

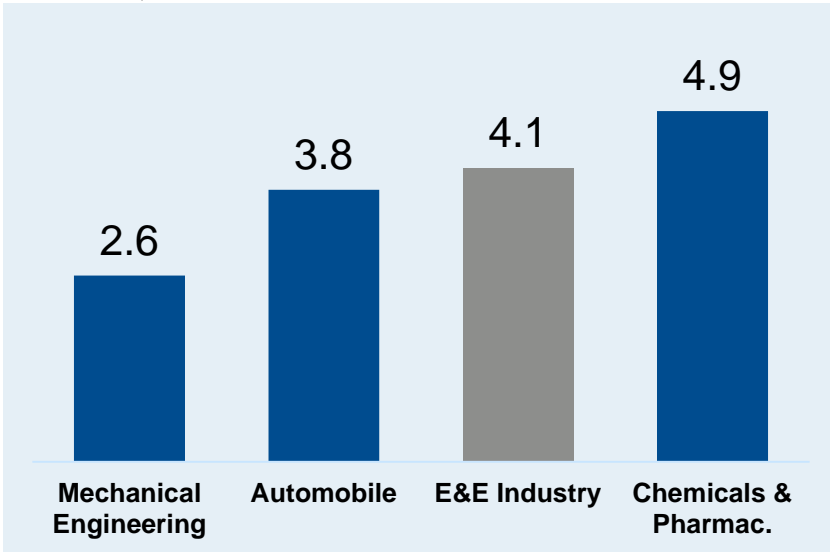
The Economic Situation in the German Electrical and Electronic Industry

International Spring Makers Conference
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Dr. Andreas Gontermann

Industrial Sectors by Global Comparison

Global production volume,
trillion €, 2016



Source: FERI, National Statistical Offices, ZVEI's own calculations

E&E Industry is the second biggest industrial sector worldwide

Since 2004 the global production of electrical and electronic products has doubled

27.8 million employees in 2014

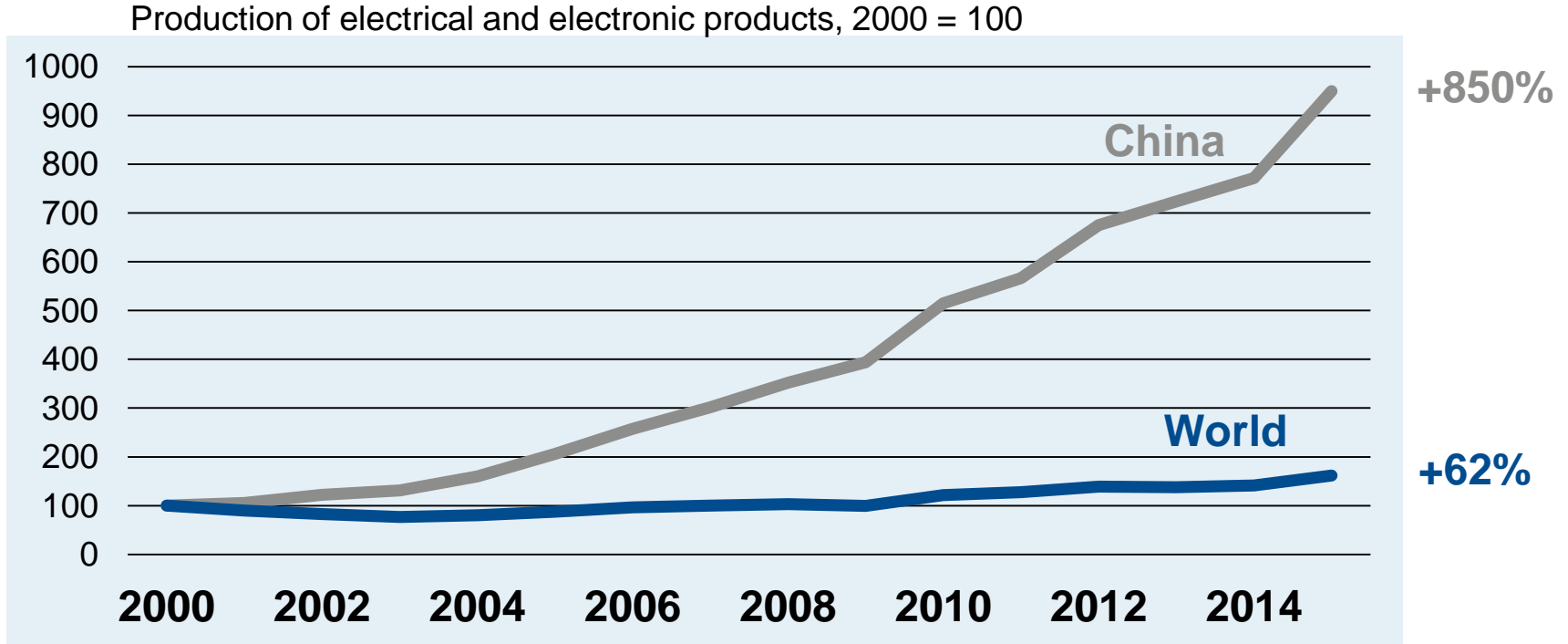
- +8.1m since 2004

Biggest sub-sectors within the global E&E industry:

- Electronic Components & Systems (€1,020bn)
- Automation (€510bn)
- Communication Technology (€437bn)
- Information Technology (€419bn)
- Energy Technology (€246bn)

