

Corporate Technology

Our central research and development unit

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6 CT as an employer

1

For nearly 170 years, pioneering technologies and the business models developed from them have been the foundation of Siemens' success. Our central research and development unit – Corporate Technology (CT) – plays an important role in this.

Our milestones – Across 170 years of history

SIEMENS

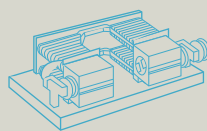
1816-1892



Company founder,
visionary and inventor

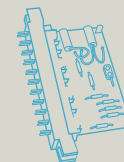
1866

Dynamo



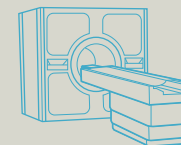
1959

SIMATIC controller



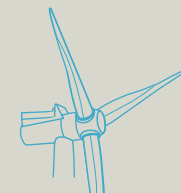
1983

Magnetic resonance
tomograph



2012

Field testing of world's
largest rotor at an
offshore wind farm

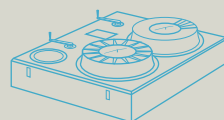


Werner von Siemens

Siemens innovations over 168 years

1847

Pointer telegraph



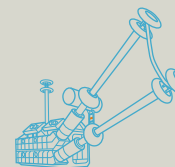
1925

Electrification of
Ireland with
hydropower



1975

High-voltage direct-
current (HVDC)
transmission



2010

TIA Portal for
automation



2015

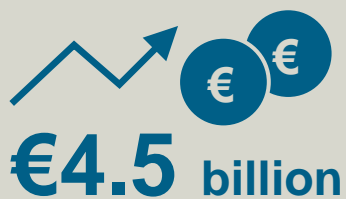
Sinalytics



Our innovative power in figures – Siemens as a whole and Corporate Technology

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Expenditures for research and development

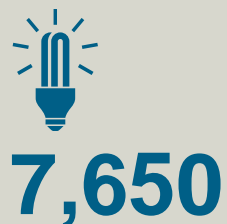


Expenditures for R&D in fiscal 2015



R&D employees¹

Inventions and patents – securing our future



inventions¹



patent applications

University cooperations – our knowledge edge

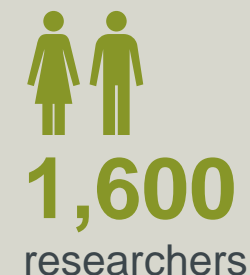


CKI
universities²



principal partner
universities

Corporate Technology – our competence center for innovation and business excellence³



