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Energy Efficiency in the German Chemical Industry

Dr. Jörg Rothermel, September 30, 2020

VERBAND DER
CHEMISCHEN INDUSTRIE e.V.
WIR GESTALTEN ZUKUNFT.

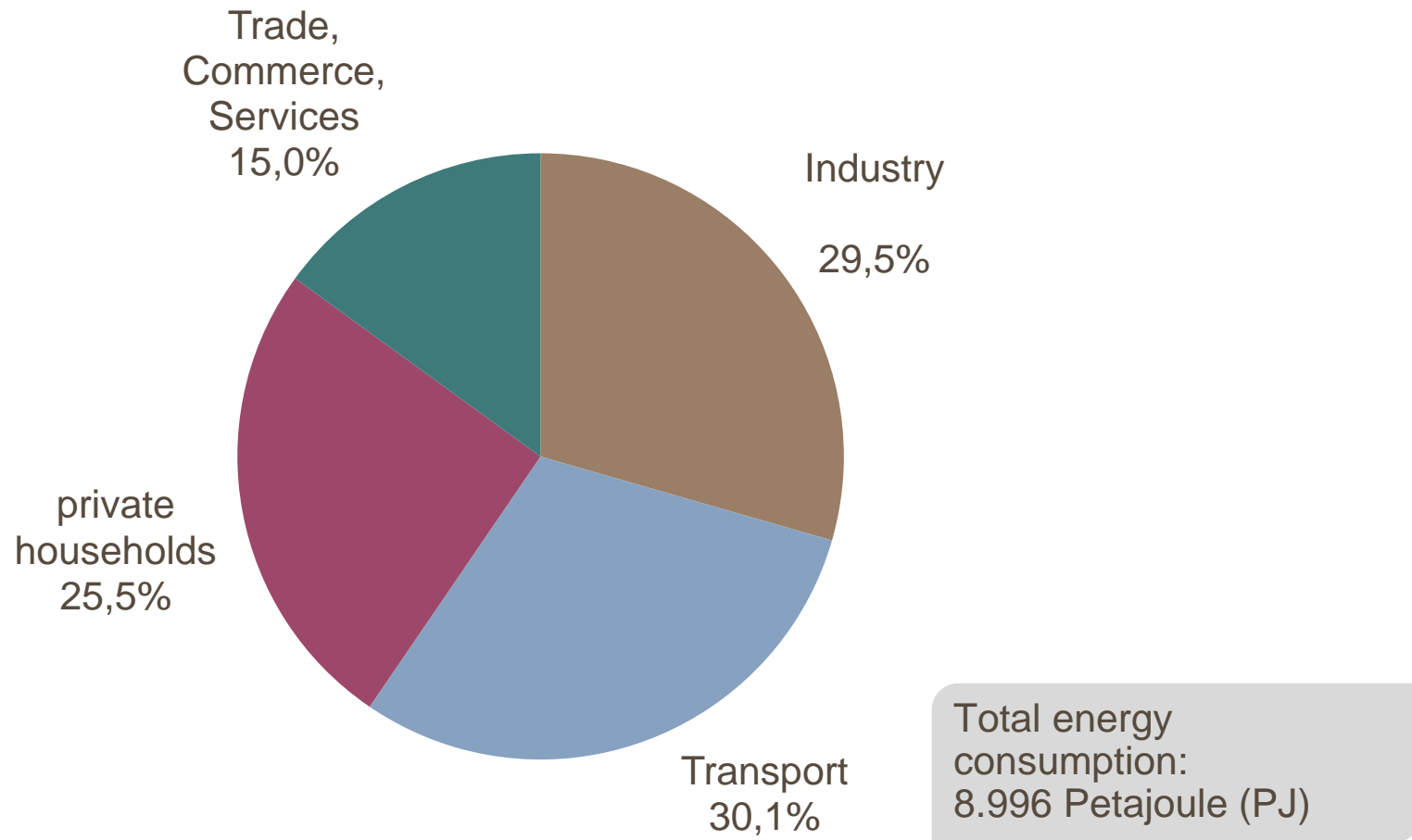


VCI

Energy Consumption in Different Sectors

Industry and transport with the same energy consumption

Energy demand in Germany 2018

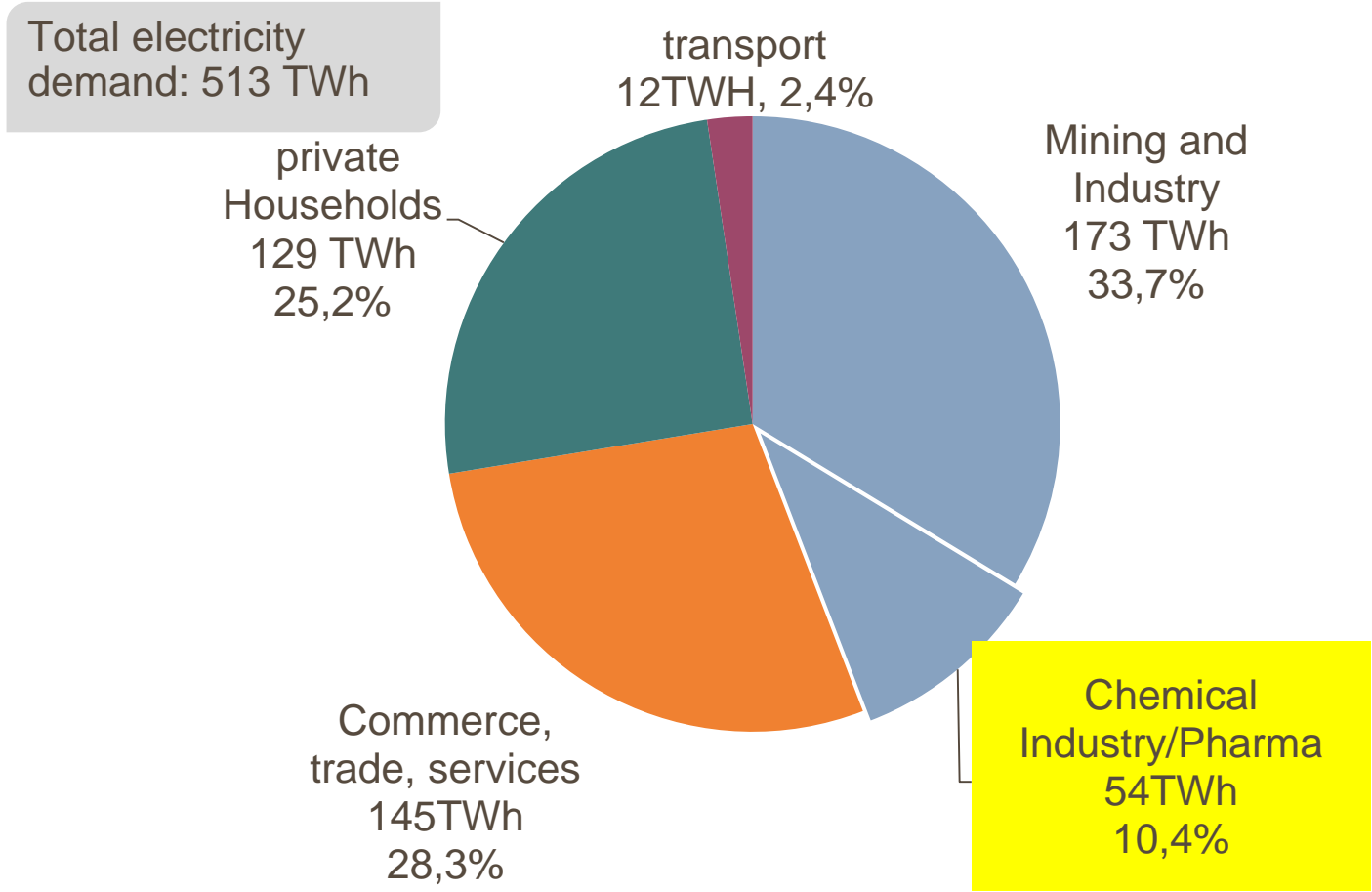


Quelle: AG Energiebilanz, VCI