Global Electrical & Electronic Industry

– Production starkly driven by China

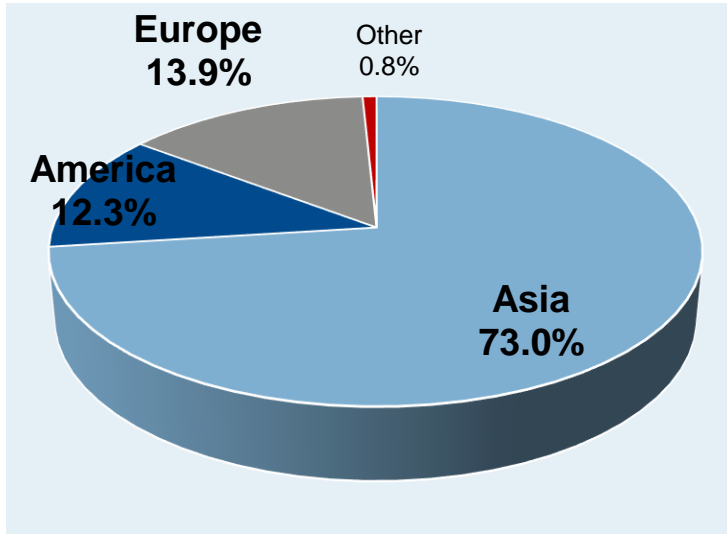


Source: National Statistical Offices, ZVEI's own calculations

Global E&E Industry

– Production structure by regions

Production structure by regions,
€4,008bn, 2015



Source: National Statistical Offices, ZVEI's own calculations

Massive shift towards Asia in the last two centuries

- Asian share in global production: From 41.9% in 1998 to 73.0% in 2015
- America: From 33.5% to 12.3%
- Europa: From 23.7% to 13.9%

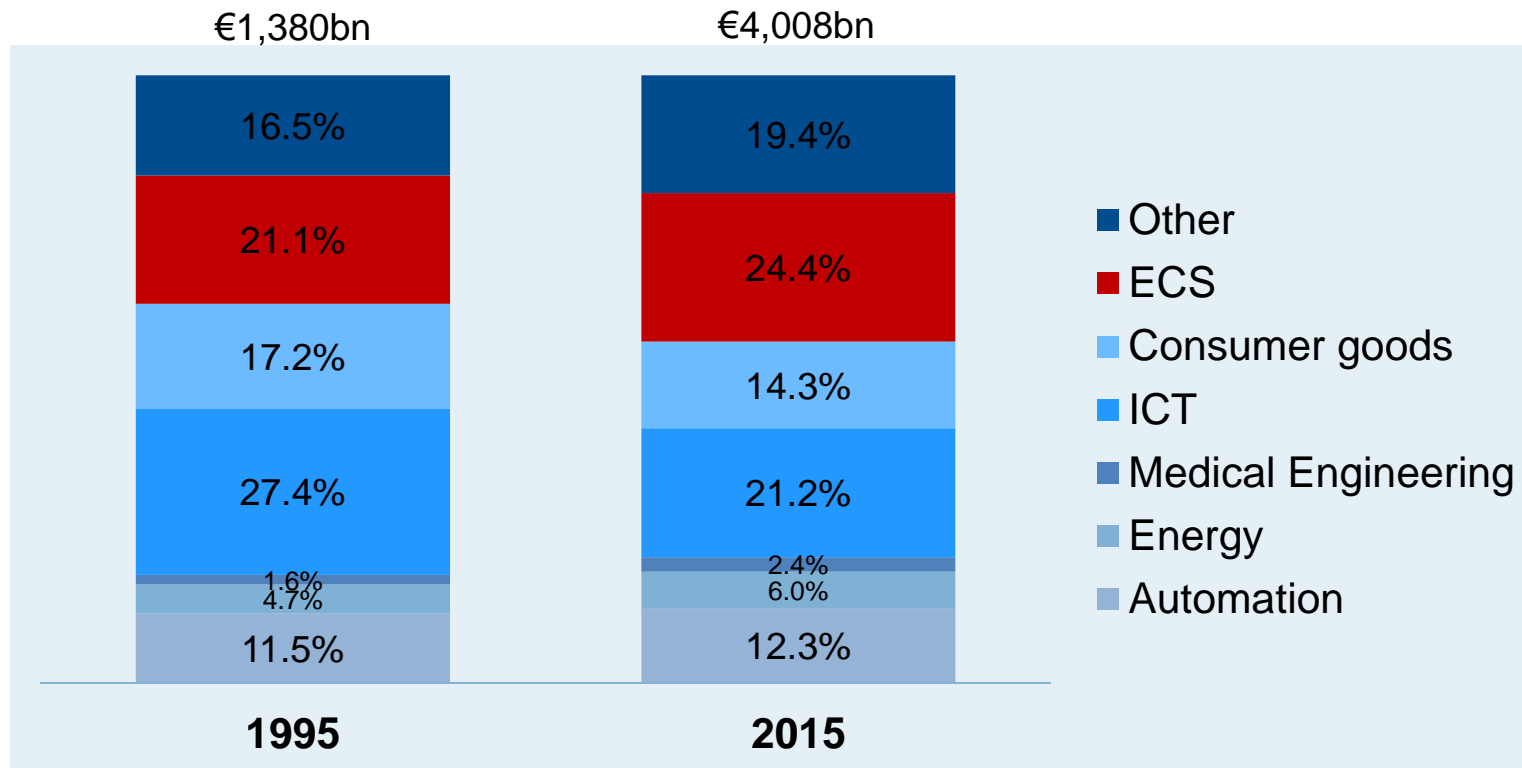
Top 5 production countries 2015:

1. China: 50.8% (1998: 7.0%)
2. USA: 9.9% (1998: 28.6%)
3. Japan: 6.8% (1998: 22.3%)
4. South Korea: 6.1% (1998: 3.3%)
5. Germany: 3.4% (1998: 5.8%)

Only three European countries among the ten largest production countries today (Germany, France, UK)

