Federal Ministry
for Economic Affairs
and Energy

Energie wende
Switch to the Future

Energiewende

Germany‘s energy system, status of energy transition, R&D needs

I: The magic triangle

II: Technological challenges

III: National R&D agenda

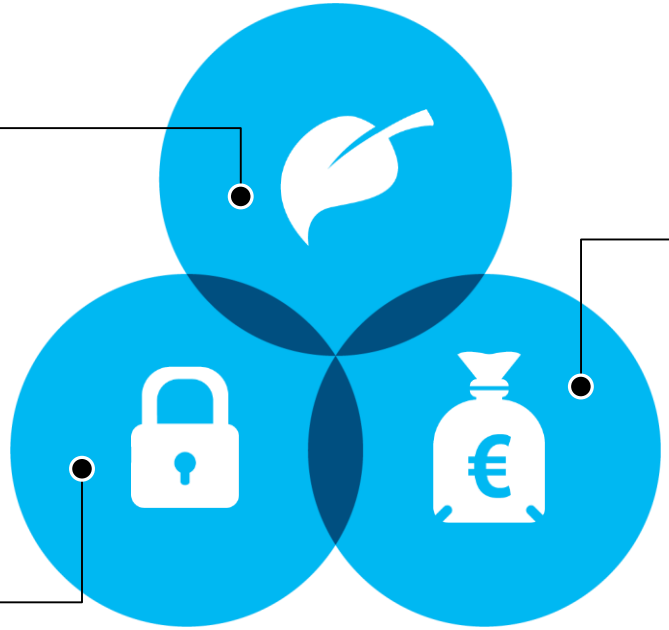
Johannes Kerner

BMWi IIC6

IEA EGRD Berlin Oct 22nd 2018

I: The *Energiewende* combines security of supply, cost-effectiveness and environmental protection

