

Prof. Dr. Martin Jänicke:

**“Co-Benefits and Ecological Modernisation:
Experiences in Germany”**

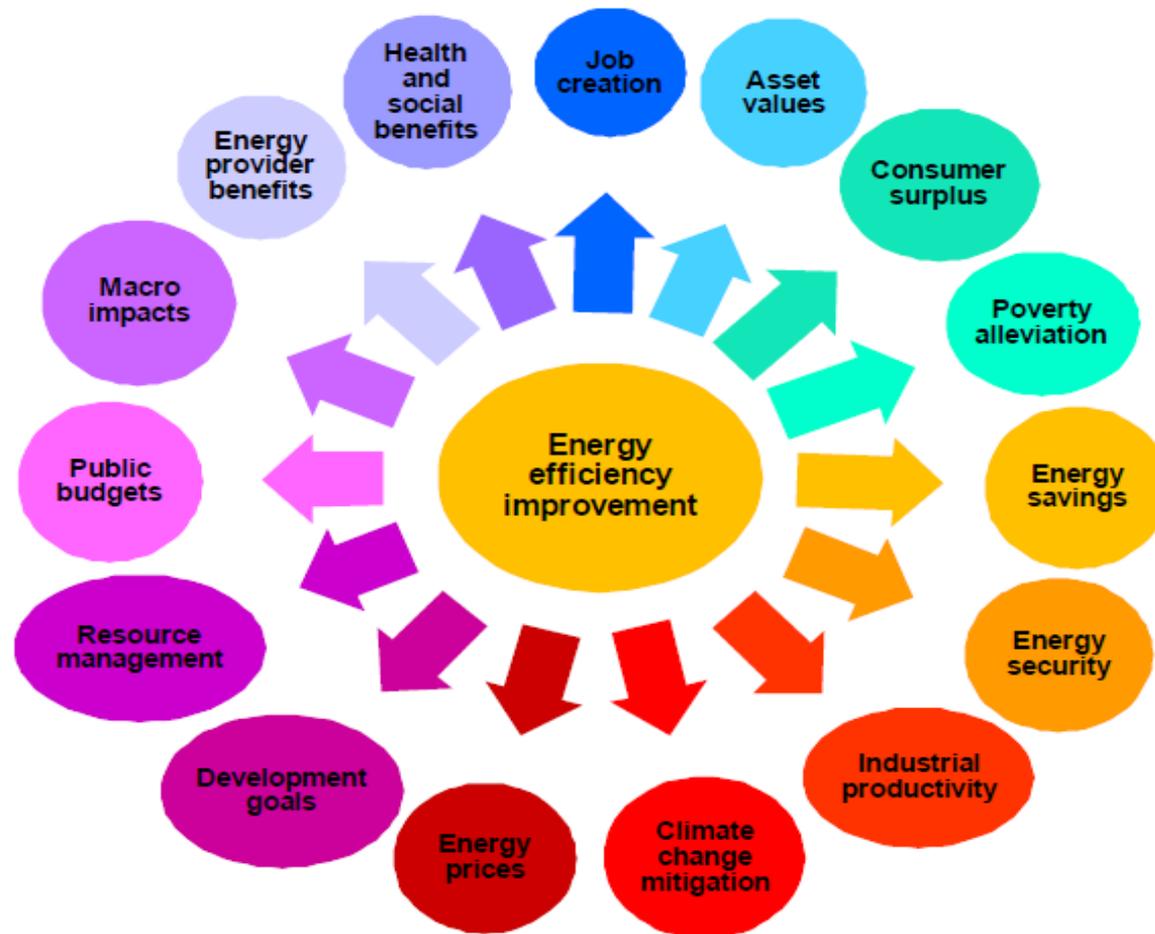
Shenyang September 23, 2016

- MBA has been in the early 1990s an argument to legitimize climate policy – beyond traditional cost-benefit analysis.
- It is essentially impact assessment (policy output – policy outcome – policy impact). There are also negative impacts....
- Ist main advantage has become the mobilisation of a broad spectrum of interests for climate policy objectives.
- Multiple benefits are also characteristic for ecological modernisation (= green economy) in general.
- MBA has a strong link to sustainable development.
- We propose MBA as an *climate policy approach of interest-related policy integration* (multi-sectoral) to mobilise special interests for climate mitigation policy.
- Be specific: Who has which advantage when and where?

The „Co-benefit Approach“

- „Co-benefits refers to multiple benefits in different fields resulting from one policy, strategy, or action plan. Co-beneficial approaches to climate change mitigation are those that also promote positive outcomes in other areas such as concerns relating to the *environment* (e.g., air quality management, health, agriculture, forestry, and biodiversity), *energy* (e.g., renewable energy, alternative fuels, and energy efficiency) and *economics* (e.g., long-term economic sustainability, industrial competitiveness, income distribution)“ (Ministry of the Environment 2009, referring to the US-EPA).
- The Paris Agreement (2015) has taken this into account stressing the „...social, economic and environmental value of...*mitigation actions and their co-benefits for adaptation, health, and sustainable development*“ (Decision 109, 128).

Figure 1 • The multiple benefits of energy efficiency



The new IEA report shows the multiple benefits of energy efficiency and calls on governments to invest more resources to harness them; „using the multiple benefits approach“. The market for energy efficiency is growing, with aggregate annual investment reaching USD 300 billion in 2012 – equal to investments in coal, oil and gas generation (9 September 2014).