Industry with the highest electricity demand

Electricity consumption in different sectors

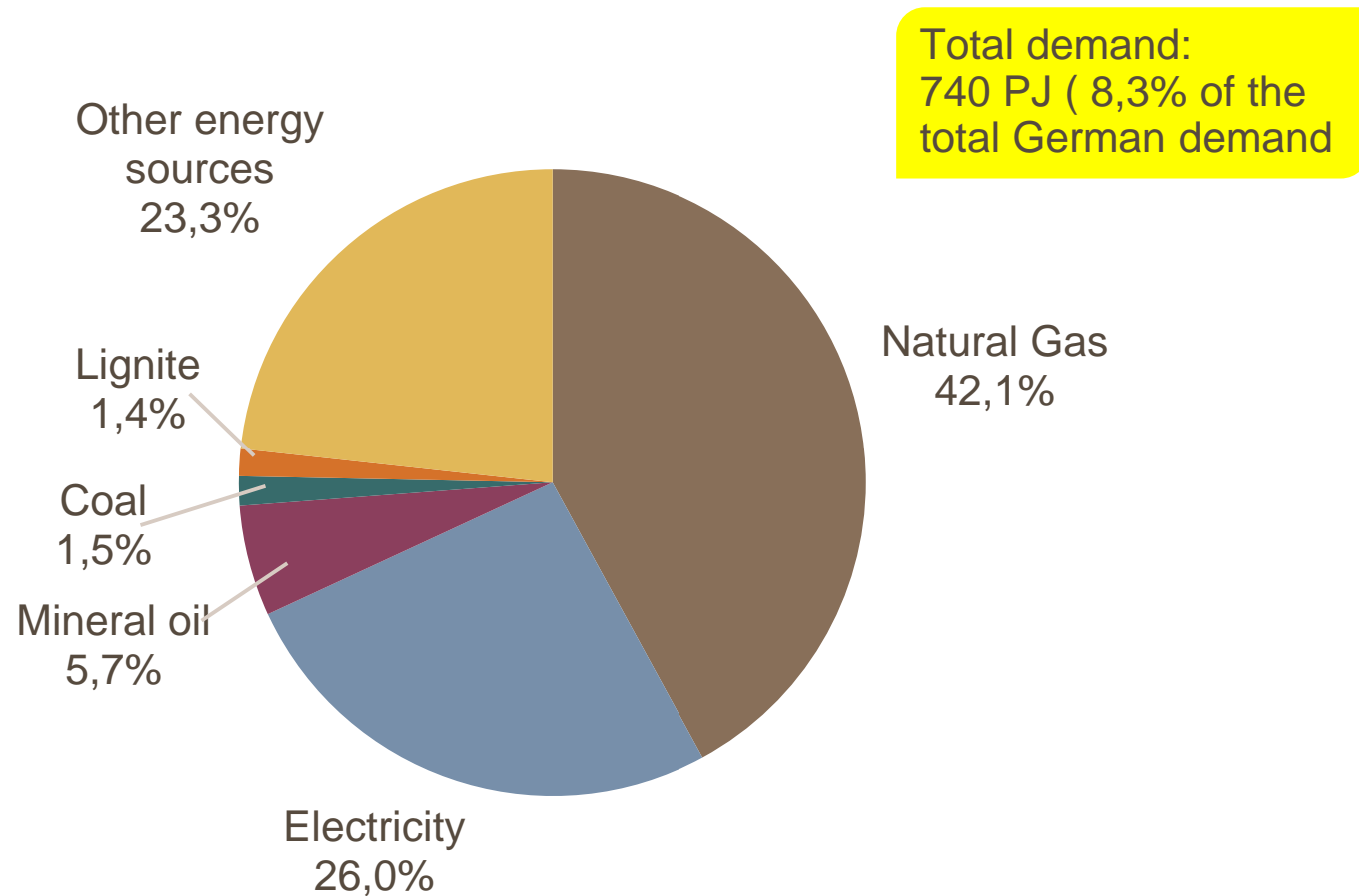
TWh and percentage, 2018



Quellen: Destatis, AG Energiebilanz, VCI

Chemical Industry: Natural Gas and Electricity most important energy sources

Energy demand in the chemical and pharmaceutical Industry in percent, 2018

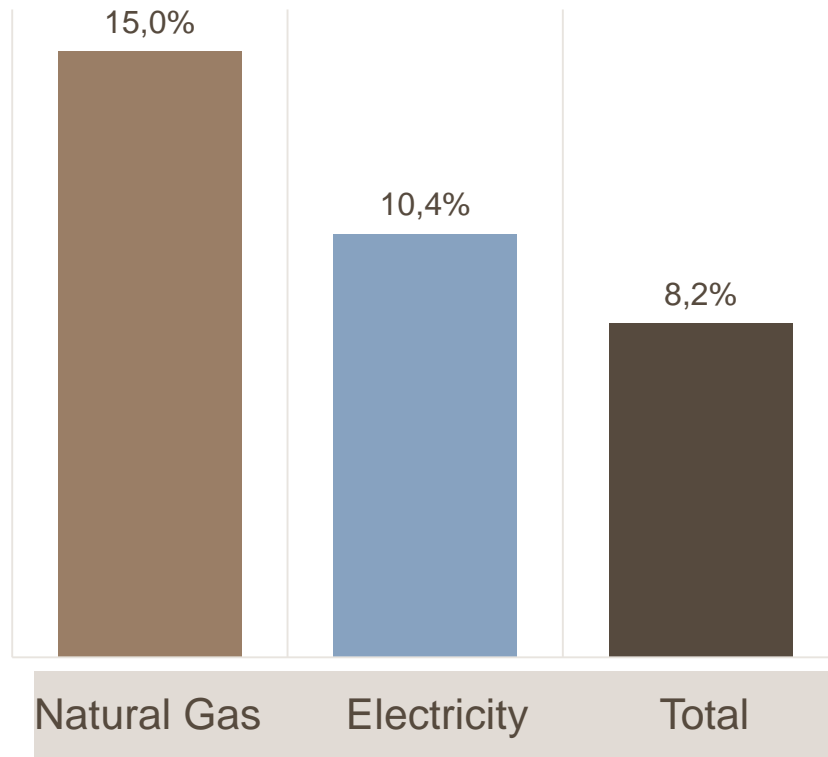


Quellen: Destatis, VCI

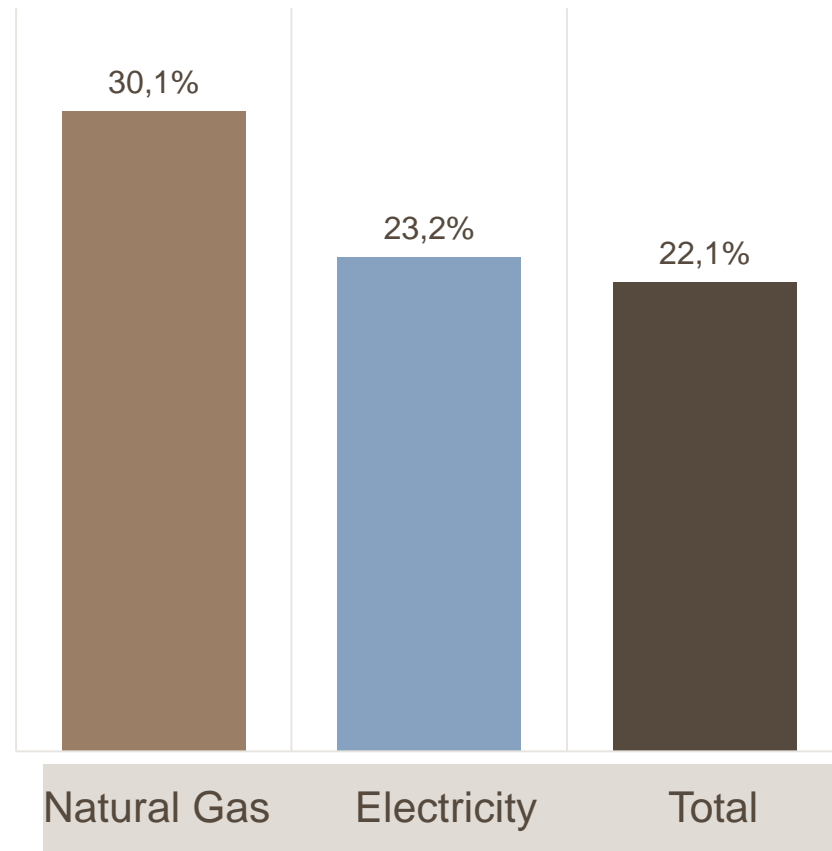