Environmentally sound

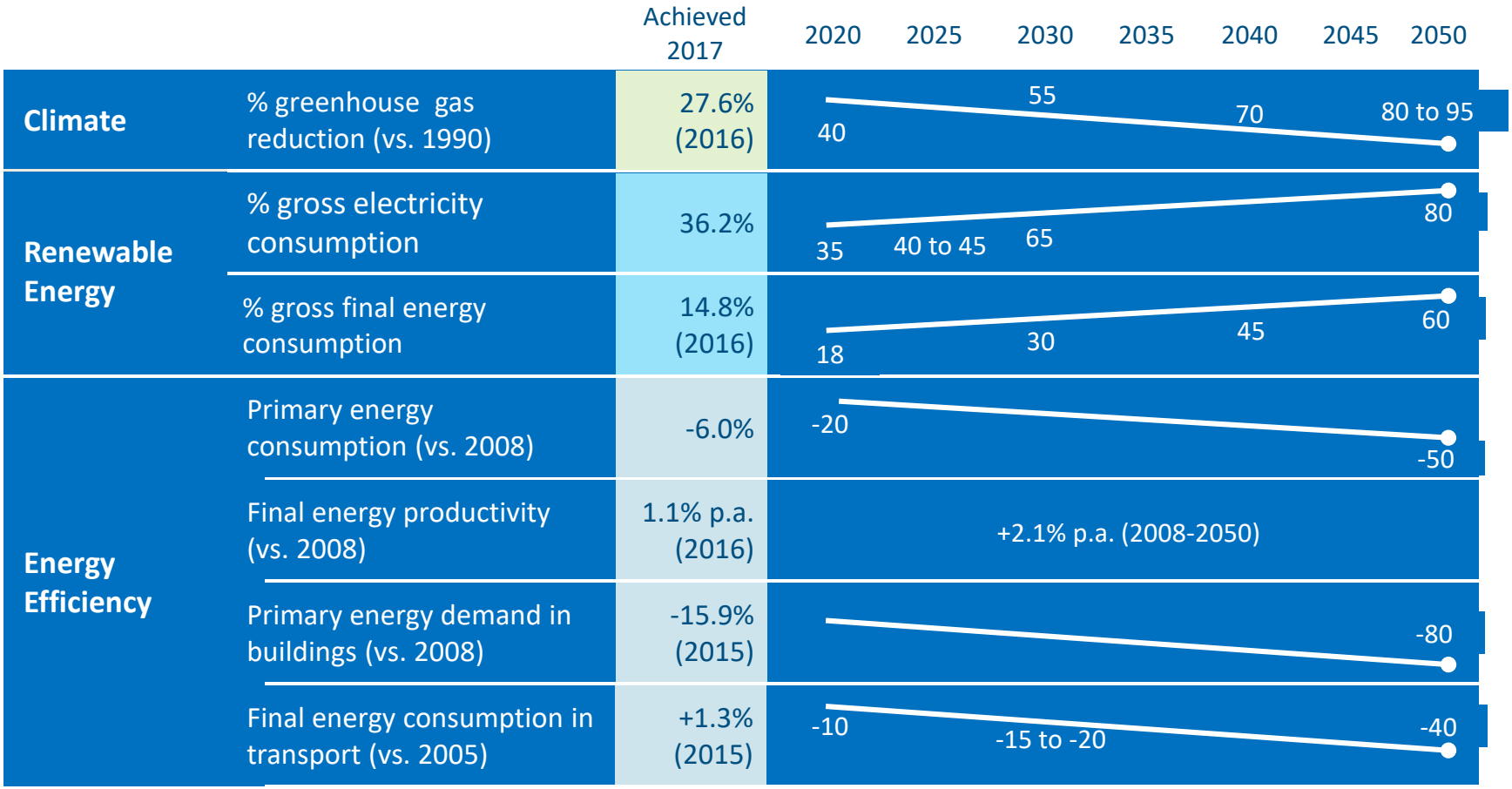


Affordable and cost-effective

Secure and reliable

Source: BMWi

The *Energiewende* is Germany's long-term energy and climate strategy



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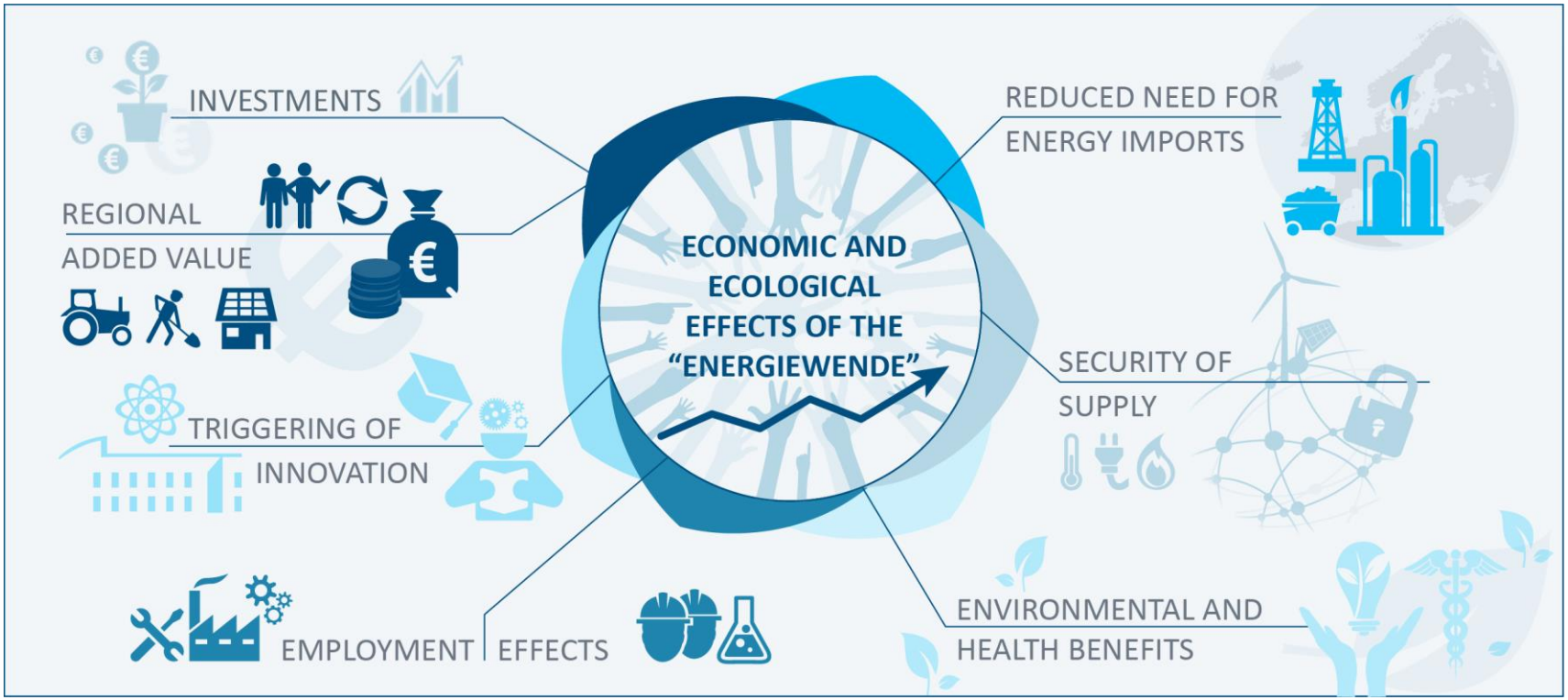
The energy transition is having positive effects at various levels of the economy



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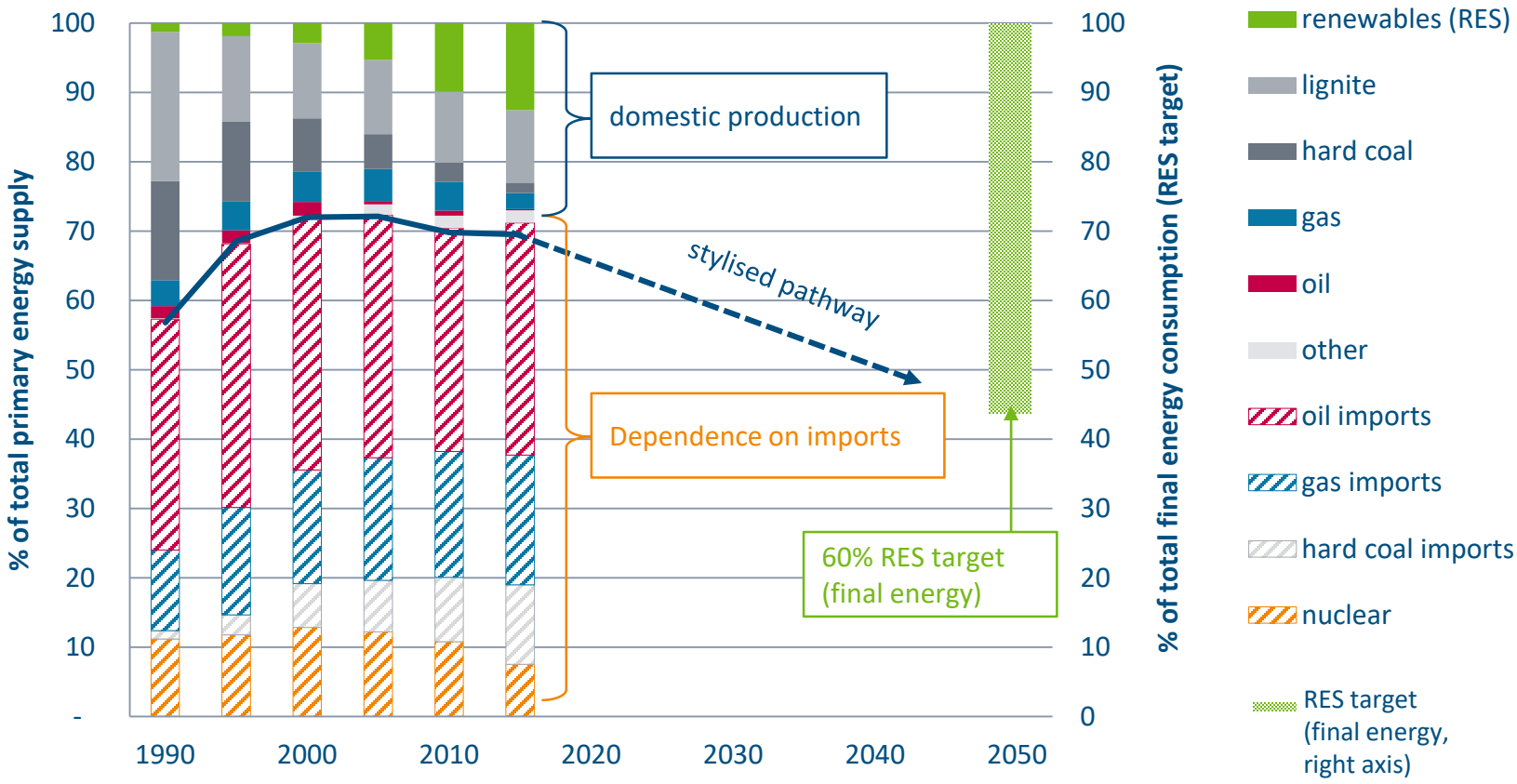
Renewables reduce dependence on energy imports



