boosting tram operation in the German city of Halle/Saale. It centrally controls 13 grade-crossing protection systems and two LRT signal control systems. In addition, an innovative sign control facility at P&R car parks provides information about the current traffic situation as well as tram departure times. As a result, car volumes at P&R car parks have increased by 50%; in the event of traffic congestion, a further 15% of the motorists uses public transport. These are synergies between road and rail put into practice!

Metro Oslo
Siemens sets new environmental standards with the Oslo metro. Compared to the previous generation of trains, the new vehicles save around 30% energy. And the Metro trains are still valuable once they’ve reached the end of their service life: Nearly 95% of their materials can be permanently recycled.

Avenio
The innovative 100% low-floor tram sets new standards. The Avenio is distinguished by excellent driving characteristics, minimum wear, maximum passenger convenience and a flexible modular design. Intelligent energy management as well as the integratable Sitras HES hybrid energy storage system ensure environmentally friendly operation, if required without any overhead contact line.

Sitraffic Epos
With its Sitraffic Epos electric recharging point, Siemens wants to make an important contribution to the future use of electric vehicles. This intelligent system forms a complete unit including the recharging point and an information terminal and considerably differs from previous solutions in test and pilot applications. Sitraffic Epos has a modular structure and can be configured as a stand-alone recharging unit or as an entire station with additional satellite terminals.

Traffic signals with LED technology
The units use only 10% of the energy needed by filament lamps. With an average intersection system with 30 signal lights consuming roughly 2 kW, the 100,000 intersections in Germany use a total of nearly 196 MW. If all these lamps were replaced with 40 V LEDs from Siemens, the same intersections would need only 16 MW of electricity.
What can you move with high tech?
Our answer: Trend-setting and future-safe mobility solutions to keep customers fit for mastering tomorrow’s challenges. Over 160 years of experience and a great number of references worldwide speak for our vast technological competence. Backed by its company-wide teamwork in research and development, Siemens taps all key synergies to speedily create market and environmentally tailored innovations. This process leads to new materials and technologies, new automation solutions and new information and communication networks that optimize efficiency and integration. In addition, Siemens uses its “Pictures of the Future” method to analyze and evaluate future trends to prepare the necessary technologies as timely as possible. This ensures we set on track today to create attractive and efficient mobility infrastructure solutions for tomorrow.

Complete mobility.

**Truck tolling system**
Siemens is a technology supplier for the new truck tolling system in the Slovak Republic and supplies the on-board units for vehicles and the electronic detection system. Contrary to conventional solutions, this tolling system detects the vehicles’ position via satellite and transmits this information directly to the control center by mobile radio. Hence, this solution is particularly suitable for extensive road networks beyond highways.

**AGT-Systems**
With automated metro systems, operators can flexibly adapt transport capacities to fluctuating passenger loads. Siemens has already proven the effectiveness of such systems in Nuremberg, Germany, and Paris – and is also demonstrating its capabilities in Beijing, where the Metro Line 10 connects the venues of the 2008 Olympic Games.

**Vectron**
This new locomotive generation can be used in both national and cross-border passenger and cargo services. The different performance classes and voltage systems permit Vectron to be flexibly and adequately configured. The new, intelligent train protection concept ensures its flexibility, today and in future, as Vectron has been pre-configured for use in practically all European countries.

**Efficient train control**
A 449 km line in Saudi Arabia has been equipped by Siemens with modern signaling and communications systems. With Trainguard 100, a train control system in accordance with the ETCS standard is being used for the first time in the Arab world. It ensures safe, reliable and efficient rail operations in these extreme and challenging environmental conditions. State-of-the-art GSM-R mobile radio technology provides for a stable, weather-independent connection between operations management, drivers and maintenance staff.

**Postal Address Redirection System (PARS)**
This intelligent sorting system from Siemens quickly redirects letters from old addresses to new. One of the world’s biggest postal authorities is currently adopting the system nationwide in order to efficiently manage millions of move-related address changes every year.
Getting from Heathrow to a meeting in the City and back – in only 3 hours?
Our answer: Intelligent networking of a city and its surrounding region – based on innovative solutions for road and rail. London, Europe’s biggest city, is a prime example of “Complete mobility”.

In 2001, Siemens won an order to deliver 1,200 Desiro UK trains to provide economical, comfortable and speedy commuter links between the region and central London. Today, the trains are an integral part of the city’s transportation system: They network regional railways with London’s mass transit systems. A direct link between Heathrow Airport and the City is also integrated into the system. Siemens trains provide a fast and comfortable service on the Heathrow Express and Heathrow Connect lines to the busy airport and provide additional mobility without burdening the roads.

Intelligent maintenance concepts ensure a high degree of rail system reliability and availability. Service is firmly integrated into Siemens’ overall concept: In the United Kingdom alone, Siemens has 500 specialists who comprehensively maintain fleets of trains in the company’s and customer-owned service depots.