1 In fiscal 2015

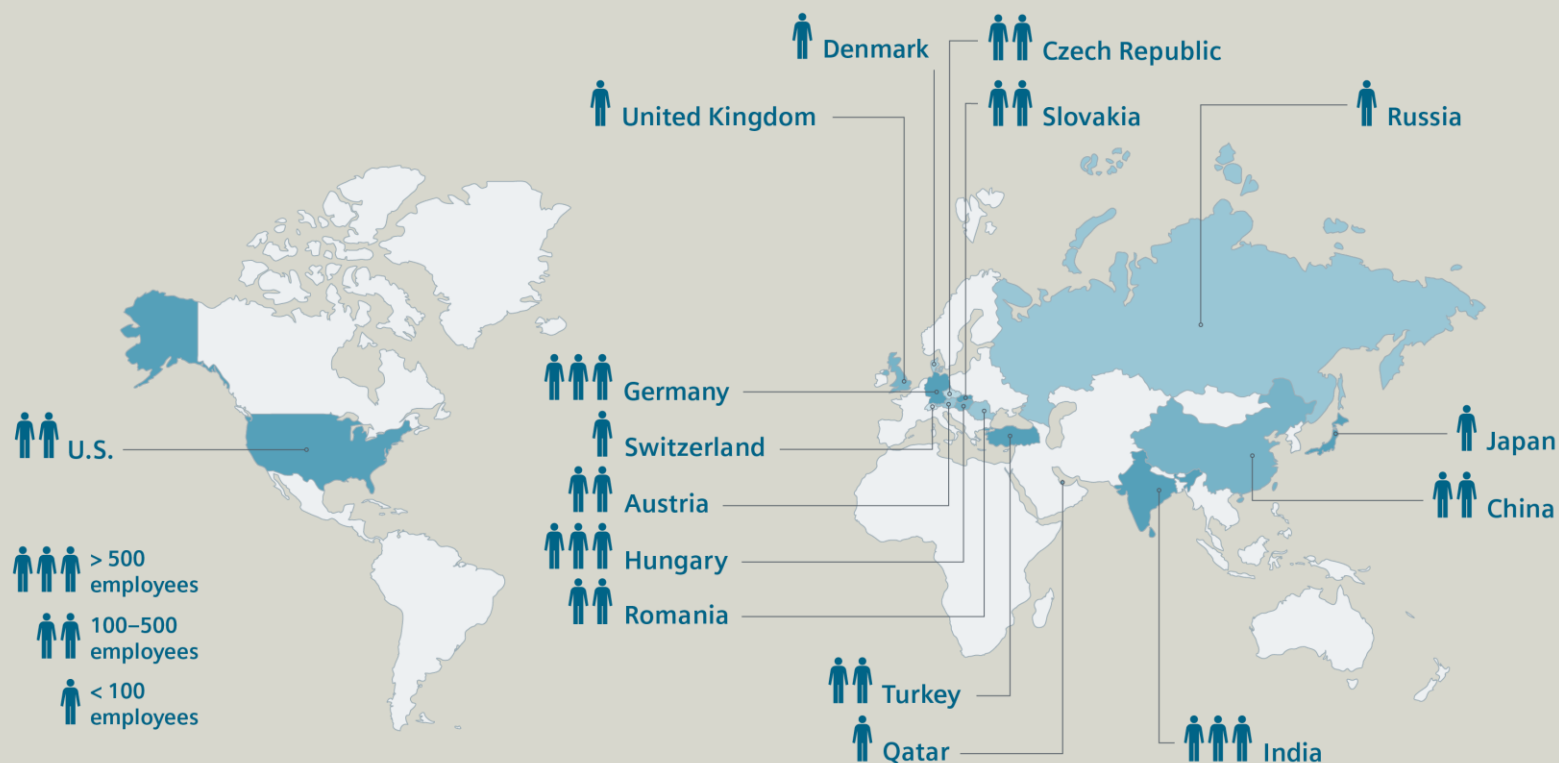
2 Centers of Knowledge Interchange

3 Employee figures: Status September 30, 2015

Our global presence – Partner to customers all over the world

SIEMENS

Corporate Technology – Worldwide locations



A worldwide presence
lies at the heart of the
Siemens brand – and that
goes for us as well.

That presence enables us
to quickly offer targeted
solutions that are tailored
to regional requirements.

2

Shaping the future with a passion for research, technology and innovation: This is the mission of Corporate Technology (CT).

Our mission and our roles – Shaping the future of Siemens with passion

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As a **guidance provider**, CT shapes Siemens' technology and innovation strategy, fosters business excellence at the Company, monitors the operating units' innovative power and assesses disruptive changes in our core markets – in the spirit of Joseph Schumpeter¹.

As a **partner at eye' level**, CT cooperates closely with leading universities and innovative start-ups and makes new technologies, cross-domain platforms and product modules available.



As an **internal service provider**, CT supports the Siemens units with research and development services, protects intellectual property rights and offers advice on improving processes and business practices.

¹ Joseph Schumpeter, Austrian economist and politician, coined the term “creative destruction” as a consequence of innovations for established business models

3

Corporate Technology contributes to the Company's success in many functions, including technology and innovation strategy, research and development, cooperation with universities and start-ups, patents and business excellence.

