

National Energy Efficiency Conference 2016

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Siemens at a glance

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Divisions (Revenue in €bn)

Industrial Business									Financial Services
Power and Gas	Wind Power and Renewables	Power Generation Services	Energy Management	Building Technologies	Mobility	Digital Factory	Process Industries and Drives	Healthcare (separately managed)	
13.2	5.7	Part of PG and WP	11.9	6.0	7.5	10.0	9.9	12.9	Assets 25

Portfolio



Digitalization Changes Everything

What Siemens sees as the future...

Industry 4.0



Sustainable Energy



Intelligent Infrastructure



All underpinned by
Digitalization

The world is becoming digital – User behavior is radically changing based on new business models and digitally enhanced products

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**Newspaper,
books**



Online media



Cinema



**Video
on demand**



Telephone booth



Smart phone



Writing letters

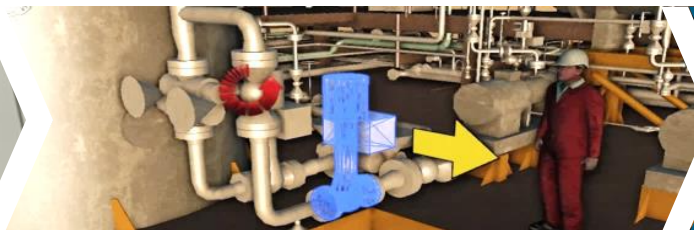


Social media



This takes place also in industrial environments ...

**Manual machine
configuration**



**Virtual
commissioning**

**Large
power plants**



**Virtual
power plants**

**X-ray
photography**



**Digital image
and analysis**

**Fixed
maintenance
intervals**



**Predictive
maintenance**

What is Industry 4.0 – the Fourth Industrial Revolution?

From Industry 1.0 to Industry 4.0

First Industrial Revolution

based on the introduction of mechanical production equipment driven by water and steam power



First mechanical loom, 1784

Second Industrial Revolution

based on mass production achieved by division of labor concept and the use of electrical energy



First conveyor belt, Cincinnati slaughterhouse, 1870

Third Industrial Revolution

based on the use of electronics and IT to further automate production



First programmable logic controller (PLC) Modicon 084, 1969

Fourth Industrial Revolution

based on the use of cyber-physical systems



Degree of complexity

Time

Industry 1.0 → 18th century
Mechanisation of manual work

Industry 2.0 → early 20th century.
Mass production techniques

Industry 3.0 → Past few decades
Electronic systems and computer technologies for automating manufacturing processes.

Industry 4.0 → NOW
Cyber-physical world - merging of virtual and physical worlds.

- Entire value chain digitalised.
- New technologies in **Digitalization, Electrification, Automation** rapidly transforming industry & society

Industry 4.0 – What it means in practice for Industry and Manufacturing?

Industry 4.0 is about

Addressing common challenges of increasing competitiveness.

Enabling industries to perform faster, better and produce more with fewer resources.

Helping businesses become more nimble, adaptable and intelligent; *from defining requirements to concept to design to prototype to production and throughout the entire lifecycle thereafter – with rapid innovation cycles.*