In February 2008, Transport for London (TfL) began operation of its citywide Low-Emission Zone. Digital cameras provided by Siemens automatically register the number plates of all passing vehicles to ensure effective enforcement of the Zone. TfL has continued to support the use of Siemens technology with the expansion of its inner-city toll-monitoring system in 2007.

The results highlight how successful integrated mobility solutions from Siemens are: Road traffic in London’s City has been reduced by around 20%, which saves around 150,000 metric tons of CO₂ emissions a year. Just eight months after the city toll system was introduced, traffic flow in the City was 37% faster. Commuters now need an average of one-sixth less time to reach their work. And dynamic traffic signs on the motorways around London control traffic flow so precisely that jams have been significantly reduced.

The British capital is a convincing example of how “Complete mobility” from a single source can provide sustainable solutions for complex traffic requirements.

Complete mobility.
Thousands of passengers every day – how can they be kept on the move?
Our answer: By networking the processes in and around the airport – from transport links and traffic controls, to parking management and innovative solutions for the transport of passengers, baggage and air freight. The advantages of “Complete mobility” can also be seen in airports.

Comfortable and reliable airport rail links – whether trams, light-rail rapid transit, regional or high-speed trains, or maglev systems – are a key element for ensuring mobility. Directly check in your baggage at the station and board the train. Your baggage will accompany you automatically. Using an innovative baggage system, your baggage reaches the destination airport in a straightforward manner to be checked out by you. Traveling can be so easy when means of transport interact perfectly. Road traffic is also an essential part of the overall concept, and Siemens’ intelligent traffic and parking management systems bring drivers to their destination more quickly and with less strain on the environment.

Regardless of whether passengers prefer to use roads or trains to get where they are going, Siemens helps ensure punctual, relaxed and safe arrivals.

Larger airports and steadily growing passenger volumes also make transporting passengers within airports a particular challenge. Siemens offers driverless, fully automated people mover solutions offering greater comfort and flexibility.

As passenger and freight volumes grow, so do the challenges of airport logistics. Baggage handling is an especially critical point: In addition to ensuring speedy processing, all security requirements must be complied with. Efficient baggage management systems from Siemens grow with demand and provide greater reliability, security and satisfied customers. For over 30 years, Siemens has also been helping handle increasing air freight volumes with highly efficient IT infrastructures and technologies.

These include flight condition simulation chambers for testing containers for explosives and other dangerous substances. With CapacityPlus, Siemens offers temporary airport terminals to boost capacity within very short periods of time. During the 2010 Soccer World Cup in South Africa, for example, the operator of the Port Elizabeth and Bloemfontein Airports relied on this Siemens solution.

Many airport operators around the world depend on Siemens as an experienced partner offering enormous potential with innovative solutions and services. Our decisive advantage: Siemens’ solutions are not limited to just one or two details, but are part of an overall concept designed to master challenges of the future. Solutions for power supplies, access controls, passenger information systems and building automation complete the company’s comprehensive portfolio.

Complete mobility.
How can traffic flow be optimized in our cities?
**Houston**
The light rail system in Houston sets new American standards for sustainable mobility. The turnkey project included project management, systems integration, planning, delivery, assembly and commissioning for 18 low-floor light rail vehicles based on the S 70 platform, as well as the operating system, electrification, communications system, track construction and ticketing management.

**Zurich**
Siemens’ answer to growing numbers of passengers in the rail network connecting Zurich and the surrounding region: 35 Desiro double-deck trains with increased capacity and running at a considerably shortened frequency provide greater speed and comfort.

**Budapest**
As traffic volumes grow in Hungary’s capital, the traffic control and management system installed by Siemens constantly adapts to the changes. More than 500 intersections are now incorporated into the system.

**Berlin**
In Berlin, a traffic center developed by Siemens forms the basis for efficient mobility management in the city. The intelligent linking and processing of data from thousands of sources is a key part of the system.

**Münster**
With a “Green Wave” cycle, the German city of Münster has improved its traffic flow by 30%. The adaptive Sitraffic Motion network control system analyzes the current traffic situation on a main road so that then the red-green phases of the traffic lights at the 24 intersections on this road can be automatically optimized. Both waiting times and exhaust emissions are thus reduced.

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**Complete mobility.**

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**Our answer:** With integrated mobility solutions that optimally network urban regions and dynamically adapt to changing conditions. Growing inner-city traffic can be managed only with a high performance, integrated system and the seamless coordination of all transport modes. Innovative traffic management systems interface road and rail networks, while information systems provide passengers with the most efficient routes. Fully automated metro systems flexibly adjust to changing passenger loads and dynamic traffic control systems ensure optimal traffic flows. The result: A high degree of mobility that gives competitive cities a sustainable quality of life.

