



Costs and Potentials of Greenhouse Gas Abatement in Germany

A report by McKinsey & Company, Inc.,
on behalf of
"BDI initiativ - Wirtschaft für Klimaschutz"

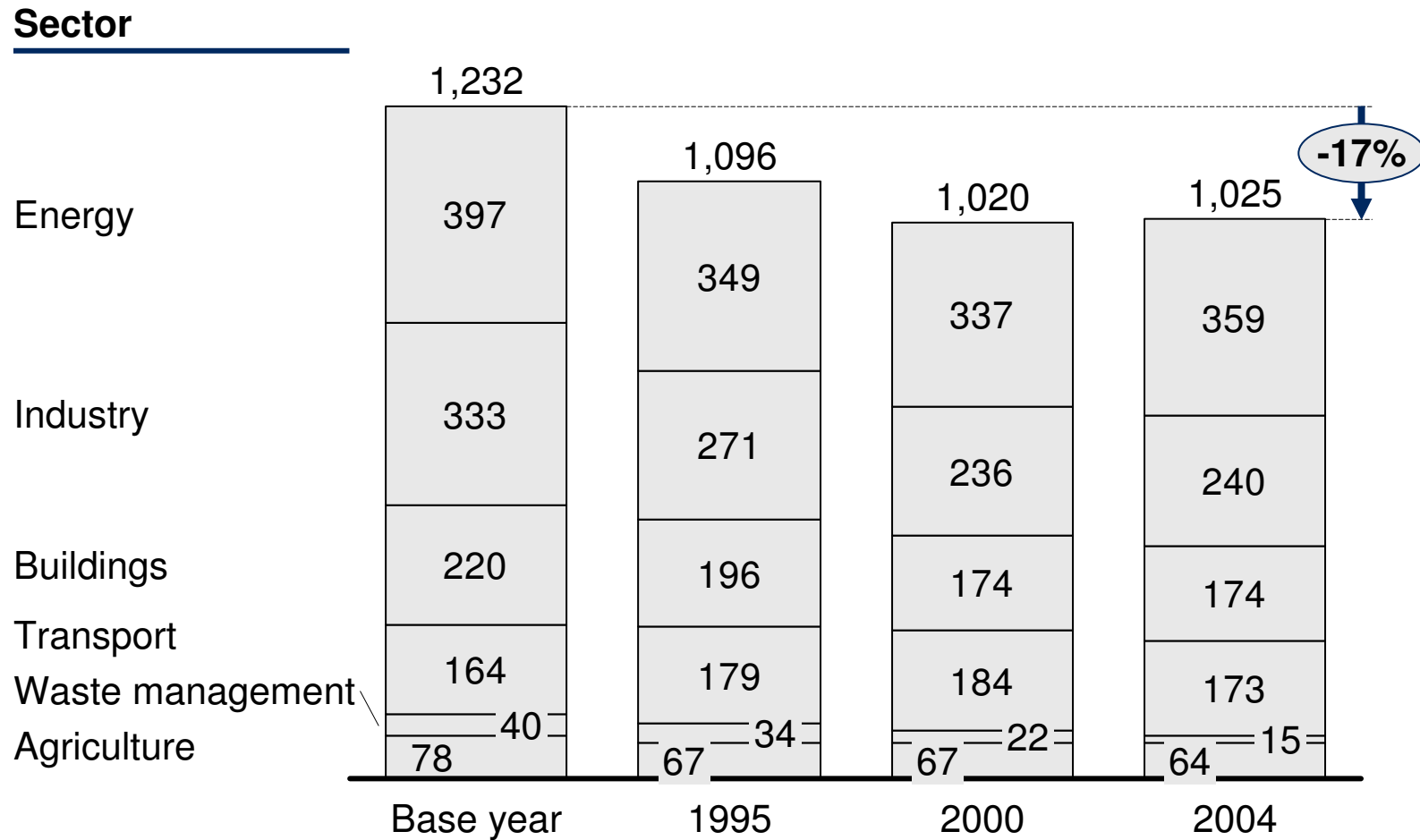
Berlin, September 25, 2007

Summary of results

1. Reducing greenhouse gas emissions in Germany by 30 percent until 2020 (compared to 1990) is ambitious, but possible
2. Most technologies needed to achieve this reduction level are already available
3. About two thirds of all measures are economic within the investment's relevant lifetime
4. The biggest lever for greenhouse gas reduction is improved energy efficiency in buildings
5. A reduction by more than 30 percent until 2020 would require substantial additional investments, significant cuts in growth and living conditions – or revising the nuclear phase-out decision
6. Until 2030, a reduction of greenhouse gases by 40 percent could only be achieved if a broad roll-out of carbon capture and storage technologies can be realized
7. Reducing greenhouse gas emissions in Germany can have positive effects on business and employment in Germany

