

# Energy Day 2018

## International Aspects of a Power-to-X Roadmap

18. October 2018 | Dr. Markus Oles thyssenkrupp CO TIS



engineering. tomorrow. together.

**WORLD  
ENERGY  
COUNCIL**

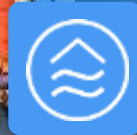


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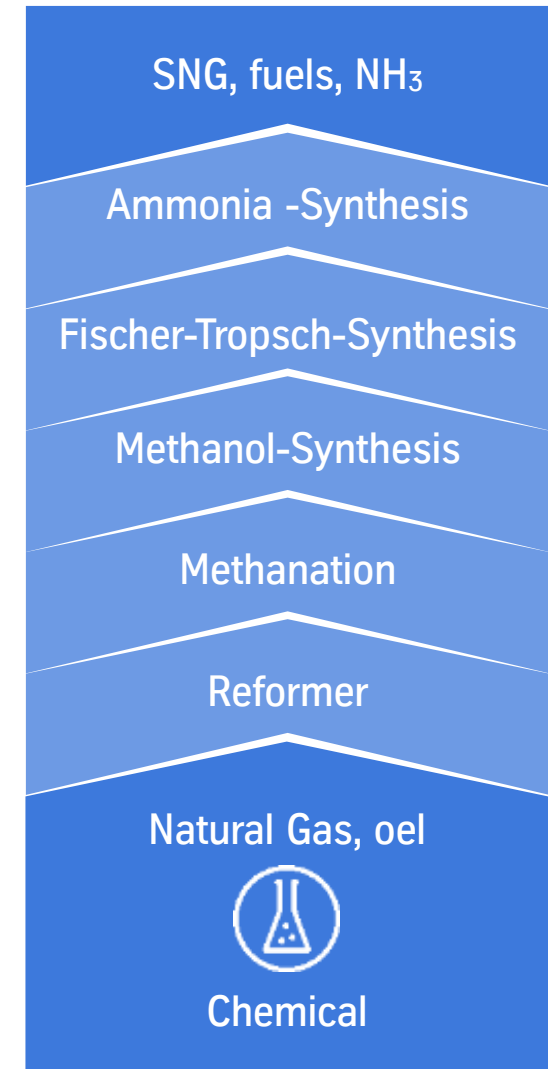
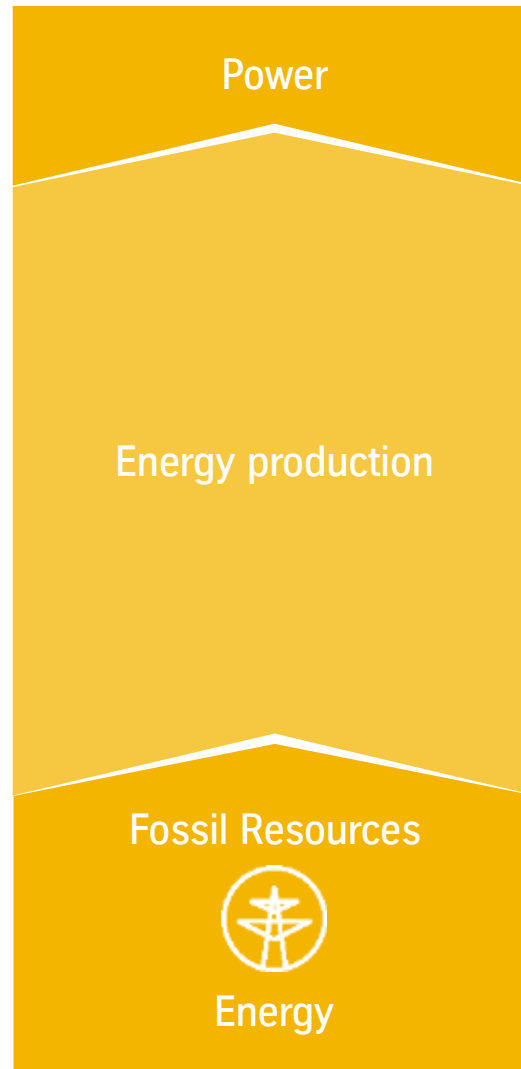
The high energy demand is the reason for the origin of CO<sub>2</sub> in the atmosphere

A Steel Plant  
needs  
approximately as much  
Energy...

... as the city of  
Berlin.