Global E&E Industry

– Production structure by sub-sectors



Sub-sectors of the global E&E Industry

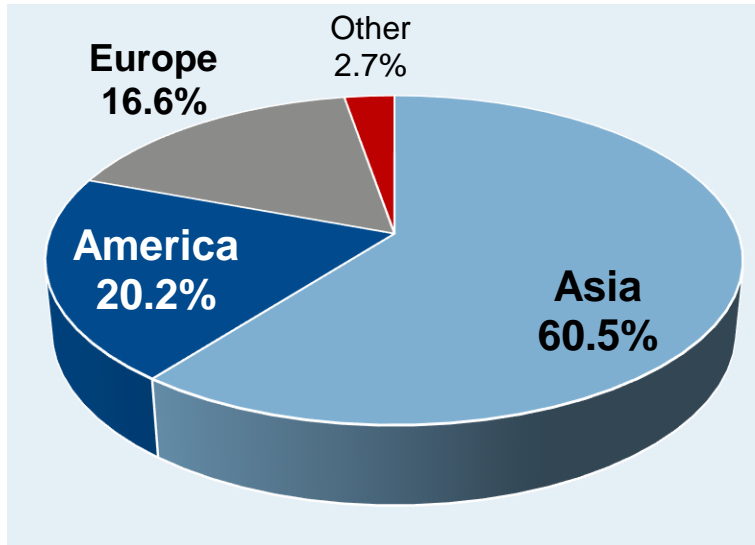
– Biggest producers by countries

| Rank | Automation | Energy Technology | Medical Engineering | ICT | Consumer goods | ECS |
|------|----------------|-------------------|---------------------|----------------|----------------|----------------|
| 1. | <u>China</u> | <u>China</u> | USA | <u>China</u> | <u>China</u> | <u>China</u> |
| 2. | USA | USA | China | S. Korea | Japan | S. Korea |
| 3. | <u>Germany</u> | Japan | <u>Germany</u> | USA | USA | Japan |
| 4. | Japan | S. Korea | Japan | Japan | S. Korea | Taiwan |
| 5. | South Korea | India | Switzerland | Taiwan | <u>Germany</u> | USA |
| 6. | UK | <u>Germany</u> | South Korea | Singapore | Turkey | Singapore |
| 7. | France | Italy | UK | Malaysia | Italy | Malaysia |
| 8. | Italy | UK | France | France | Poland | <u>Germany</u> |
| 9. | Switzerland | France | Australia | <u>Germany</u> | Malaysia | France |
| 10. | Russia | Spain | Ireland | Brazil | Mexico | Switzerland |

Source: National Statistical Offices, ZVEI's own calculations

Global market for electrical and electronic products

Market volume, €4,128bn, 2016



Source: National Statistical Offices, ZVEI's own calculations

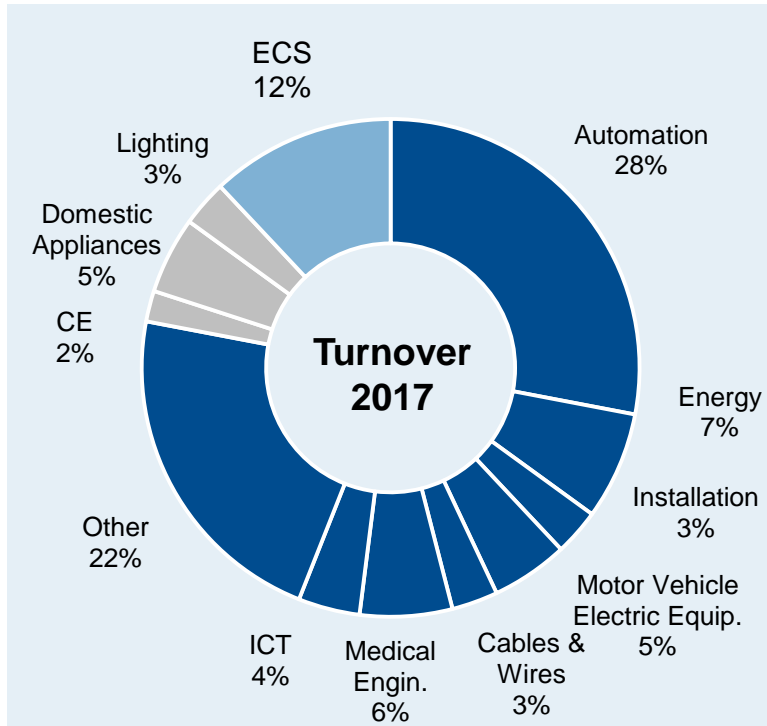
Market structure has shifted heavily towards Asia, too; but less than production structure

- Asian market share: From 36.9% in 1998 to 60.5% in 2016
- America: From 36.3% to 20.2%
- Europa: From 24.2% to 16.6%

Top 5 country markets in 2016:

- China: 39.8% (1998: 5.9%)
- USA: 14.9% (1998: 30.1%)
- Japan: 6.5% (1998: 19.7%)
- South Korea: 4.3% (1998: 3.6%)
- Germany: 3.0% (1998: 5.2%)

Only three European countries among the ten largest markets (Germany, UK, France)



Source: Destatis and ZVEI's own calculations

Sales of €191.5bn in 2017

- 10% of total industrial turnover in Germany
- Contribution to German GDP: 3%

Added value over production ratio of 44%

868 thousand employees

- Second largest branch of industry in Germany
- >20% engineers (i.e., >190 thousand), 60% skilled workers

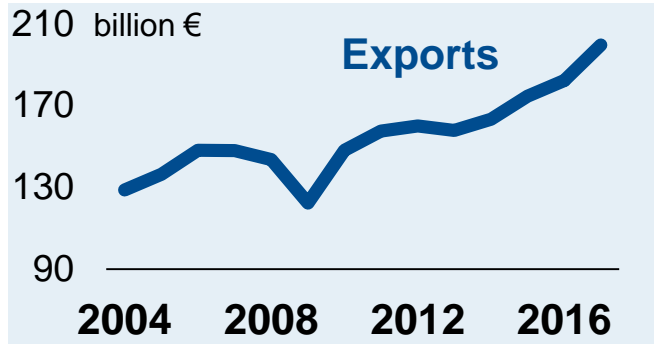
Broad product portfolio

- 78% industrial goods
- 12% intermediate goods
- 10% consumer goods

More than 90% of firms are SMEs

German E&E Industry

– Internationalization: Foreign trade & FDI

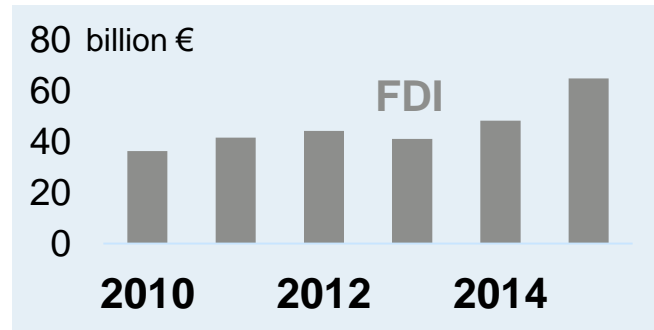


Exports of €200bn in 2017

- 4th all-time high in a row
- 1/7 of all German exports
- 2/3 to industrialized countries, 1/3 to emerging countries
- Since 2000: Overall growth in exports by 2/3, exports to China increased sixfold
- Export surpluses with Europe and America, but deficit with Asia