Historical development of greenhouse gas emissions – Germany from base year to 2004

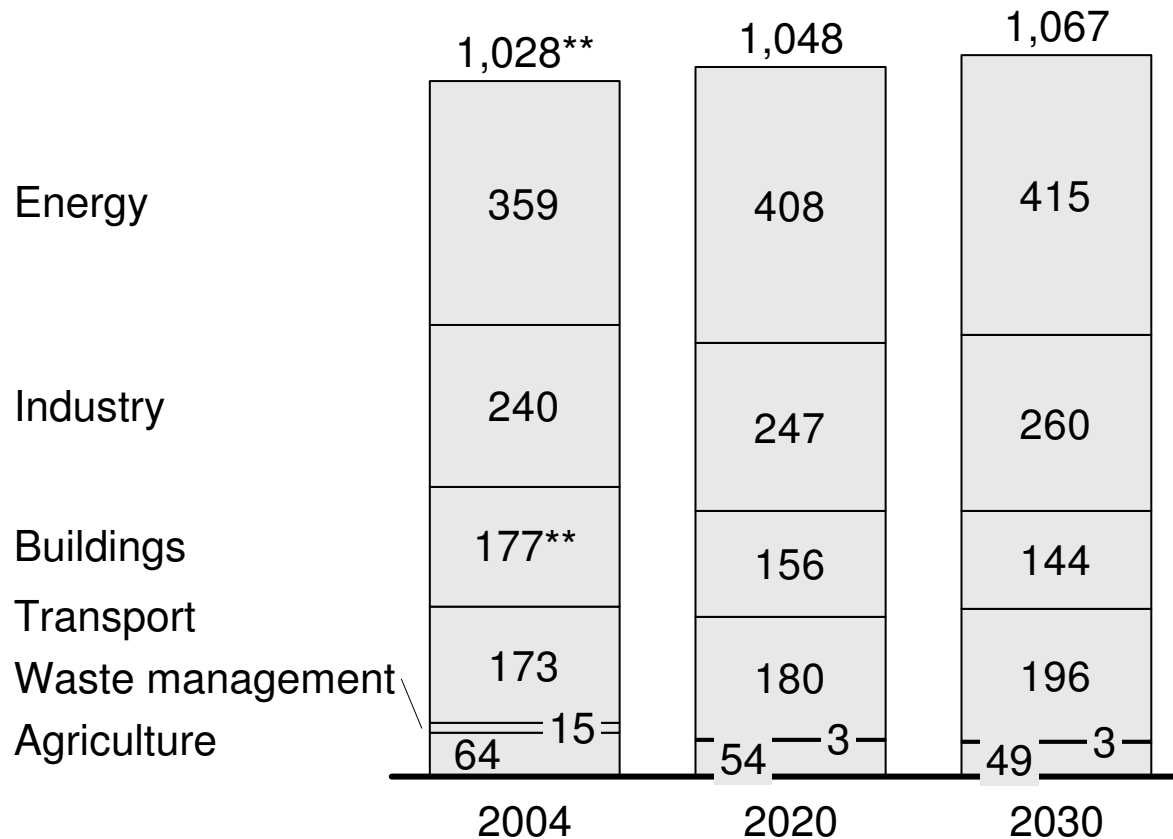
Mt CO₂e



"State of the art technology" projection for greenhouse gas emissions – Germany 2004 - 2030*

