Innovation @ Siemens

Siemens: a company of innovations

The global framework for innovation
Our approach to cooperation
Funding
Open Innovation & Technology Scouting
Siemens is organized in 4 Sectors: Industry, Energy, Healthcare and Infrastructure & Cities

Siemens: Facts and Figures

### Siemens sectors

<table>
<thead>
<tr>
<th>Industry</th>
<th>Energy</th>
<th>Healthcare</th>
<th>Infrastructure &amp; Cities</th>
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<tbody>
<tr>
<td>Divisions:</td>
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<tr>
<td>• Industry</td>
<td>• Power Generation</td>
<td>• Imaging &amp;</td>
<td>• Rail Systems</td>
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<tr>
<td>Automation</td>
<td>Generation</td>
<td>Therapy Systems</td>
<td>Mobility &amp; Logistics</td>
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<td>• Drive</td>
<td>• Wind Power</td>
<td>• Clinical Products</td>
<td>Low and Medium Voltage</td>
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<td>Technologies</td>
<td>• Energy Service</td>
<td>• Diagnostics</td>
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<tr>
<td>• Customer</td>
<td>• Power</td>
<td>• Customer</td>
<td>Smart Grid</td>
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<tr>
<td>Services</td>
<td>Transmission</td>
<td>Solutions</td>
<td>Building</td>
</tr>
</tbody>
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1) Sales in FY 2013

- **Industry**: ~€ 19 bn.¹
- **Energy**: ~€ 27 bn.¹
- **Healthcare**: ~€ 14 bn.¹
- **Infrastructure & Cities**: ~€ 18 bn.¹

### Key figures FY 2013

- **Sales**: ~€ 76 bn.
- **Locations**: In 190 countries
- **Employees**: ~362,000
- **R&D expenses**: ~€ 4.3 bn.
- **R&D engineers**: ~29,800
- **Inventions**: ~8,400
- **Active patents**: ~60,000

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¹) Sales in FY 2013

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Efficient wind power generation – world's longest rotor blade

- World record length of 75 meters
- Special design delivers superior performance at a wide range of speeds
- Maximum strength at minimum weight – reduces costs for nacelles, towers, and foundations
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Technology leadership ➔ market leadership ➔ profit

Interrelations of technology leadership, market leadership and profit

**Technology leadership**

*... finances ...*

**Profit**

<table>
<thead>
<tr>
<th>Margin and margin band</th>
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<tbody>
<tr>
<td>Energy</td>
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<tr>
<td>Healthcare</td>
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<tr>
<td>Industry</td>
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<tr>
<td>Infrastructure</td>
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<tr>
<td>and Cities</td>
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- Siemens margin
- Margin band

**Market leadership**

*... is the basis for ...*

*... drives scale effects and ...*

Source: CT, C top*

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Bright people are the most important ingredient for success

R&D key data

**Employees**
- 29,800 employees in R&D worldwide
- About 17,500 software engineers
- Roughly 190 R&D locations in 30 countries

**R&D spending**
- In % of revenue
- 4.3 bn. EUR
- 5.3% 2011
- 5.4% 2012
- 5.7% 2013

**Inventions**
- About 8,400 inventions in FY 2013
- Roughly 38 inventions per working day

**Patents**
- Over 60,000 granted patents

**Patent rankings**
- Germany: No. 3
- Europe: No. 2
- USA: No. 11
Pioneer 1847: Pointer telegraph

Facts & Benefits

- Construction of a reliable pointer telegraph by electrically synchronizing the transmitter and receiver
- Vastly superior to previous equipment because it no longer works like a clock mechanism
- Transmission of messages by pressing a rotating needle on the transmitter to stop it on the letter to be transmitted
- Range of about 50 kilometers
- Use of electric batteries for the power supply
- Apparatus made of cigar boxes, tin plate, pieces of iron and insulated copper wire

The pointer telegraph revolutionizes modern communications by providing reliable message transmission over long distances
Pioneer 2015: Smart grid