Source: Ecofys 2017 based on AGEB 2012, AGEB 2014

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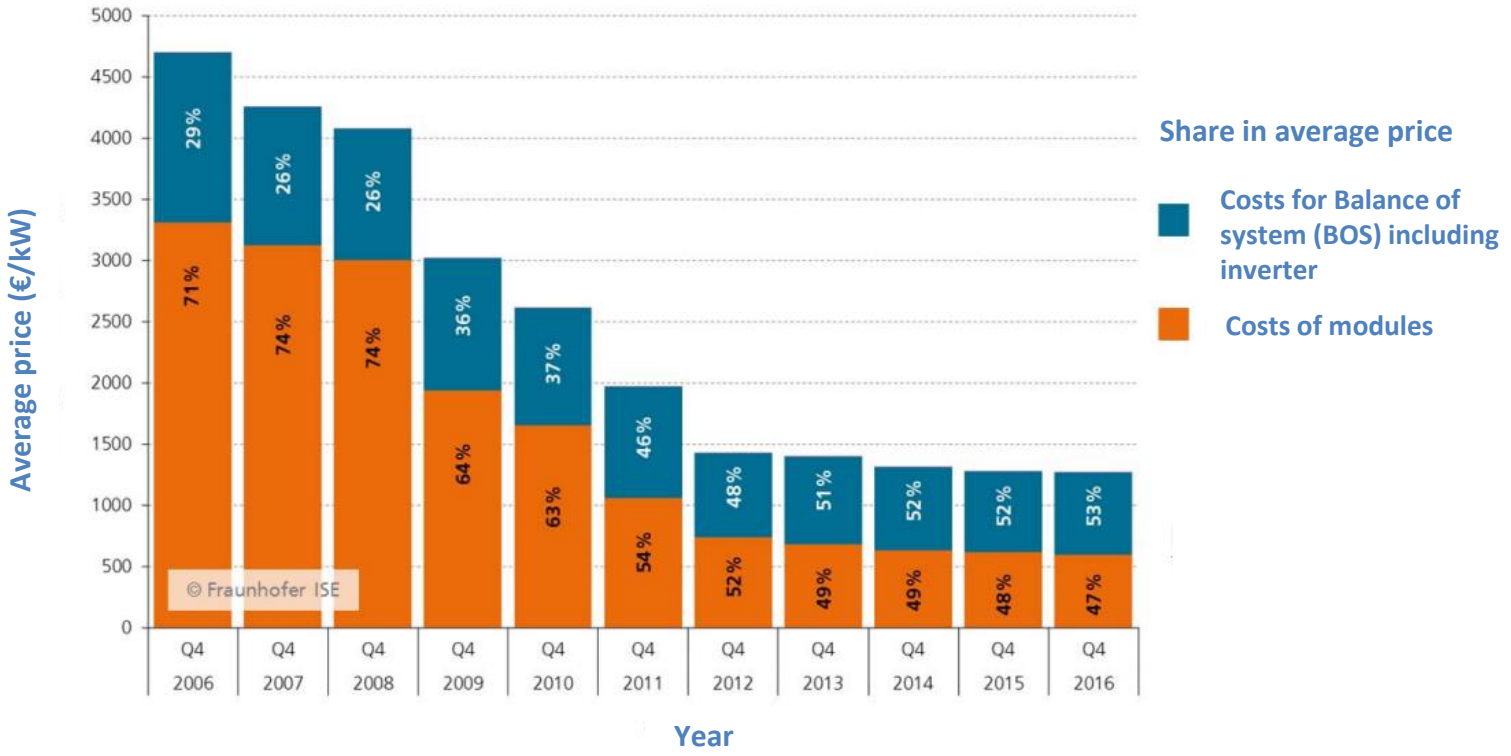
Declining module costs in particular have driven down the price of solar PV systems in Germany



Average retail price for rooftop systems with an installed capacity of 10-100 kW

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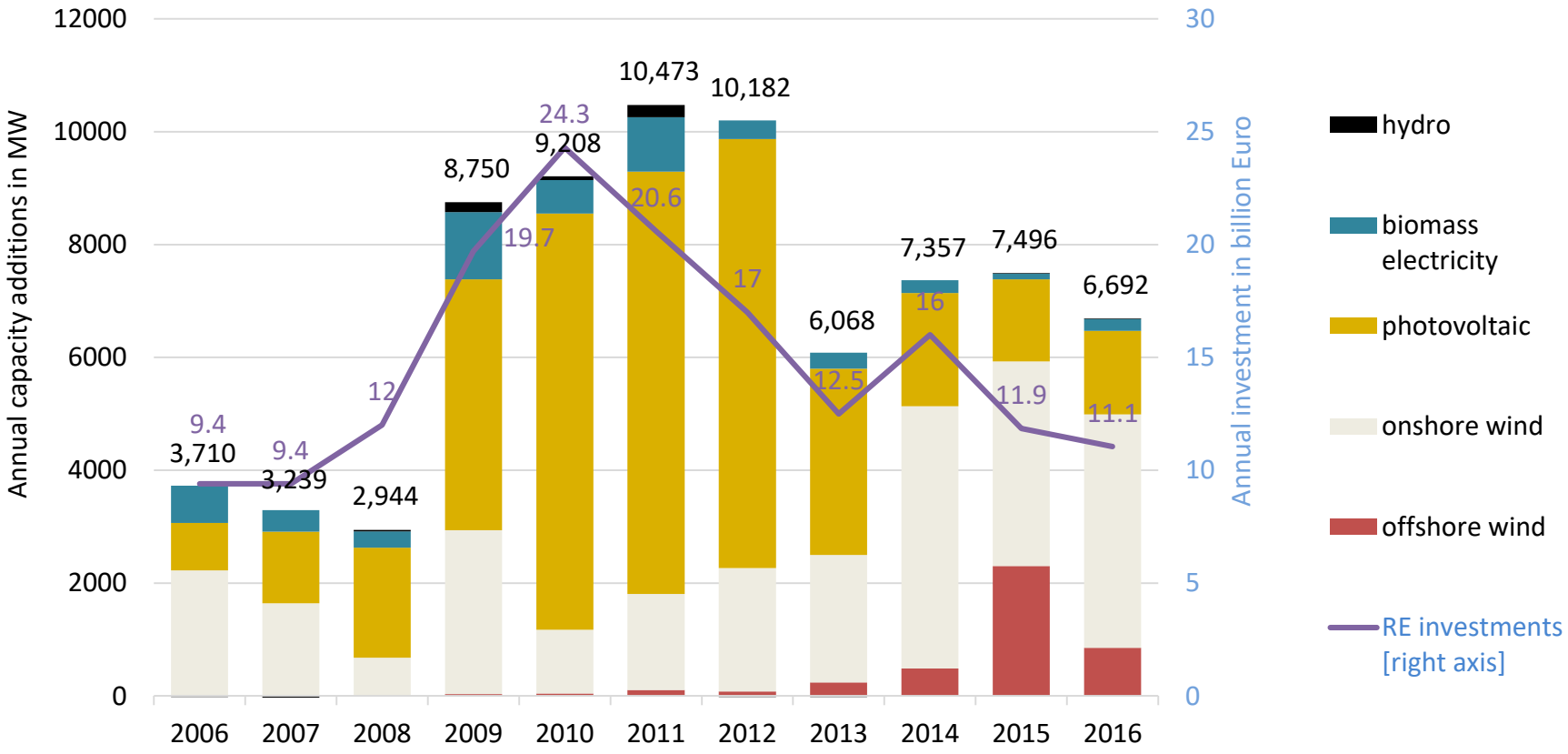
Investments in wind power have overtaken investments in solar PV