Reducing the time to market

- Shorter innovation cycles
- More complex products



Enhancing flexibility

- Individualized mass production
- Volatile markets



Increasing quality

- Closed loop quality process
- Traceability and integrated genealogy



Increasing efficiency

- Energy and resource efficiency as key competitive factors

Industry 4.0 – Enabling Technology domains for Industry & Manufacturing

Electrification – Automation - Digitalization

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Global trends



Digital transformation



Globalization



Urbanization

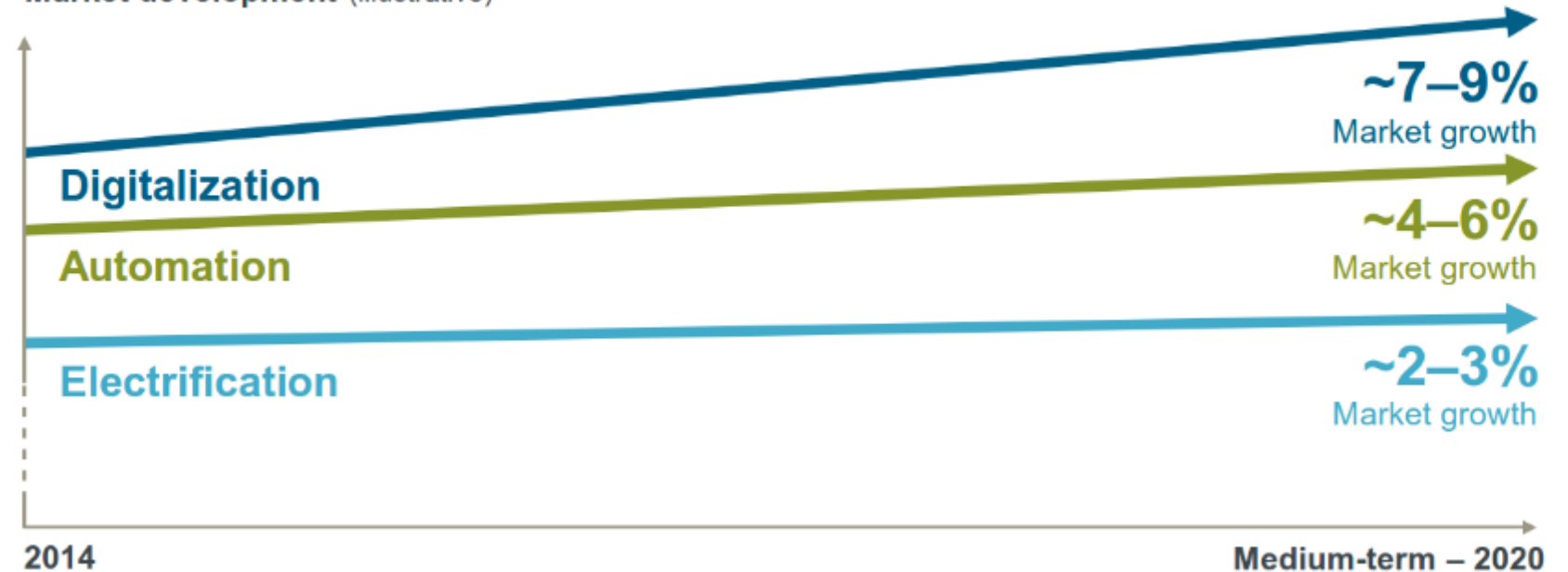


Demographic change



Climate change

Market development (illustrative)



What is Industry 4.0? – How does it relate to energy productivity? Electrification

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India

Improved availability of distribution grid and loss¹ reduction from 30% to 15%



Melbourne

Energy efficiency upgrades in Melbourne Cricket Ground will cut operating costs by 20%
Guaranteed annual energy savings €772K.



Dusseldorf - new combined cycle gas turbine power plant

World record of 61.5 percent for net power-generating efficiency achieved.



Federation Square, Melbourne

Overall, energy cost is down by more than 43 percent.

What is Industry 4.0? – How does it relate to energy productivity? Automation

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**Dörries Scharmann
Technologie GmbH, Germany**

Production Machinery

Efficiency improvements
ranging between 88% and 94%



**NLT Norder Lagertechnik
GmbH & Co, Germany**

Steel Cutting

Hydraulic energy usage of strip
steel cutting system reduced by
90%.



Bürger GmbH, Germany
**F&B (Pasta/Potato
Dumplings)**

Live energy flow monitoring.
Energy balancing & re-direction.
4.2 MW to 3.7 MW for same
output.



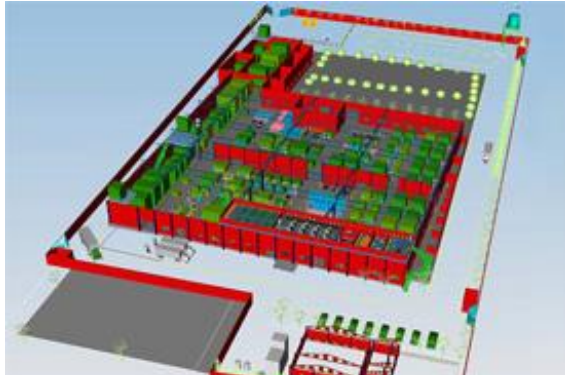
**Spenner Zement,
Germany**
Cement

Live energy flow
monitoring. Energy
balancing & re-
direction. 24%
efficiency
improvements

What is Industry 4.0? – How does it relate to energy productivity?

