



SIEMENS



UITP 2015 Milan – Siemens AG Press Conference – Dr. Jochen Eickholt – CEO Mobility Division

Automation and digitalization: For greater efficiency in mobility

Siemens at a glance



Division Structure

| | | | | | | | | | |
|---------------|---------------------------|---------------------------|-------------------|-----------------------|----------|-----------------|-------------------------------|---------------------------------|--------------------|
| Power and Gas | Wind Power and Renewables | Power Generation Services | Energy Management | Building Technologies | Mobility | Digital Factory | Process Industries and Drives | Healthcare (separately managed) | Financial Services |
|---------------|---------------------------|---------------------------|-------------------|-----------------------|----------|-----------------|-------------------------------|---------------------------------|--------------------|

Portfolio examples

| | | | | | | | | |
|--|---------------------------------|--|---|--|--|--|---|---|
| | | | | | | | | |
| Gas turbines, generators, compressors, instrumentation & control, electrical engineering | On/offshore wind turbine plants | Service for gas, steam and wind turbines | Power transmission and distribution, energy automation, smart grids | Fire protection, security, building automation, heating and air conditioning systems | High-speed, regional and urban trains, rail infrastructure, traffic management systems | Security, communication and software solutions for industry, service | Process automation, drives and software solutions | Technologies for imaging, lab diagnostics, IT solutions |
| 1) FY 2014 | 2) At September 30, 2014 | | | | | | | |

Mobility Division

Greater efficiency thanks to intelligent products and solutions

Mobility Division

FY 2014: Orders €9.3 billion – Revenue €7.2 billion – Profit margin: 7.3% – Employees: ca. 26,000

Business Units

Mobility Management



Products, solutions and turnkey systems for rail and road automation and optimization

Mainline Transport



Short-distance, regional and long-distance rolling stock, and product and system solutions for passenger and freight transport

Urban Transport



Rail-bound urban public transport vehicles, eBuses and passenger coaches

Turnkey Projects & Electrification



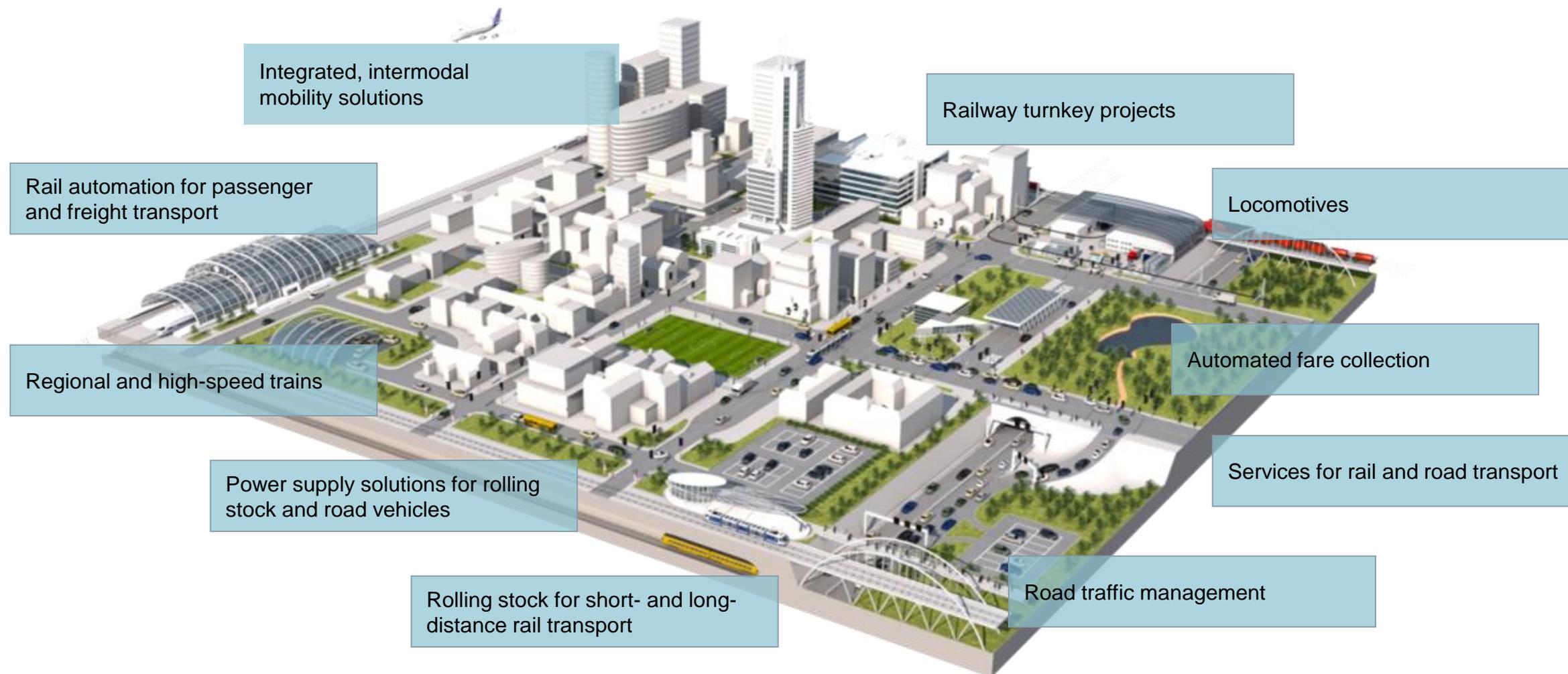
Complete rail and road solutions and rail electrification solutions

Customer Services



Services and tools for servicing road and rail infrastructure and rolling stock

Mobility portfolio – an overview



Mobility Division – A global footprint

Main locations



Order highlights in fiscal year 2014 and 2015 ...