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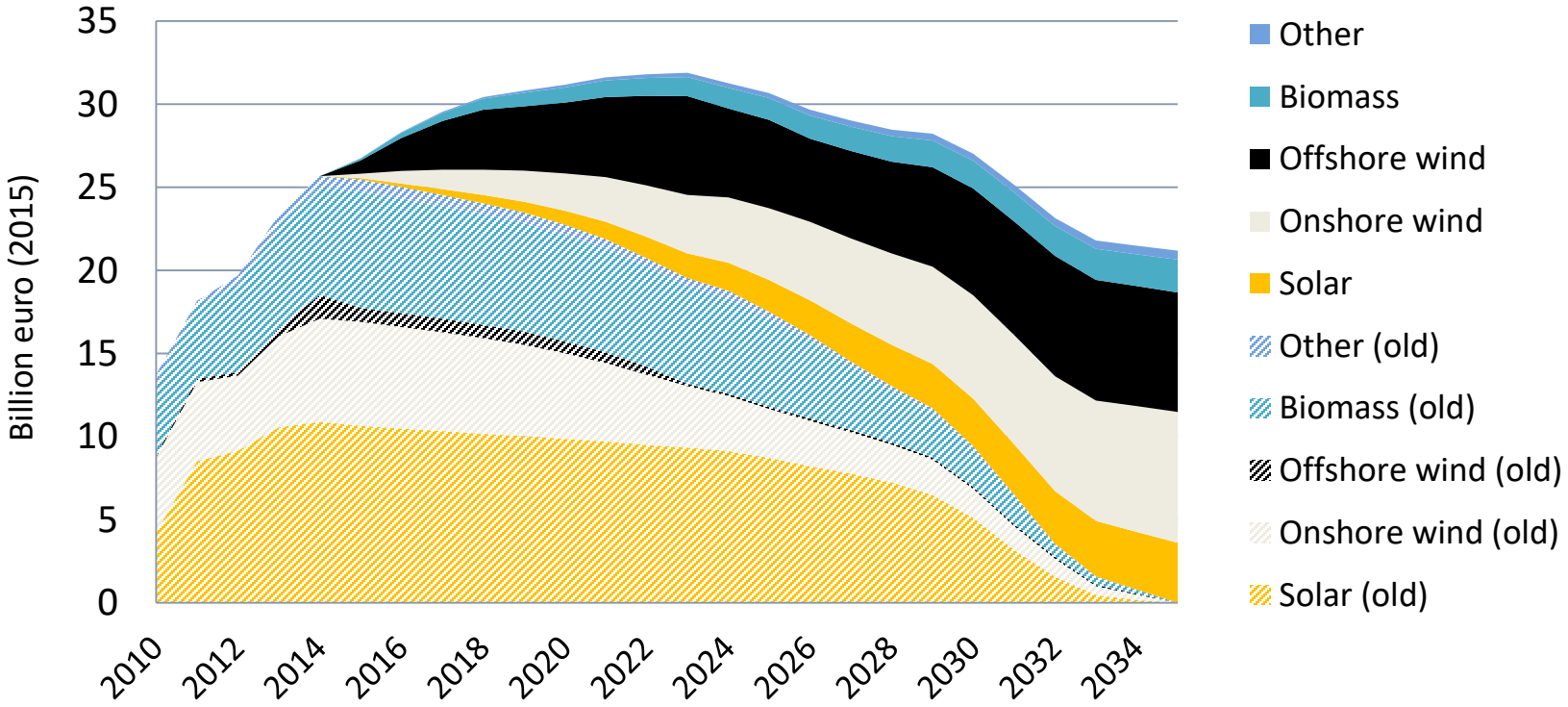
German RES support payments mainly go to existing plants; new installations account for a much smaller share



Source: Ecofys 2015, based on Agora Energiewende (Mai Initiative 20)

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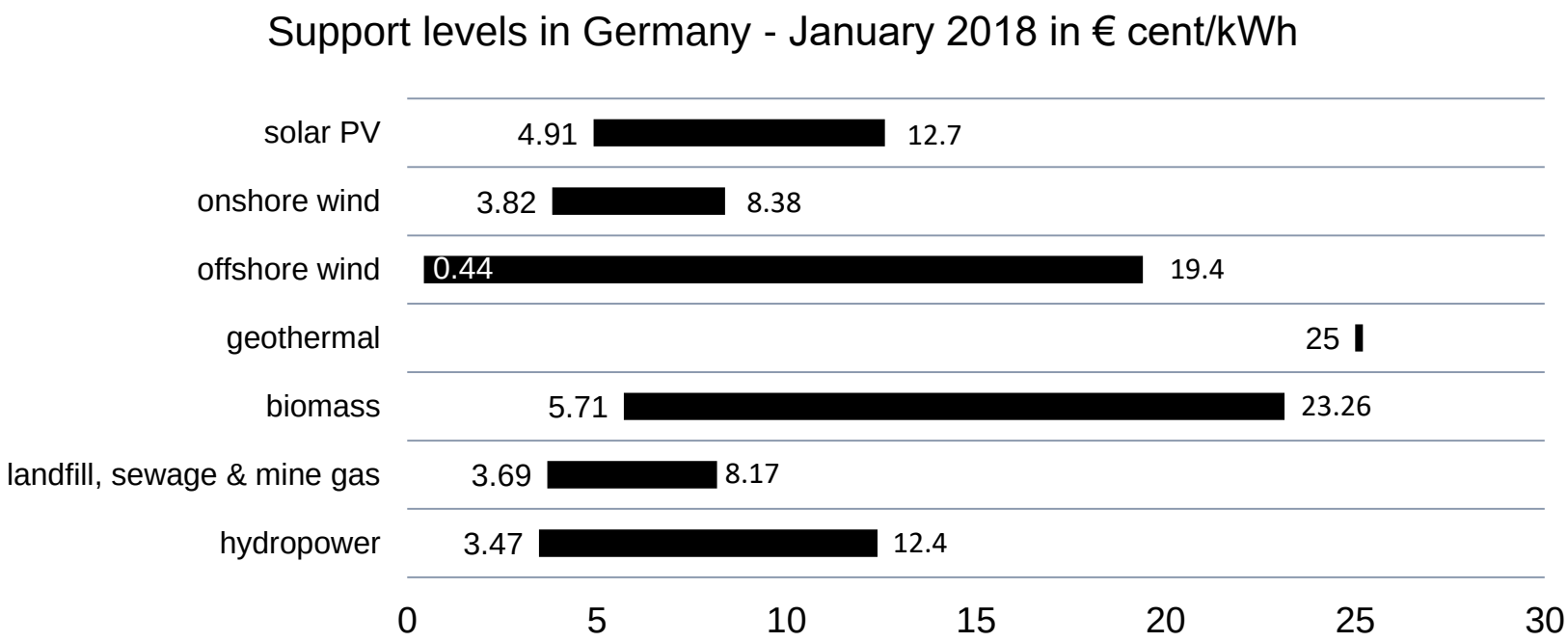
Technology-specific payments reflect the varying cost of different types and sizes of renewables



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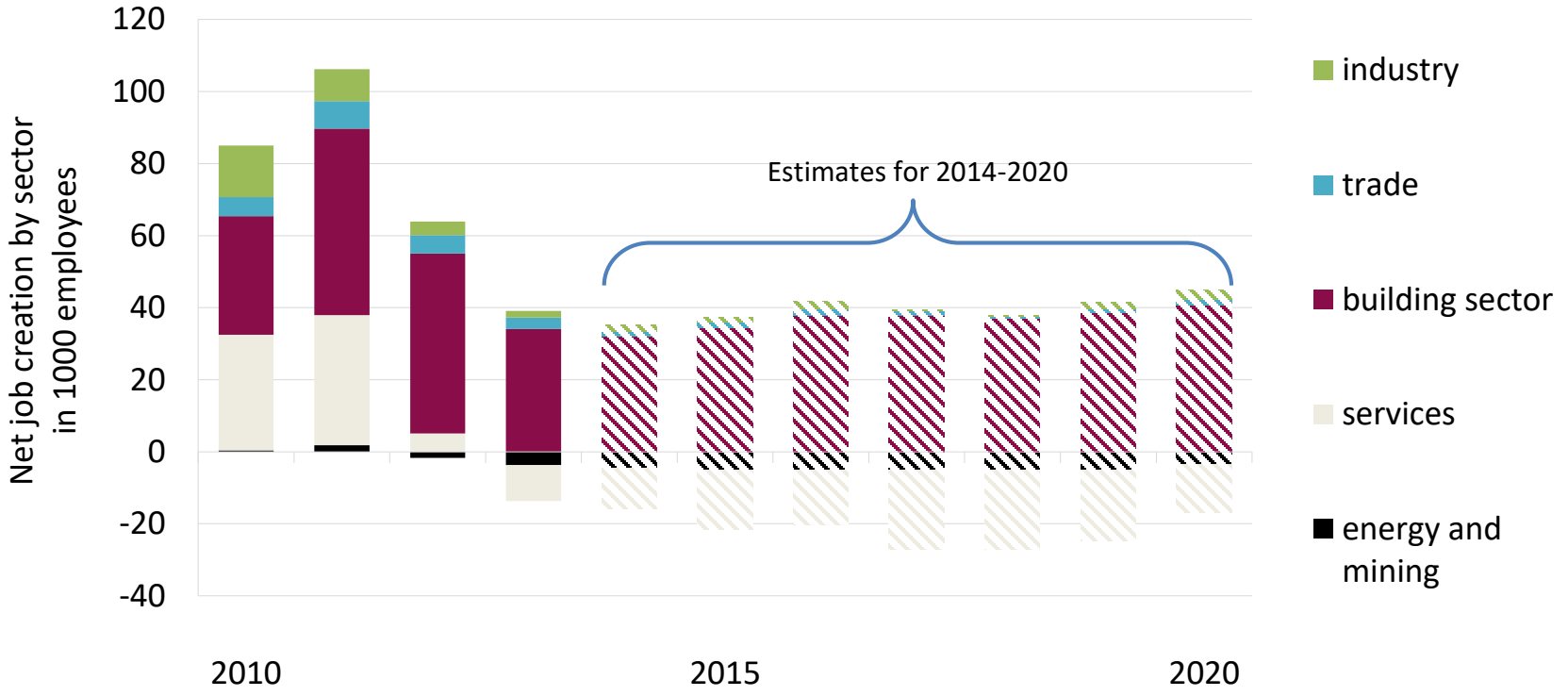
Net job creation shows that the German building sector is benefiting most from the energy transition