Stock of FDI: 64.7 billion Euro (2015)

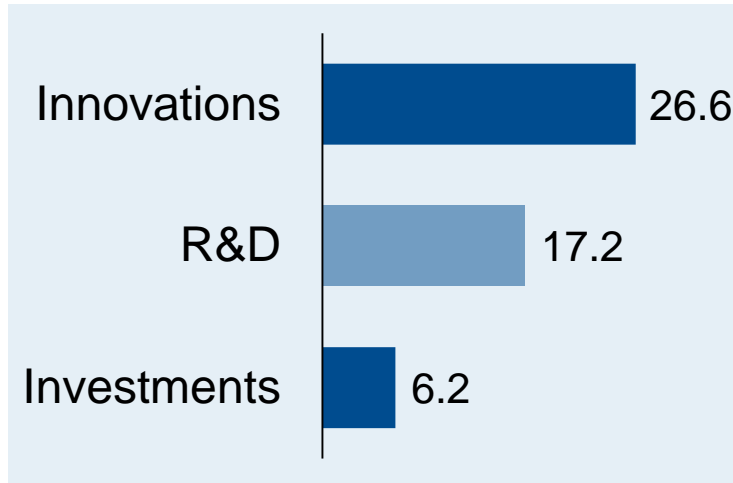
- 1/5 of total German industry's FDI stock
- Biggest investment locations: 1. China (€11.9bn), 2. USA (€6.9bn), 3. UK (€3.8bn)
- 706 thousand employees abroad



Source: Destatis, Deutsche Bundesbank and ZVEI's own calculations

German E&E Industry – Innovative capacity

Expenditures for ...,
2017, billion €



Source: Destatis, Ifo Institute, Stifterverband, ZEW and ZVEI's own calculations

96 thousand employees in R&D

11,825 patent applications per year

About 7 out of 10 firms regularly come up with product or process innovations

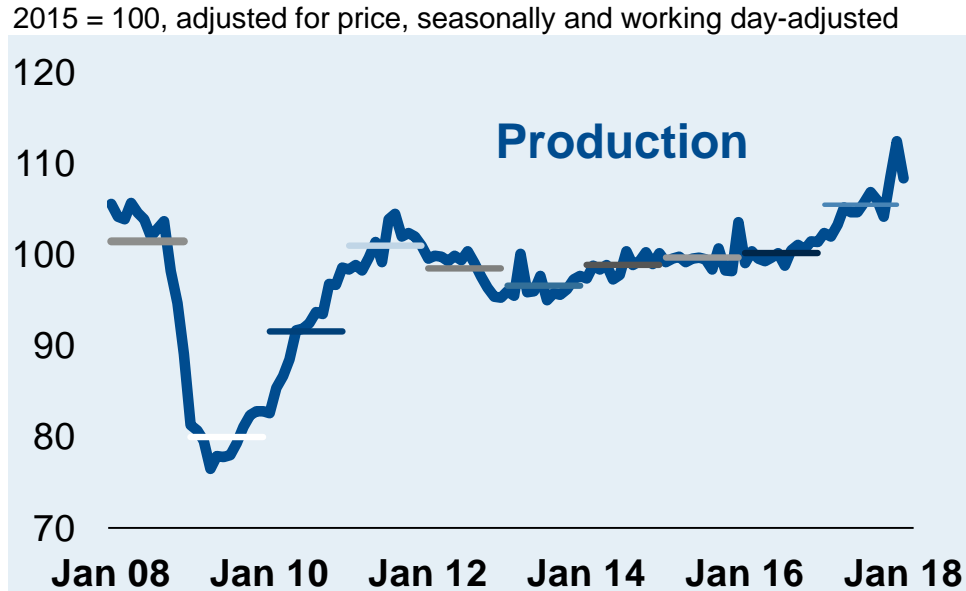
1/3 of sales with new products (not older than three years)