Digitalization – the greatest and most accessible benefactor

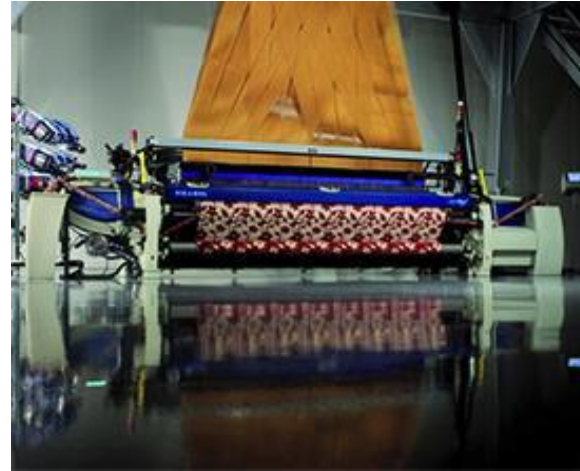
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Eicher Engineering Solutions

Factory & Production Line Simulation

Efficiency improvements of at least 32% on existing facilities

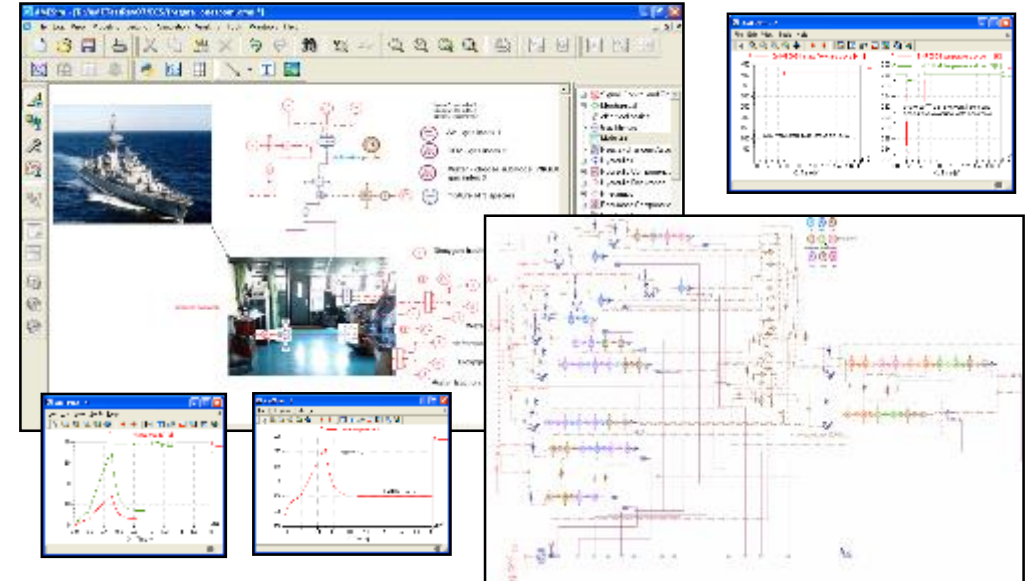


Picanol

Weaving Loom Manufacturer

Early-stage simulation to innovative faster

Energy-efficient machines without sacrificing performance

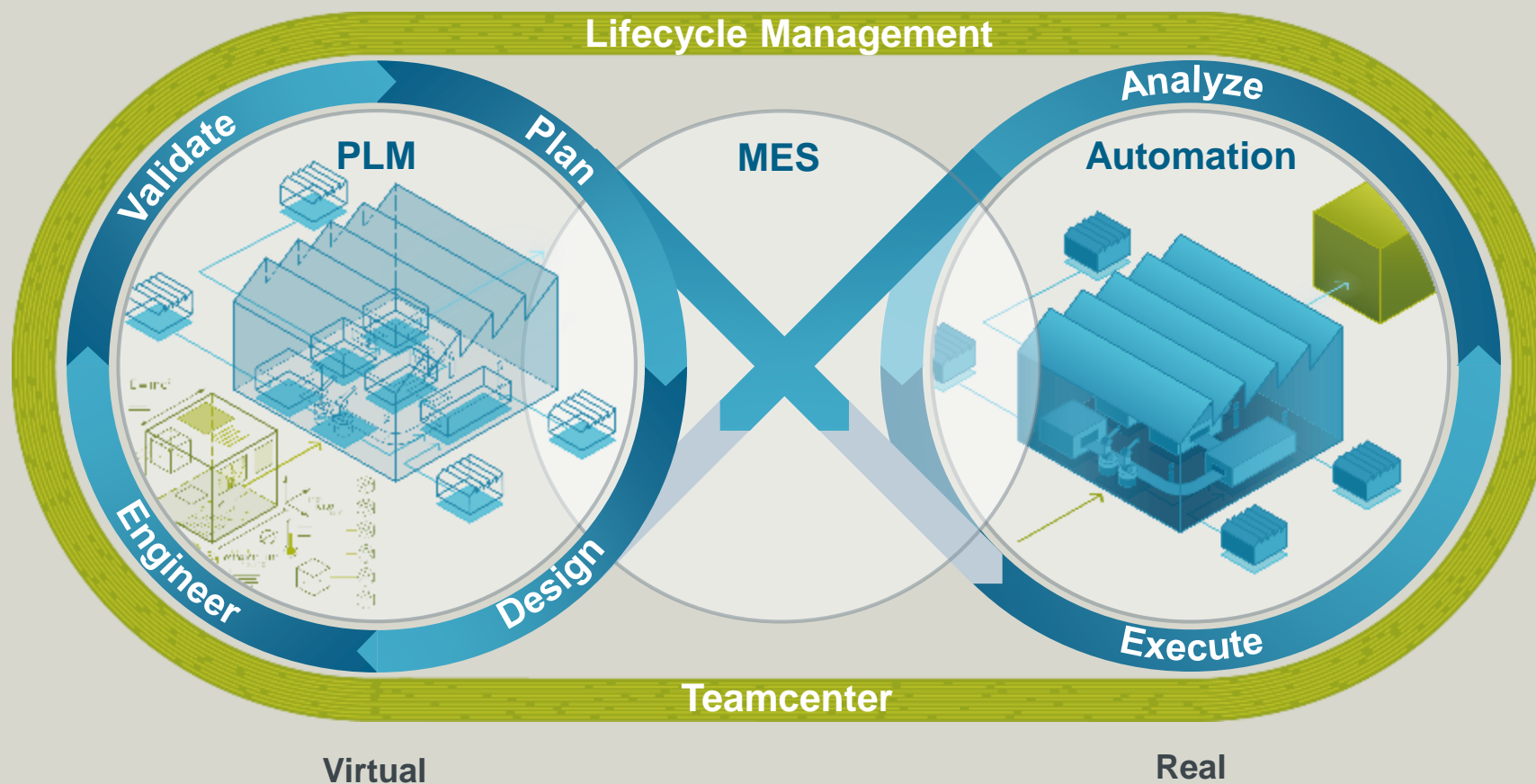


Naval Fleet Retrofit Mission Profile / Duty Cycle Thermal Energy Simulation.

**€800M in Fuel cost savings
Customer Withheld**

Industry 4.0 – Merging the virtual and real worlds

Siemens offer for Industry 4.0 – Digital Enterprise



Decision and policy maker expectations concerning Industry 4.0

Embrace key megatrends affecting industry and economy

- Disruptive and new technologies
- Software and Digitalization
- New Business Models

Support success factors in a globalized economy with fast changing and volatile markets.

- **Innovation** – support the adoption and use of proven technologies, processes and know-how.
- **Agility** – support creation of right fiscal & regulatory environment
- **Education and R&D** – support STEM and resulting IP development

Support local industry, manufacturers, academia in entering the lucrative high-value global supply chains with their innovative products and services.

Thank you

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