Rhine-Ruhr Express

82 Desiro HC commuter trains incl. 32 years service for one of Europe's biggest conurbations



San Francisco Light Rail

175 cars – one of the biggest orders for light rail cars ever placed in the USA



Eurostar

Orders seven additional Velaro e320 16-car trainsets – option exercised



Amtrak

Orders Sitras SFC plus static frequency converters, two 30-megawatt units for the New Jersey High Speed Rail Improvement Program



Customer Service Thailand

Successful extension of the full service contract for Bangkok's metro system



Rheinbahn AG

Modernization of light railway signaling and operating systems for Düsseldorf light rail



UK – South West Trains

Order for 30 five-car trainsets for the Desiro City concept



Paris Line 14

Signaling and operating systems for the 4-station extension of the driverless metro line



... and examples of successful project milestones

Velaro D

407 Series receives authorization in France in March 2015



Velaro Turkey

First train finished authorization process, passenger service in spring 2015



Finland: broad gauge Vectron

VR Group, advance Vectron arrives in Helsinki for tests, begin of series production



ÖBB cityjet

First trip in ÖBB network in March 2015, first train presented in Krefeld in November 2014



USA: Amtrak Cities Sprinter

Passenger service begins, and first long-term service contract won



Istanbul, Turkey

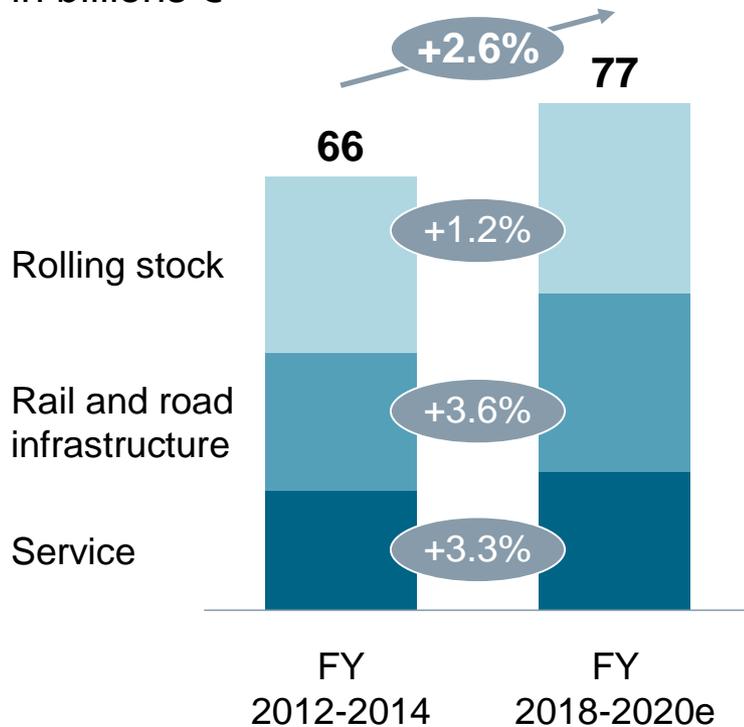
Marmaray Tunnel inaugurated, Siemens signaling system connects Europe and Asia



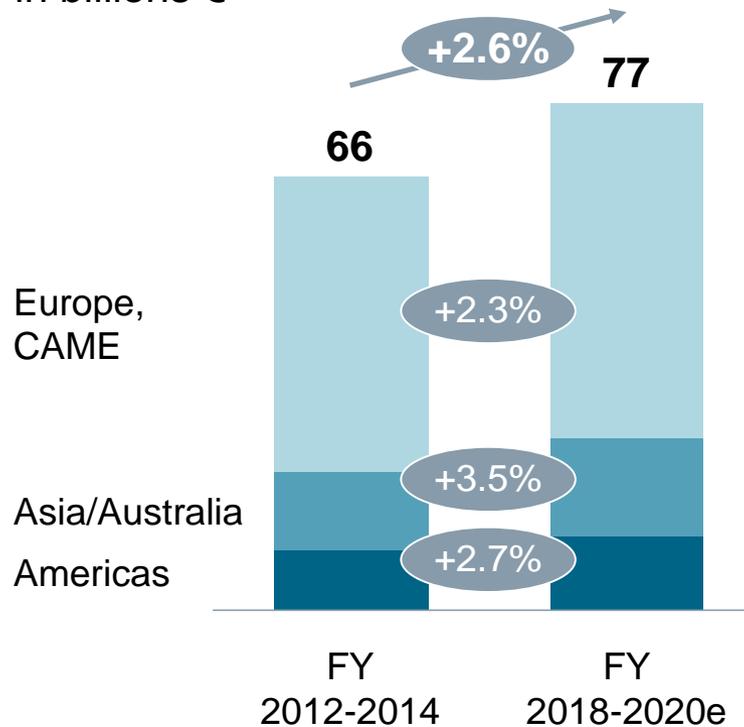
Mobility market will remain very attractive over medium term