Ohne stofflicher Einsatz, Erdgas enthält Stromerzeugung mit Erdgas = Doppelzählungen von Strom

Chemical Industry is energy intensiv

Share of chemical industry of the total German energy demand , 2018

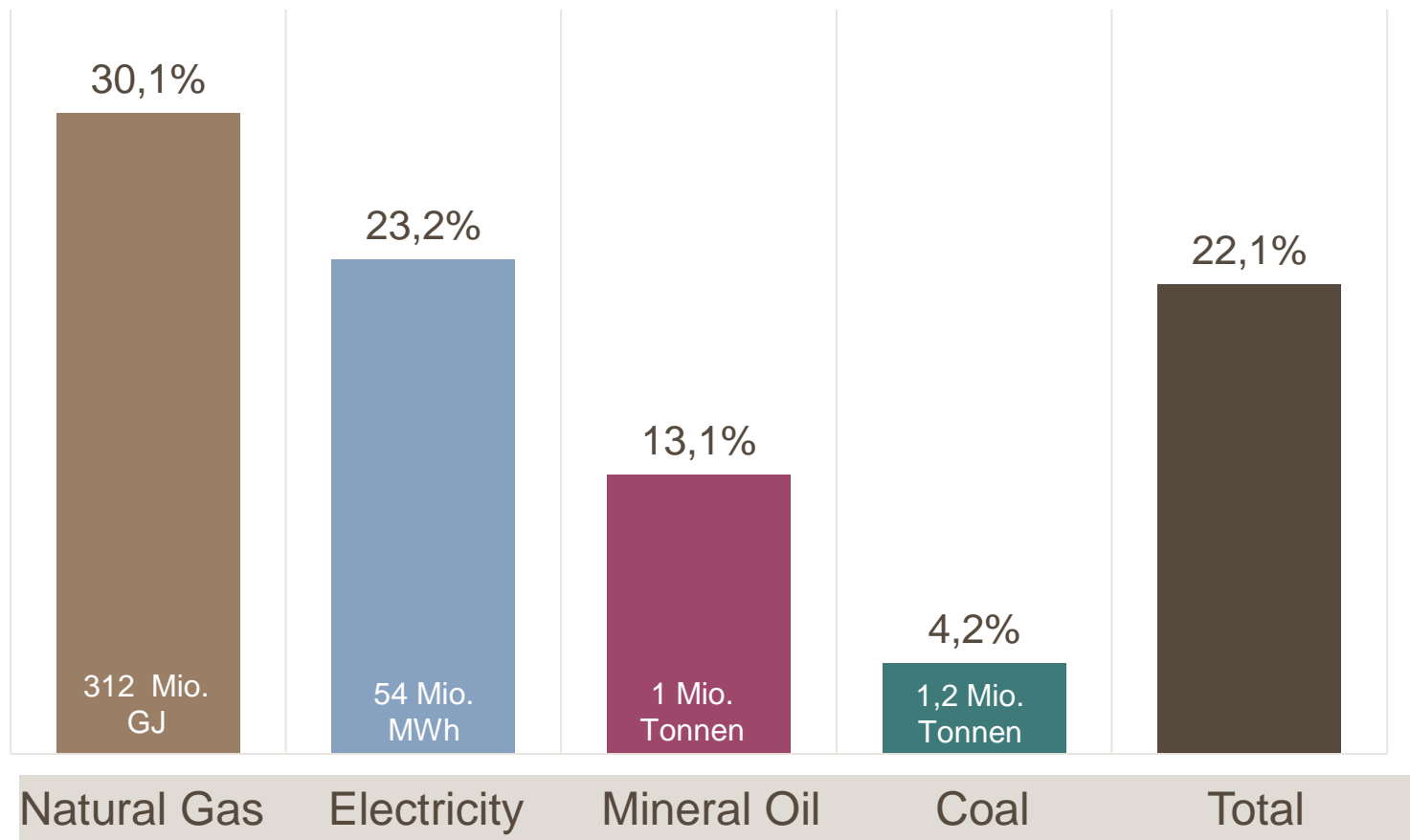


Share of chemical industry of the total industry energy demand , 2018



Chemie Industrie with 20% of the Total Energy Demand of Industry

Energy demand of the chemical/pharmaceutical industry and shares of the total industry
Gew