16% of all „Hidden Champions“ in Germany

Driving force for every third innovation within the total industrial sector

German E&E Industry

– Current economic situation

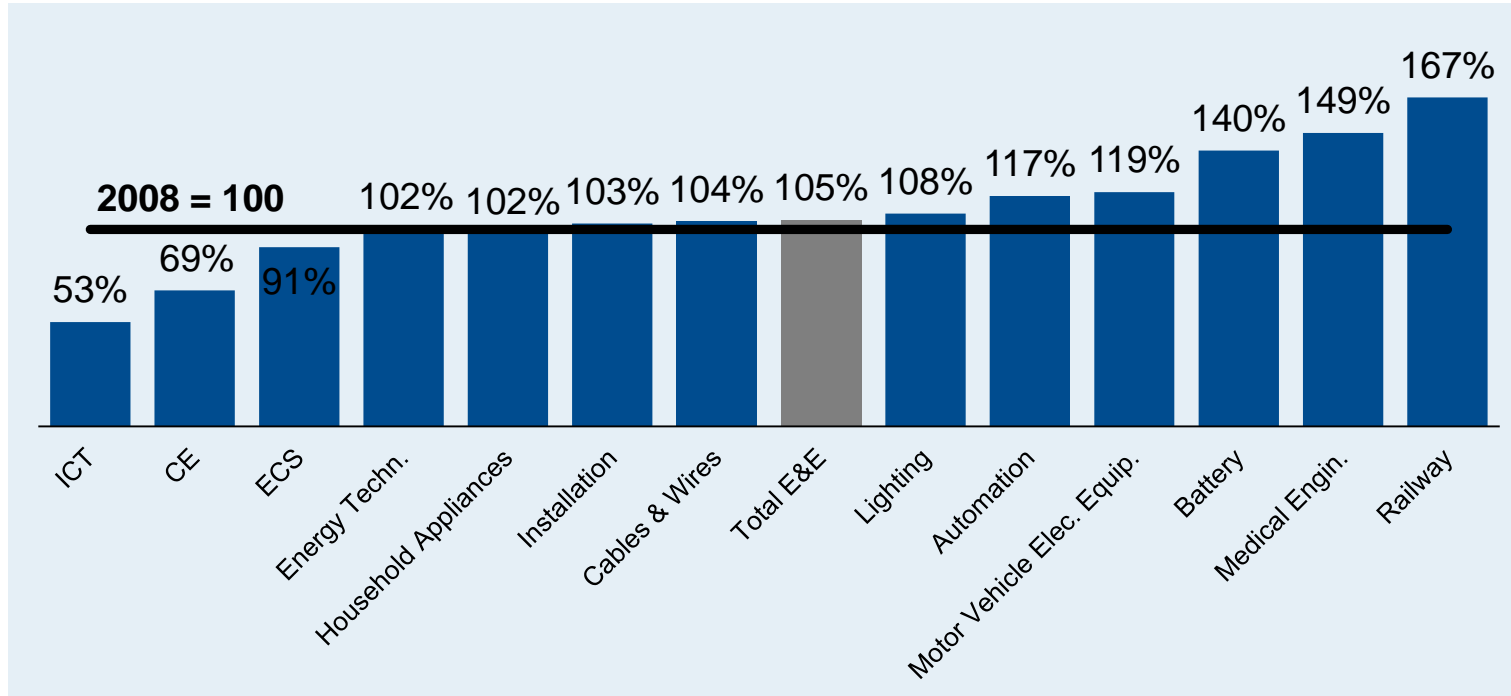


Source: Destatis and ZVEI's own calculations

| | 2016 | 2017 |
|--|--------------------------|--------------------------|
| Production (real) | +1.1% | +4.5% |
| Turnover (nominal, including services & software) | +0.2% €178.5bn | +7.3% €191.5bn |
| New orders | -1.0% | +11.0% |
| Exports | +4.4% €182.1bn | +9.6% €199.5bn |