(IEA: Capturing the Multiple Benefits of Energy Efficiency, Paris 2014).

ffu The IPCC AR5 2014: 18 Potential Co-Benefits of Climate Mitigation (IPCC AR5, WGIII, Ch.15, 2013)



Effect of mitigation measures on additional objectives or concerns

Economic	Social	Environmental
Energy security (7.9, 8.7, 9.7, 10.8, 11.13.6, 12.8) Employment impact (7.9, 8.7, 9.7, 10.8, 11.7, 11.13.6) New business opportunity/economic activity (7.9, 11.7, 11.13.6) Productivity/competitiveness (8.7, 9.7, 10.9, 11.13.6) Technological spillover/innovation (7.9, 8.7, 10.8, 11.3, 11.13.6)	Health impact (e.g., via air quality and noise) (5.7, 7.9, 8.7, 9.7, 10.8, 11.7, 11.13.6, 12.8) Energy/mobility access (7.9, 8.7, 9.7, 11.13.6, 12.4) (Fuel) Poverty alleviation (7.9, 8.7, 9.7, 11.7, 11.13.6) Food security (7.9, 11.7, 11.13.6/7) Impact on local conflicts (7.9, 10.8, 11.7, 11.13.6) Safety/disaster resilience (7.9, 8.7, 9.7, 10.8, 12.8) Gender impact (7.9, 9.7, 11.7, 11.13.6)	Ecosystem impact (e.g., via air pollution) (7.9, 8.7, 9.7, 10.8, 11.7, 11.13.6/7, 12.8) Land use competition (7.9, 8.7, 10.8, 11.7, 11.13.6/7) Water use/quality (7.9, 9.7, 10.8, 11.7, 11.13.6) Biodiversity conservation (7.9, 9.7, 11.7, 11.13.6) Urban heat island effect (9.7, 12.8) Resource/material use impact (7.9, 8.7, 9.7, 10.8, 12.8)

Pollution control costs,

Balance of trade

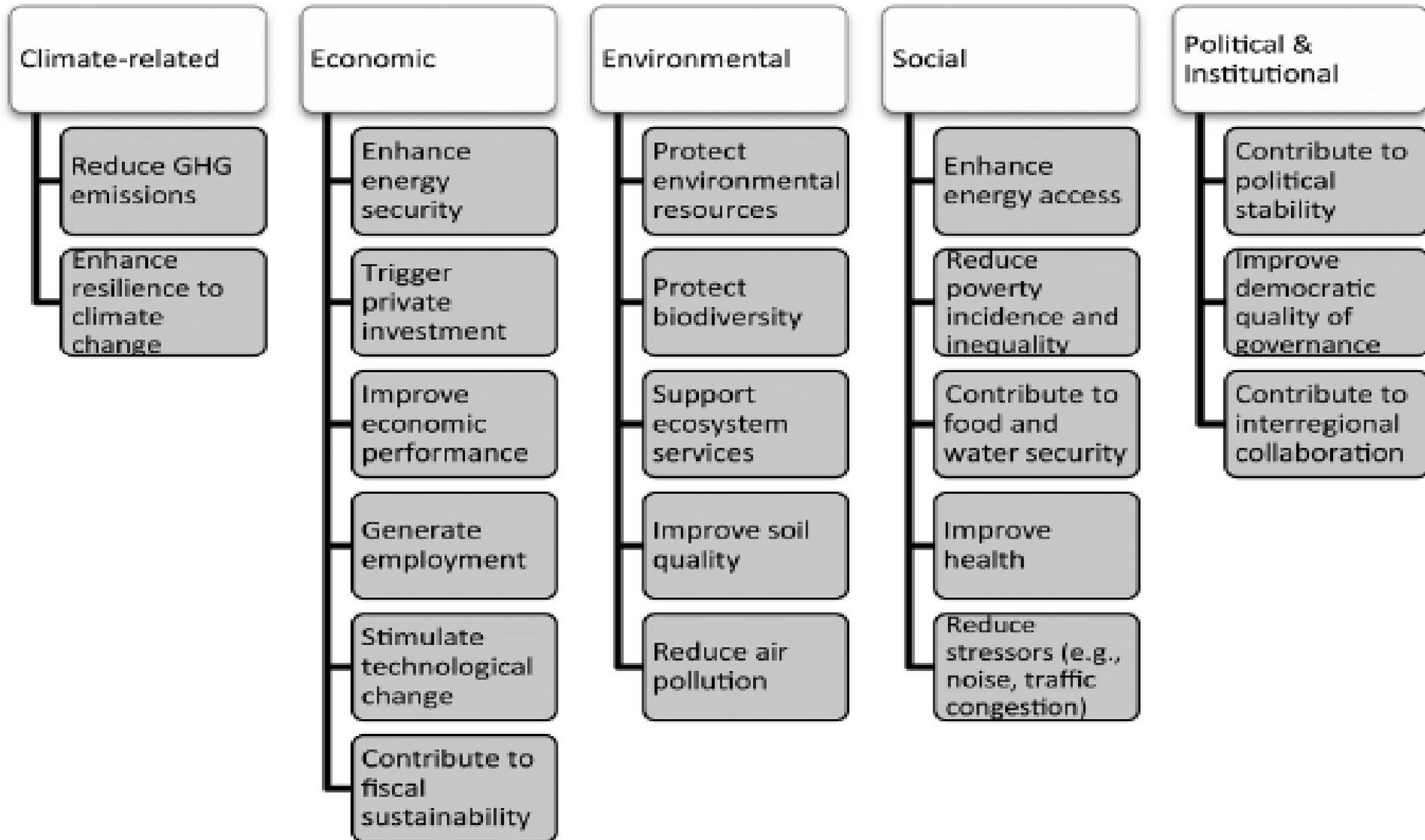


Table 3.2: Sector policy case studies: Monetized health, agricultural, and energy benefits in 2030

