

Institute for Resource Efficiency and Energy Strategies Prospects and challenges of the transformational process for Germany's industrial sector until 2050



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The Institute for Resource Efficiency and Energy Strategies (IREES)

- Conducts interdisciplinary research in selected fields of sustainable resource use
- Focuses on energy and material efficiency, mainly in the industrial sector
- Customers include federal ministries, regional administrations, trade associations and companies
- Based in Karlsruhe, branchlet in Berlin



Transformational process for Germany's industrial sector until 2050 Agenda

- 1. Motivation: GHG-emission targets and status quo
- 2. Challenges
- 3. Production and demand/consumption
- 4. Taking into account structural changes and foreign trade
- 5. Summary/Conclusions



The necessity of the transformation National climate change mitigation targets and status quo

• Federal Government's climate change mitigation target: Reducing national GHG-emissions by 80 – 95 % until 2050 (compared to 1990)



GHG-emissions of Germany's industrial sector

Principle starting points Looking at the problem from all sides

- GHG emissions of the industry are driven by production as well as by demand
- What about structural changes?
- What about foreign exchange/export?
- Different kinds of sources for industrial emissions:
 - Combustion or energy-consumption related emissions
 - Emissions originating in the process itself, not related to energy consumption ("process emissions") → Steel, cement, …



Transformation of Germany's industry Challenges for a fundamental transformation of production

- Very long reinvestment cycles for production facilities: 30-40 years, even up to 70 years (e.g.: steam crackers)
 → Compare with 34 years to go until 2050
- 1/3 of industrial emissions are directly related to the processes (Steel, Cement, etc.); no marketable mitigation options available at the moment
- Conclusion: no time to wait for action on industry emissions.
 Otherwise lock in effects will loom. 2050 is not so far away as it may seem.



Transformation of Germany's industry General matters and addressing the production

- Huge gap: Need to use all possibilities to mitigate industrial GHG, need to innovate and find new mitigation options
- Major fields of action for GHG mitigation:
 - Best possible usage of efficiency potentials
 - Best possible substitution of fossil energy carriers
 - Facilitation of structural changes
 - Addressing of (up to now often disregarded) process emissions
- We need further analyzes on mitigation potentials of innovative solutions, especially with regard to material-related options (product design, light weight construction, material substitution...)



Transformation of Germany's industry Looking at the demand for industrial goods

- Demand-side often not considered regarding industry's GHG
 emissions
- Domestic and abroad demand is one of the major drivers for Germany's industrial production
- Structure of end-user demand matters: consumption of short-living products leads to an increase, structural shift towards services to a decrease of industrial GHG-emissions
- Product design matters: longevity, serviceability, modularity
- → Facilitation of sustainable lifestyles as political challenge!



Transformation of Germany's industry Taking structural changes into account





Transformation of Germany's industry Taking foreign trade into account

- Linkage to interior structural development and GHG emissions
- Germany's industry too much focused on traditional sales markets, not much engaged in newly industrialized countries, China et al.
- But: Structure of Germany's export is positive for market shares and emission extensive at the same time – research and knowledge intensive technology products, also climate friendly productions
- → Strengthening exports of emissions extensive goods, adressing risks, could foster interior structural changes leading to lower energy intensities and deeper GHG emissions; engagement in emerging markets should be fostered, too



Conclusions/Summary

- No time to wait for action: long re-investment cycles and the need to adress process-related emissions, both in the basic materials industries
- Different aspects / political fields of action must be taken into account: production, demand, trade/export/markets, structural changes
- We need further analyses to quantify and prioritize especially innovative mitigation options
- Long-term policies must take structural changes and foreign trade into account

Thank You!

