Shaping Digitalization.
Innovation at Siemens

Innovation Day USA 2017 | Princeton, March 27, 2017
Dr. Roland Busch, Chief Technology Officer and Member of the Managing Board of Siemens AG

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Notes and forward-looking statements

This document contains statements related to our future business and financial performance and future events or developments involving Siemens that may constitute forward-looking statements. These statements may be identified by words such as “expect,” “look forward to,” “anticipate” “intend,” “plan,” “believe,” “seek,” “estimate,” “will,” “project” or words of similar meaning. We may also make forward-looking statements in other reports, in presentations, in material delivered to shareholders and in press releases. In addition, our representatives may from time to time make oral forward-looking statements. Such statements are based on the current expectations and certain assumptions of Siemens’ management, of which many are beyond Siemens’ control. These are subject to a number of risks, uncertainties and factors, including, but not limited to those described in disclosures, in particular in the chapter Risks in the Annual Report. Should one or more of these risks or uncertainties materialize, or should underlying expectations not occur or assumptions prove incorrect, actual results, performance or achievements of Siemens may (negatively or positively) vary materially from those described explicitly or implicitly in the relevant forward-looking statement. Siemens neither intends, nor assumes any obligation, to update or revise these forward-looking statements in light of developments which differ from those anticipated.

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Due to rounding, numbers presented throughout this and other documents may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures.
Vision 2020 is our strategy

Global trends
- Digitalization
- Globalization
- Urbanization
- Demographic change
- Climate change

Market development (illustrative only)

- Digitalization: +3 – 4% Market growth
- Automation: +1 – 2% Market growth
- Electrification

2017

2020

- Power generation
- Power transmission, power distribution and smart grids
- Efficient use of energy
- Efficient healthcare delivery

Efficient healthcare delivery
We’re increasing R&D spending

Research and development spending in billions of $ and as a % of revenue

<table>
<thead>
<tr>
<th></th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017e</th>
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</thead>
<tbody>
<tr>
<td>Amount</td>
<td>4.3</td>
<td>4.8</td>
<td>5.0</td>
<td>~5.4</td>
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<tr>
<td>%</td>
<td>5.6%</td>
<td>5.9%</td>
<td>5.9%</td>
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</tbody>
</table>
next47 fosters disruptive ideas and drives innovation

Strategic focus

- Funding volume: $1bn in funds over 5 years
- Focus on investments in start-ups
- Strategy: Capital, Create, Catalyst

next47 Innovation fields

- Distributed electrification
- Autonomous machines
- Connected (e-)mobility
- Artificial intelligence
- Block chain applications
- eAircraft
Digitalization provides growth momentum

**Revenue FY 2016**

- Siemens Software: ~$3.5bn
- Siemens Digital Services: ~$1.1bn
- MindSphere – IoT operating system
- Enhanced Automation: ~$19bn
- Enhanced Electrification: ~$45bn
- Classic Services: ~$18bn

**Customer value**

- Time-to-market
- Efficiency
- Flexibility
- Productivity
- Energy and resource optimization
- Extendibility (open standards)

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1 Comparable; portfolio adjusted
Our offering separates us clearly from our competitors

- Deep domain-knowledge in a broad range of markets and industries
- Strong installed base/connected fleet
- Powerful eco-system
- Unmatched digital portfolio: MindSphere, software, services, security
- Numerous Siemens-internal use cases as proof points
Holistic approach to meet customer needs

Design & Engineering  Automation & Operation  Maintenance & Utilization

Siemens Software  Siemens Digital Services

MindSphere  The cloud-based, open IoT operating system  Platform as a Service

Enabler: Infrastructure as a Service (storage, processing power, provider agnostic)

Digitally enhanced Electrification and Automation

Holistic IT security concept

- Connectivity
- Open interfaces
- Data analytics
- Artificial intelligence
- Customer-specific apps by Siemens or third-party suppliers
- Cost transparency
Open partner eco-system

Consulting/strategy partners
- McKinsey & Company
- PwC
- Accenture
- Tata

Technology Provider
- IBM Watson
- Amazon Web Services
- SAP
- Microsoft Azure
- Accenture

Application Developer
- SAP
- Accenture
- PwC
- Senseye
- Atos

IaaS Provider
- Amazon Web Services
- SAP
- Microsoft Azure
- Atos

System Integrator
- Accenture
- Atos
- Omnetric

Connectivity Developer
- BluVision
- Tata

MindSphere
The cloud-based, open IoT operating system
**Holistic approach to meet customer needs**