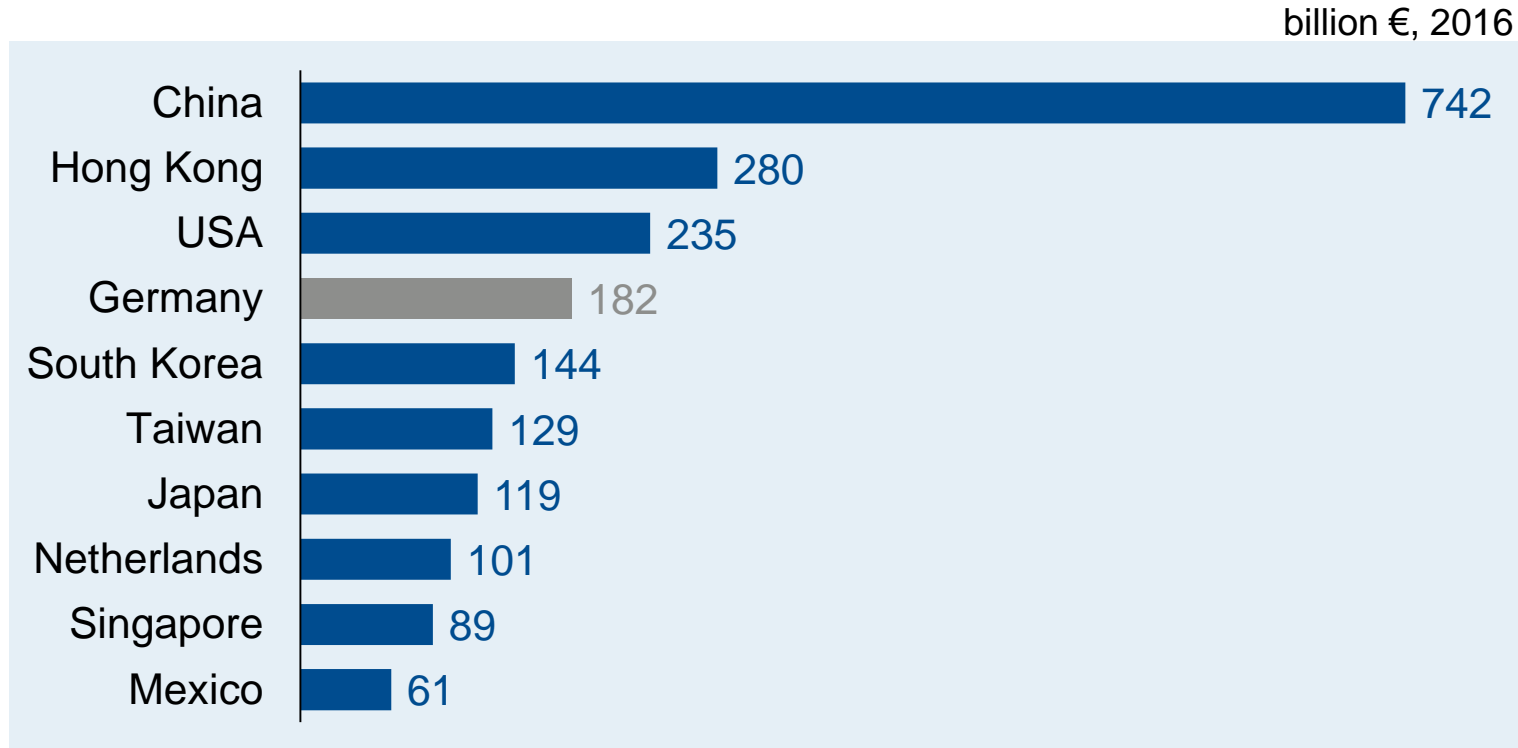
German E&E Industry

– Turnover in 2017 by sub-sectors



Source: Destatis and ZVEI's own calculations

Top 10 exporting countries of electrical and electronic products

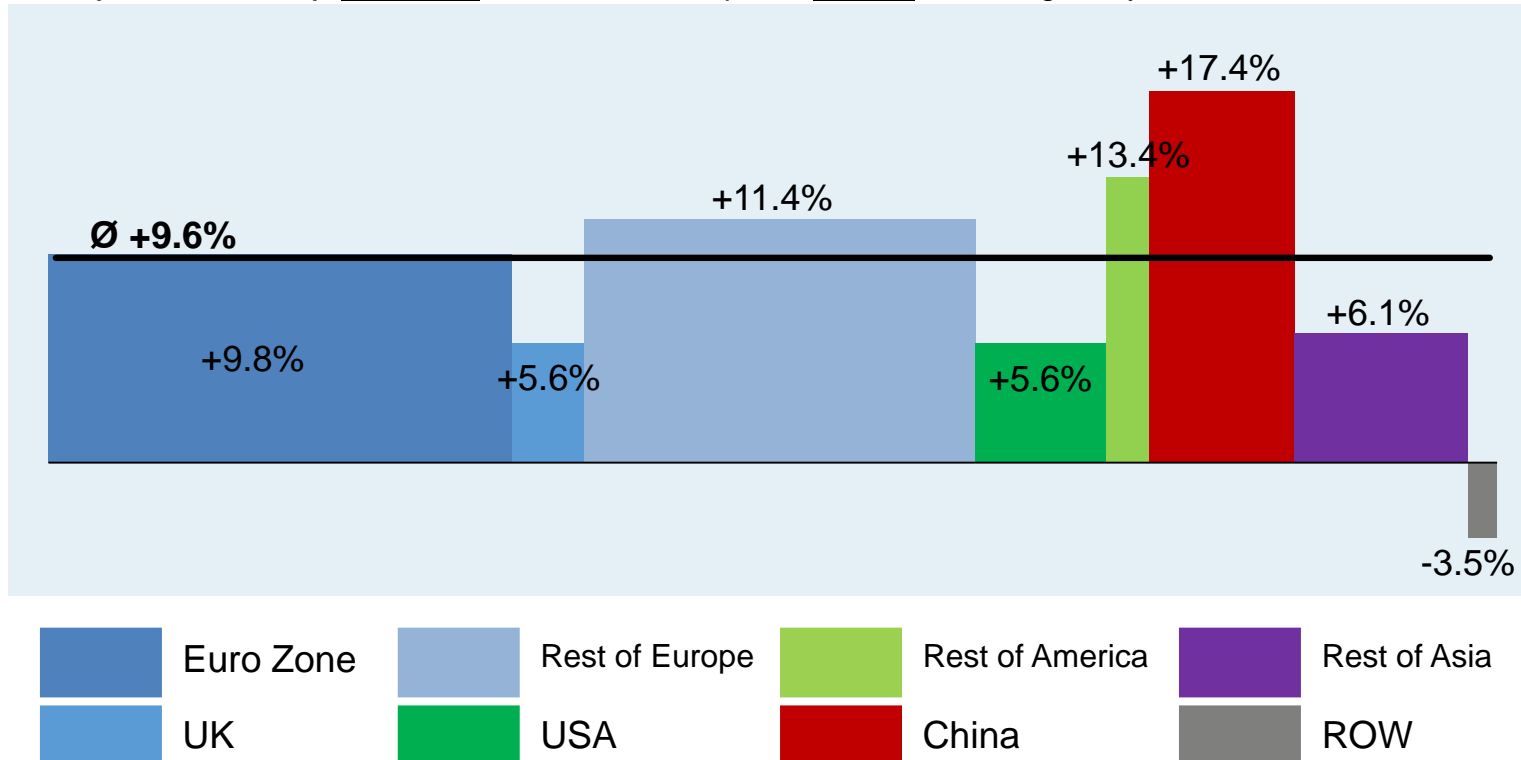


Source: National Statistical Offices, ZVEI's own calculations

German E&E Industry

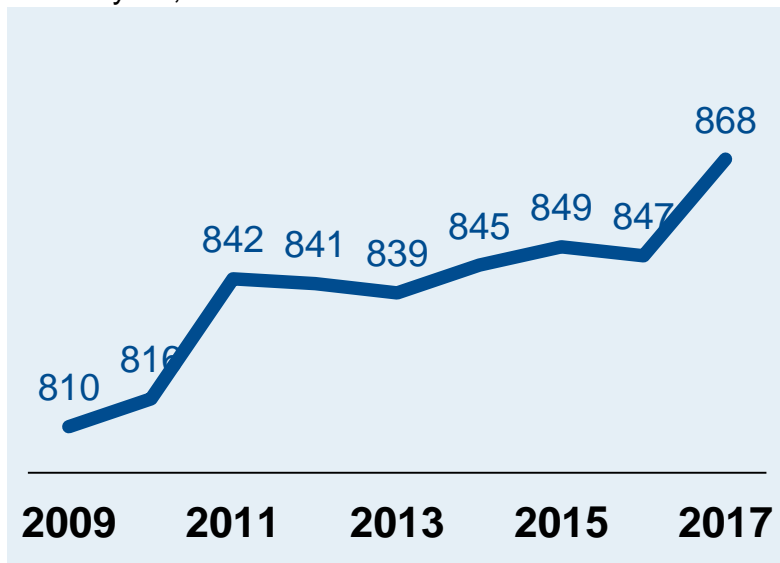
– Export performance in 2017

2017 (199,5 billion €), horizontal: share of total exports, vertical: % change on year earlier