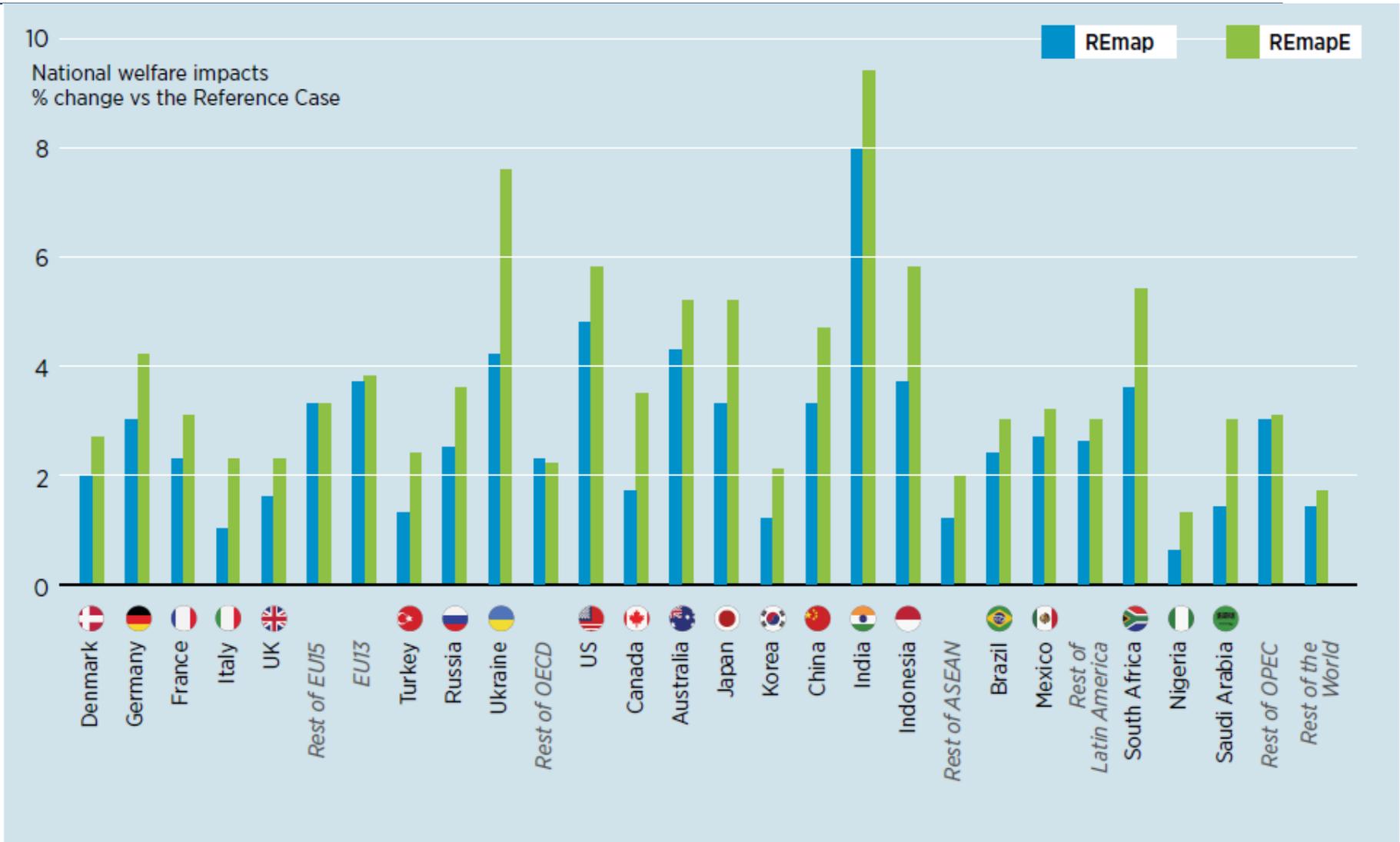
Regions	Health	Agriculture	Energy Savings
China	\$ 66 billion	\$ 69 million	\$ 311 billion
India	\$ 293 billion	\$ 14 million	\$ 75 billion
US	\$ 8 billion	\$ 48 million	\$ 186 billion
EU	\$ 8 billion	\$ 82 million	\$ 181 billion
Brazil & Mexico	\$ 53 billion	\$ 3 million	\$ 45 billion
Total	\$ 429 billion	\$ 216 million	\$ 798 billion

Note: Estimated avoided premature mortality and increased crop yields from abatement measures undertaken in each sector (transport, industry, and buildings) are monetized and aggregated by region. The values^a of energy savings are also shown. Figures are denoted in 2010 dollars.

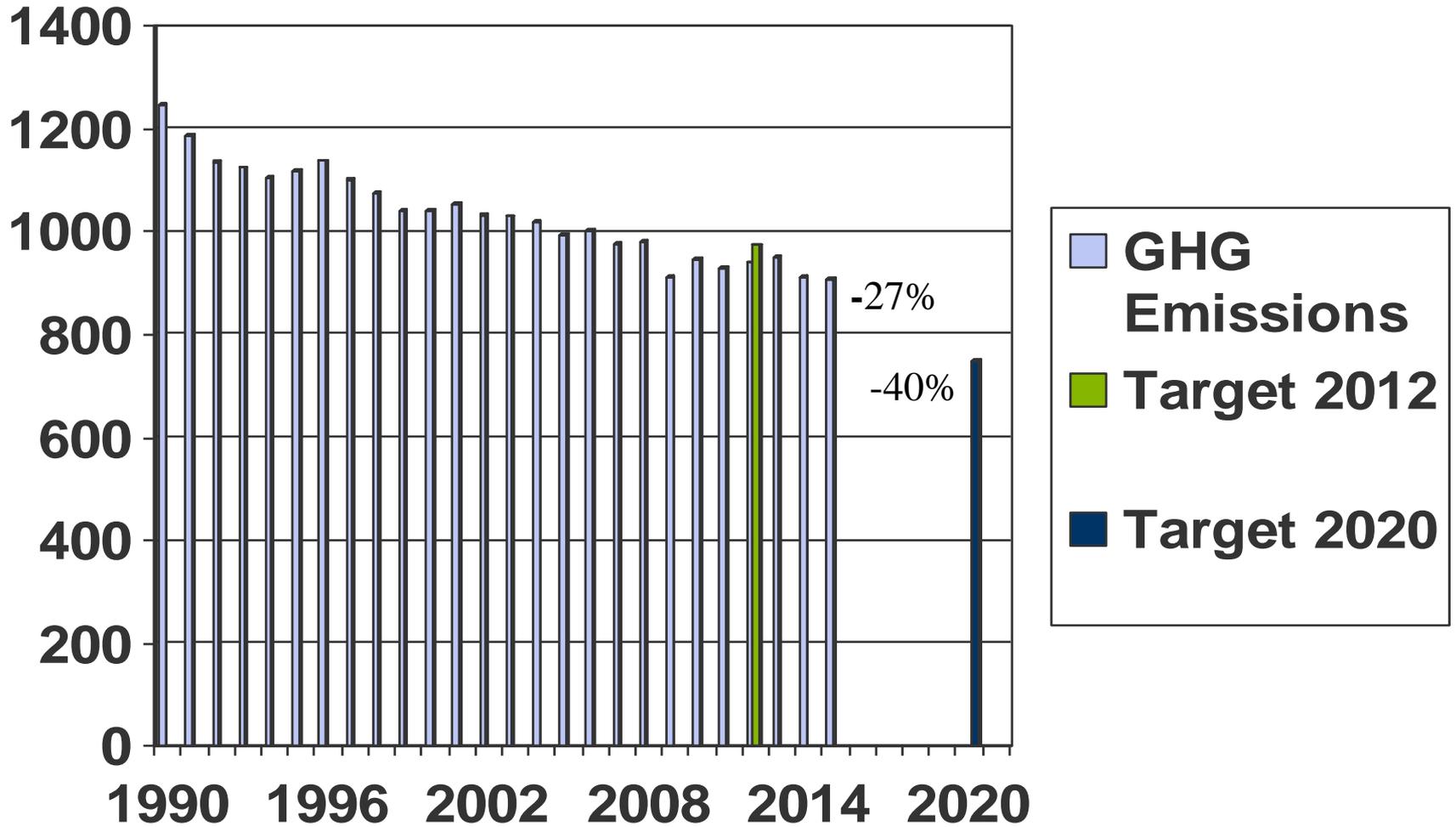
^a The monetized values for energy savings are obtained by assuming a price of oil