<table>
<thead>
<tr>
<th>Design &amp; Engineering</th>
<th>Automation &amp; Operation</th>
<th>Maintenance &amp; Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Siemens Software</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unmatched Software Suite</td>
<td>$3.5bn</td>
<td></td>
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<tr>
<td>~70m contracted meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Siemens Digital Services</strong></td>
<td></td>
<td>800k connections, $3.2bn order backlog at Power</td>
</tr>
<tr>
<td>$1.1bn</td>
<td></td>
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</tbody>
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**MindSphere**

The cloud-based, open IoT operating system

Platform as a Service

**Enabler:** Infrastructure as a Service (storage, processing power, provider agnostic)

**Digitally enhanced Electrification and Automation**

#1 position in automation, ~30mn automation systems

**Holistic IT security concept**

Unmatched Software Suite

~70m contracted meters

$3.5bn

800k connections, $3.2bn order backlog at Power

$1.1bn

~30mn automation systems

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Dr. Roland Busch, CTO Siemens AG

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Holistic approach to meet customer needs

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**Digitally enhanced Electrification and Automation**

**Holistic IT security concept**

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Design & Engineering
- Siemens Software
  - EnergyIP
  - Design & Simulation
    - NX, LMS, CD-adapco
    - Comos, Tecnomatix
- ...  

Automation & Operation
- Siemens Digital Services
  - Navigator
  - Railigent
  - FlexLTP
  - Teamplay
  - ...  

Maintenance & Utilization

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Challenge
Community-owned electric and water utility in Jacksonville, FL, to upgrade its infrastructure towards advanced metering

Solution
EnergyIP: collects, consolidates and validates meter data and outage events, passes data on to automate workflows

Outcome
Utility can remotely connect-disconnect customers at any time; improved reliability, maintenance savings of >$1.5m in 1.5 years
Holistic approach to meet customer needs

Design & Engineering

- Siemens Software
  - EnergyIP

Automation & Operation

- Siemens Digital Services
  - Navigator
  - Railigent
  - FlexLTP

Maintenance & Utilization

- Teamplay

MindSphere

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Digitally enhanced Electrification and Automation

Holistic IT security concept
Optimize building performance

**Challenge**
Residential and commercial buildings are to account for 40% of total U.S. energy consumption

**Solution**
**Navigator**: Bank company Capital One monitors >20 office buildings to improve energy efficiency

**Outcome**
10% energy savings, based on 14m data records per week
Amtrak locomotives

Challenge
Amtrak aims for maximum availability of 70 Vectron locomotives for their North East Corridor High Speed Passenger Service

Solution
Railigent: Maintenance optimization, smart monitoring and obsolescence management

Outcome
Target is to guarantee >99% availability and reliability of rolling stock
Machine learning – NO$_x$ emission reduction

**Challenge**
- Conventional NO$_x$ emission reduction approaches reaching limits
- Tightening environmental regulations

**Solution**
Machine learning algorithms for optimization of control parameters

**Outcome**
- 15-20% additional NO$_x$ reduction
- Providing more sustainable balancing power
Customer value
- Time-to-market
- Efficiency
- Flexibility
- Productivity

next47
Divisions
Ecosystem
Go-to-market
Technology
Customer access
Corporate
Regions
New York 2016

8.6 m Inhabitants

$570 bn GDP ($66,000 per capita)

Extreme weather conditions increase pressure on resilience of infrastructure

ConEd grid automation
Grid stabilization <0.5 sec

Hudson 660MW HVDC
~10% of peak load served

Microgrid for Co-op City
Reliable energy supply for > 60,000 people
New York 2030

9.5 m Inhabitants → +10%¹

70% Of energy supply still conventional

60% Fewer CO₂ emissions¹
New York 2030

eCar charging
20% of all cars are eCars and balance grid peak loads

Energy trading/Blockchain
PV on all roofs supply 25% of the city’s energy demand

Demand management
CHP in every public building lowers energy consumption by 30%\(^1\)
Unique digital offering to meet a city’s needs

Siemens Software and Digital Services

- EnergyIP
- Fault Detection
- Demand Management
- Energy Trading/Blockchain
- Leak Detection
- eCar Charging
- Railigent
- Storage
- Car Sharing
- Intermodal Traffic Management
- Fleet Management
- Traffic Management

MindSphere

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Platform as a Service

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Electrical field devices of a city

Holistic IT security concept