



Nachhaltigkeit im Transport – wie können Güter wettbewerbsfähig auf die Schiene verlagert werden?

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We create chemistry

Veranstaltung im Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit
am 08.07.2016

Chemicals remains a growth industry



Agriculture



Health & Nutrition



Energy & Resources



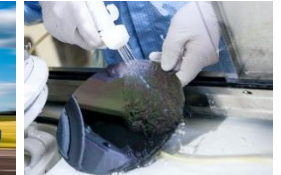
Construction & Housing



Consumer products



Automotive & Transport



Electric & Electronics

Chemistry as enabler for current and future needs

~10bn



...people by 2050

70%



...of the world population will live in cities by 2050

50%



...more primary energy consumption by 2050

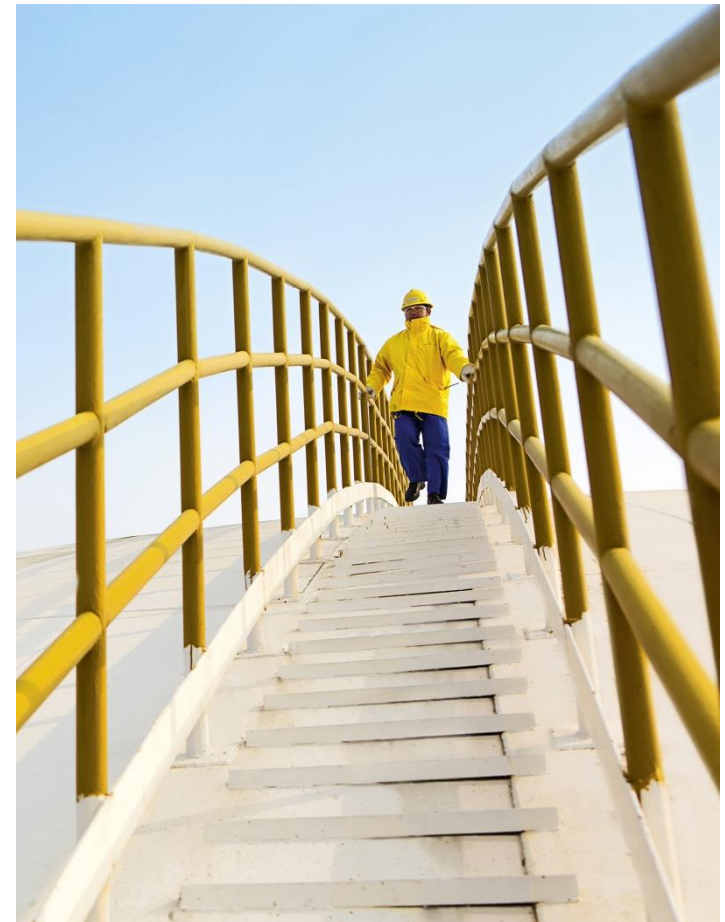
30%



...more food needed by 2050

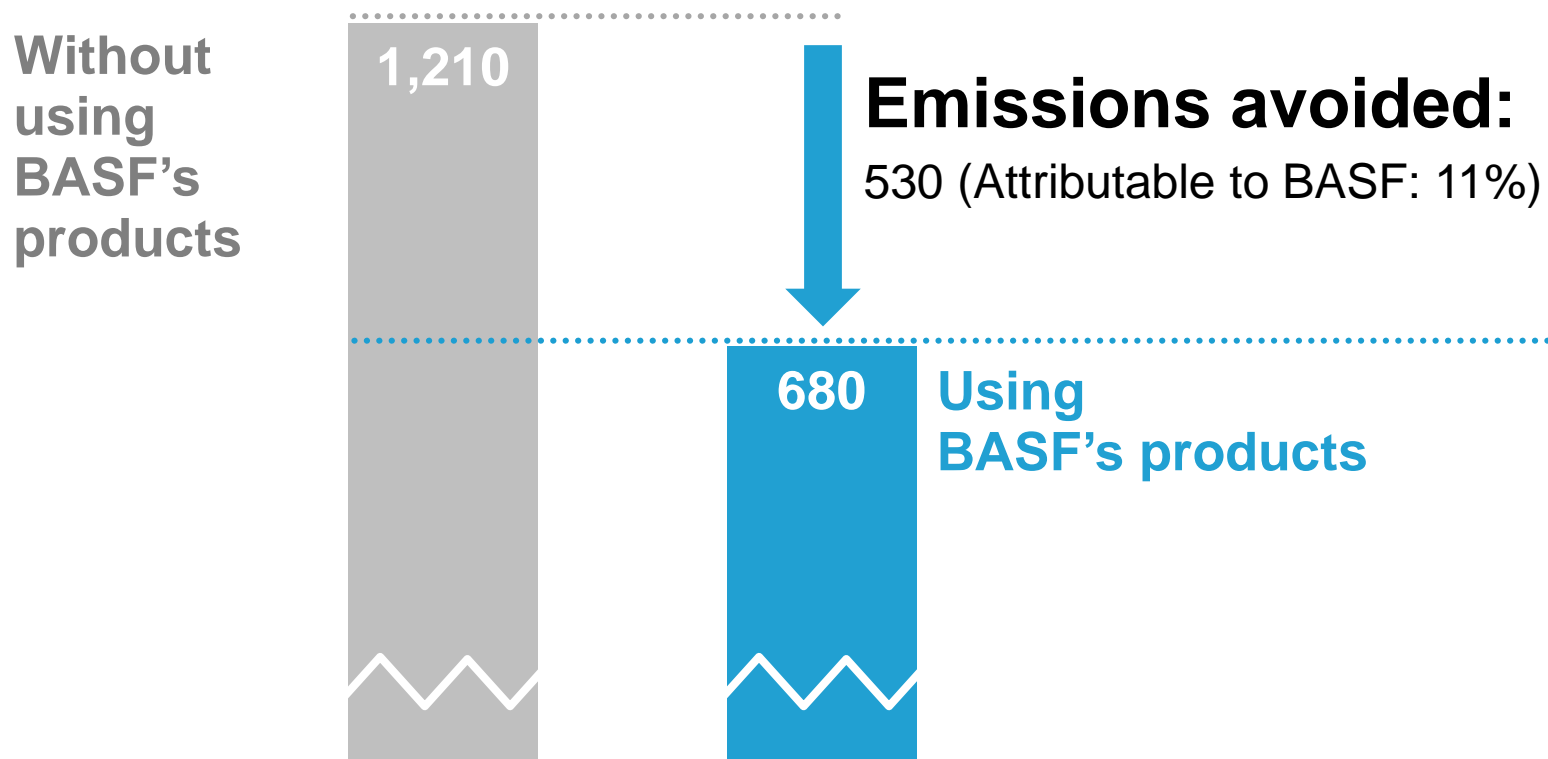
Climate protection at BASF

- With our climate protection products, we make an important contribution to climate protection and energy efficiency.
- We invest around one third of research expenditures in the development of products and processes for climate protection and energy efficiency.
- We reduce emissions along the entire value chain.
- We have set ourselves ambitious goals to reduce greenhouse gas emissions in our production by 2020 and want to reduce emissions per ton of sales product by 40% compared with 2002.