# Value Chains in different Industries are highly optimize in terms of CO<sub>2</sub> Emissions & Energy demand

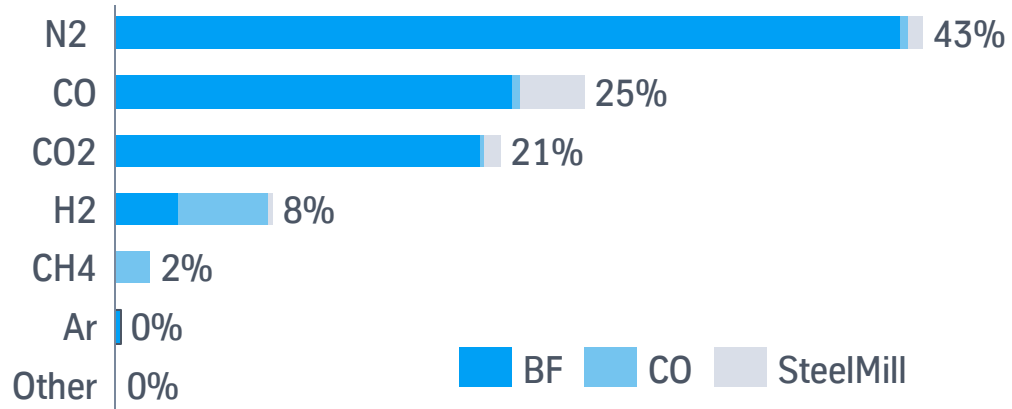


# Steel Production is coming