Mobility – accessible market¹⁾

Market by business
in billions €



Market by region
in billions €



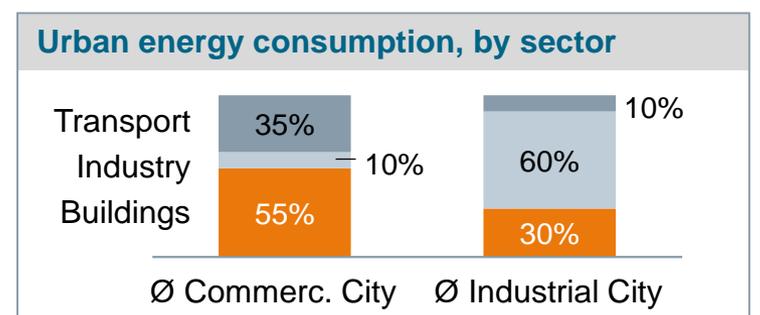
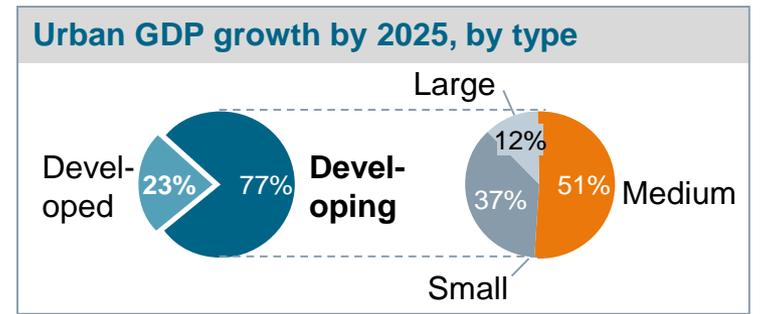
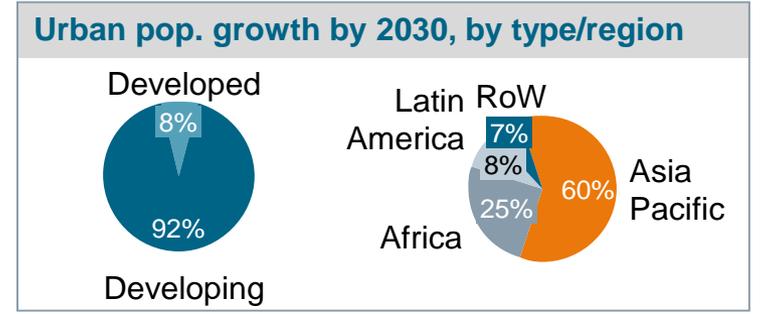
- Mobility accessible market remains very attractive
- **CAGR** still nearly **3%** despite exceptionally high market volume in 2014 (South Africa, Middle East)

1) MO accessible market based on UNIFE World Rail Market Study 2014, adjusted to MO portfolio; CAME = CIS, Africa, Middle East

Social trends in the urban age



| | | |
|----------------------------------|--|---|
| Population | 2010 ~50% of the world's population lives in cities | By 2030 Urban population will grow from 3.5 billion to ~4.7 billion, mainly in developing countries |
| Economy | 2010 ~50% of global GDP is produced in 600 cities; Top 100 cities generate 38% of the global total | By 2025 77% of global GDP growth will be generated by middleweight cities in emerging markets |
| Energy and CO₂ | Cities account for two-thirds of the world's energy consumption and up to 70% of its CO ₂ emissions | Energy consumption pattern is dependent on city and industry structure |

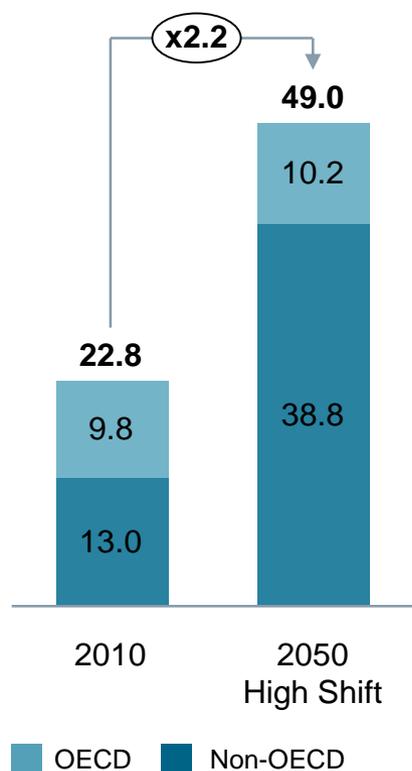


Sources: UN DESA 2014: World Urbanization Prospects; McKinsey 2011: Urban World
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Solid growth perspectives in public transport