German E&E Industry – Employees

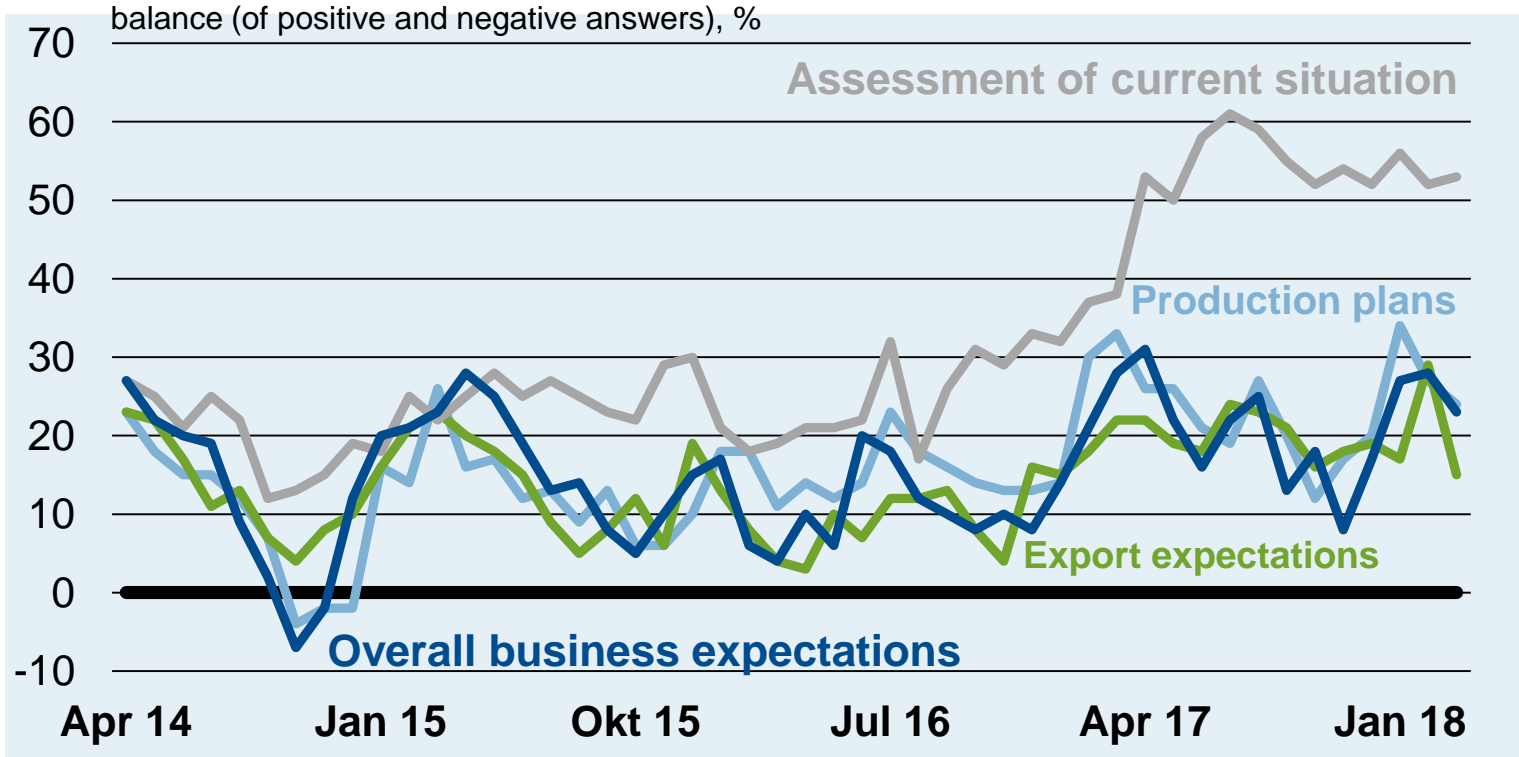
End of year, thousand



Source: Destatis and ZVEI's own calculations

| | 2017 |
|---|-------------------------|
| Automation | 270,800 (+6,000) |
| ECS | 77,600 (+2,800) |
| Energy | 62,500 (-100) |
| Domestic appliances | 48,100 (+1,800) |
| Medical engineering | 38,400 (+1,500) |
| Motor vehicle electric equipment | 33,200 (+1,500) |
| Lighting | 28,800 (+/-0) |