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II: The energy transition triad combines efficiency, direct use of renewables and sector coupling

Efficiency first

Direct use of renewables

Sector coupling

Source BMWi 2017

Improved grid connections between northern and southern Germany are required to prevent shortages

Supply

Demand

- solar
- wind (installed)
- wind (planned)
- bottlenecks
- transmission grid
- distribution grid
- high-demand areas

Source: DUH 2011

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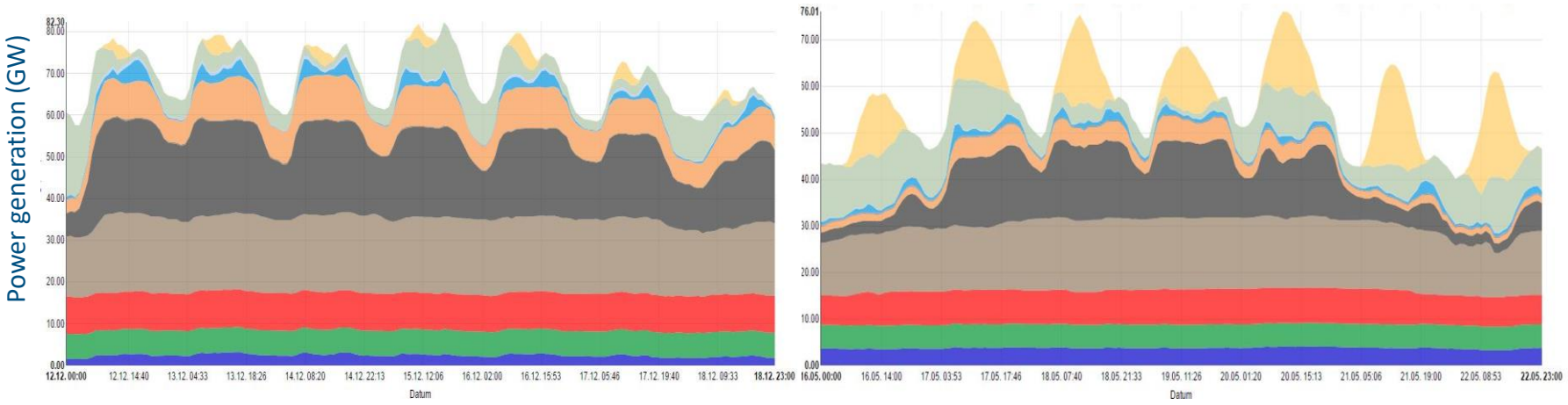
Renewables require high flexibility from the system

Winter 2016
week no. 50 (December)

Summer 2016
week no. 20 (May)



solar | seasonal storage | oil | hard coal | nuclear | hydro

wind | pumped storage | gas | lignite | biomass

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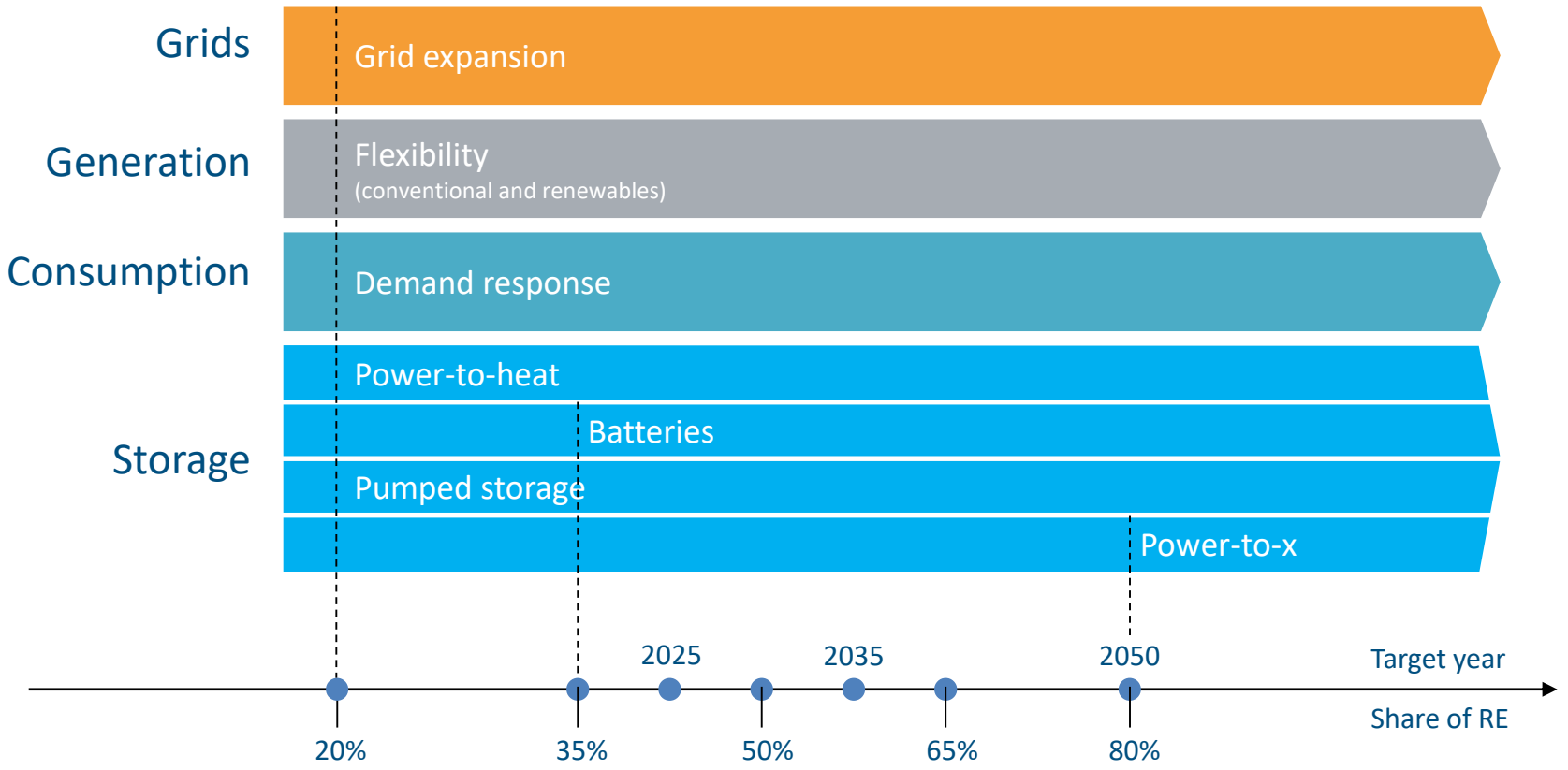
Flexibility options are key to making the system renewables-ready