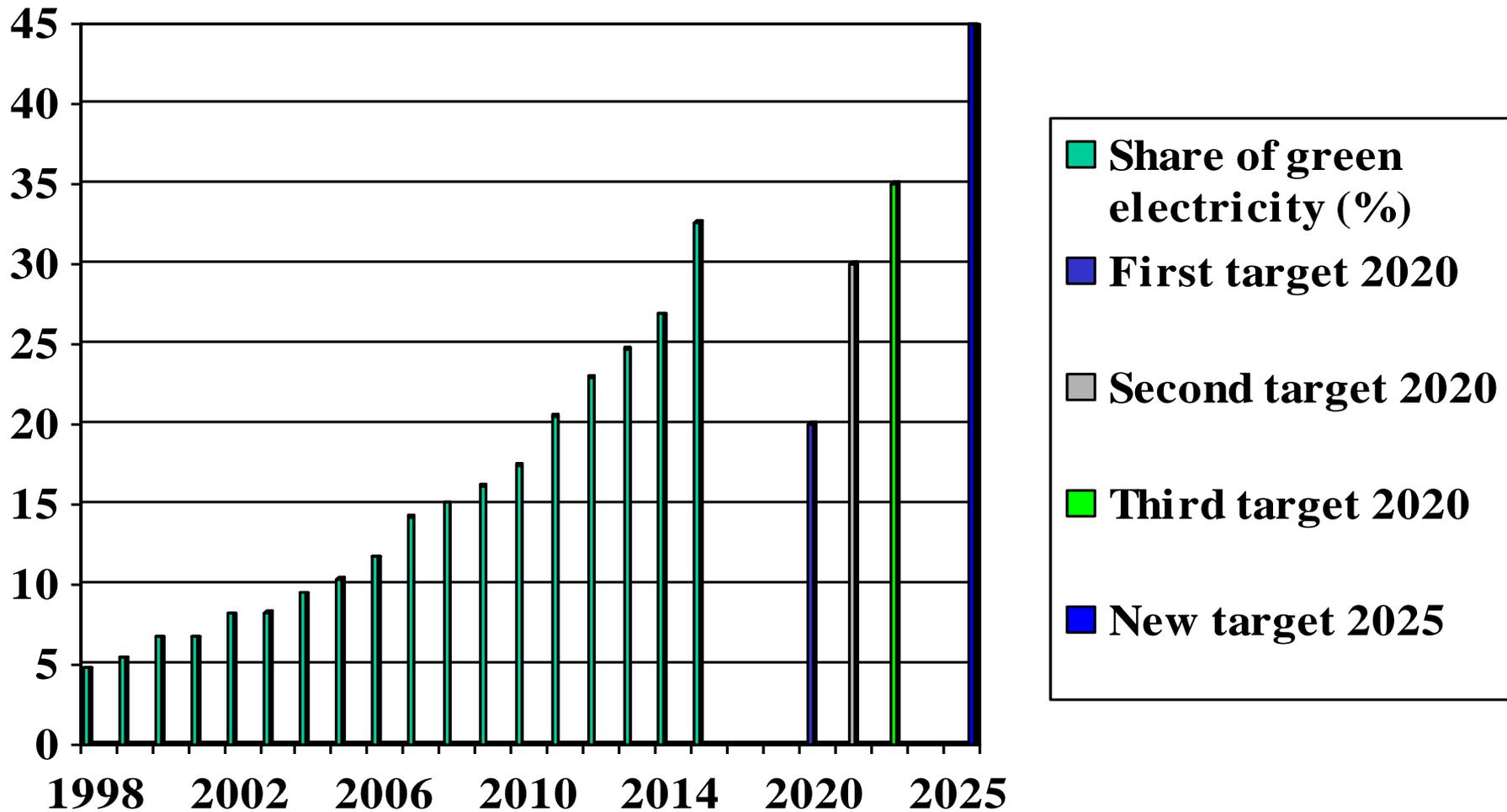
	Weighting	REmap (main case)	REmap (with full crowding out)	REmapE (main case)	REmapE (with full crowding out)
Economic dimension					
 Consumption + Investment	1/3	0.7	0.0	1.2	-0.2
Social dimension					
 Employment	1/6	0.1	-0.1	0.2	-0.2
 Health and education	1/6	1.8	1.5	2.1	1.4
Environmental dimension					
 Greenhouse gas emissions ²⁸	(-) 1/6	-11.2	-11.2	-15.7	-15.7
 Material consumption	(-) 1/6	-1.6	-1.7	-1.9	-2.2
Total welfare Impact		2.7	2.4	3.7	3.1