Mt CO₂e

Sector



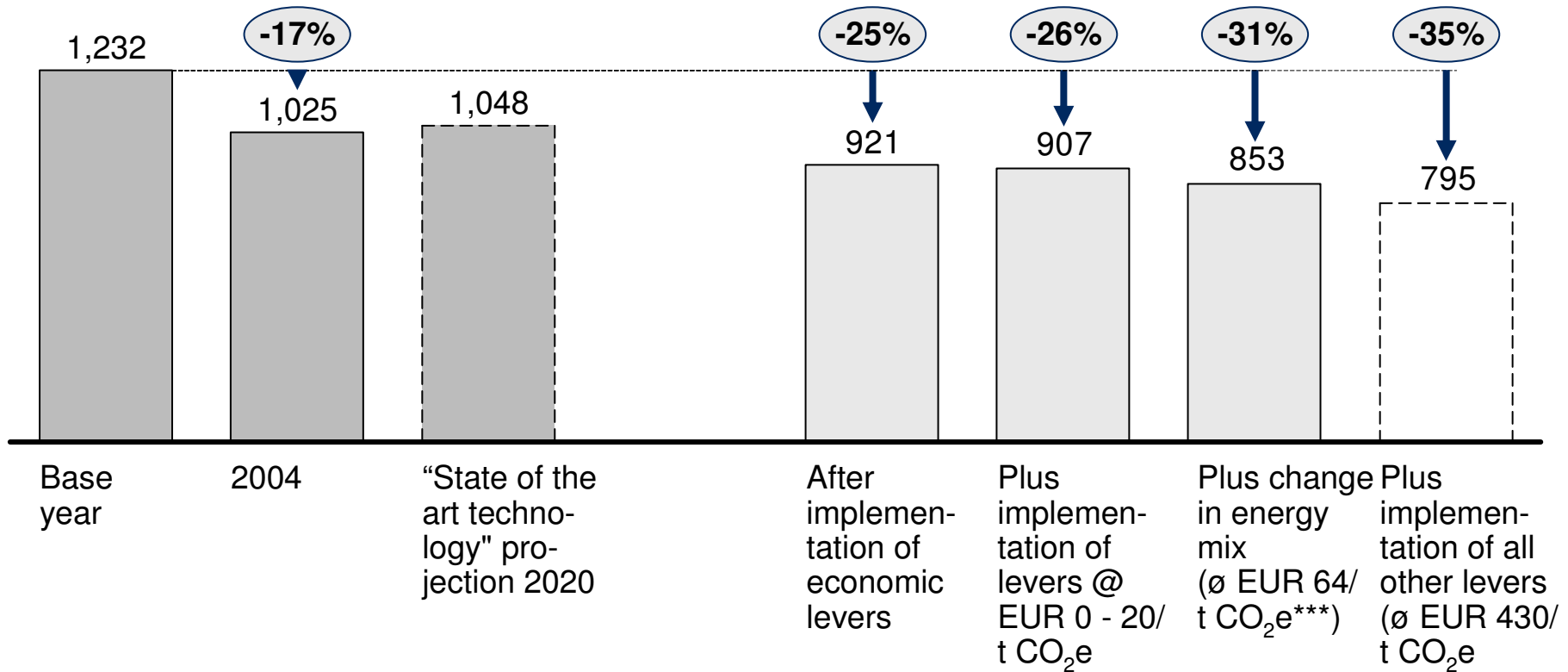
* Maintaining exit from nuclear energy

** Climate adjusted for 2004: temperature correction based on degree days

Abatement potential – Germany 2020*

Mt CO₂e

**DECISION-MAKER
PERSPECTIVE**



Abatement potential
compared to "State of the art
technology" projection 2020