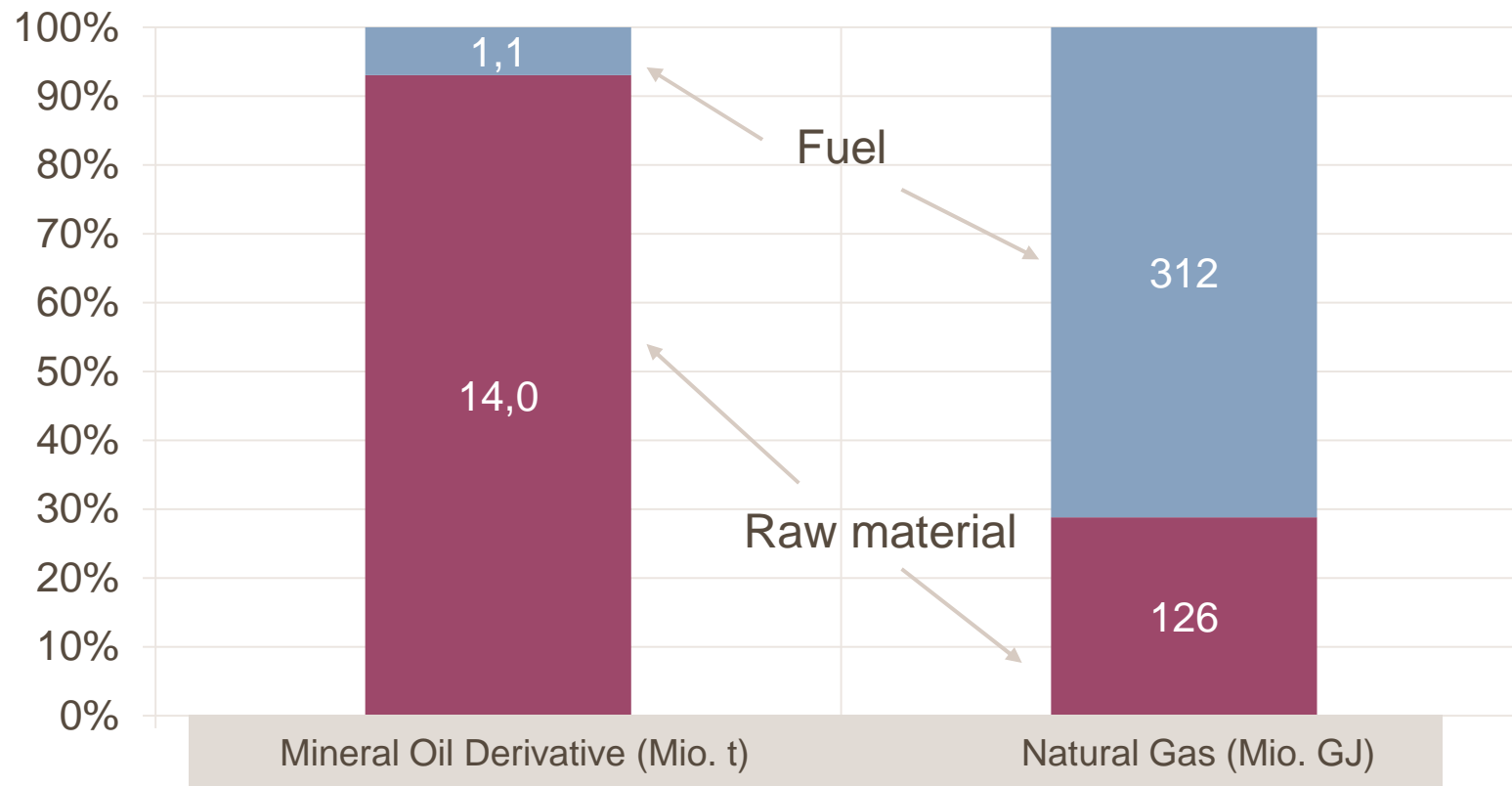


Quelle: Destatis, VCI

Ohne stofflichen Einsatz

Chemie uses fuels also as feedstock for production

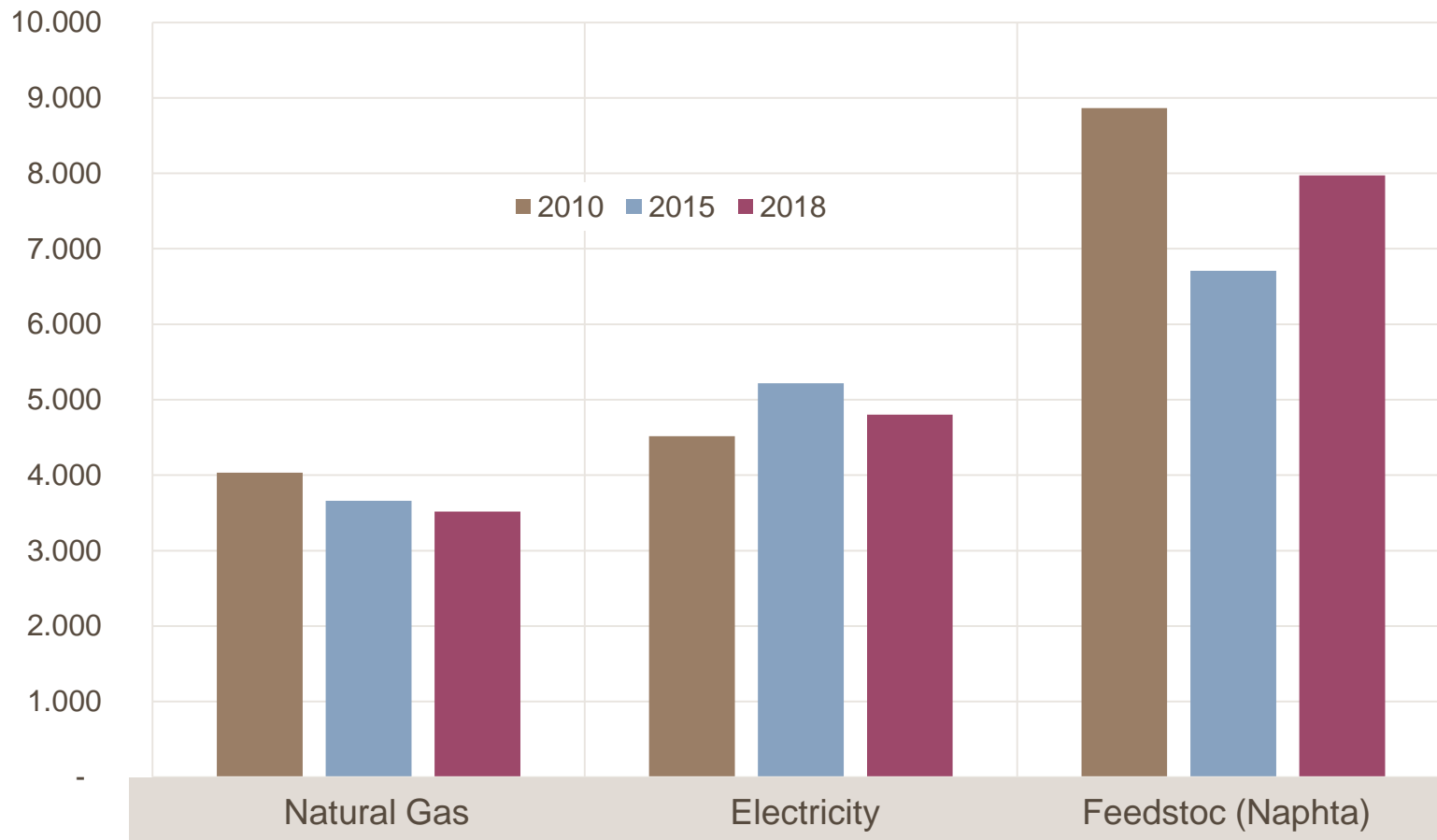
Use of mineral oil derivatives and natural gas as fuel and as raw material, 2018