National Welfare Impacts of Doubling RE by 2030 (% Change vs. Reference Case, IRENA 2016)



Co-Benefits of Climate Mitigation: German Experiences



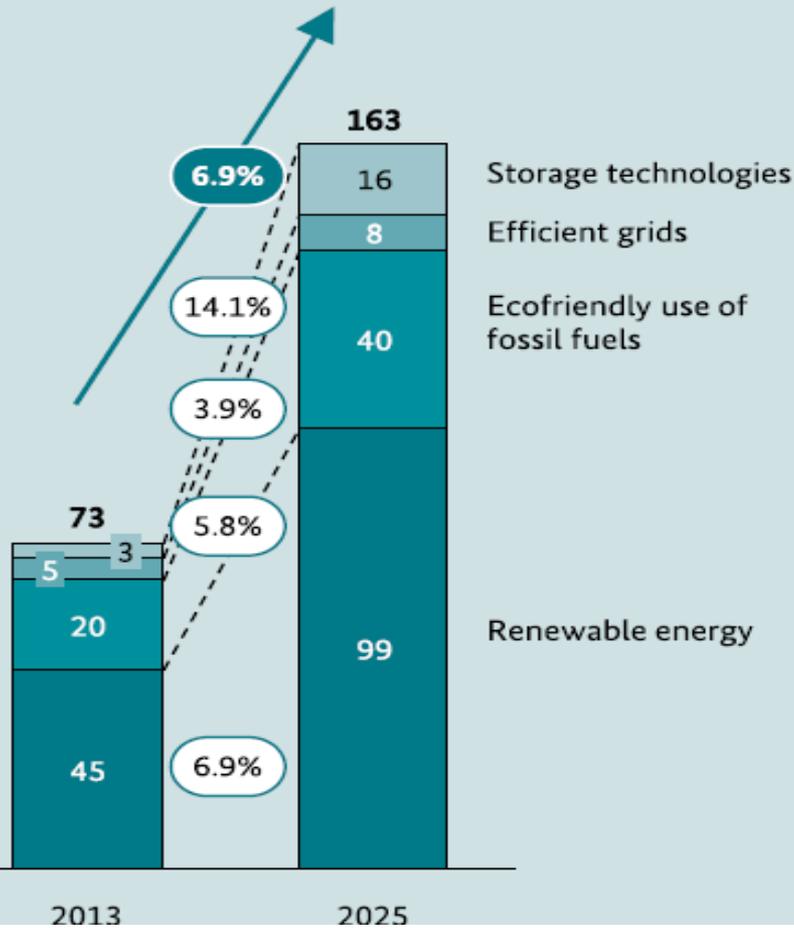


Climate policy 1998 as „ecological modernisation“:

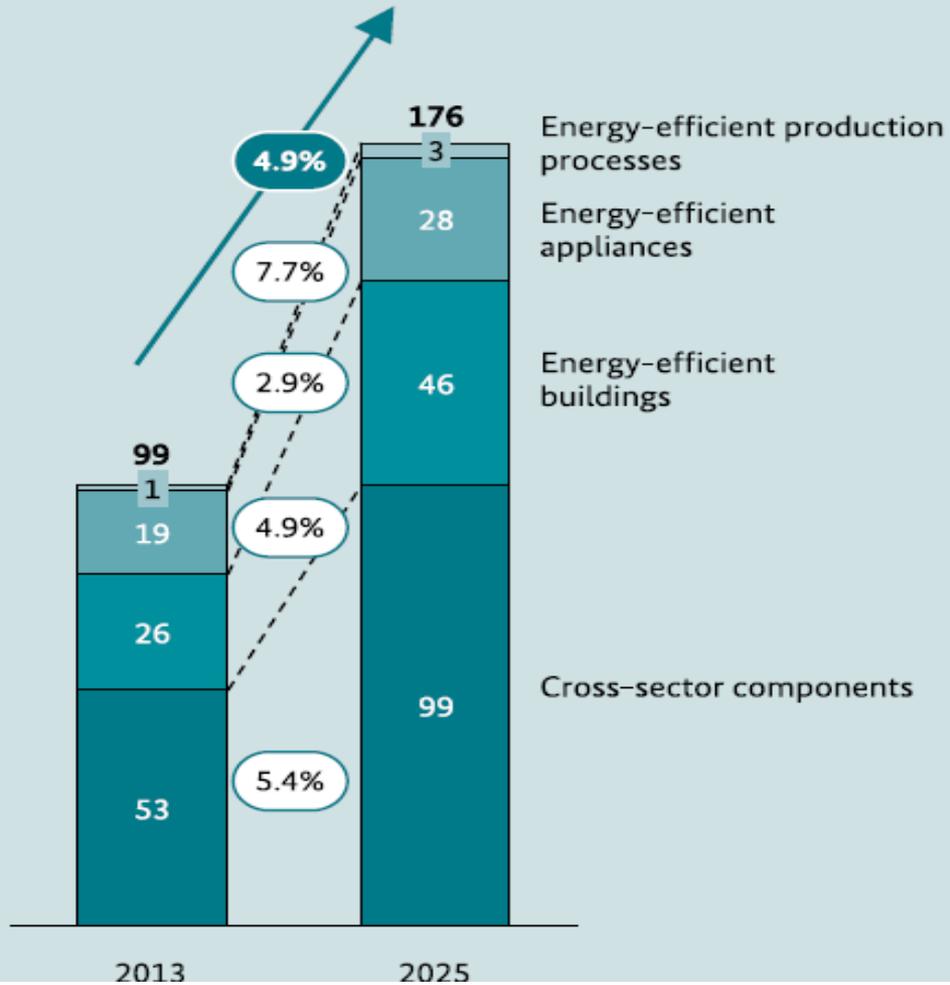
- **Growth:** Positive economic effects: a booming „climate protection industry“ (2005: >5% GDP)
- **Innovation:** Ambitious targets (THG plus phasing out of nuclear energy) have created high pressure for innovation
- **Productivity:** Cost reductions and increased productivity
- **Employment:** 370.000 (renewable energy), 850.000 (energy efficiency), 250.000 (energy tax with reduced social security contrib.)
- **Lead markets/Export:** first-mover advantages; global Market share energy efficiency 12%, climate-friendly energy: 17% (2013).
- **Foreign investment:** Inflow of capital into the German market (induced by the EEG).
- **Rural development**
- **More Energy security.**

- **Land use:** A smaller area used for lignite coal mining.
- **Progression over time:** By stimulating innovation and markets more ambitious targets have become feasible resulting in dynamic targets.
- **Demonstration effect** + competitive pressure on others.