127

14

54**

58

* Maintaining nuclear phase-out

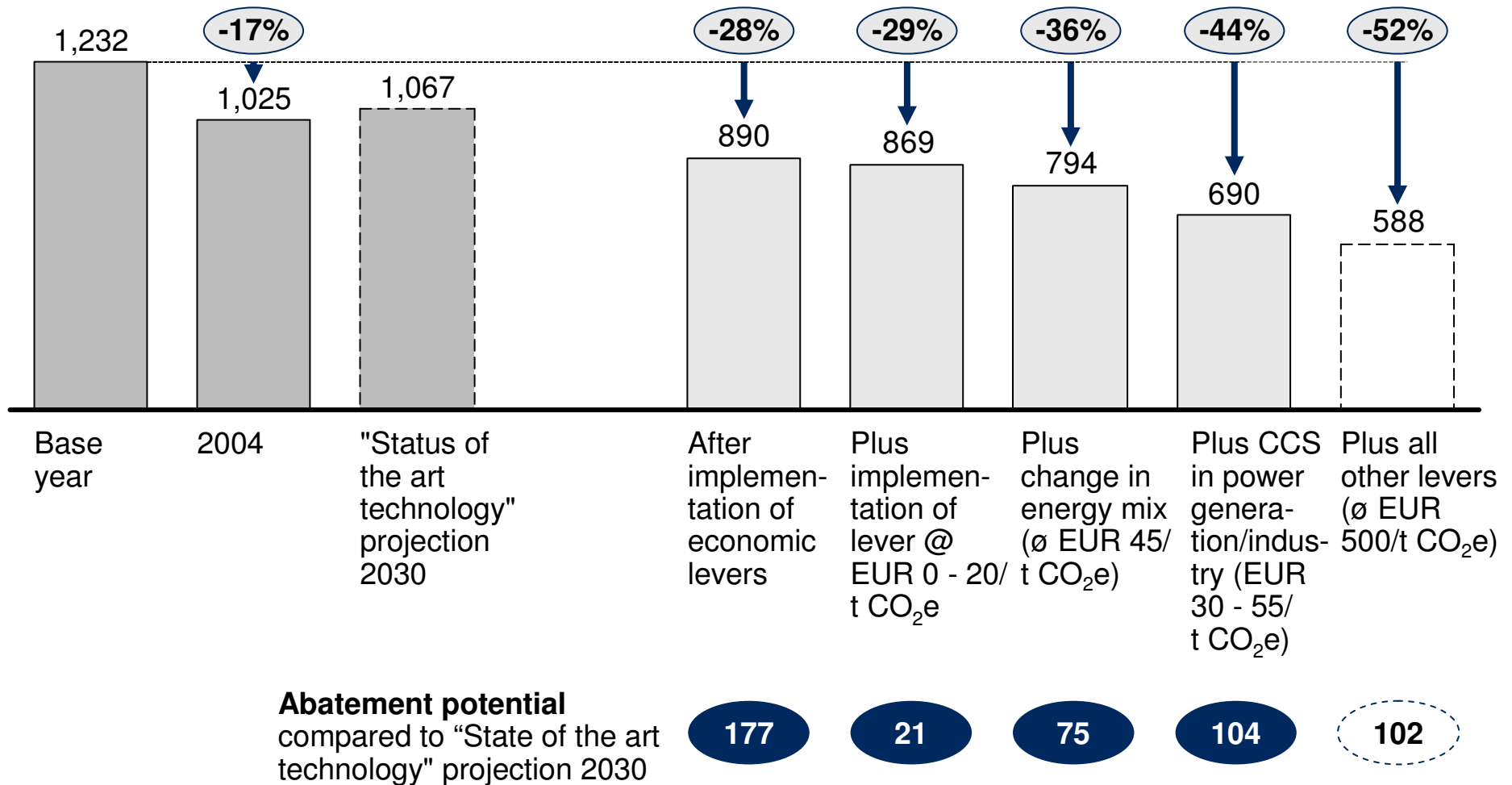
** Including 6 Mt CO₂e from CCS pilot projects in power generation

*** Power generation: Ø EUR 32/t CO₂e; biofuels: Ø EUR 175/t CO₂e; both considering the applicable subsidy rates in each case, taxes, and customs