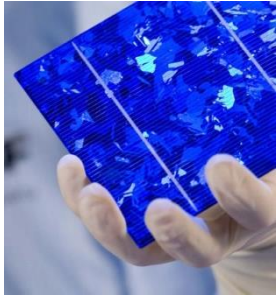
We help our customers to reduce their CO₂ emissions

Prevention of greenhouse gas emissions through the use of BASF products 2015 (in million metric tons of CO₂ equivalents*)



* CO₂ equivalents = units for measuring the impact of greenhouse gas emissions on the greenhouse effect

Climate protection at BASF



Products for

- avoiding greenhouse gas emissions
- adapting to climate change



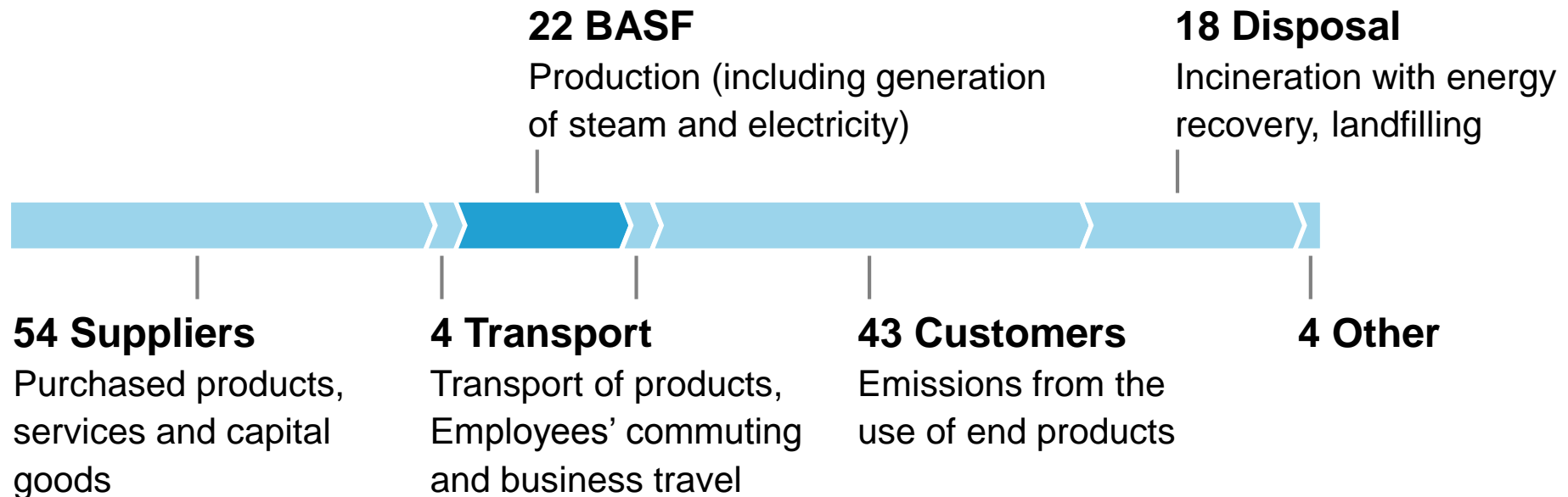
Reduction of greenhouse gas emissions in

- production
- value chains

We assume responsibility along the entire value chain

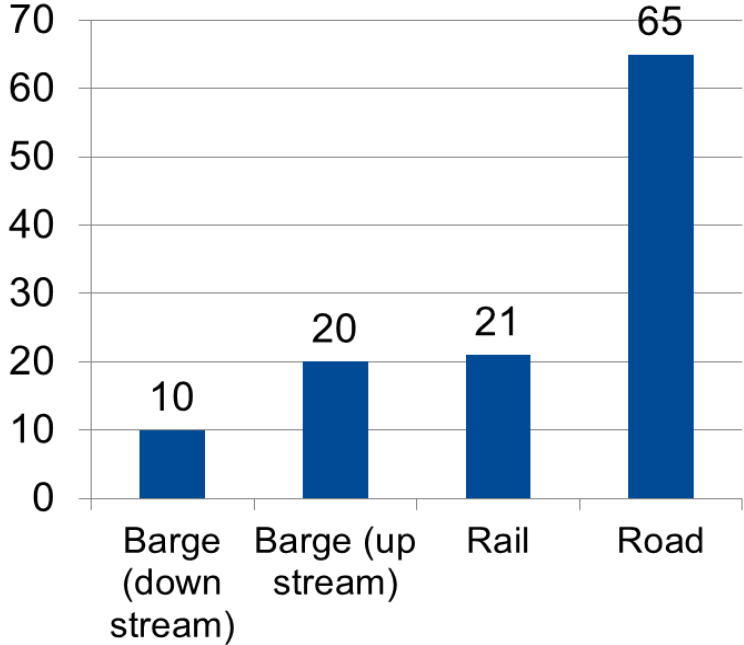
Greenhouse gas emissions along the BASF value chain in 2015