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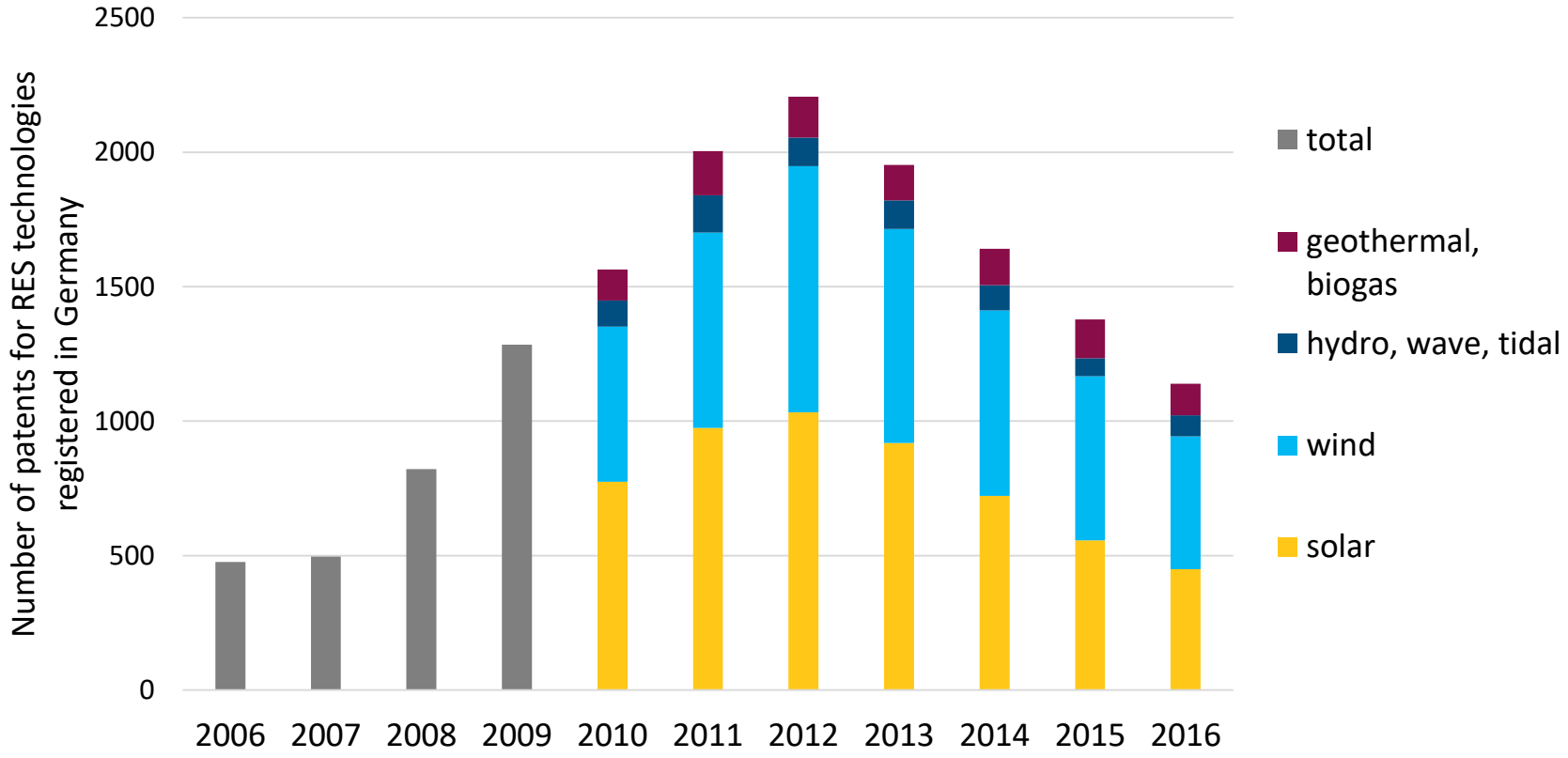
The energy transition is a driver of innovation in Germany



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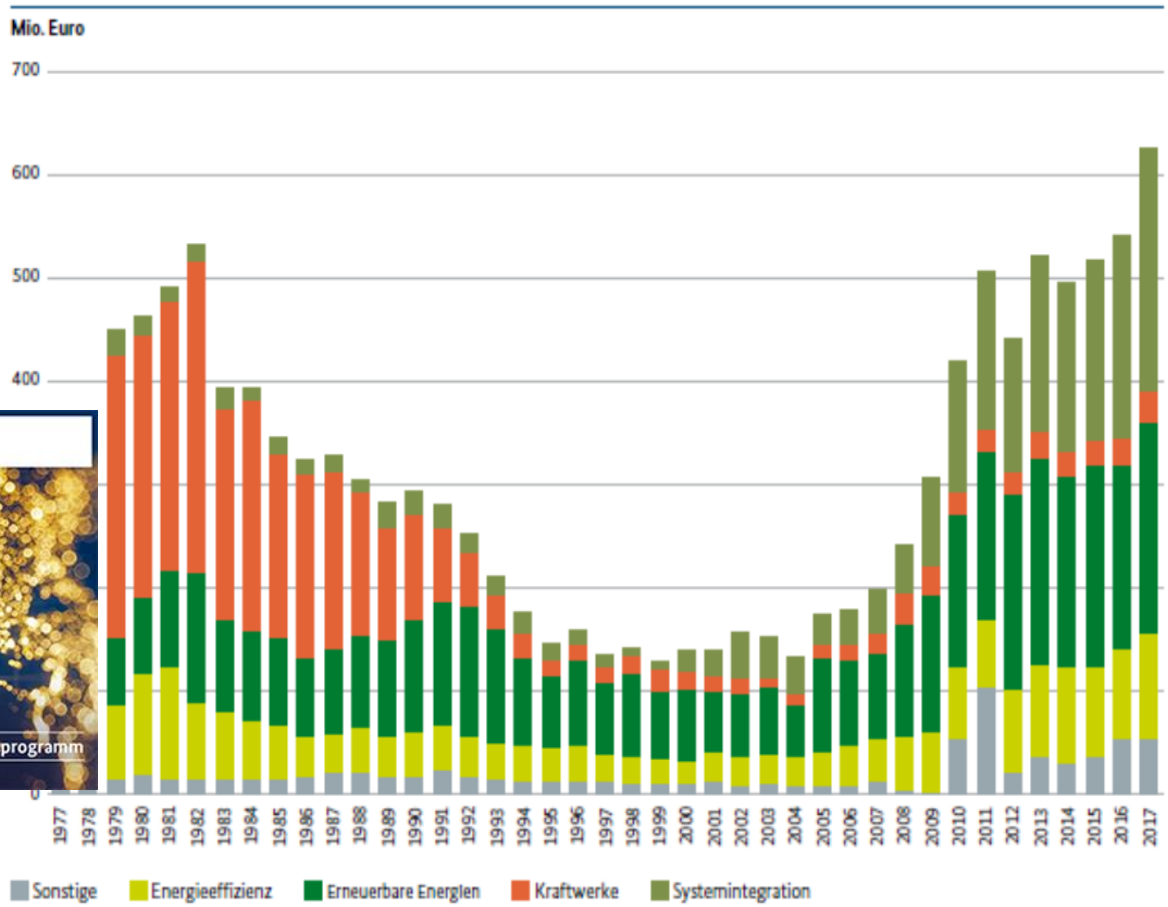
III: The new energy research programme