Our areas of activity – A short overview of important fields of activity

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Innovation strategy

Shaping Siemens' technology and innovation agenda

Digitalization & Automation

Research on technologies with a broad impact for the Business Units

Energy systems & Electrification

Improve system expertise to understand the requirements of future energy systems

Research cooperations

Overcoming the silo mentality and absorbing new technologies

Cooperations with start-ups

Making the innovative power of start-ups usable for Siemens

Digitalization Competence Center

Promoting digitalization at Siemens

Patent and trade- mark protection

Protecting inventions and defending IP rights

Business excellence

Becoming faster, more efficient and more agile

Our areas of activity: Innovation strategy – Shaping Siemens' technology and innovation agenda

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- We pick up trends and technologies and, from these, we develop long-term scenarios for our core markets and make recommendations for action for the Company's innovation and technology agenda
- We regularly assess Siemens' innovative power and the impact of disruptive changes in the spirit of Joseph Schumpeter
- We elaborate and represent the Company's position in matters of research policy
- We look after Siemens' standardization activities in all Divisions and regions
- We provide the Company with publications relating to research and development

**Our areas of activity: Digitalization and Automation –
Securing and extending our technology leadership**

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Business Analytics & Monitoring

Automation & Control

IT Platforms

IT Security

Networks & Communication

Sensing & Industrial Imaging

Software and Systems Innovation

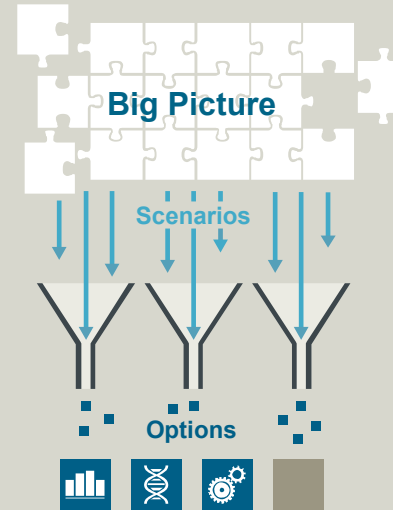
- Our researchers work worldwide on technologies with a broad impact for the Business Units
- A specific focus is on the future issues of digitalization and automation
- We combine the physical and the virtual worlds through our Core Technology Initiatives and research projects in the areas of Sinalytics, the Web of Systems, autonomous systems, systems integration, and cyber security
- We are thus helping the Siemens Business Units turn inventions into successful innovations in the market

Our areas of activity: Electrification & Electronics – Secure our traditional businesses and tackle new markets

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Our topics

- Future energy supply, “Energiewende 2.0”
- Electrification and Electronics
- New materials
- Innovative Manufacturing



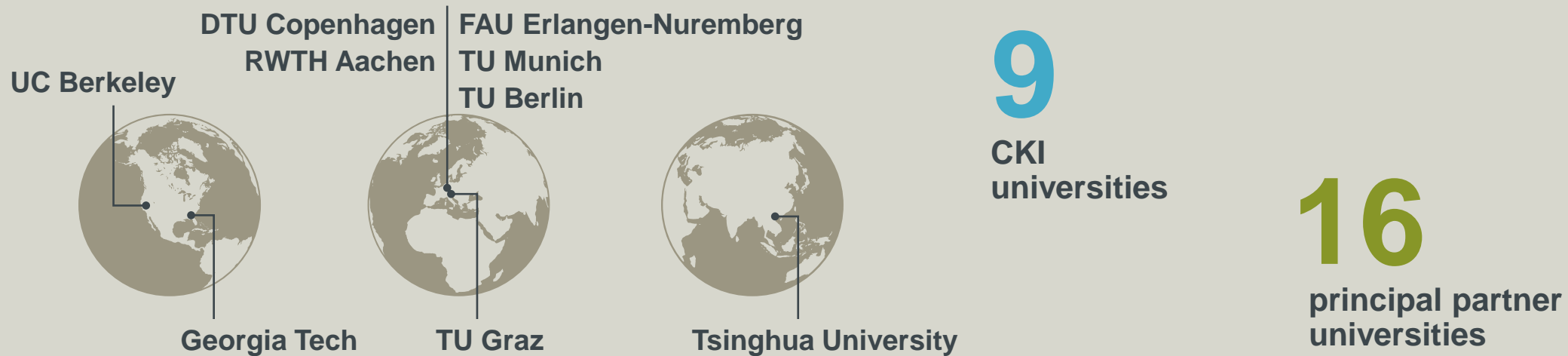
Our approach

- Understand the overall situation
- Develop/model future scenarios
- Develop long-term/interdisciplinary strategic research projects
- Derive development and business strategies