with huge amounts of Top Gas

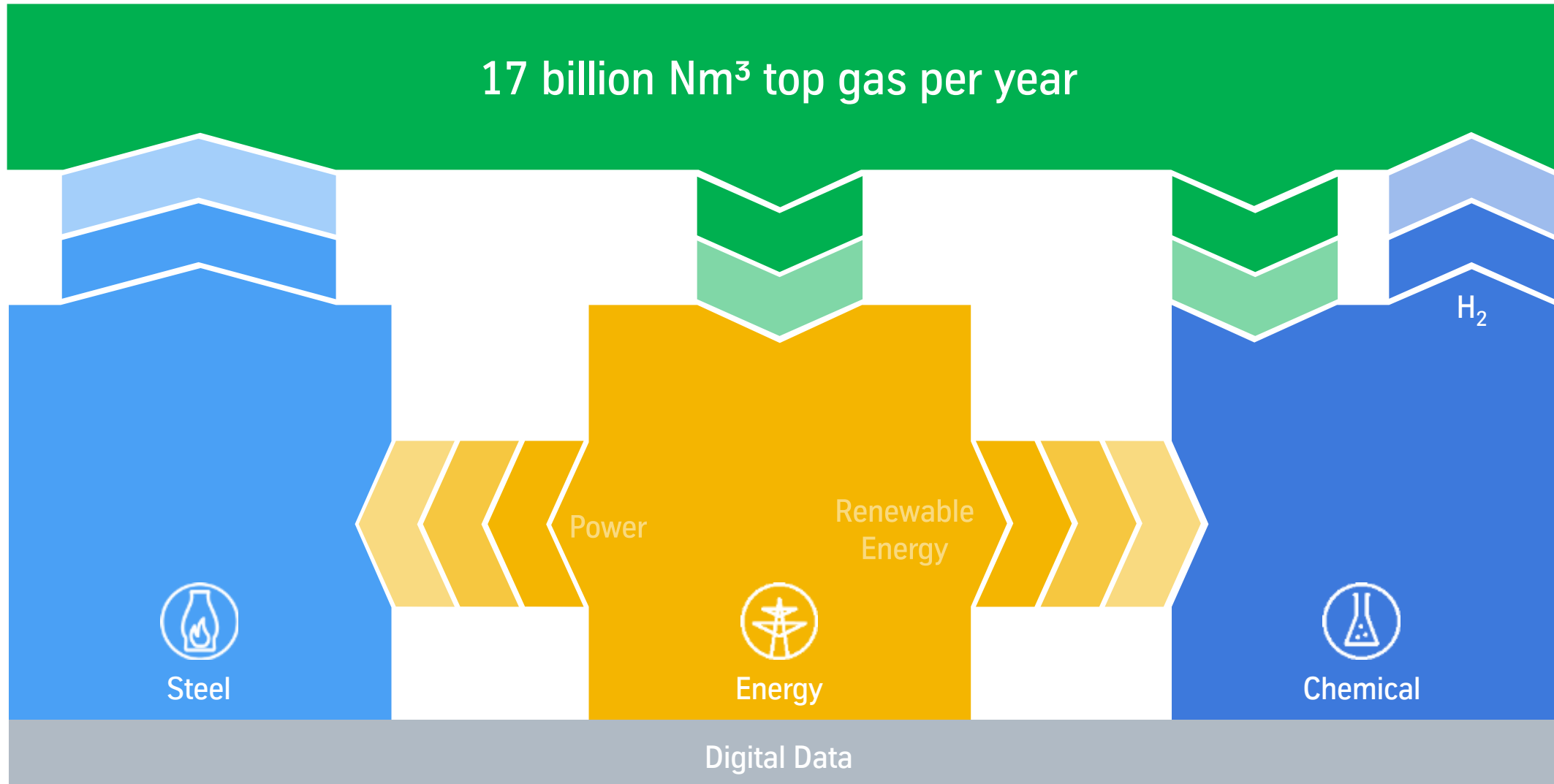
~300.000 m<sup>3</sup> Gas



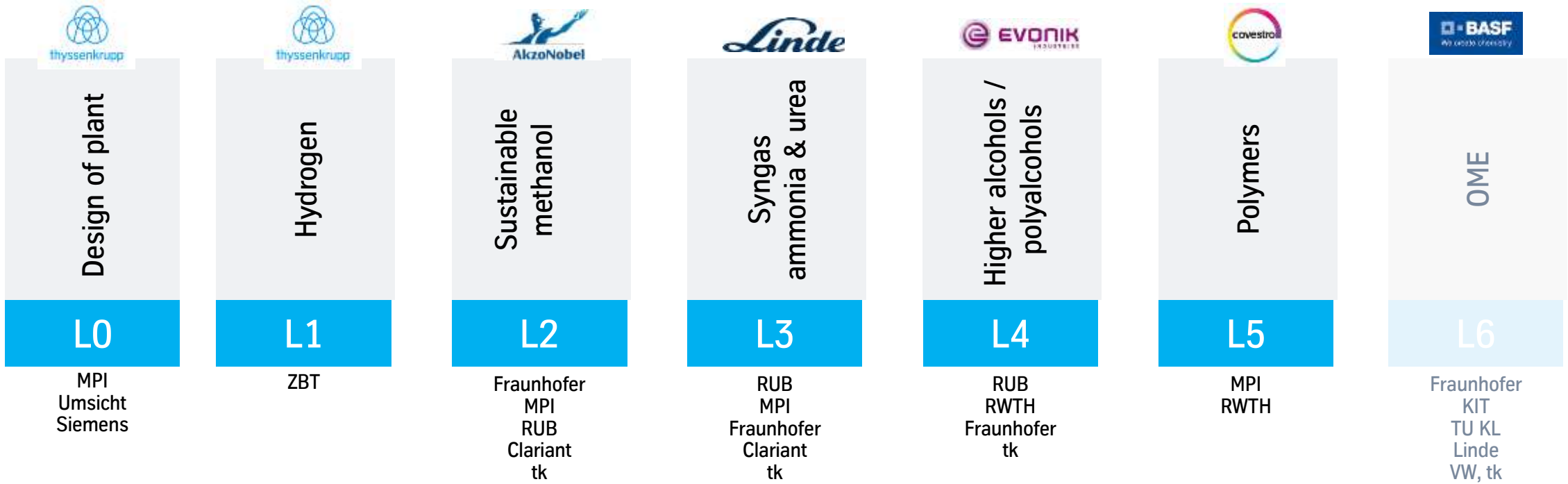
2 Mio. Nm<sup>3</sup>  
Waste Gas per hour