Quelle: Destatis, VCI

Energy and Raw Material Costs

High costs for energy and raw materials



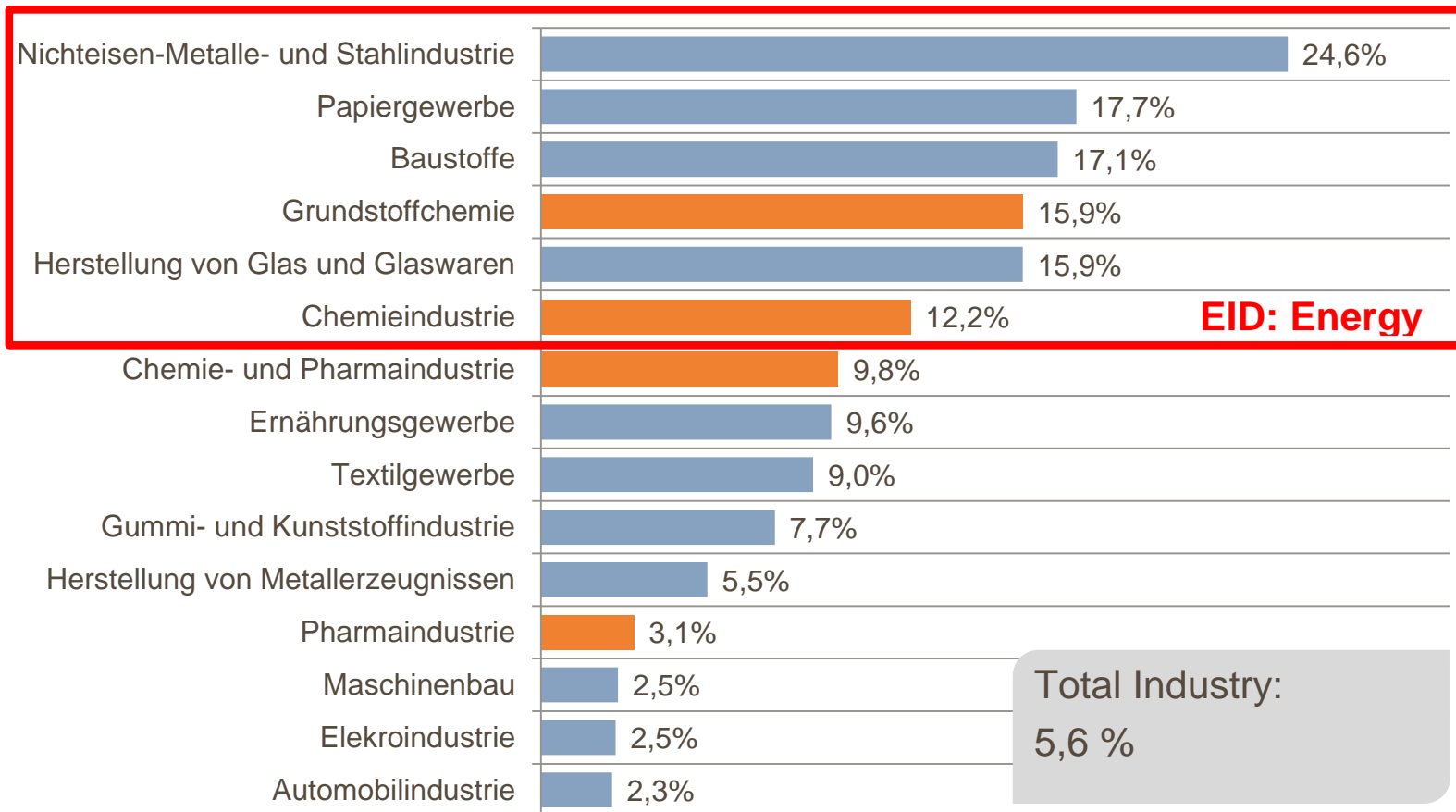
Quelle: VCI

* Schätzung, VCI Daten: leichte Abweichung zur Kostenstruktur

Chemie zählt zu den energieintensiven Industrien (EID)