Lead market for environmentally friendly power generation, storage and distribution



Lead market for energy efficiency



2010)

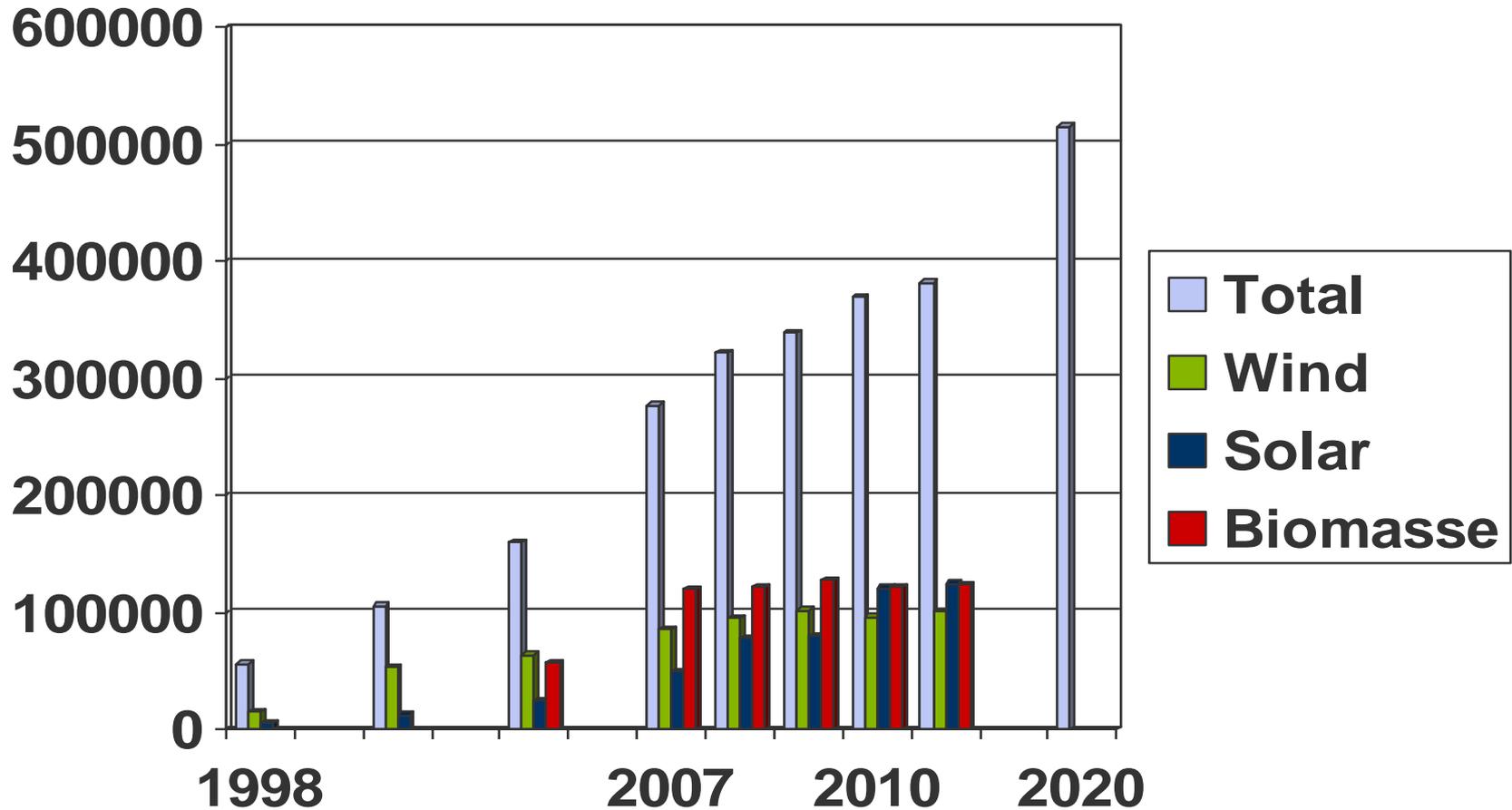
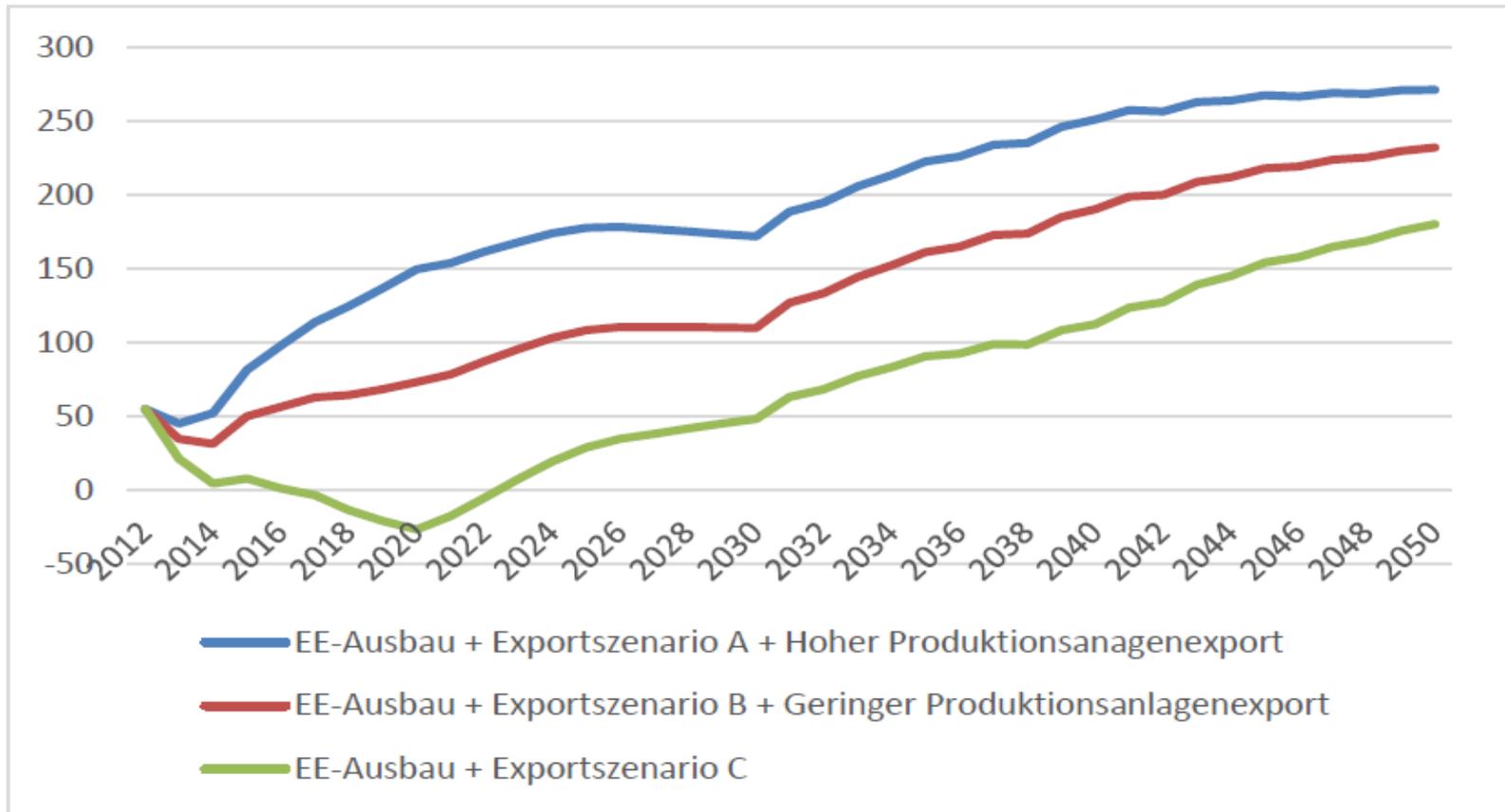