- Increase in system expertise to understand requirements for the energy supply of the future
- Ensuring innovations in traditional fields, e.g. power electronics
- Growth in decentralized power generation
- Development of (chemical) energy storage systems
- Research in innovative materials and manufacturing technologies

Our areas of activity: Research cooperations – Overcoming the silo mentality and tapping potential

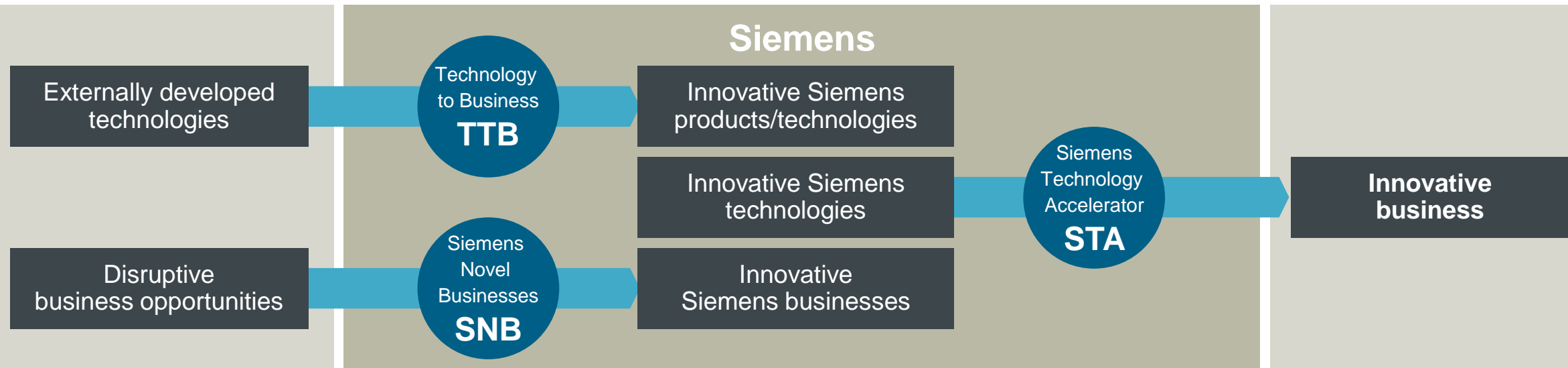
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- We network with leading universities and non-university research institutes around the world
- With Open Innovation, we strengthen Siemens' innovative power and tap the potential of a networked, open company
- We link the industrial and academic worlds and thus promote intensive research and recruiting activities
- Our cooperation with nine top universities and the “Centers of Knowledge Interchange” (CKIs) that we set up there are an excellent example of this

Our areas of activity: Cooperations with start-ups – Making the innovative power of start-ups usable for Siemens

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- Our technology scouts look for promising start-ups and new technological trends
- In this way, we tap radical, disruptive external innovations for Siemens
- We found our own start-ups in business fields with high potential for our company
- Through carve-outs, we commercialize developments that do not fit in with our portfolio

Our areas of activity: Digitalization – Highest quality software and systems development

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>20%

of software developments at Siemens

>375

projects per year

- We are driving a center of competence for software that is capable of consistently offering Siemens' latest development services on a global scale
- We are continuing to promote Siemens' and CT's digital agenda and are committed to its continuous implementation
- We are developing company-wide technology platforms and building blocks with a view to making them available to Siemens' Business Units

Our areas of activity: Patent and trademark protection – Protecting inventions and defending IP rights