High energy intensity in the chemical industry

Energy Costs in relation to gross value added, 2017

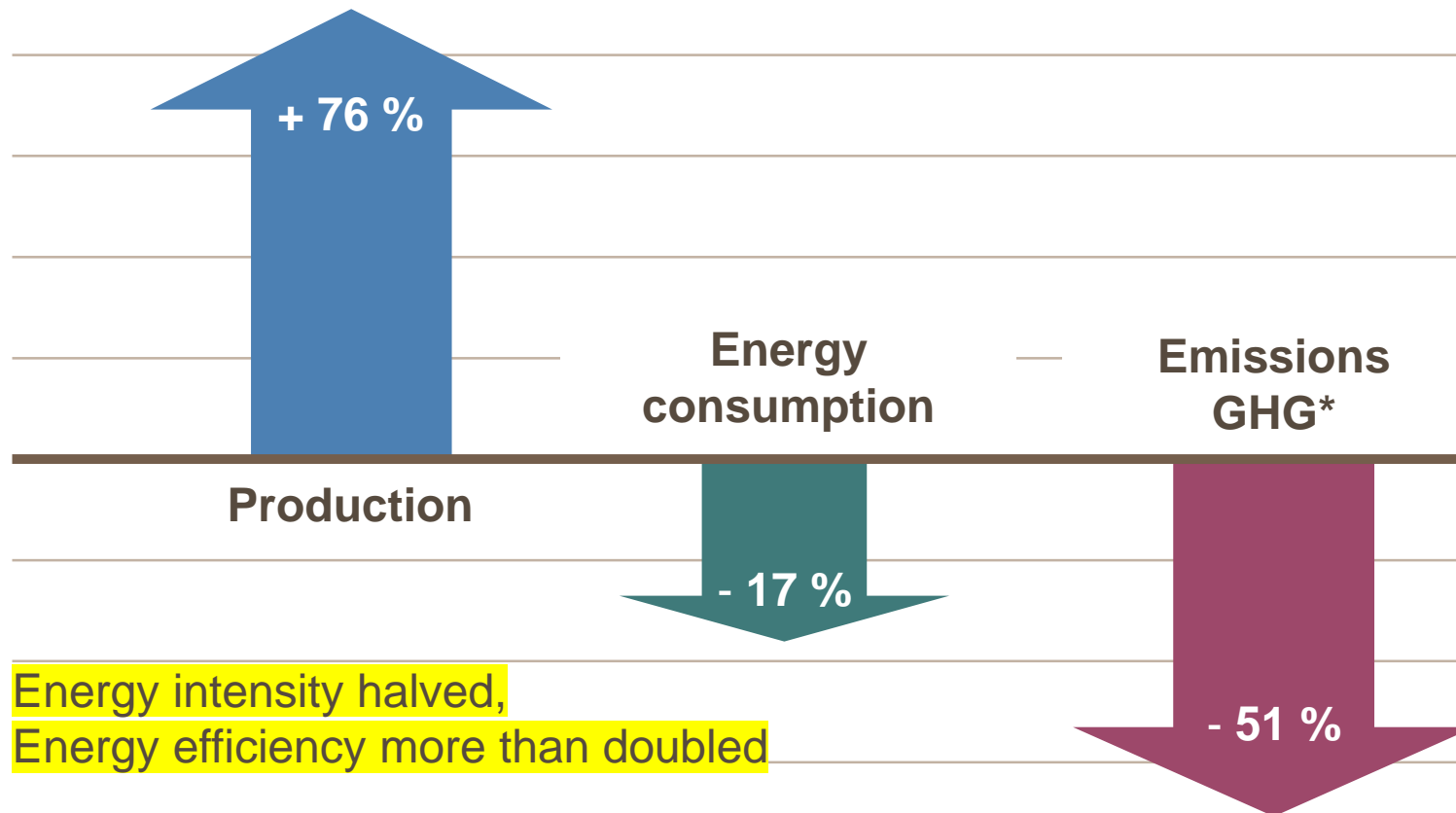


Quelle: Destatis (Kostenstruktur)

Nur energetischer Einsatz, EID=Energieintensive Industrien

Decreasing Emissions and Growing Production

Development of production, energy consumption and GHG emissions 1990-2018 in %



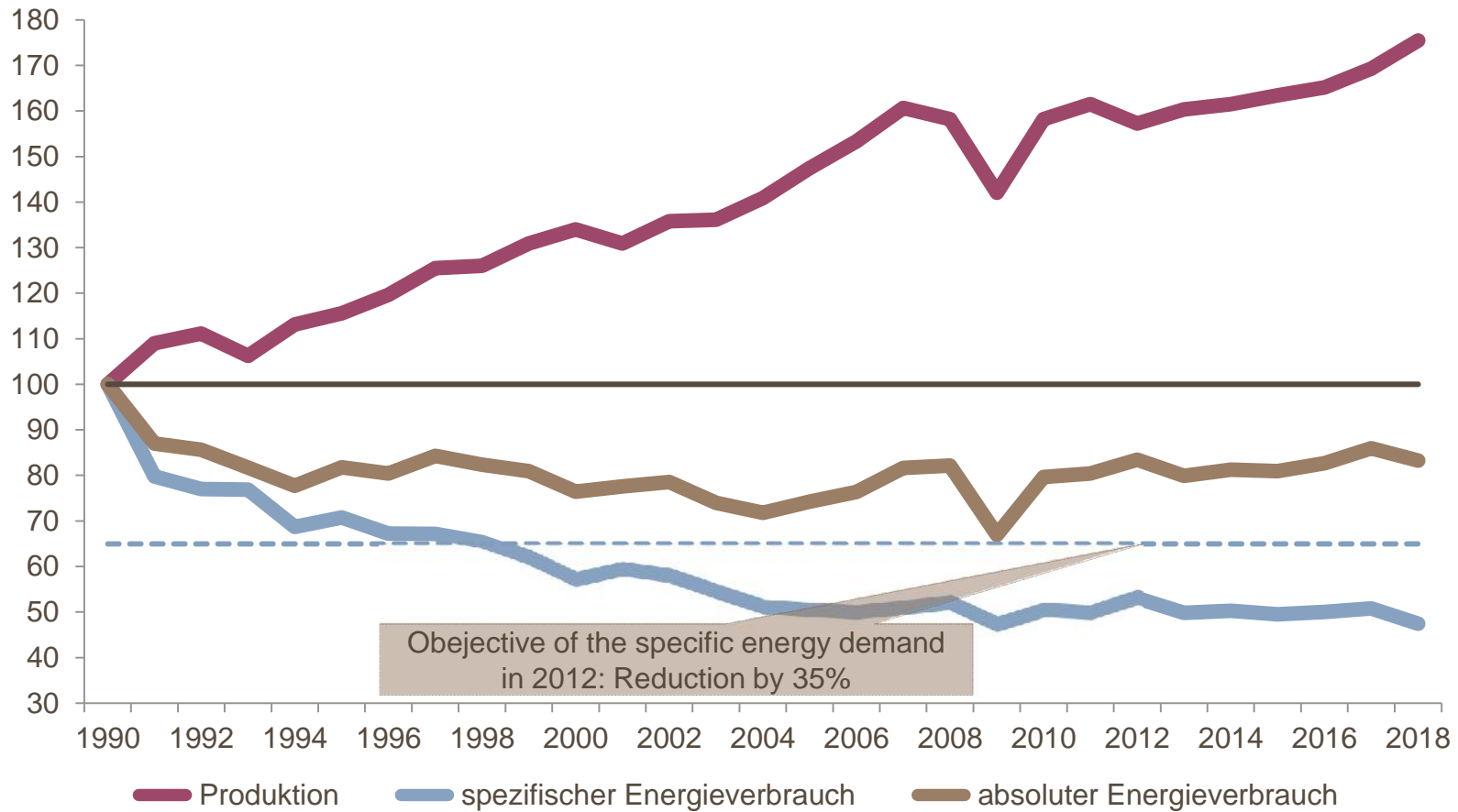
*Treibhausgase: Energiebedingte CO₂-Emissionen und Lachgasemissionen (N₂O)