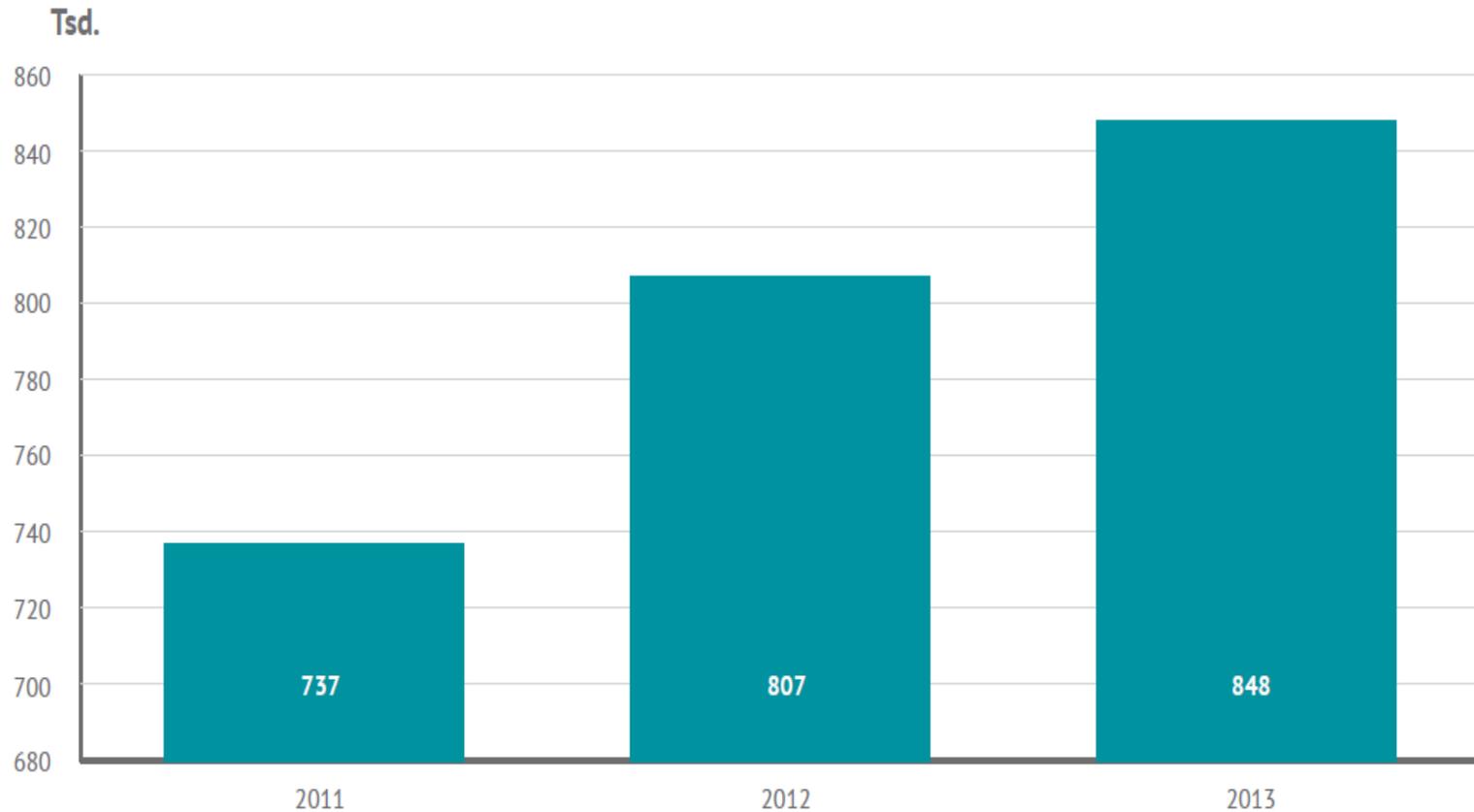
Abbildung 1-2

Nettobeschäftigung unter verschiedenen Exportannahmen (1000 Beschäftigte)