Demand growth in urban mobility

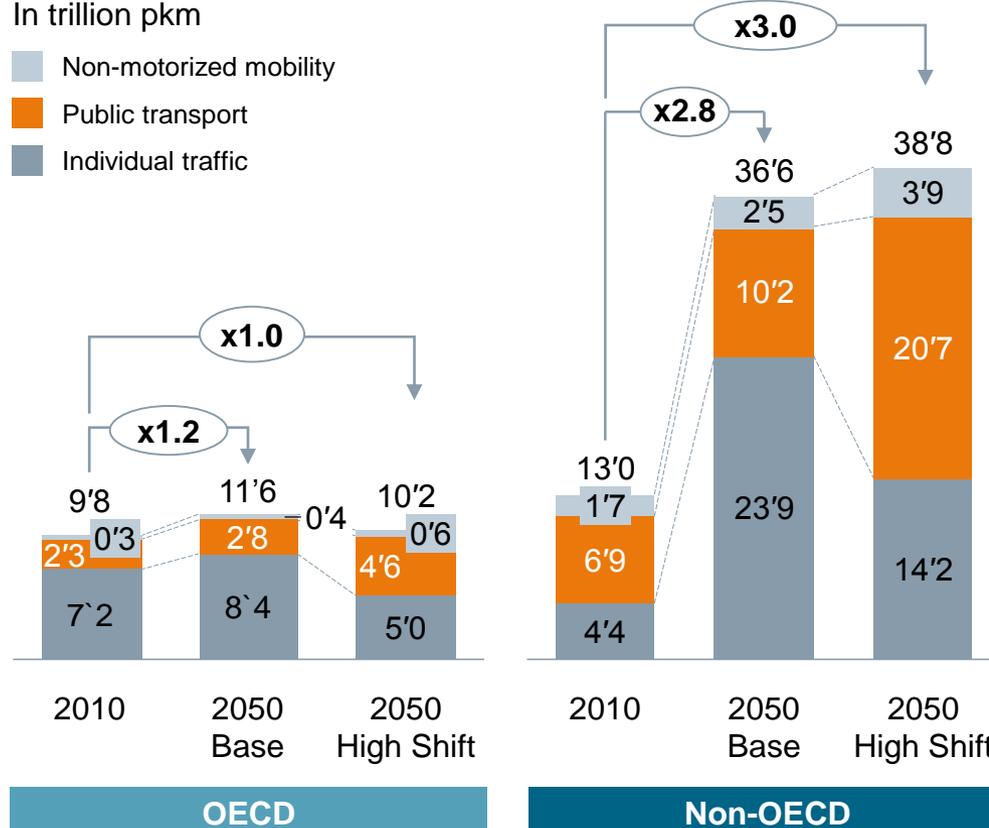
In trillion pkm



Demand growth in urban mobility, by mode of transport

In trillion pkm

■ Non-motorized mobility
■ Public transport
■ Individual traffic



Key trends

- **Significant overall demand growth** until 2050 (x2,2), mainly Non-OECD driven
- **Highest growth rates:** India (x3.7), Africa (x3.3), China (x2.8)
- **Base Scenario:** Trend extrapolation
 - Strong growth of individual traffic (x2.7) and only modest growth (x1.4) of public transport
 - High risk of gridlock: Congestion, energy/emissions
- **High Shift Scenario:** Penetration of best-practices and policy shift
 - Disproportional increase of public transport (x2.7), in both OECD and Non-OECD cities
 - Non-linear development, upsurge from 2020 onwards

Sources: ITDP/UC Davies 2014: A global high shift scenario; UITP/ADL 2014: Future of Urban Mobility, expecting even higher growth (x2.6) over the same period

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Global trends are driving profitable growth