- Published end of September 2018
- Replaces 6th programme from 2011
- New focus areas:
  - Sector coupling (PtX)
  - Digitalisation
  - From Lab to Market

Source BMWi 2017

Evolution, not Revolution



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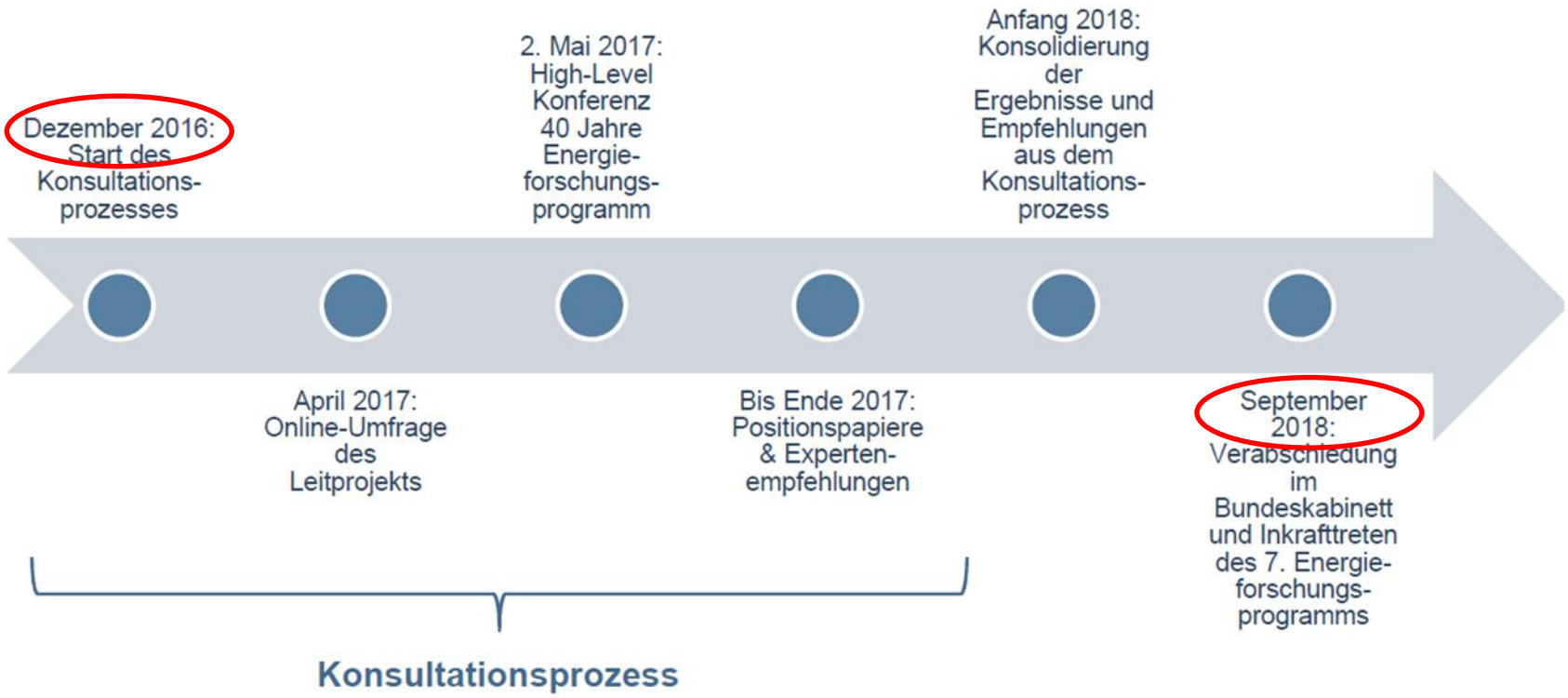
The Road to EFP7: Public Consultation



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Highlights

New focus on technology und innovation transfer to markets

- „Living labs“ as bridging instrument towards market uptake of technological innovation
- Dynamic product development through better integration of „startup“ companies

More attention to systemic relevant and cross-cutting issues

- Digitisation , Sector coupling (Power-to-X)…

Better coordination between project-based and institutional R&D funding

Closer European and international cooperation.

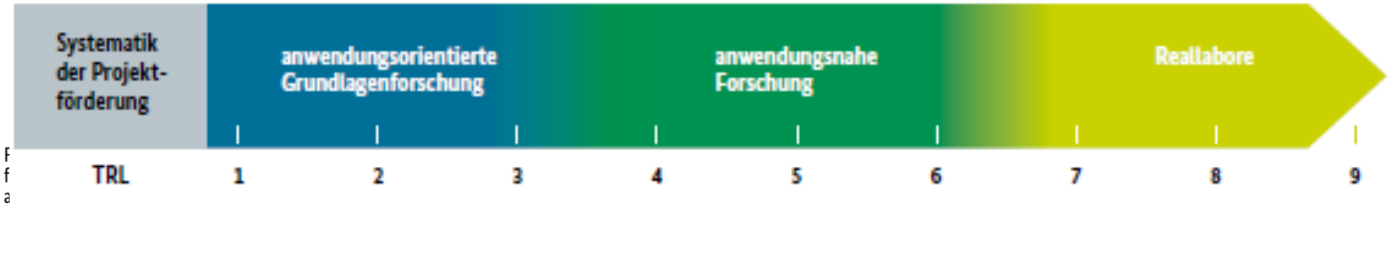


Table of Content Research Topics

Cross cutting issues

- Energy System Analysis
- Digitisation
- Resource Efficiency
- CO2-technologies
- Societal engagement
- Materials research

Consumers

- Buildings and Quarters
- Industry and Commerce
- Link to mobility and transport

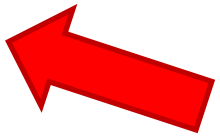
System integration

Electricity Grid, Storage

Sector coupling (Power to X)

Energy Production

- Photovoltaics
- Wind
- Bioenergy
- Geothermal energy
- Hydropower
- Fossil power plants



special emphasis on
heat, transport and industry

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„Living Labs“ and „Startup culture“

Living Labs: extended versions of previous demonstration projects:

Possible topics:

- sector coupling
- large-scale thermal storage
- CO2 technologies
- smart grid, virtual power plants

includes „regulatory learning“

Drawing ***Startups*** into energy research

-Inclusion of non-technical innovation (business models, new services) related to new energy technologies

-Streamlining and accelerating administrative procedures (e.g. revised financial standing requirements)

-New *Startups* networking platform

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Thank you
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Contact details