# Based on huge amounts of Top Gas C2C create a cross Industrial network to produce Steel, Energy and Chemicals



# Products are aligned with market needs and availability renewable



## Main addressed markets

Synthetic fuels



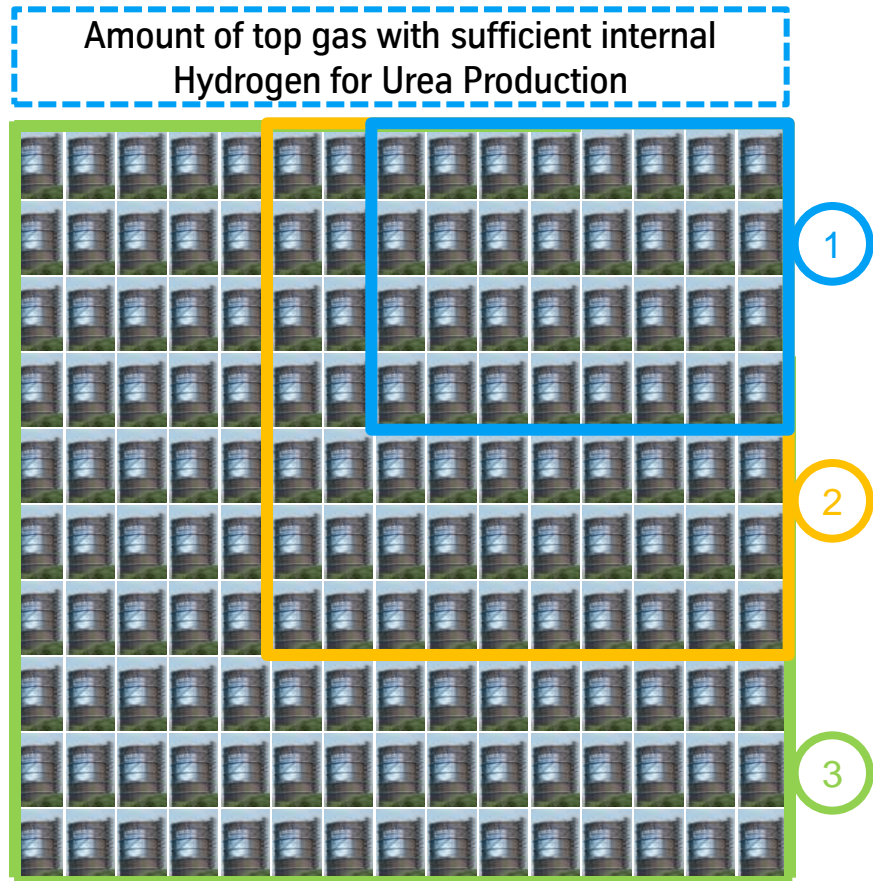
Polymers / Chemicals



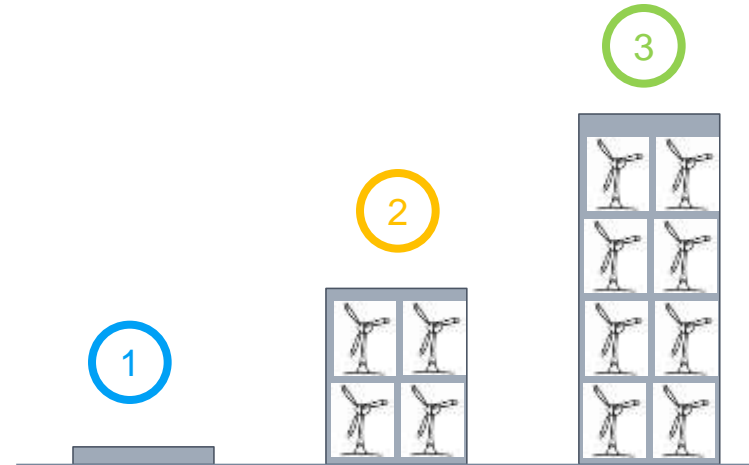
Agriculture



# Today: Ammonia / Urea and Methanol Plant technical feasible!



Illustrative: Available power from wind energy



- 1 No renewable energy for H<sub>2</sub> production necessary
- 2 Average amounts of renewable energy for H<sub>2</sub> production available
- 3 Hypothetical future scenario: High amounts of renewable energy for H<sub>2</sub> production necessary and available



# Carbon2Chem<sup>®</sup>: Targets



We use the carbon from metallurgic gases as a starting material for chemical products and enter in a circular economy



We reduce the CO<sub>2</sub> emissions in the cross-industry network overall



We use renewable energies in a cross-industry network for more than one product



We provide an essential contribution to climate protection and the “Energiewende”



engineering.  
tomorrow.  
together.

**Contact:**

**thyssenkrupp AG**

**Dr. Markus Oles**

**Phone: +49 201 844-553444**

**[Markus.Oles@thyssenkrupp.com](mailto:Markus.Oles@thyssenkrupp.com)**



**thyssenkrupp**