Global trends

Digital transformation

Networked world of complex and heterogeneous systems

Globalization

Global competition driving productivity & localization

Urbanization

Infrastructure investment needs of urban agglomerations

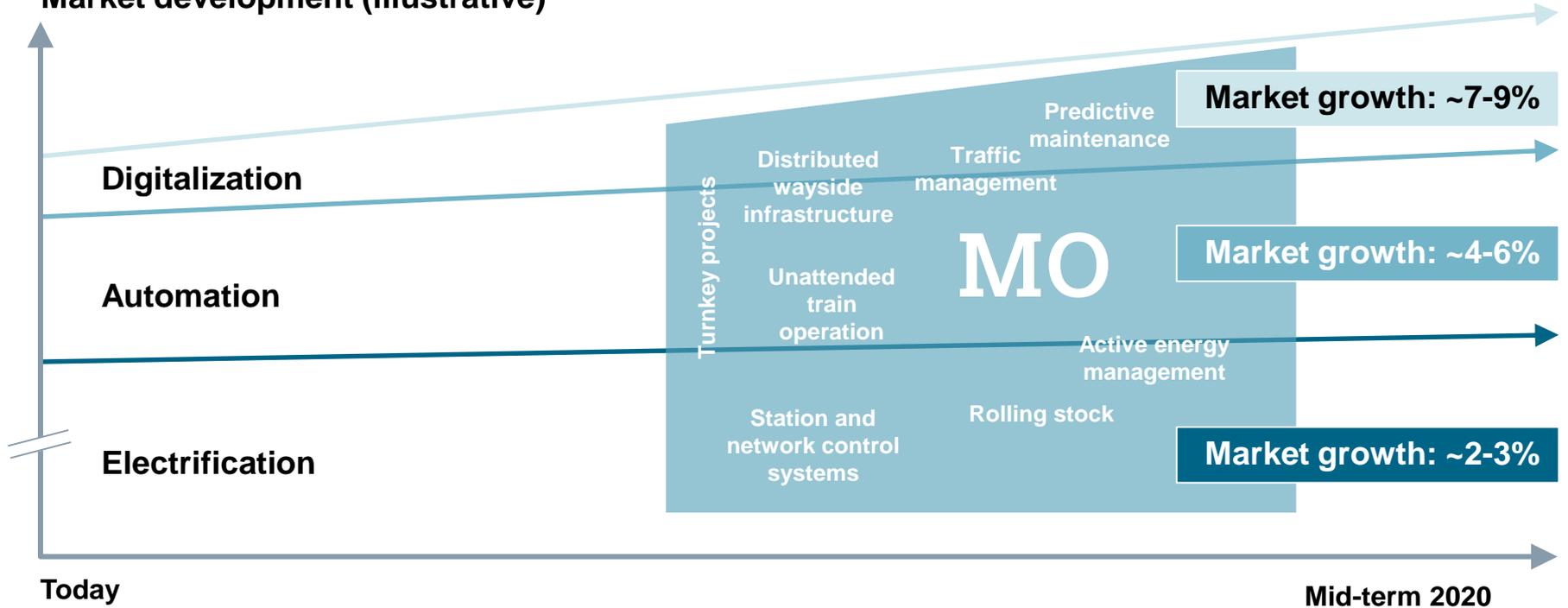
Demographic change

Decentralized demand of a growing and aging population

Climate change

Higher resource efficiency in an all-electric world

Market development (illustrative)



Digitalization drives the Mobility business

Availability ...



- Smart data analytics for infrastructure and vehicle service
- Combine high vehicle/infrastructure performance with best-in-class service and maintenance

Guaranteed availability

Throughput ...



- Integrated resource management
- Software for next-generation train control (ETCS Lx and CBTC)
- Next-generation digitally enhanced interlockings

Best asset utilization

Passenger experience ...



- Passenger information and assistance systems
- Broadband and entertainment services
- Automated fare collection "be-in / be-out"

Enhanced passenger experience

Digitalization

More intermodality, energy efficiency and passenger comfort

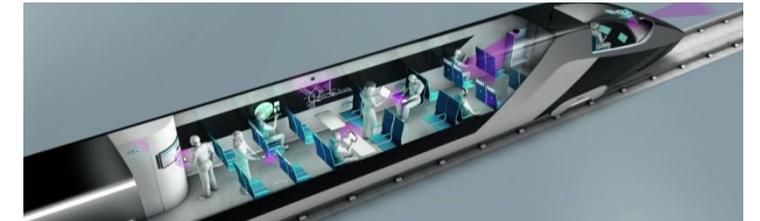
Availability ...



Throughput ...



Passenger experience ...



Predictive maintenance

CS

Availability guarantee for equipment

CS

Optimized spares bundling

CS

Rail & Road

Extended OCS

MM

Integrated resource mgmt. and Intelligent asset mgmt.

MM

Always connected

e.g. Intelligent CCTV, passenger and conductor assistance

MLT+UT

Train driver advisory system/autonomous driving

Cross

Rail

Automated fare collection (BiBo)/eTicketing

MM

Integrated Mobility Platform (IMP)

MM

Car2X communication

Infrastructure for autonomous driving (road)

MM

Advanced parking management

MO TI

Active energy management

TPE

Traffic management SaaS

MM

Road

Intermodal

New era in urban and regional transport

Desiro City for maximum throughput on the Thameslink line through London



- Delivery of 115 newly developed Desiro City regional trains (1,140 cars)
- Maximum throughput (trains per hour) increased 25% through automatic driving²⁾
- Improved energy efficiency – through lightweight construction and intelligent systems (25% weight reduction¹⁾)
- Trainguard Automatic Train Operation (ATO) for ERTMS Level 2
- Desiro City Thameslink rolling stock will be operated as 8- and 12-car trainsets in dual mode
- Long-term maintenance by Siemens in two new depots
- "Always connected" – innovative passenger information system

1) Compared to predecessor models
2) ATO GoA2: Automated Train Operation – Grade of Automation 2 (driver in cab)