Abatement potential – Germany 2030*

Mt CO₂e

**DECISION-MAKER
PERSPECTIVE**



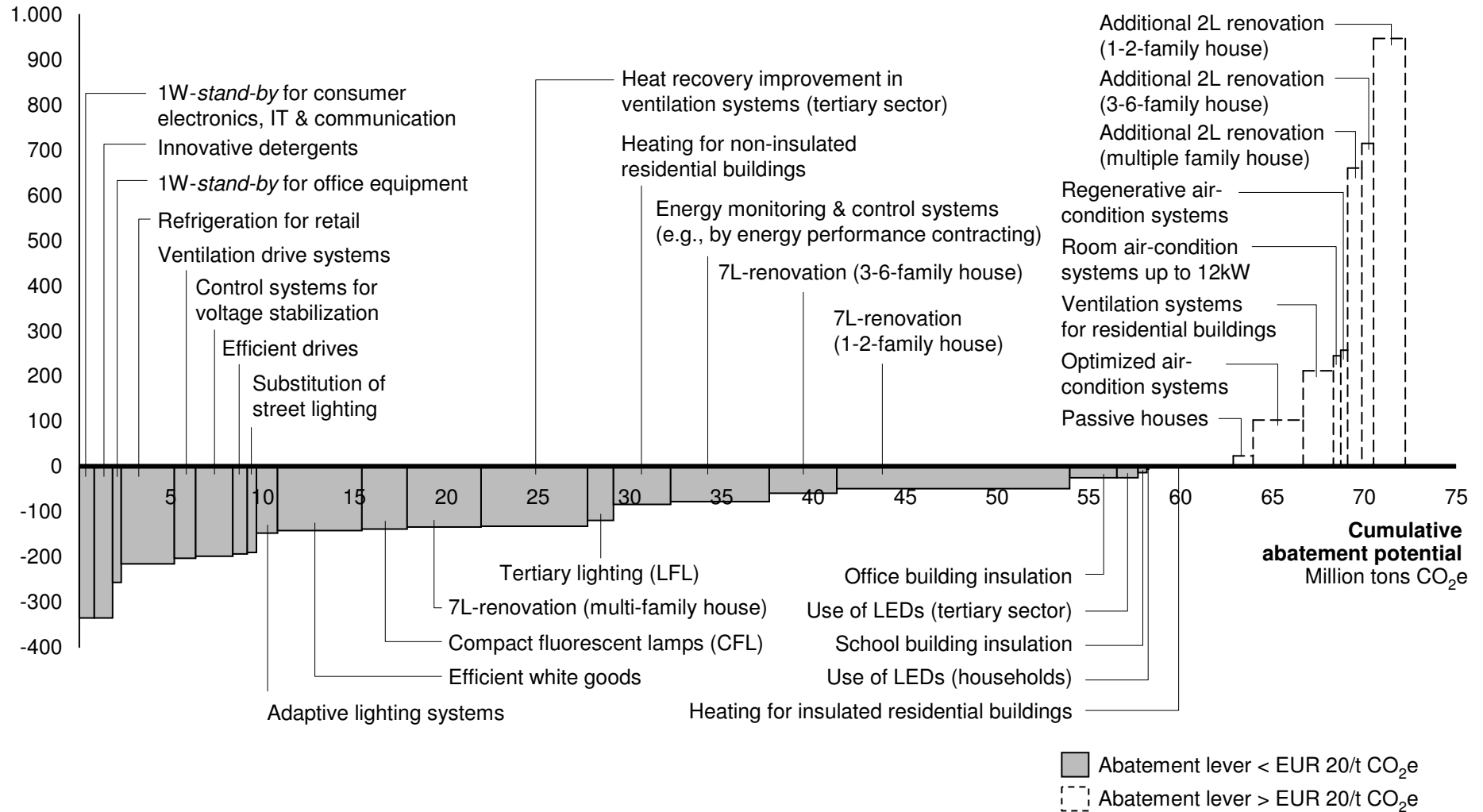
* Maintaining nuclear phase-out

** Power generation: ø EUR 31/t CO₂e; biofuels: ø EUR 95/t CO₂e; both considering the applicable subsidy rates in each case, taxes, and custom

