

# BDI-Study „Climate Paths for Germany“

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# Current policies (how big are the gaps?) vs. target scenarios (which societal and political conditions do we expect?)

## C Current policies



**Continuation** of current and likely-to-see policies (Germany and internationally)

**Economic and climate policy background:** economic growth path, basically lack of enhanced climate policy coordination internationally

## G Global climate protection



States stick to **2°C-target**

Climate instruments are **coordinated internationally**

Economic growth and **open markets**

**Investments in climate technologies** speed up innovation

**Low fossil fuel prices** continue

**Willingness to pay** for climate protection

## L Lack of global ambition



**Only some countries** continue to pursue ambitious climate targets.

Various **national efforts** coexist next to each other

Economic growth and **open markets**

Less **innovation acceleration**

**Fossil energy prices** rise

Focus on **prosperity**. Less **willingness to pay** for climate protection



### Climate paths

R

*Detailed current policies scenario, identification of gaps*

G80

*Detailed analysis 80 % path*

G95

*Detailed analysis 95 % path*

N80

*Detailed analysis 80 % path*

N95

*Basic analysis 95 % path*

## Assumptions: Oil prices and CO<sub>2</sub> prices

**Oil prices** (all price assumptions for fossil fuels according to WEO 2016, IEA)

Ref, N:	2020: 79 \$/barrel	2030: 111 \$/barrel	2050: →	115 \$/barrel
G:	2020: 70 \$/barrel	2030: 80 \$/barrel	2050: →	50\$/barrel

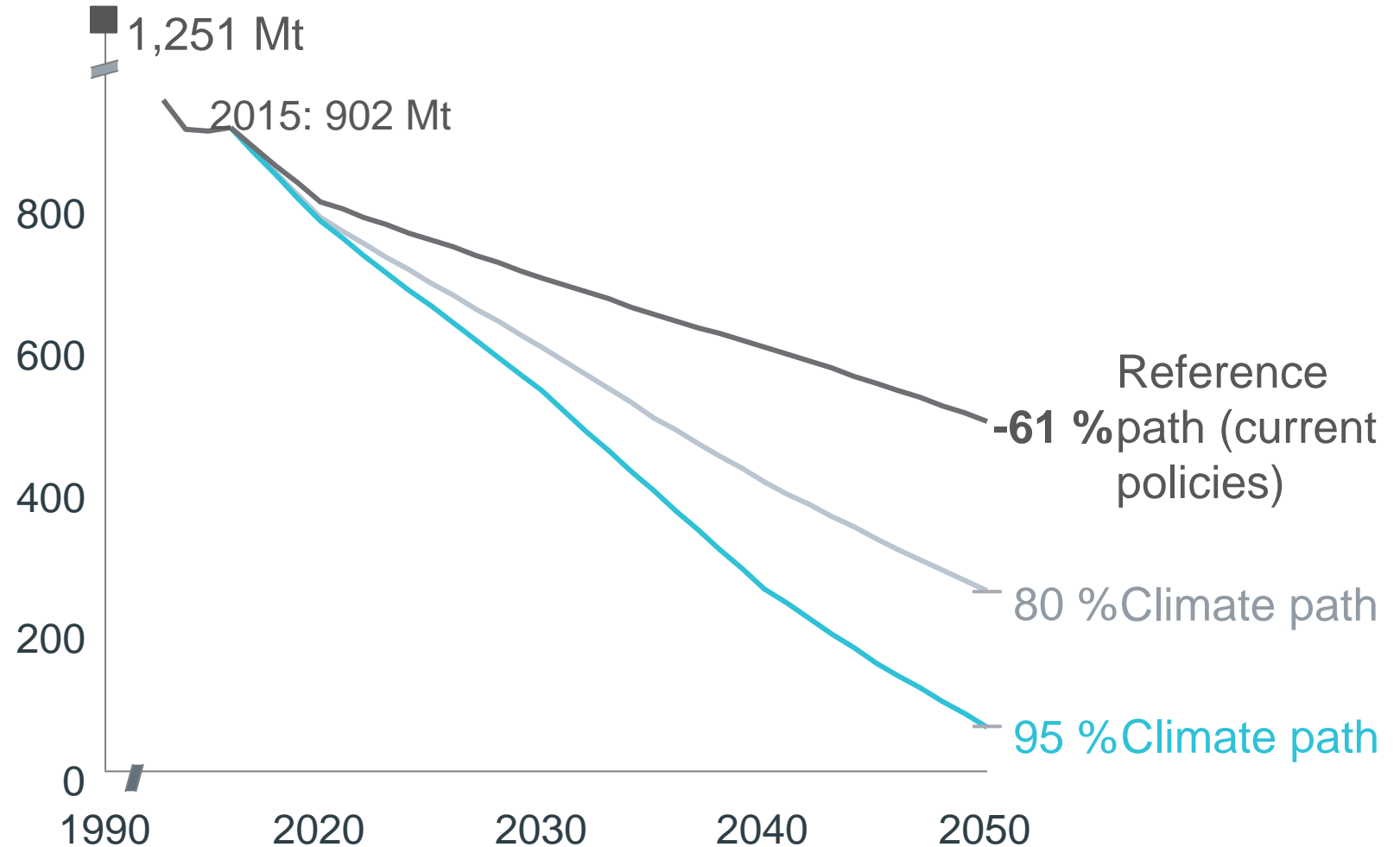
**CO<sub>2</sub>-prices** (according to WEO 2016, IEA)

Ref, N (EU):	2020: 11 €/t	2030: 26 €/t	2050: →	45 €/t
G:	2020: 18€/t	2030: 55 €/t	2050: →	124 €/t

61 % reduction  
of greenhouse  
gases as  
current policies  
are continued...

