Smart City - Infrastructures

Vasilis Kastanis
A state-of-the-art Smart City in 2020

- Power coming from renewable sources
- Decentralized energy generation and storage
- Grid talks to buildings
- IT connects the parts
- Urban and interurban mobility connects people and places
- Intermodal transportation solutions for everybody
- Intelligent buildings with zero emissions
Energy Management

A constant reliable energy supply is central for economic growth and stability, as well as social wellbeing. However today’s grids were not designed to handle the growing power requirements or the increasing proportion of fluctuating power generated from renewable sources.
Significant changes in energy systems
The new age of electricity

... to decentralized energy systems and bidirectional energy balancing

End-to-end Management

Balancing of generation & consumption
Load management & peak avoidance
Resilience automatic outage prevention & restoration
CO₂ avoidance & cost curtailment
Avoidance of non technical losses
Cost optimization and improved supply security
Smart Building in Smart Grids

Buildings not only offer space for working and living, they are also capital investments. Their value can be maintained only if they are operated cost-effectively.
Smart Buildings within a Smart Grid
Intelligently linked buildings are key for a City

Smart energy consumption
Building reacts on price signals from the grid and shifts or reduces energy consumption during high tariff periods

Smart Storage
Building stores energy in electrical and thermal storage devices during off-peak times to save costs and help to balance the grid

Smart on-site generation
Building generates power for own usage and can even act as electricity provider to the grid

EU: all new constructions must be zero net energy in member states by 2018
CA, USA: New residential / commercial buildings will be zero net energy by 2020
With smart grid from smart buildings to smart cities

Smart buildings communicate and integrate with the smart grid

Together with the smart grid, smart buildings form the basis for a smart city
Mobility

Transportation of people and goods is a top priority for metropolitan areas. Population growth, congestion and the growing demand for mobility all place increasing burdens on transport systems with negative impacts for businesses, residents and overall quality of life.
The powerhouse for intelligent infrastructure

Rolling stock & Road and Rail

Traffic control center

Traffic lights

Drive assistance systems

Remote services

Rail automation

On board unit (OBU)

Tolling

Trams

Propulsion

Crossing

Signals

Train automation

Highspeed trains

E-ticketing

Selected portfolio elements incl. field devices
### Smart Mobility

“The Future of integrated, multi-modal Transport”

<table>
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<tr>
<th>Requirement</th>
<th>Smart Mobility Solutions (Examples)</th>
<th>Benefits</th>
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<tr>
<td><strong>Citizens / Visitors</strong></td>
<td>Easy „end-to-end“ travel with individualized info</td>
<td>Convenient and seamless multi-modal travel</td>
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<tr>
<td><strong>Business</strong></td>
<td>Smart Payment, Less congestion, Easy parking</td>
<td>Value added services for citizens / visitors (attractiveness of city)</td>
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<td><strong>Environment</strong></td>
<td>CO2 friendly transport and traffic</td>
<td>Easy collaboration and real-time information across different modes of transport</td>
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<tr>
<td><strong>Administration</strong></td>
<td>Integrated traffic and transport control</td>
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**Smart Mobility Solutions (Examples):**

- **Smart IT for Urban Traffic Car 2 X**
- **Integrated Mobility Platform Traffic Control Center**
- **Advanced Parking Management**
A powerful cloud-based open IoT operating system for cities

MindSphere
More open ecosystem

OEM
Achieving predictive maintenance, lower warranty costs, value-added services, shorter innovation lifecycle and new business models

End customer
Improving OEE (overall equipment effectiveness), energy efficiency, productivity and production quality, and optimizing enterprise assets

Application developer
Analyzing customer pain points with industrial knowledge and specific know-how, as well as designing architecture, deploying applications and providing maintenance and services

Developing Apps

Consulting company
Architecture design

System integrator
Integrating different data systems throughout the value chain to increase data variety, including MES and ERP

Value Transmission

Go-to-market partner
Building new cloud-based business models with Siemens to achieve open cooperation and win-win prospects

Connectivity developer
Developing gateways through open standard Connectivity APIs to connect with third-party equipment and achieve a broad spectrum of equipment connection and data collection

Data Transmission

Deployment and maintenance

Development and maintenance

Applications development

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