Facts & Benefits

- Smart Grid is a power system securing highest degree of flexibility and robustness mainly in the distribution area (last mile)
- The system optimizes efficiency, while balancing electricity prices and fluctuations caused by an increased feed-in of renewable energy sources
- Siemens’ strength lies in the combination of its world leading position in the fields of energy automation, equipment manufacturing, offshore generation, HVDC transmission etc.
- Potential risks:
  - Market volume relatively small today
  - Competition intensifies as new competitors move into the market

Involving the entire electricity production and distribution chain, Siemens is the only company having a comprehensive portfolio to master the smart grid challenge
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Open Innovation & Technology Scouting
Networks are the breeding grounds for innovation ("Open innovation")
Innovating with partners – Closed’ and ‘open’ processes complement one another

“The lab is our world”

“The world is our lab”

<table>
<thead>
<tr>
<th>We must be a leader in key technologies …</th>
<th>... and be capable of integrating innovation partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>We generate the best ideas in key technologies and competences...</td>
<td>...and make use of all internal and external ideas</td>
</tr>
<tr>
<td>We protect our competitive advantage, for example, through key patents...</td>
<td>...while also managing the risks – which enables us to be open for knowledge transfer</td>
</tr>
<tr>
<td>World-class R&amp;D teams in key technology fields...</td>
<td>...combined with external R&amp;D resources, create tremendous value</td>
</tr>
<tr>
<td>Our employees are on equal terms with the most innovative suppliers, customers, partners...</td>
<td>…allowing them to exchange ideas with the most talented people at the company and beyond</td>
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</table>
## Close cooperation with top universities

### CKI – Center of Knowledge Interchange

- Siemens launches over 1,000 research partnerships every year with universities, research institutes, and industrial partners all over the world.

- The CKI program is Siemens' most intensive means of collaborating with universities. Siemens enters into a CKI partnership with specially selected universities worldwide.
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Publicly funded R&D: Key motivation for participation

Additional funding is an **important but not the main motivation** to engage in publicly funded research. Other benefits include…

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<th>Build-up Know-how</th>
<th>Talent &amp; People Acquisition</th>
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<tbody>
<tr>
<td>▪ New ideas – follow the state of the art</td>
<td>▪ Access to new talents internationally</td>
</tr>
<tr>
<td>▪ Access to high-class innovation know-how</td>
<td>▪ Efficient integration of young researchers</td>
</tr>
<tr>
<td>▪ Use of synergies, achieve critical mass</td>
<td>▪ Establish international collaboration culture</td>
</tr>
<tr>
<td>▪ Platform for pre-competitive cooperation &amp; networking towards customers &amp; suppliers</td>
<td>▪ Influence the education systems to establish (new) required study courses (e.g. via EIT)</td>
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<th>Operational Excellence in R&amp;D</th>
<th>Policy &amp; Influencing / Standards</th>
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<tr>
<td>▪ Standard need for clearly defined project plans and deliverables</td>
<td>▪ Position Siemens as valued expert partner for policy makers</td>
</tr>
<tr>
<td>▪ Faster ramp-up to critical mass in new R&amp;D topics</td>
<td>▪ Shape future R&amp;D funding agenda</td>
</tr>
<tr>
<td>▪ Benchmark with other R&amp;D partners</td>
<td>▪ Participate in the development of common industry standards &amp; influence regulations</td>
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</table>
Siemens AG Österreich has strong collaborations within funded projects
Successful cooperation in the Smart Grid Modellregion Salzburg (SGMS)

Cooperation partners: Salzburg AG, Salzburg Wohnbau, Siemens AG Österreich, TU Wien, AIT, CURE, Fichtner IT-Consulting

Achievements

- > 13 successfully implemented R&D Projects and Field tests (>20 in total)
- Successful approaches to get from R&D results into products (e.g. SCADA extension - Voltage Var Control, through IC SG EA SOL)

Siemens Added Value

- Siemens is main technology provider for the Smart Grid Modellregion
- Joint Cooperation of IC SG, IC BT and CT
- Close link of Modellregion Salzburg (Rural Focus) to Smart City Aspern (Urban Focus)