Quelle: VCI-Berechnungen auf der Grundlage von Daten des Statistischen Bundesamtes, des Umweltbundesamtes und eigener Erhebungen

Better than voluntary agreement

Development of specific energy demand

Development of energy consumption in the chemical industry, Index 1990 = 100



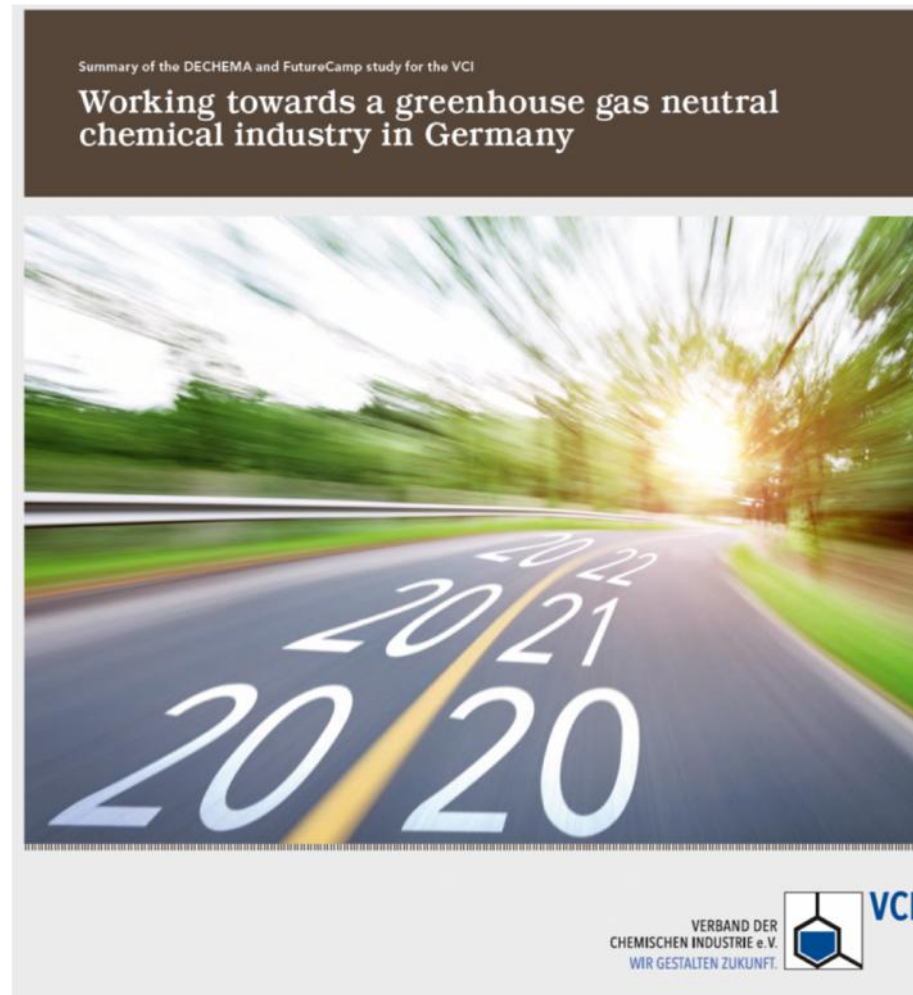
Quelle: VCI-Berechnungen auf der Grundlage von Daten des Statistischen Bundesamtes