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56,200

patents held
in fiscal 2015

7,650

invention disclosures in fiscal 2015 –
35 per working day

3,700

patent applications in
fiscal 2015 – 17 per working day

400

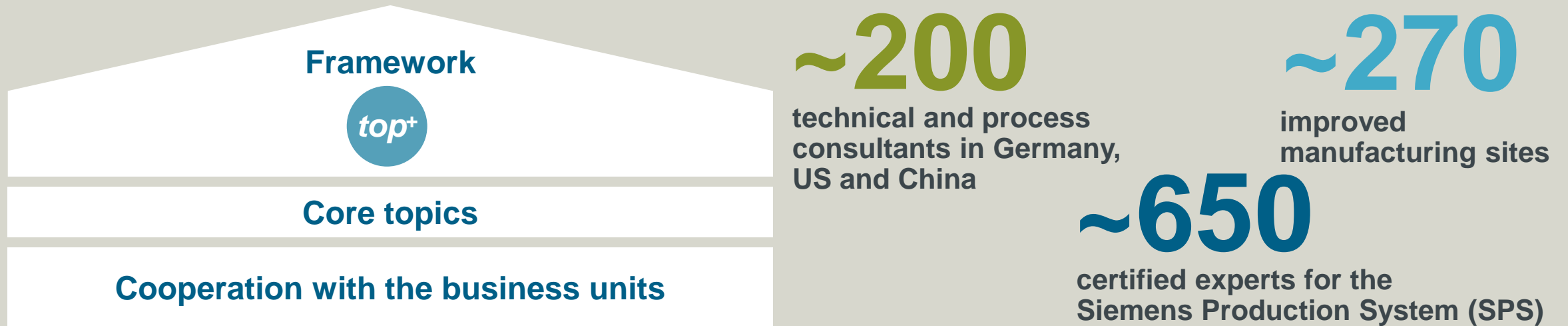
intellectual property
experts worldwide¹

- Ideas are turned into inventions that give Siemens a competitive edge in the market
- We ensure that these inventions get a high level of patent protection
- We have around 400 experts¹ who manage Siemens' intellectual property:
They register, establish and market trademark rights

¹ Employee figures: Status September 30, 2015

Our areas of activity: Business excellence – Becoming faster, more efficient and more agile

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- Excellent business practices make Siemens faster, more agile and more efficient
- For this purpose, we improve the value chain in all types of business – from the manufacturing of products to project business and services
- This requires a willingness to change and the courage to consistently implement the changes that have been identified as necessary

Concrete examples of our work

4

With our innovations and technologies, we set standards for existing and future markets, so that Siemens remains successful over the long term. Concrete examples show how Corporate Technology contributes to this.

Concrete examples of our work – Future of the energy system and electrically powered flight

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Simulating the future energy system

Thanks to complex simulation models, for the first time we can analyze how power will be generated, transmitted and distributed in a future when 60 to 80 percent will come from millions of decentralized regenerative energy sources. And what this means for the energy markets.

[Further information is available here: Pictures of the Future](#)



World-record motor for aircraft

Flight with hybrid-electric drives uses 25 percent less fuel and significantly reduces CO₂ emissions and aircraft noise. That is why we have developed an electric motor with a weight of 50 kilograms and a continuous output of 260 kilowatts. The aim is for aircraft with hybrid-electric drives to fly 60-90 passengers by 2035 – a revolution in the aviation industry.

[Further information is available here: Pictures of the Future](#)

Concrete examples of our work – Core elements for the success of Digitalization

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Intelligent industrial networking via Internet

We extended the concept of the Internet of Things for industrial applications: A digital networked world full of devices which are connected to the Internet has an influence how we control factories or critical infrastructures. Our Web of Systems makes these interactions reliable, safe, durable and can be used to "digitally toughen up" existing plants.

[Further information is available here: Pictures of the Future](#)