**Our solutions for urban traffic:**
- Tramcars and light rail vehicles, metro vehicles, AGT-Systems
- Express trains and regional trains
- Rail automation systems
- Contact lines and traction power supplies
- Traffic control systems and centers
- Traffic management systems and centers
- Parking systems
- Toll systems
- Tunnel systems
- Components
- Services
- Complete rail solutions
How can a region be seamlessly networked with the rest of the world?
Our answer: Provide regional transport solutions that connect surrounding regions with city centers – as well as speedy, environmentally compatible cross regional solutions that link cities with one another. An efficient, long distance transport infrastructure creates the basis for borderless mobility – and paves the way for the sustainable economic development of regions and countries. The infrastructure includes modern, high performance trains and locomotives, automation and electrification solutions and dynamic systems for compiling data and controlling highway traffic. By integrating coordinated mobility solutions, growing volumes of traffic can be efficiently managed to ensure quicker connections, improved safety, less congestion and greater reliability when travelling.

Complete mobility.

Our solutions for long-distance traffic:

- High-speed trains
- Intercity and regional trains
- Passenger coaches
- Electric and diesel-electric locomotives
- Rail automation systems
- Contact lines and traction power supplies
- Traffic control systems and centers
- Traffic data acquisition systems
- Traffic management systems
- Toll systems
- Tunnel systems
- Components
- Services
- Complete rail solutions

Russia
Siemens has built Russia’s fastest train, the Velaro RUS, called Sapsan, the Russian word for peregrine falcon. With extraordinary features such as its design for temperatures of down to –50 °C, the Velaro RUS has been in reliable operation between Moscow and St. Petersburg since 2009. Traveling at a maximum speed of 250 km/h, it covers the distance of 650 km in only 3.5 hours.

Germany
The new Desiro ML was specially developed as the platform for meeting future needs in light rail, regional and interregional rail transport. Different train configurations, types of drives, and flexible interior fittings can be selected by customers for the Desiro ML according to their particular needs.

Austria
Motorways in Tyrol register 40% fewer accidents and substantially shorter travel times since Siemens installed its intelligent traffic information and management system.

The Netherlands
The turnkey HSL Zuid project proves Siemens’ competence in developing high speed infrastructures. The 100 kilometer line runs from Amsterdam via Rotterdam to the Belgian border and offers an impression of the coming European high speed network.

Germany
Siemens’ advanced traffic management system operating on Munich’s motorways and access roads improve traffic flows and reduce accidents during major events.
How can freight be transported more efficiently worldwide?
Our answer: With intermodal transport and efficient automation solutions, Siemens offers the basis for integrated transport systems – with seamless transport chains for reliably serving cities, regions and countries. An efficiently functioning transport and logistics system provides the basis for economic strength and competitiveness. Interoperable locomotives and efficient cargo management systems ensure the smooth transport of goods, while innovative automation solutions for letter, flats, parcel and baggage, comprehensive security technologies and complete solutions for logistics processes guarantee an efficiently functioning transport network. The result: an optimized modal mix and highly efficient logistics chain that is economical and environmentally compatible, secure and reliable.

Complete mobility.

Freight locomotives
Queensland Rail, one of Australia’s biggest rail operations, depends on powerful, environmentally compatible freight locomotives built by Siemens. To pull its coal trains, weighing over 13,000 tons, only three locomotives are now needed instead of the previous five – resulting in annual savings of 1,050 MWh of electricity.

Cargo systems
With its Vicos CM cargo management system, Siemens offers intelligent disposition and logistics solutions for marshalling in yards, providing the basis for efficient freight transport.

Postal automation
Siemens’ Open Mail Handling System (OMS), the new generation of high performance and efficient flats sorters, can carefully and speedily sort large volumes of mail in all sizes.

Baggage logistics
Optimized comfort for passengers and minimized operating costs: Siemens baggage logistics offer reliable solutions and fully integrated recognition systems to meet all airport requirements.

Cargo logistics
Innovative cargo logistics are distinguished by their efficiency and strong performance. Siemens combines these features in a comprehensive spectrum of products and services. With its hardware and software solutions for ULD and palette transfers, transport, loading and unloading, and security Siemens provides the basis for efficient and cost-effective cargo handling.

Our solutions for logistics and freight transport:
• Postal and courier, express and parcel automation
• Automated address reading systems for postal and courier, express and parcel applications
• Logistics software for postal and courier, express and parcel applications
• Letter, flats and parcel sorting systems
• Parcel and tray sorting and conveying systems
• Postal forwarding systems
• Baggage handling systems
• Cargo handling systems
• Security systems
• Electric and diesel-electric locomotives
• Rail cargo management
• Components
• Services
The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.