Produktion: Chemie- und Pharmaproduktion

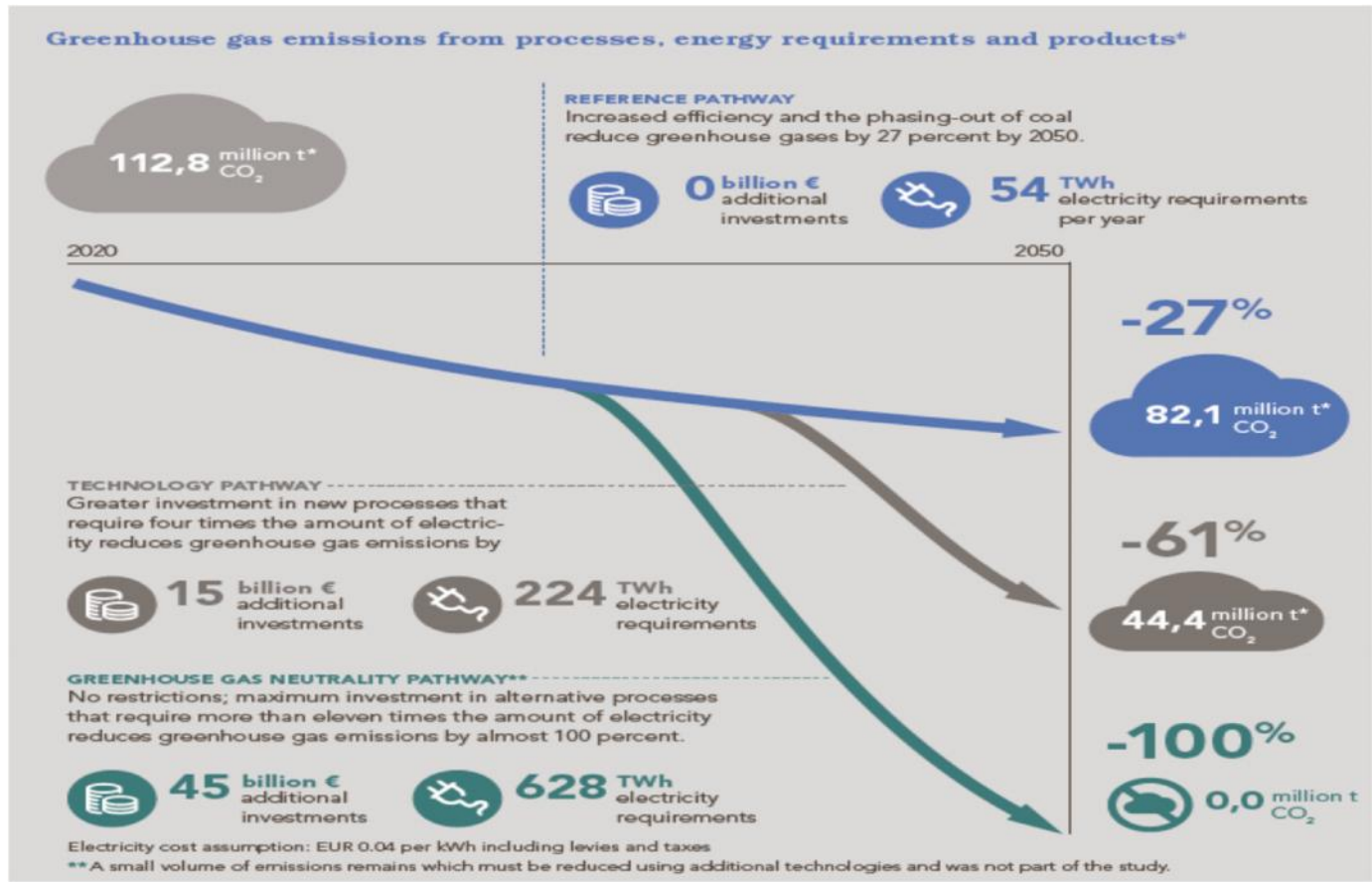
Measures to Improve Energy Efficiency

- Fuels Switch in heat and electricity production: coal to natural gas
- More combined heat and power
- Optimization of production processes
- Improved heat management at integrated sites („Verbundstandorten“)

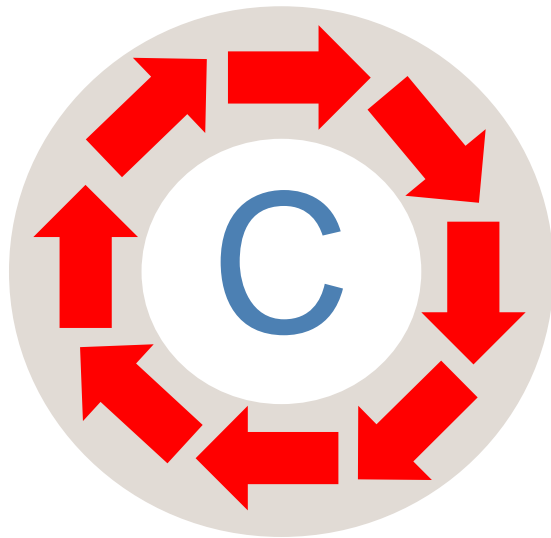
Energy efficiency in the future: How to get Greenhousegas-neutral



Results Overview



Assumption:
Electricity price of
4 Cent/KWh

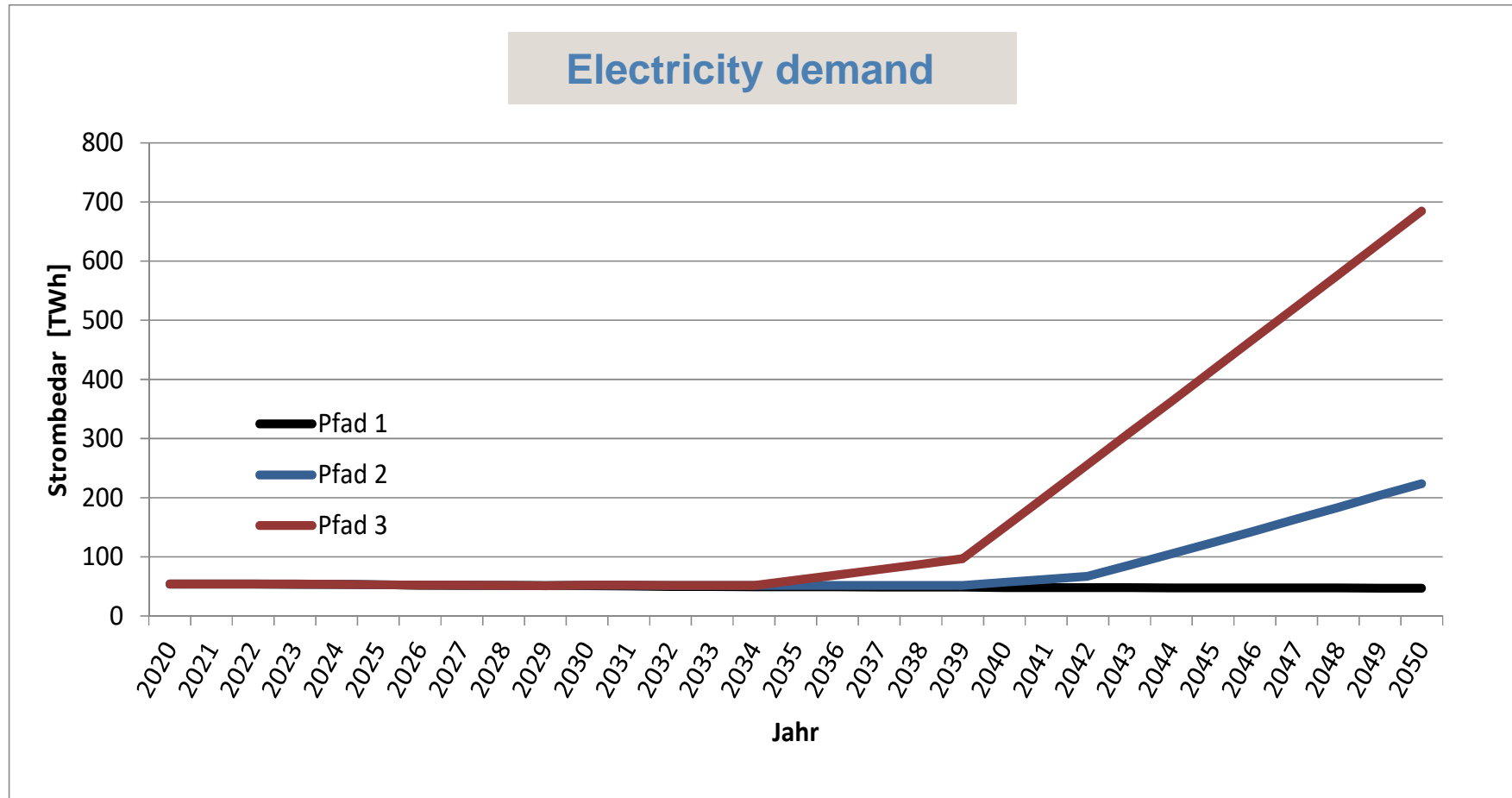


**Central role of circular economy
with circulation of Carbon**

**Electrification and covering of the
increased energy demand
by renewable electricity**



Development electricity demand



Climate protection needs more (renewable) energy

- New GHG-neutral technologies with a much higher demand of energy/electricity
- Increased demand must be covered by renewable energy, mainly electricity
- New technologies will increase their energy efficiency: specific energy demand will decrease but in absolute terms, energy consumption will increase significantly

Technical objective of improved energy efficiency (specific value: less energy consumption per production unit) will be realized

Political objective of improved energy efficiency (absolute reduction of energy consumption) will not be realized