Trainguard MT train operation system for mass transit

High throughput thanks to short headways



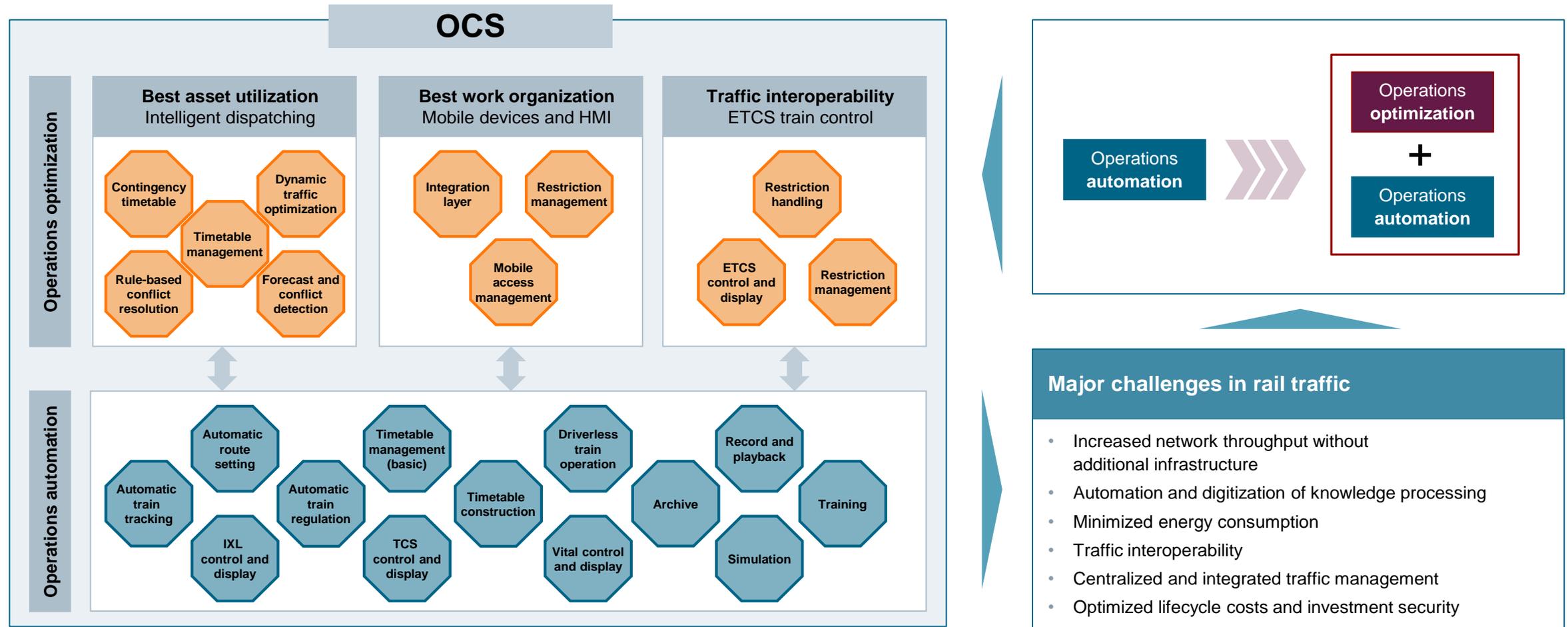
- Trainguard MT is the most widely used radio-based CBTC train operation system in the world
- Optimum use of track infrastructure by moving block operation with short headways (< 80 seconds)
- Scalable for all degrees of automation (semi-automatic and fully automatic driverless operation)
- Energy-saving operation through intelligent ATO control (coasting & cruising principle) and optimized timetable management
- Prepared for mixed-mode operation with ERTMS/ETCS
- Very low maintenance costs as a result of reduction or elimination of outdoor equipment (track vacancy detection, signals)
- Project references: Beijing Line 10, Copenhagen, Istanbul, Hong Kong, São Paulo, New York, Barcelona, Paris

Controlguide OCS integrates operations and dispatching

Efficient decision-making through seamless data integration



Controlguide OCS: Increased throughput thanks to digitalized workflow and optimized infrastructure performance



Data integration from device control to traffic management level for optimized infrastructure throughput

Rail Electrification: Energy efficiency and stable grids for the smart grid age

Smart Sitras portfolio for the smart grid age

- Integration of regenerative energy sources
- Recuperation of braking energy
- Recovery: bi-directional transfer of active power
- Power quality for both grids together

Task

Product

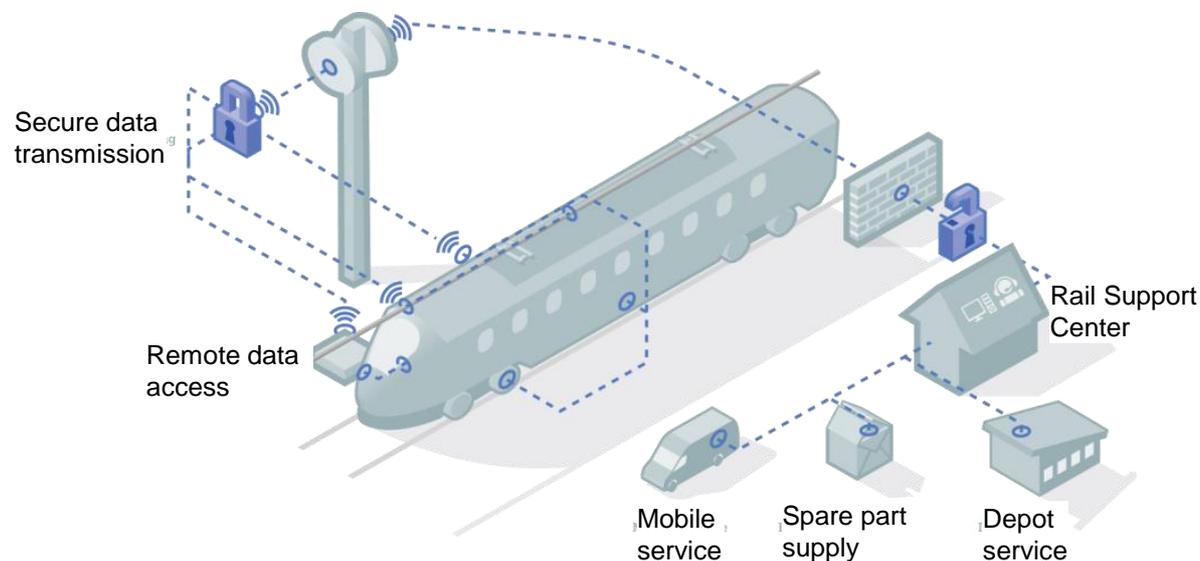
Features

| | |
|------------------------|------------------------------------|
| Frequency conversion | Sitras SFC plus |
| Static Var Compensator | Sitras SFC plus Sitras RVC plus |
| Active balancing | Sitras RAB plus |
| Energy exchange | Sitras SFC plus |
| Energy storage | Sitras SES Sitras MES HES |
| Energy recovery | Sitras TCI |

