



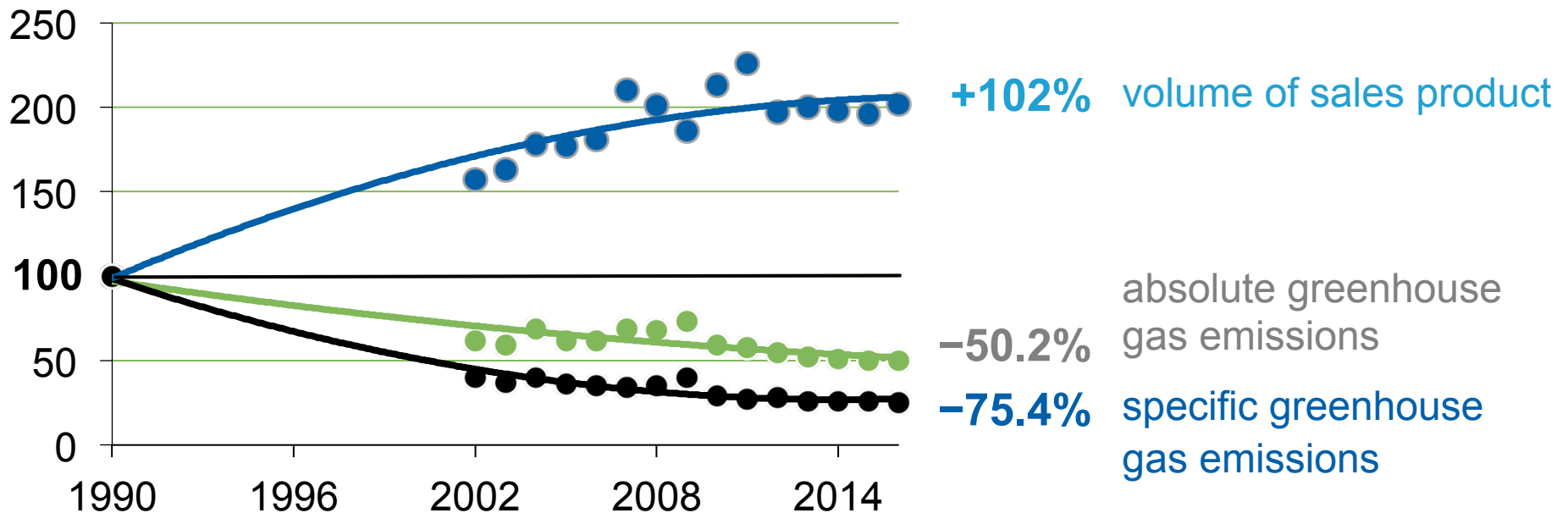
Reducing Greenhouse Gas Emissions – Challenges for the Chemical Industry

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10.11.2017

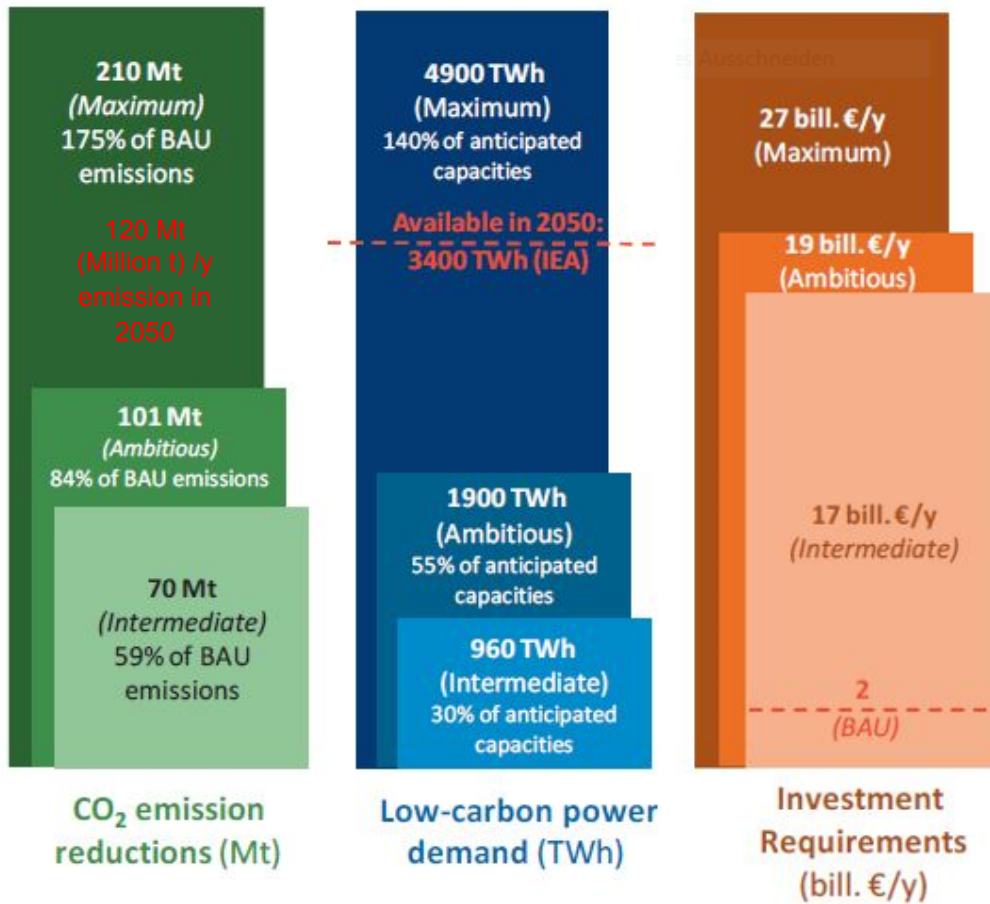
Reduction of greenhouse gas emissions with increased production

Development since 1990

Index 1990 = 100%, BASF Group excl. oil and gas business



DECHEMA Technology Study: Results of scenario calculations (w/o fuels production)



Analysis:

- 9 Chemicals accounting for 2/3rd of greenhouse gas emissions

Technological option:

- Alternative carbon feedstock
- Low carbon power supply
- Energy efficiency
- Power to heat
- Industrial symbiosis

Opportunities and challenges for various scenarios by 2050 (without fuels applications)

BAU: business-as-usual

Methane pyrolysis – a new source of H₂

Project outlook and financing aspects

Risks and project financing

- breakthrough process development
- carbon utilization in metallurgy
- industrial scale reference required
- CAPEX and OPEX support

Pilot Unit

~€20-40 million investment
(start-up ≥2020,
~1000 Nm³/h H₂,
~2 000 t/y carbon)

Reference/demonstration unit on commercial scale

~€100 million investment
(start-up ≥2024,
~20 000 Nm³/h H₂,
~40 000 t/y carbon)

Ongoing

R&D-Project funded by the German
Ministry of Education and Research
July 2013- July 2017
Total R&D cost €25 million