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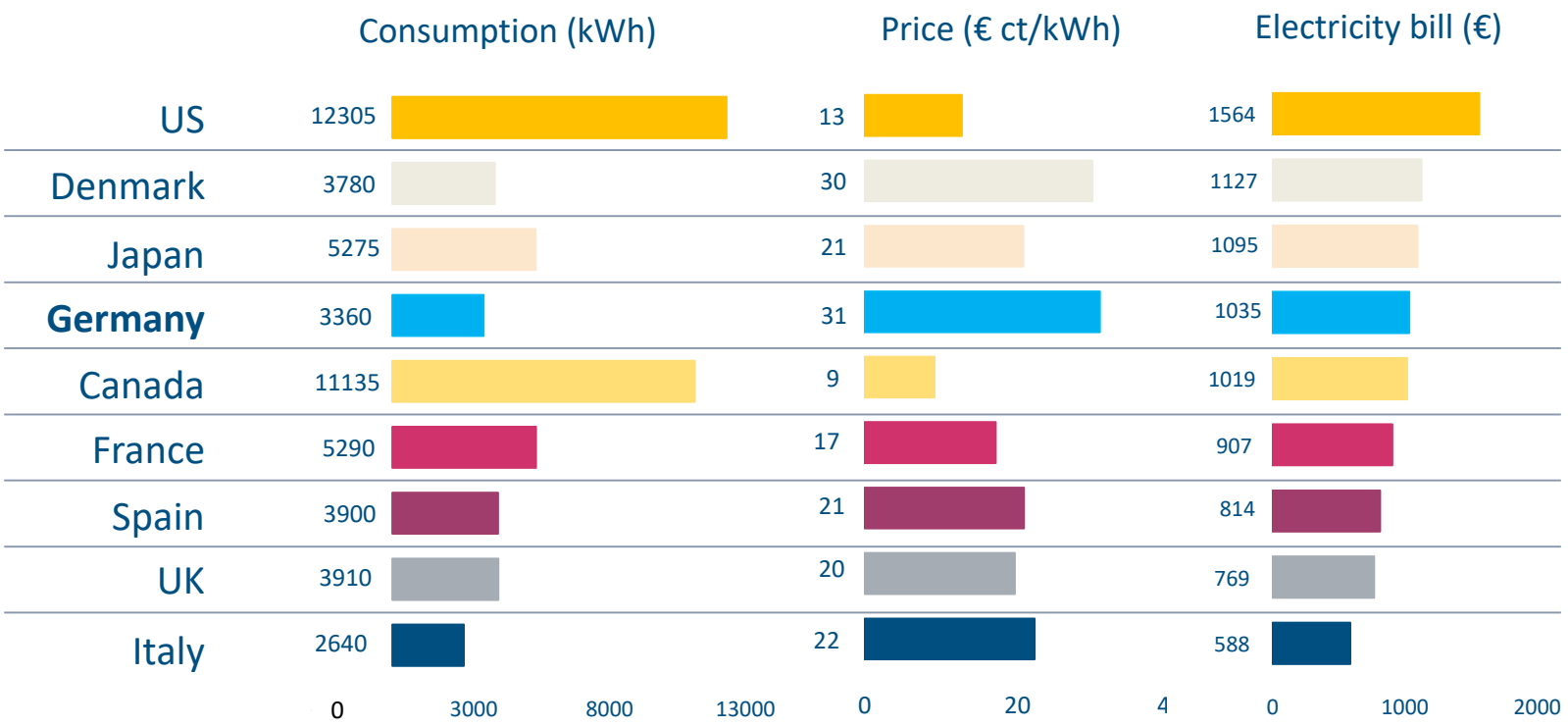
Average electricity bills in Germany are comparable to those of other industrialised countries



Data from 2014-2017

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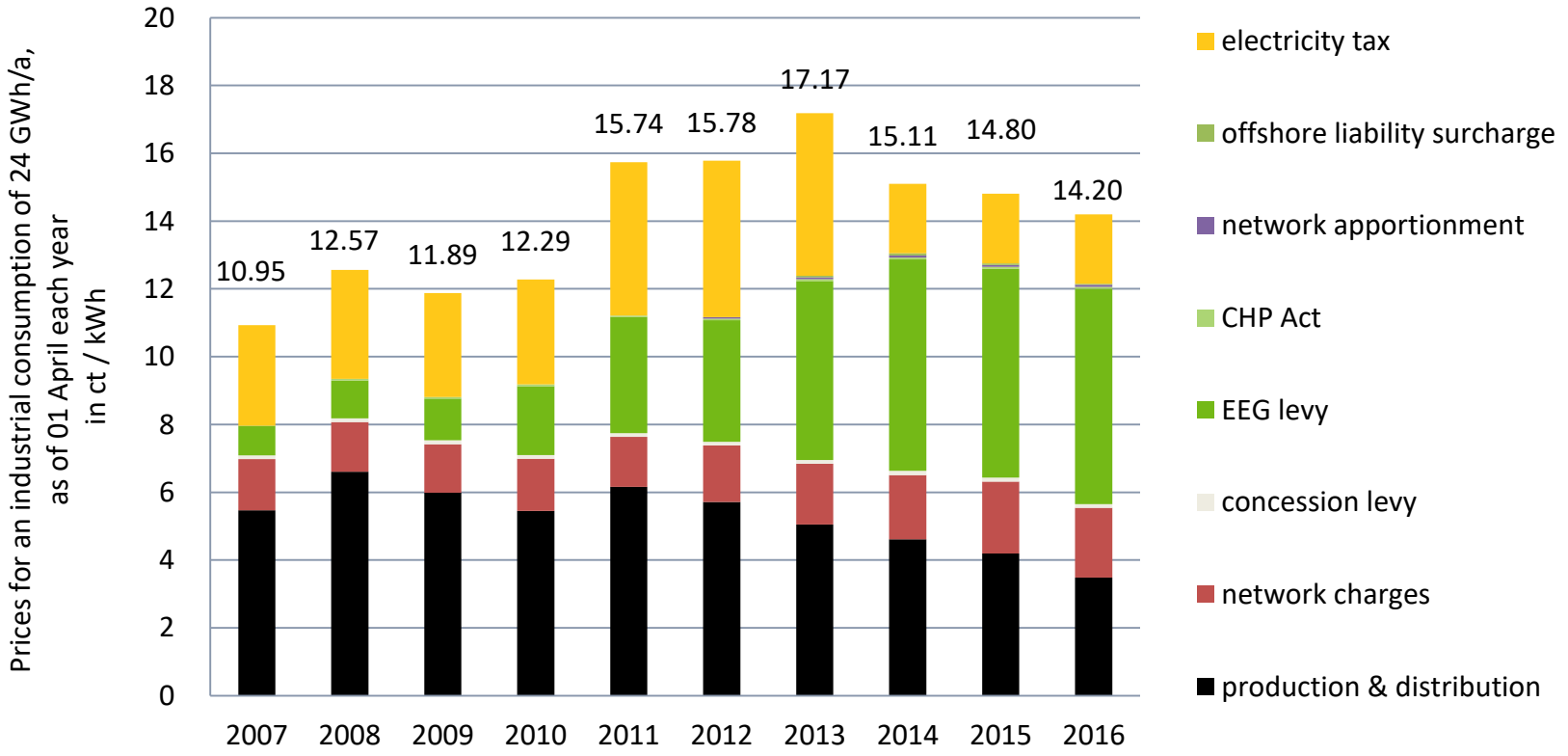
German industrial electricity prices: increased levies balanced by declining production costs



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