- Both grids stabilized
- Increased power quality
- Less energy consumption for reduced lifecycle costs
- Reduced CO₂ emissions
- Operation without overhead contact line in mass transit systems



Service: ensure reliability rates of over 99 percent is our aim Further increase through digitalization of maintenance



Vehicle and infrastructure diagnostics

- Data collection (sensors, monitoring devices, cameras)
- Selecting/ prioritizing data
- Remote data access by means of Siemens' own common Remote Service Platform (cRSP)

Centralized diagnostics system

- Basis for analysis and fault prognosis
- Diagnostics server houses databases with collected data

Fault recognition

- Processing of diagnostic data in the Rail Support Center
- Once analyzed, data is included in work instructions for maintenance

Rail Support Center

- Draws up work instructions for maintenance
- Deploys mobile technicians if required
- Manages logistics for the required spare parts
- Ensures feedback of field experience into the service process
- Transfers pattern analyses to other projects

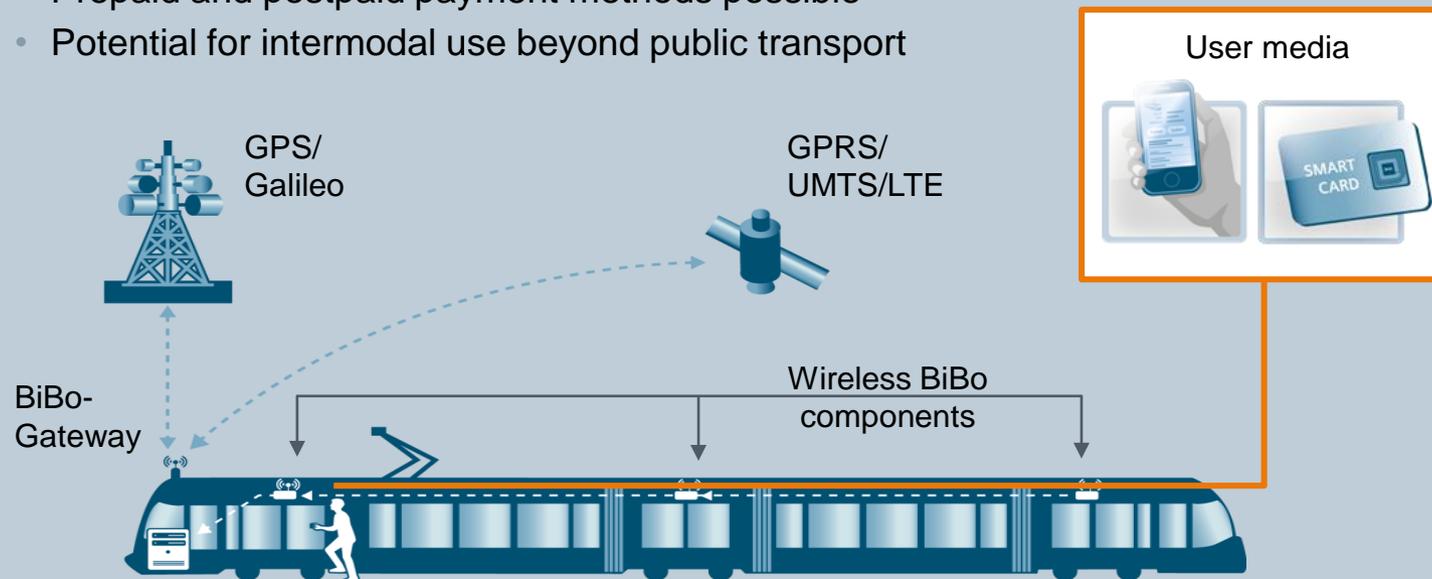


eTicketing – Intermodality all the way to the end customer

For attractive public transport with seamless mobility access

Basic technical set-up:

- Based on RFID, Bluetooth LE or Wi-Fi technology in smartphone or smartcard
- eTicket automatically detected when passenger is inside a vehicle
- Charging based on the route traveled
- Prepaid and postpaid payment methods possible
- Potential for intermodal use beyond public transport



- Modular eTicketing system for seamless mobility access in cities – attractive and efficient for user and operator
- Development of innovative be-in/be-out solutions (based on cards and mobile phones) supplements established check-in/check-out solutions
- Together with Integrated Mobility Platform (IMP) complete offering for door-to-door trips: "IMP" integrated into public transport systems with, for example, barcodes also suitable for check-in/check-out