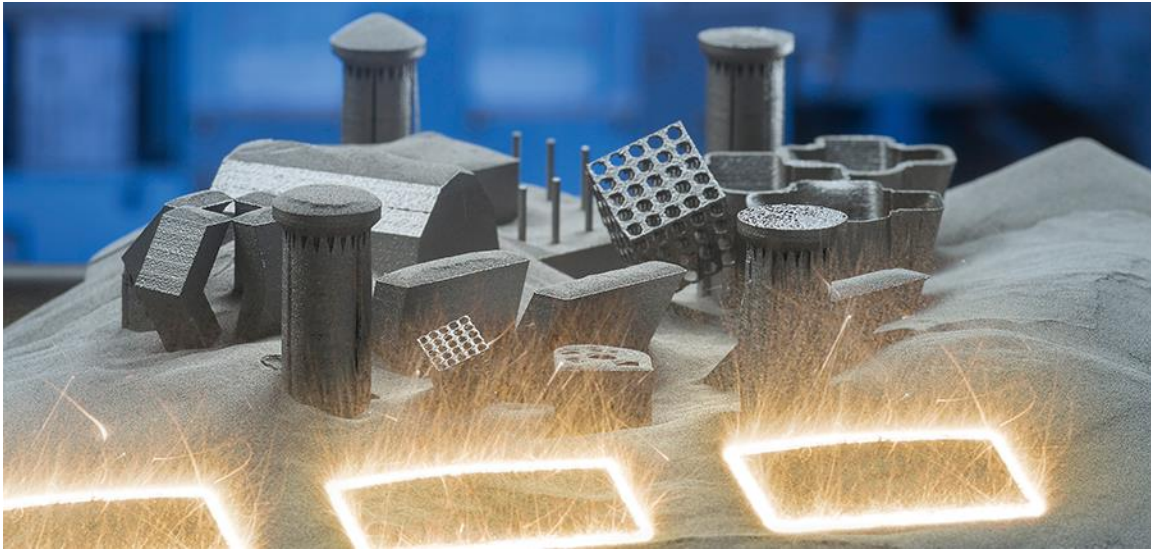
Optimizing maintenance intervals

From trains to turbines, a vast range of machines generate and transmit data every second. With the technology platform Sinalytics we extract valuable information from this data to provide benefits for our customers. CT is responsible for this platform which brings together all of the technological components needed for data integration and analysis, connectivity, and cyber security.

[Further information is available here: Pictures of the Future](#)

Concrete examples of our work – Spare parts you can print yourself and networked batteries

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Printed burner tips for gas turbines

In the future, 3-D printers will enable spare parts for industrial installations to be produced where they are needed: right at the customer's site. This reduces waiting times and allows warehouse space to be put to better use. Siemens, for example, prints burner tips for gas turbines and thus reduces repair times by up to 90 percent.

[Further information is available here: Pictures of the Future](#)



Intelligent storage of solar energy

Energy storage systems will be an important part of a sustainable energy network in the future. They are capable of storing electricity produced by solar panels. The start-up company Caterva, which was founded by CT, links the storage systems with intelligent control software and thus evens out fluctuations in the power grid – an important building block for the energy transition.

[Further information is available here: Pictures of the Future](#)

5

We see ourselves as a partner to our Business Units. Our service areas are optimally geared to their requirements. With this strong structure, we contribute to Siemens' success.

Our organization – Corporate Technology at a glance

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Corporate Technology (CT)

CTO – Prof. Dr. Siegfried Russwurm

Business Excellence, Quality Management, *top*⁺

- Business excellence
- Quality management
- Internal process and production consulting

Corporate Intellectual Property

- Protection, use and defense of intellectual property
- Patent and brand protection law

Development and Digital Platforms

- Competence center for horizontal and vertical product-and-system integration as well as software, firmware, and hardware engineering

Innovative Ventures

- Access to external innovations
- Start-up foundation
- Commercialization of innovations

Research in Digitalization and Automation

- Research activities covering all relevant areas in digitalization and automation for Siemens

Research in Energy and Electronics

- Research activities relating to energy and electrification, electronic, new materials and innovative manufacturing methods

Technology and Innovation Management

- Siemens' technology and innovation agenda
- Standardization, positioning regarding research policy
- Provision of publications relating to R&D

University Relations

- Global access to the academic world
- Top positioning in terms of university cooperations

6

Those who work at Corporate Technology are more than just employees: they make an active contribution to improving peoples' lives little by little every day. Experts from all over the world and from a wide range of disciplines value CT as an employer.

CT as an employer – Shaping the technological future with us

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- Corporate Technology's global network of experts comprises more than 7,800 employees¹, including 5,300 software developers, 1,600 researchers, 400 patent experts and 260 specialists who push business excellence within the company
- Do you want to be a part of that? Then come and join us. You can expect a strong practical orientation and the opportunity to contribute your knowledge and visions to individual projects – on a global scale
- Whether you're involved in the development of marketable products for our operational business or interdisciplinary projects for the Business Units: at Corporate Technology, you'll be working at the heart of Siemens' technological research

¹ Employee figures: Status September 30, 2015

Siemens Corporate Technology – Contact and further information



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