Buildings sector: Abatement cost curve – Germany 2020

DECISION-MAKER PERSPECTIVE

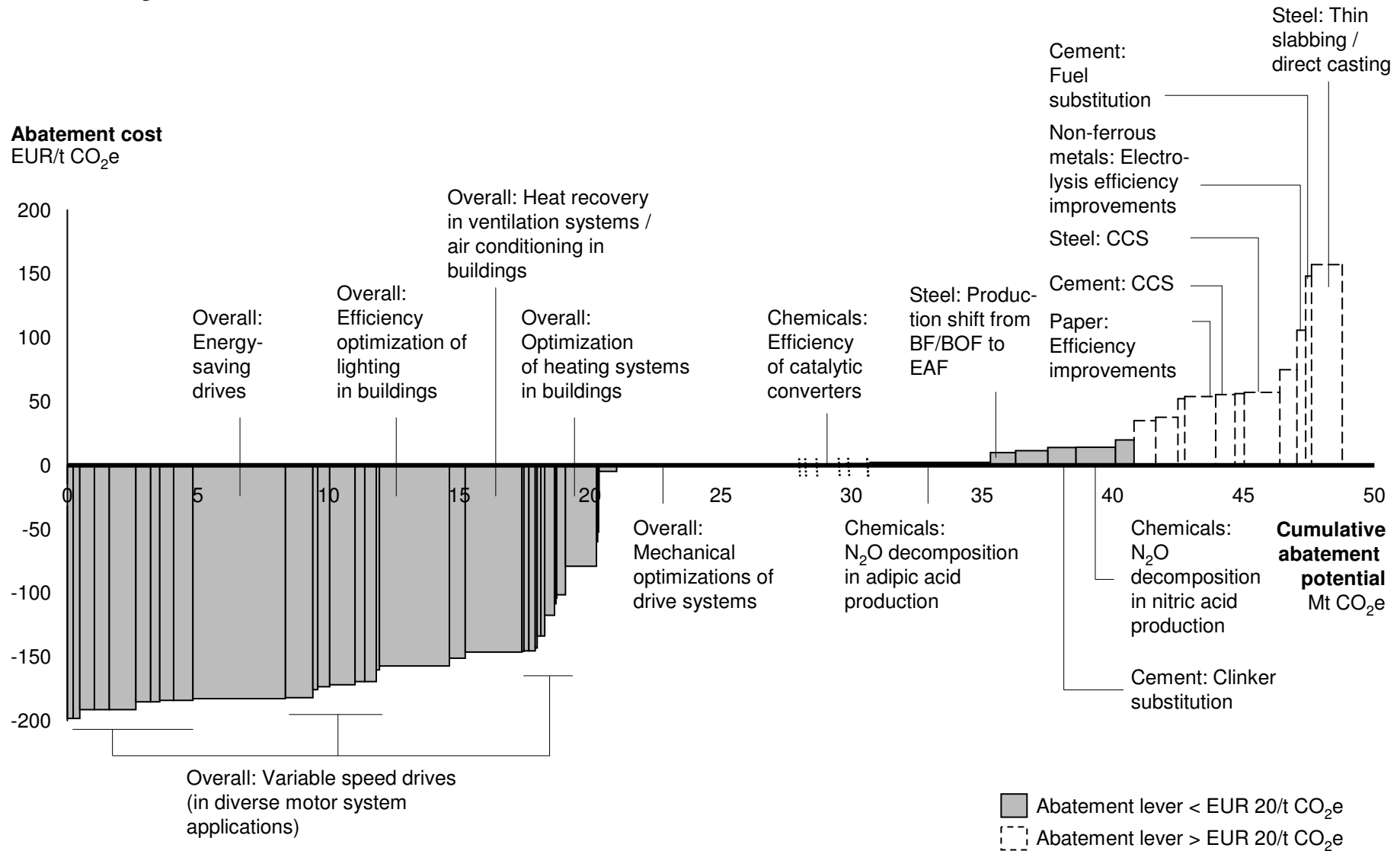
Abatement cost
EUR/t CO₂e



Source: Report "Kosten und Potenziale der Vermeidung von Treibhausgasemissionen in Deutschland" by McKinsey & Company, Inc. on behalf of "BDI initiativ – Wirtschaft für Klimaschutz"