The heart of future-oriented individual mobility

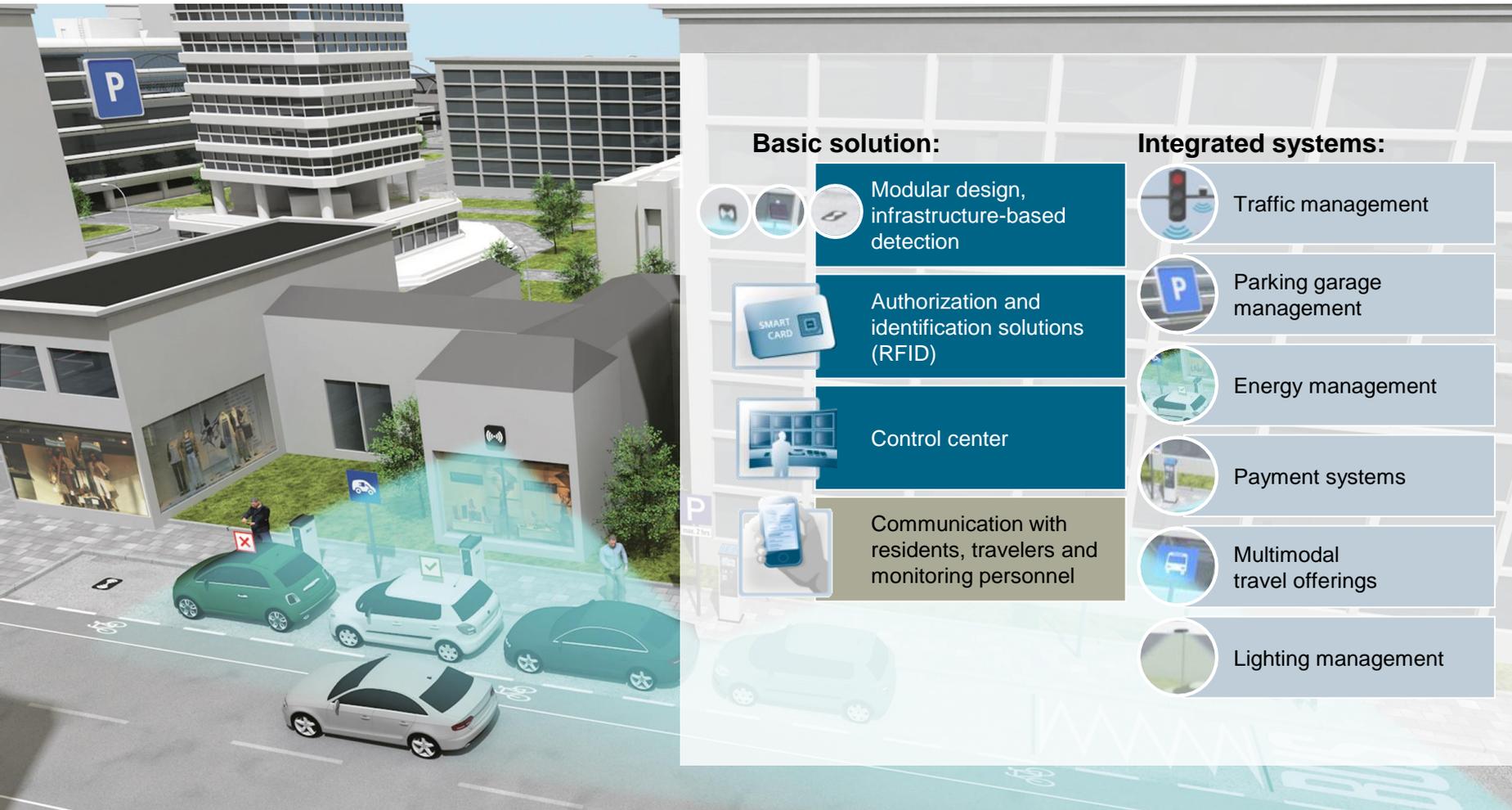
Intermodal traffic information centers



- Berlin: Europe's most modern traffic control and information center
- Controls more than 2,000 traffic lights, 1,150 detectors, 250 cameras and eight traffic management systems
- Total length of the network of roads, tunnels and motorways covered: 1,600 kilometers
- Current traffic data available with FCD via TomTom
- Traffic information is provided to the public, media and authorities via the Internet, e-mail and SMS services

Saves time and CO₂

Holistic parking management system simplifies search for parking spots



➤ Reduces traffic and emissions

➤ Optimizes use of infrastructure

➤ Increases traffic safety

➤ Efficient management

Digitalization driving customer benefit

Metro Riyadh – Exemplifies opportunities for integration of all performance levers

Metro Riyadh



- **World's largest urban transport project** with 7 metro lines, total length of 175 km
- **Siemens' contribution:**
 - Turnkey systems for Lines 1 & 2: metro trains, electrification, signaling/communication, interlockings
 - 63 km, >15,000 passengers/hour, shortest headway of 90 sec.

Digital enhancements of electrification and automation components



- Driverless metro trains
- Sensors, IP comms, advanced automation
- 50% more capacity, 15% energy savings

Optimized throughput

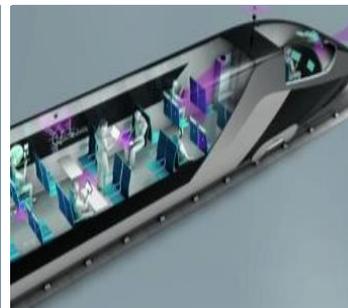
Digital services



- Smart data analytics for infrastructure and vehicle service
- Predictive maintenance
- Performance-based contracts

Guaranteed availability

Vertical software/IT solutions



- Passenger information and assistance systems
- Broadband and entertainment services
- Automated fare collection "Be-in/Be-out"

Enhanced passenger experience

Within ~1,6 bln. order

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Hall 4 – Booth 4F 150
June 8-10, 2015