(in million metric tons of CO₂ equivalents)



BASF Supply Chain fosters sustainability at competitive cost by a proper modal split

CO₂ emission by mode of transport (gCO₂/tkm)



Source: VCI-Leitfaden zur Ermittlung der CO₂-Emissionen in der Logistik der chemischen Industrie, 06.07.2010



Transportation Volume BASF Ludwigshafen 2015

Volume inbound + outbound: 14.3 mio t



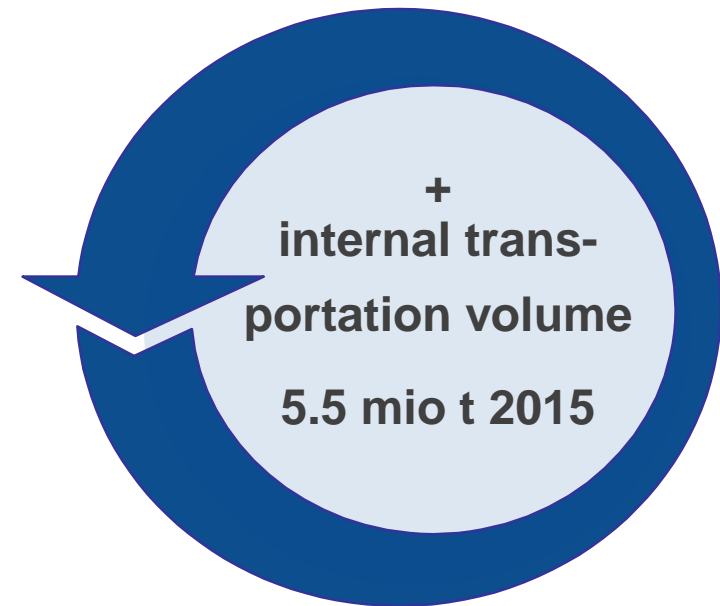
42 % Barge
= 22 ships / day



32% Road
= 1,966 trucks / day



26% Rail
= 363 rail cars / day



Rail Transport

- 230 km Tracks
- 780 Switches
- Hump
- 161 Loading stations
- Railway undertaking