German E&E Industry – Ifo sentiment indicators

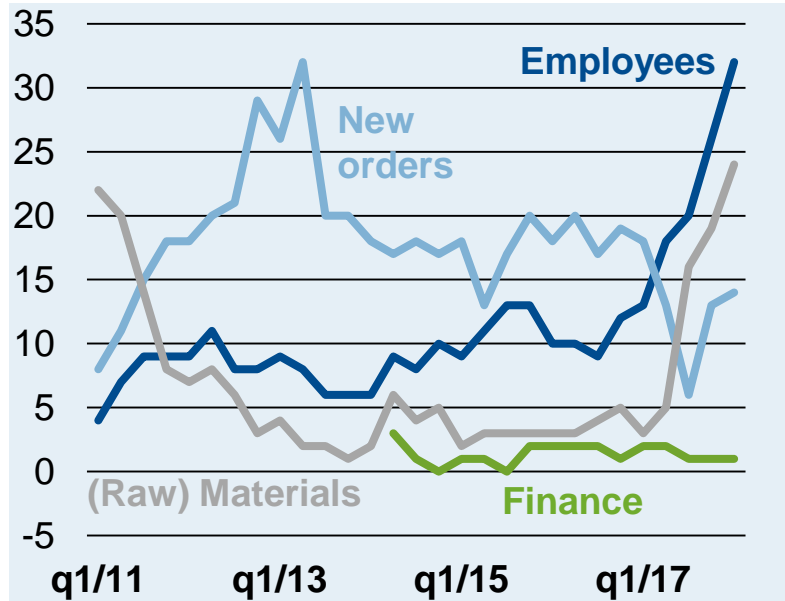


Source: Ifo Institute

German E&E Industry

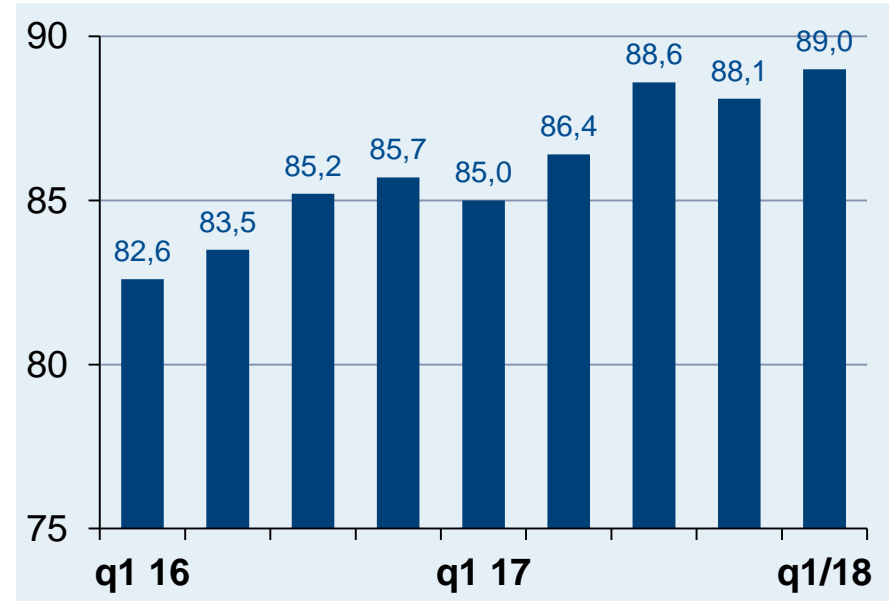
– Production obstacles and capacity utilization

Production obstacles by ... % of firms



Source: Ifo Institute

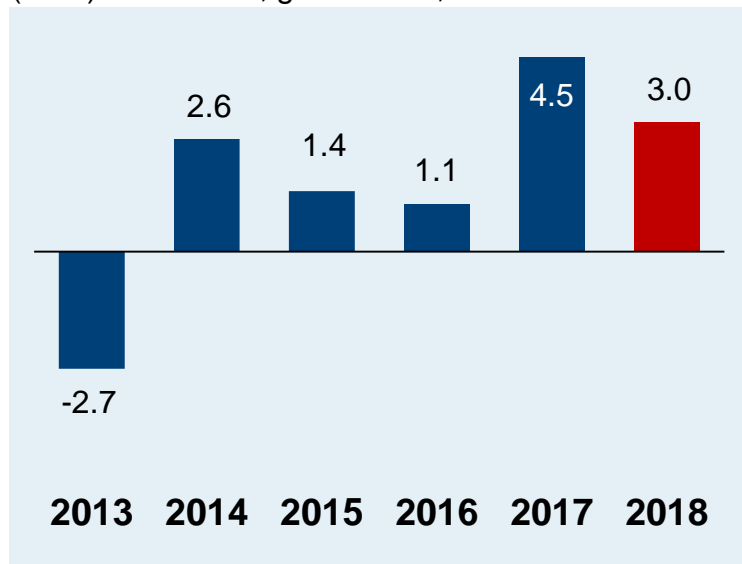
Capacity utilization (in % of normal full use level)



Outlook (1)

– German production of electrical and electronic products

(Real) Production, growth rate, %



Source: Destatis and ZVEI's own calculations

Leading markets from a topical point of view

- Industry (4.0)
- Energy (efficiency)
- (e-)Mobility
- Health
- Smart home and smart building

Outlook (2)

– E&E world market (selected regions and countries)

| | 2016 billion €* billion €* | 2017, %** Estimate | 2018, %** Forecast |
|----------------|----------------------------------|-----------------------|-----------------------|
| World | 4,128 | +4 | +4 |
| Europe | 685 | +2 | +2 |
| Germany | 125 | +2 | +2 |
| United Kingdom | 82 | +1 | +1 |
| France | 70 | +1 | +3 |
| America | 833 | +3 | +5 |
| USA | 617 | +4 | +6 |
| Asia | 2,497 | +5 | +5 |
| China | 1,645 | +7 | +6 |
| Japan | 267 | +2 | +1 |
| South Korea | 178 | +3 | +1 |

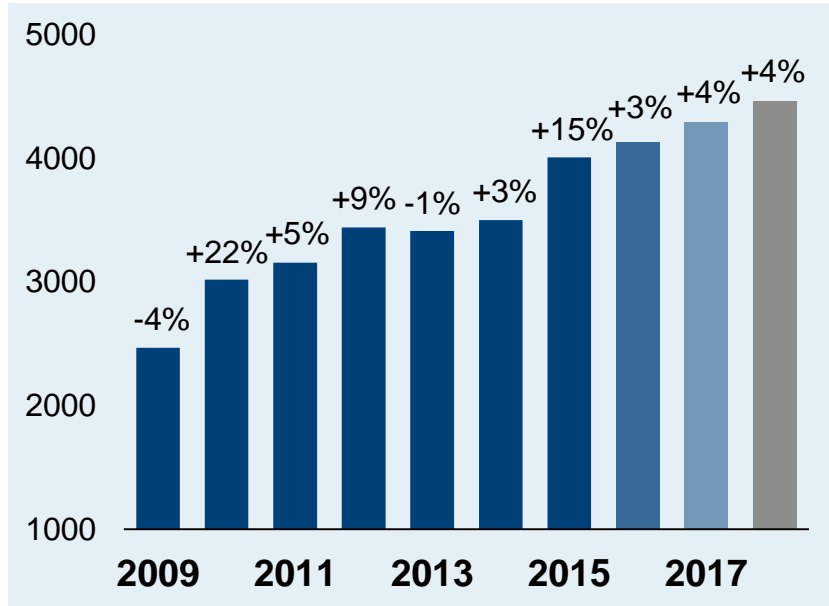
* preliminary and at fixed exchange rates; ** at fixed exchange rates

Source: National Statistical Offices and ZVEI's own calculations

Outlook (3)

- E&E world market (by sub-sectors)

E&E world market, billion €



* 2016 preliminary and at fixed exchange rates; ** at fixed exchange rates
Source: National Statistical Offices and ZVEI's own calculations

| | 2016 billion €* | 2017, %** Estimate | 2018, %** Forecast |
|----------------------|--------------------|-----------------------|-----------------------|
| E&E World Market | 4,128 | +4 | +4 |
| Automation | 510 | +4 | +4 |
| Energy Technology | 246 | +3 | +4 |
| Medical Engineering | 95 | +6 | +6 |
| CT | 437 | +3 | +4 |
| IT | 419 | +3 | +4 |
| Household Appliances | 248 | +5 | +5 |
| Lighting | 117 | +4 | +4 |
| Consumer Electronics | 231 | +3 | +3 |
| ECS | 1,020 | +6 | +4 |

Thank you very much for your kind attention!

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