Main goals of our customers

- Getting experience with combined Smart Grid / Smart Energy / Smart Building relevant questions within one Modellregion
- Implementation of solutions with focus on new technologies and end customer acceptance
- Implementation as European lighthouse project and overall system approach (European Electricity Grid Initiative – Core Label!!)
- Cross project and business domain (Grid Operation, Market Operation, IT, Telekom department, Building Operator) management
Field Test

- Transformer 250 kVA
- 60 Objects (res. and comm. buildings)
- 40 PV with 175 kWpeak
- 35 eCars with wallboxes
- BEA connects to PV, wallbox, Smart Meter and home automation system
- all BEAs communicate with intelligent secondary substation node (iSSN)
- iSSN guarantees grid stability

Progress

- Hardware installed
- Field test successful ongoing
- Software deployment in progress
aspen Seestadt Wien: Vienna’s future smart city district

One of the biggest Smart City Projects in Europe

Apartments for 20,000 inhabitants and 20,000 work places until 2030
Size: 240 Hectare

Manifold utilization generates economic impulse and provides quality of life, ideal “living lab”

New, multifunctional city district incl. apartments, offices, business and research quarters and a school campus

aspen Seestadt Wien addresses the Megatrends urbanization and climate change

Future oriented concept including technologies, products and solution for an energy efficient city district
asern Seestadt Wien: Aspern Smart City Research (ASCR)

- Development and implementation of systems in a real city environment, hand-in-hand with an integrated district planning (spatial planning, energy planning and mobility planning)

- Demonstration of the performance of these systems
  - Access to real data of customers, buildings and networks
  - Direct feedback from citizens, building operators and energy suppliers
  - Risk minimization during the development of customer proximity and real environment (reduced time-to-market)
  - Better use of the innovation potential through participatory approach of all stakeholders
aspern Seestadt Wien: Smart City Research Program

home/building data -> low voltage grid data -> external data (e.g., weather data)

energy efficiency

ASCOR
Aspern Smart City Research research for the energy future

CO₂ reduction
Partner with strength in implementation
form the structure of the Joint Venture

Wien Energie GmbH
- The biggest Energy Provider in Austria
- Provides electricity, natural gas and thermal energy to 2 Million people, 230,000 industrial facilities and 4,500 agricultural entities

Wiener Netze
Wiener Netze is the distribution network operator in Vienna, parts of Lower Austria and Burgenland. Wiener Netze provides its customers with a high security of supply rate of 99.99%. Main tasks are:
- Customer Service
- Network strategy and planning
- Expanding, operating and servicing the electricity grid
- Meter and data management
- Regulation management
- Network services in customer installations

Siemens AG Österreich, in cooperation with Headquarter (CT & IC)
- Unique know-how and access to international expert knowledge in the areas of Energy (generation, distribution, storage, management), building technologies (energy efficiency, management systems, security), Mobility as well as Project Management, IT & Consulting

Wien 3420 Aspern Development AG
- Both, project developer and landowner
- Property exploitation and project development; acquisition of partners
- Facility marketing und –branding
- Urban planning, complete infrastructural development

Vienna Business Agency
- Supports the development of Vienna as a business location
- First contact point for national and international companies
- Financial support, real estate and consulting
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Consider how much you want to disclose when selecting the right open innovation approach

Overview over frequently used open innovation approaches

Idea-Contests

- Search field and company are visible
- Pre-qualification for participants possible but complicated

E-Brokering

- E-broker sends request to a proprietary (closed) list of experts
- Anonymity and black-list possible

Scouting

- Search field and company not visible
- Need to manage large number of databases

For cultural change, also internal cross-sector „open“ innovation projects are important:
e.g. knowledge networking platforms, internal idea contests, corporate problem solving platforms

A → B….A gets info from B
TechnoWeb supports the use-case to get hints by colleagues in order to solve a technical problem.

TechnoWeb from a user's view

1) Do not expect to find answers directly in TechnoWeb, but expect to find the experts who know the answer!

2) High activity level is not necessary

Minim pre-requisite is to join a network once

Find people to get answers

https://techno-web.siemens.com
Contact

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