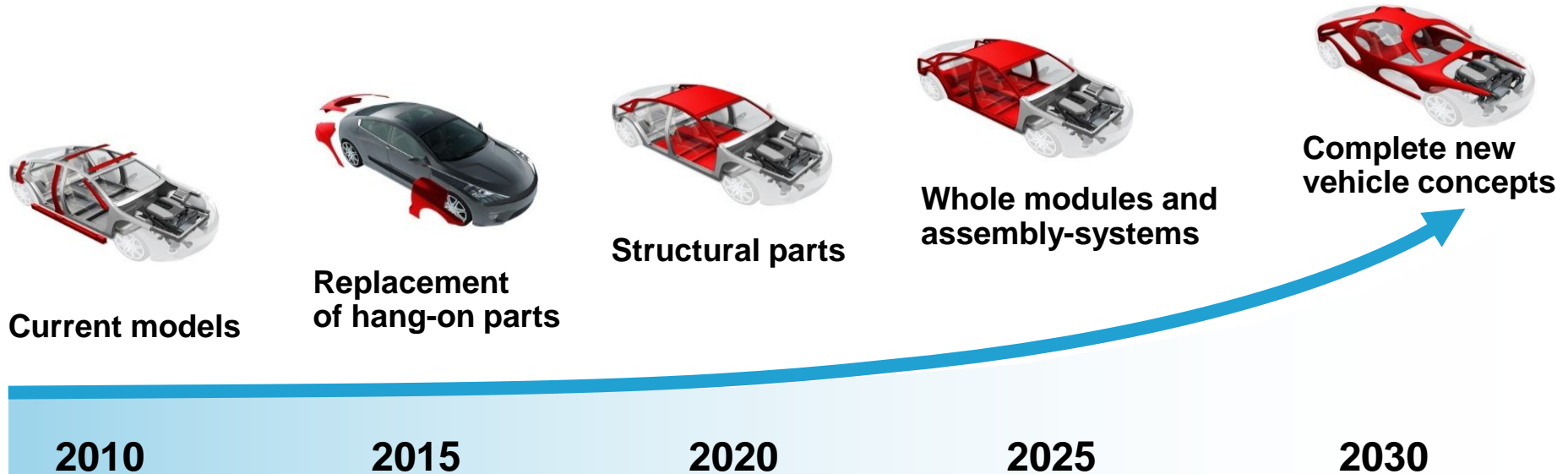


Competitive Advantage

	classic rail tank car	Intermodal (TC)	tank lorry
Labor cost per t	+	+	-
Public acceptance (CO ₂)	+	+	-
Public acceptance (Noise)	-	-	+/-
Flexibility	-	+	+
Transportation time	-	+	+
Costs first & last mile	-	+	+
Cost mobile equipment per t	-	+	+
Filling costs [Axle load]	+	-	-

Rail must shorten innovation cycle times to survive

Lightweight composites help to reduce weight in automobiles



In rail there are (almost) no activities to reduce weight

- Disadvantage in competition
- Disadvantage to achieve further CO₂ reduction
- ➔ Minimum weight restrictions / guidelines / regulations
 - 1 t minimum weight per meter
 - 4 t minimum axel load (5 t disk brake)

New rail optimized 45' tank container

Existing 4 axle rail tank cars



Volume: 70,000 liter
 Payload: 64 tons
 Gross weight: 90 tons

New 45' TC



BASF Innovation

Volume: 63,000 liter
 Payload: 66 tons
 Gross weight: 75 tons (90 tons incl. wagon)

Existing 20' to 26' TC



Volume: 25,000 to 36,000 liter
 Payload: 32 tons
 Gross weight: 36 tons

Innovation: storage rail & barge optimized 45' tank container

- Costs advantage thru separate optimization of tank and wagon
- Less handlings & lower filling costs compared to existing 20' TC
- “Shunting” via cranes possible
- Further automation of last and first mile process possible

BASF 45' tank container



BASF 45' tank container

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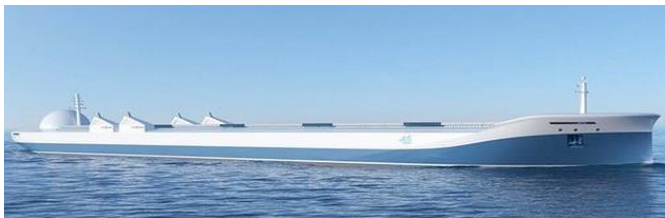
Further Innovation first mile process possible



Google Car: prototype 2014



Mercedes truck: prototype 2014



Rolls Royce Ship: study 2014



Automation of first & last mile process is opportunity for conventional rail to keep competitive advantages and to shift more volume to rail

Summary

Competitive Advantage

- Labor cost per t
- Public acceptance (CO₂)
- Public acceptance (Noise)
- Flexibility
- Transportation time
- Costs first & last mile
- Cost mobile equipment per t
- Filling costs [Axle load]

new rail 45' TC process

Intermodal (TC)

tank lorry

+	+	-
+	+	-
+/-	-	+/-
+	+	+
+/-	+	+
+	+	+
+	+	+
+	-	-





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