Industrial sector: Abatement cost curve – Germany 2020

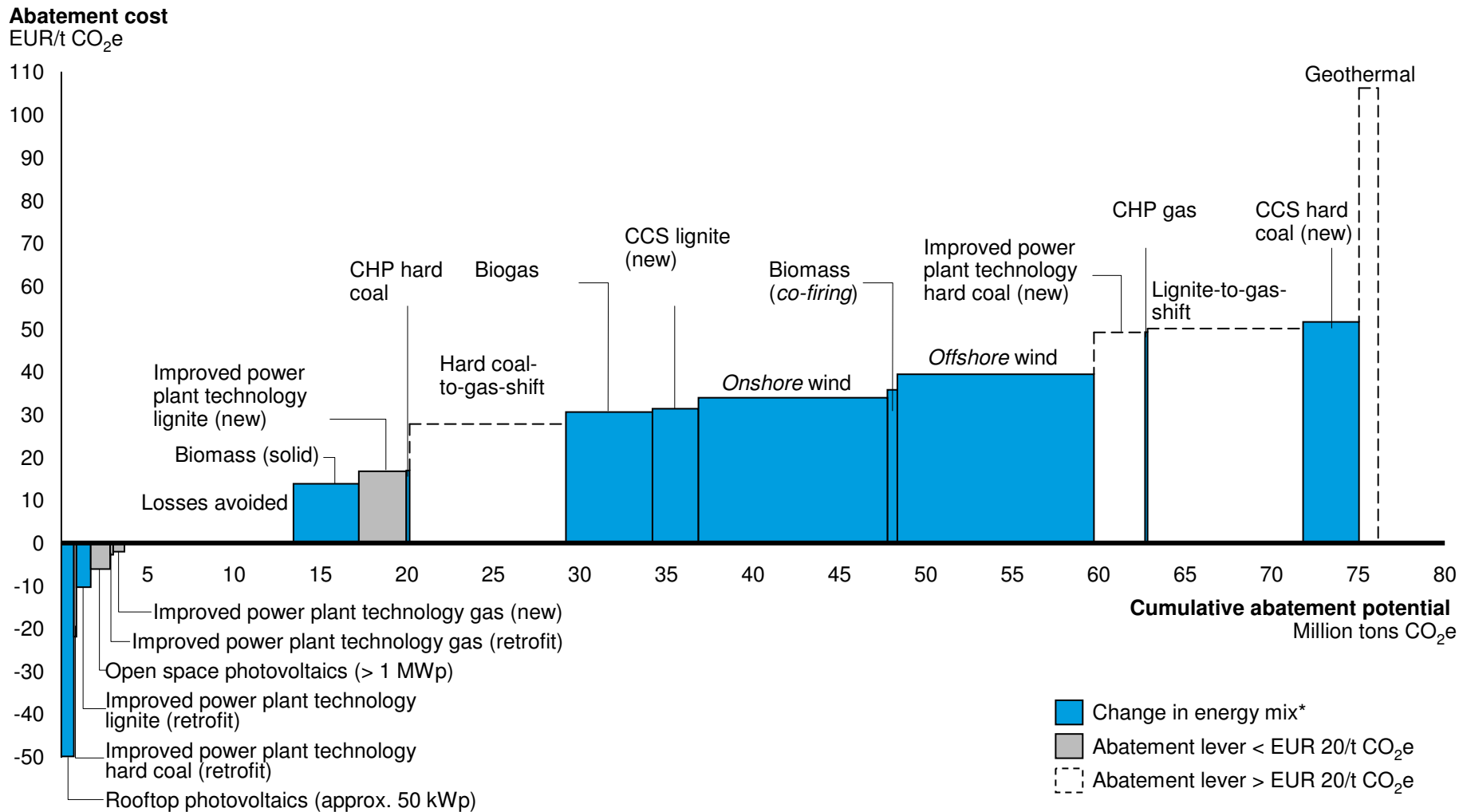
DECISION-MAKER PERSPECTIVE



Source: Report "Kosten und Potenziale der Vermeidung von Treibhausgasemissionen in Deutschland" by McKinsey & Company, Inc. on behalf of "BDI initiativ – Wirtschaft für Klimaschutz"

Energy sector: Abatement cost curve – Germany 2020*

DECISION-MAKER PERSPECTIVE
BASIC SCENARIO 2020



* Maintaining exit from nuclear power and considering promotion for renewable energies (EEG)

Cross-sectoral assumptions

		Assumptions			Source
		2010	2020	2030	
General assumptions	• Annual growth GDP	1,6%	1,6%	1,6%	Global Insight
	• Population, millions	82,0	80,7	78,5	DESTATIS
	• Discount rates (real)				Working groups
	– Energy sector	7%	7%	7%	
	– Industrial sector	9,5%	9,5%	9,5%	
	– Commercial	9%	9%	9%	
– Individuals	4%	4%	4%		
Energy prices, real (2005)	• Oil in USD per barrel*	57	52	59	Annual Energy Outlook 2007 (EIA)
	– High price scenario	63	66	75	EWI/EEFA**
	• Hard coal in EUR/MWh	7,2	7,6	8,1	EWI/EEFA**
	• Lignite in EUR/MWh	4,3	4,3	4,3	EWI/EEFA**
	• Natural gas*** in EUR/MWh	20,1	18,8	20,3	EWI/EEFA**
	– High price scenario	22,0	23,0	25,0	EWI/EEFA**

* Exchange rate: 1 EUR = 1,2 USD

** Energiewirtschaftliches Gesamtkonzept 2030

*** Delivery at power plant; bases on EIA oil price

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