## Greenhouse gas (GHG) emissions in Germany

Million Tons CO<sub>2</sub> equivalents



Sources: The Boston Consulting Group, Prognos 2017

# 80 % path achievable with technologies known to us today

**Energy:** 240 GW wind and PV, grid extension

**Energy:** Gas gradually replaces coal in backup generation

**Buildings:** 50 % increase in the building refurbishment rate (1.7 % p. a.)

**Buildings:** Expanded urban district heating

**Buildings:** 14 mn. heat pumps, mainly in residential building stock (1 - 2 families)



**Industry:** 90 % penetration of efficiency technologies

**Industry:** Concentration of national solid biomass for heat < 500°C

**Mobility:** 26 mn. electric vehicles, 2/3 of passenger cars

**Mobility:** 4.000 km of electric overhead lines for highway trucks

**Farming:** More efficient use of fertilizers

# 95 % path to breach technical feasibility and social acceptance

**340 TWh Imports**  
„renewable fuels“  
(PtL, PtG)

**Energy: 295 GW** wind  
and PV, grid extension

**Energy: 100 %** renewable  
with PtG, gas-grid as  
seasonal storage

**Buildings: 70 %** increase in  
the building refurbishment  
rate  
(1.9 % p. a.)

**Buildings: Heating free** of  
fossil fuels (through 16 mn.  
heat pumps and 100 %  
renewable district heating)

**Industry: ... produces** with recycled  
carbon from biomass incineration

**Industry: 100 %** renewable heat /  
steam through biogas and PtG ...

**Mobility: 33 mn.** electric  
vehicles, 4/5 of passenger cars

**Mobility: 8.000 km** of electric  
overhead lines for highway  
trucks

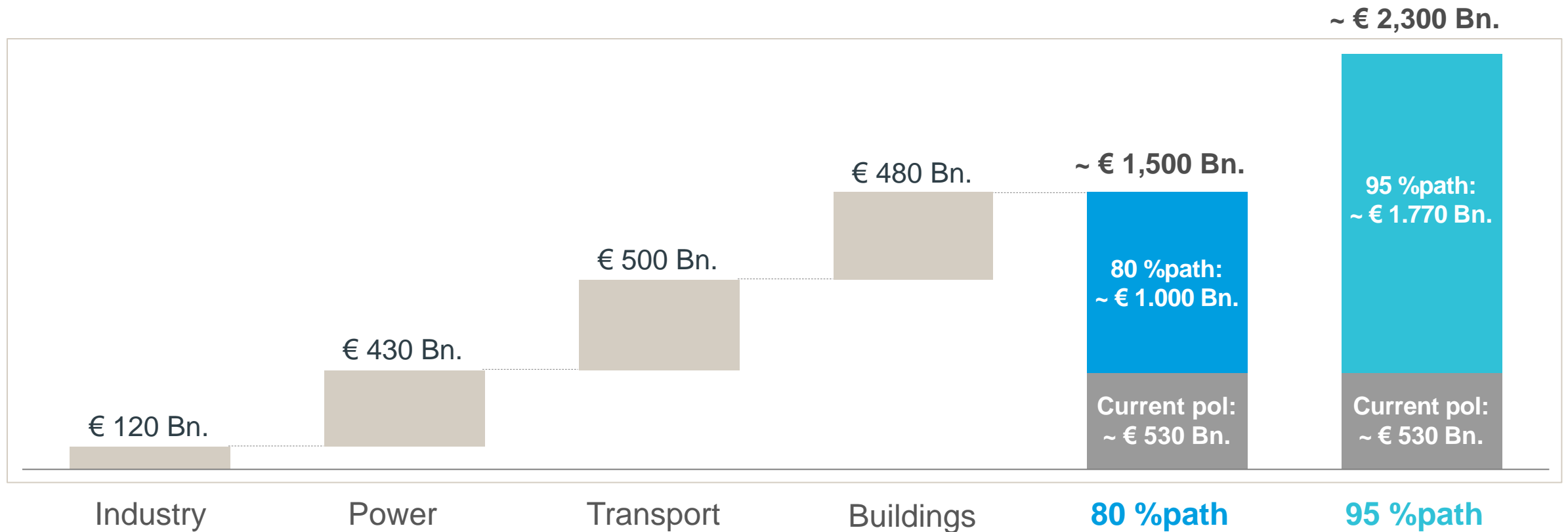
**Farming: „methane**  
pill“ for cattle  
population

**Carbon Capture and  
Storage** for steel, cement,  
ammonia, refineries,  
waste combustion

PtL = Power-to-Liquid, PtG = Power-to-Gas  
All figures refer to 2050

# Additional investments of € 1,500 to € 2,300 bn. until 2050

Cumulative marginal investments until 2050 (vs. scenario without GHG reduction efforts)



# 80 % economically feasible – 95 % only globally achievable

	80 %-Climate path	95 %-Climate path
 Additional investment <sup>1</sup>	€ 1.500 billion	€ 2.300 billion
 Additional net cost for economy <sup>1</sup>	€ 470 billion Ø € 15 billion annually	€ 960 billion Ø € 30 billion annually
 GDP-effect	At least no negative effect in all scenarios  ..... ✓ .....	At least balanced effect or slightly positive effect with global cooperation  ..... ✓ .....
	Massive investment Economically achievable  	Huge ambition technologically and regarding acceptance Only possible with global consensus  

1. Jeweils kumuliert für die Jahre 2015 bis 2050; Inklusive Investitionen und Mehrkosten der Referenz; bei einem volkswirtschaftlichen Zinssatz von 2 %; Importe zu Grenzübergangspreisen