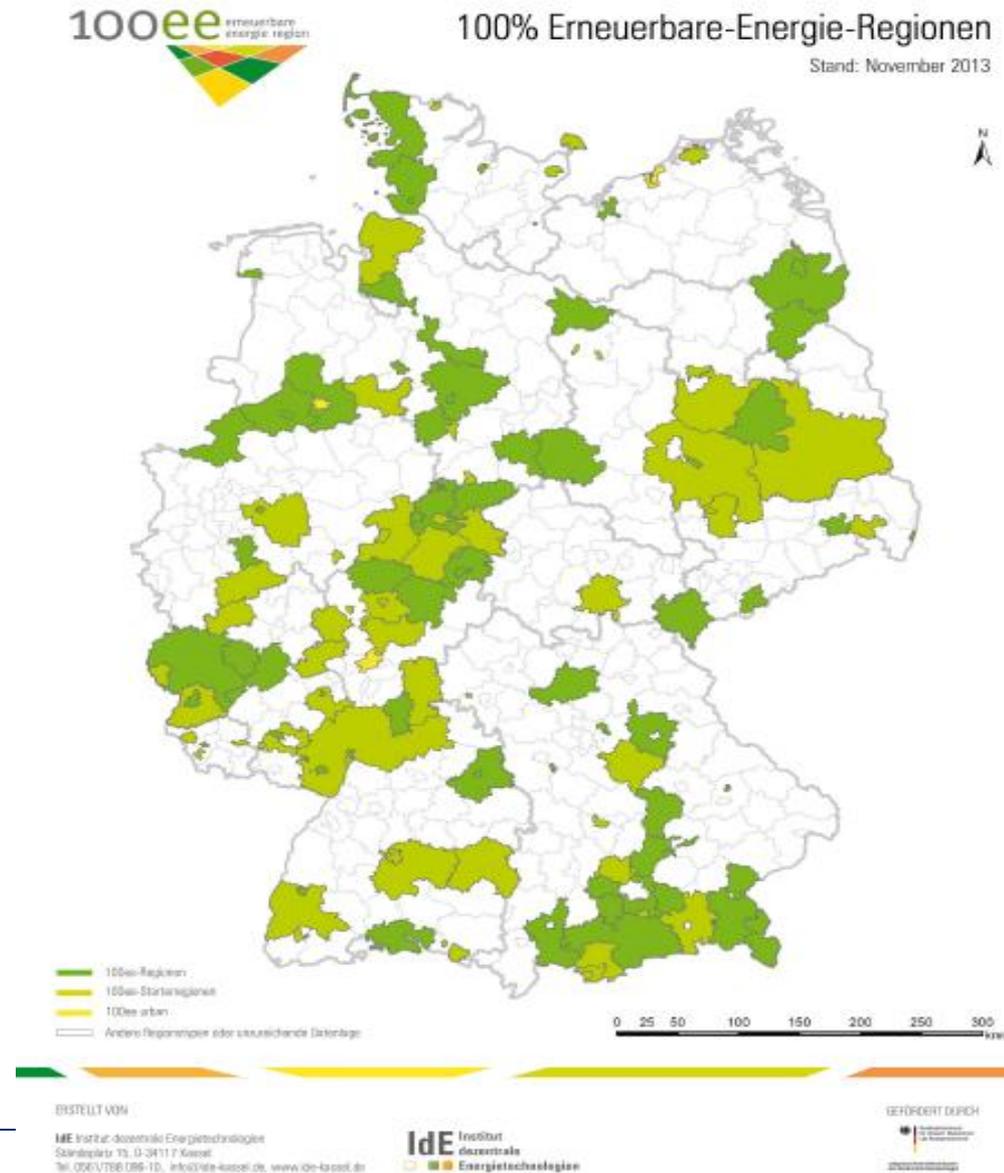
Quelle: Berechnungen mit dem Modell PANTA RHEI.

Erwerbstätige im Bereich Energieeffizienz in Deutschland (hochgerechnet)



Quelle: DENEFF-Befragung „Branchenmonitor 2014“, hochgerechnet auf Basis der Daten „Branchenmonitor 2013“

- 2013: 138 EE-Regions
(59 Starter regions)
21,6 Mio Inhabitants
ca 30% of the territory.
- 2010: 72 EE-Regions
7,8 Mio. Inhabitants,
13,6 % of the territory



- **Green power supply** in villages (two villages with >500% supply)
- **Green heat supply in villages** (often in „bio energy villages“)
- **Green mobility supply:** rural car-sharing or leasing based on green local power.

Related:

- Organic farming
- Eco tourism
- Health and recreational services

The Broader Context: Multiple Benefits of Ecological Modernisation and Efficient Resource Use

- Germany has a long tradition in supporting environmental-friendly technology by a „green“ industrial policy.
- The concept of „ecological modernisation“ (Jänicke 1982, 1984) had a strong influence on the German red-green government (1998-2005). It was defined *in the 2002 coalition treaty as “...integration of labour and environment“ with the implication of „increased eco-efficiency, lower production costs and improved competitiveness.“* (Koalitionsvereinbarung zwischen SPD und Grünen, 2002).
- The concept of ecological modernisation was later on also used by other German politicians. It is nearly synonym with „green economy“.

Material Flows

Economic Benefits

Environmental Benefits

Social Benefits



* Lower Costs of:

- materials
- energy
- water
- transports
- land use
- pollution contr.
- * Competitiveness
- * Innovation
- * New materials
- * Income, taxes...
- * Balance of trade

Reduced:

- * emissions
- * dissipative losses
- * waste
- * loss of living space
- * loss of species and functions

Improved:

- * health
- * employ-
ment
- * taxes
- * ...

Co-Benefits of Ecological Modernisation: German Experiences

The German „CleanTech Industry“ +

Forecast (turnover, bn. €) (Source: Roland Berger 2006-14)

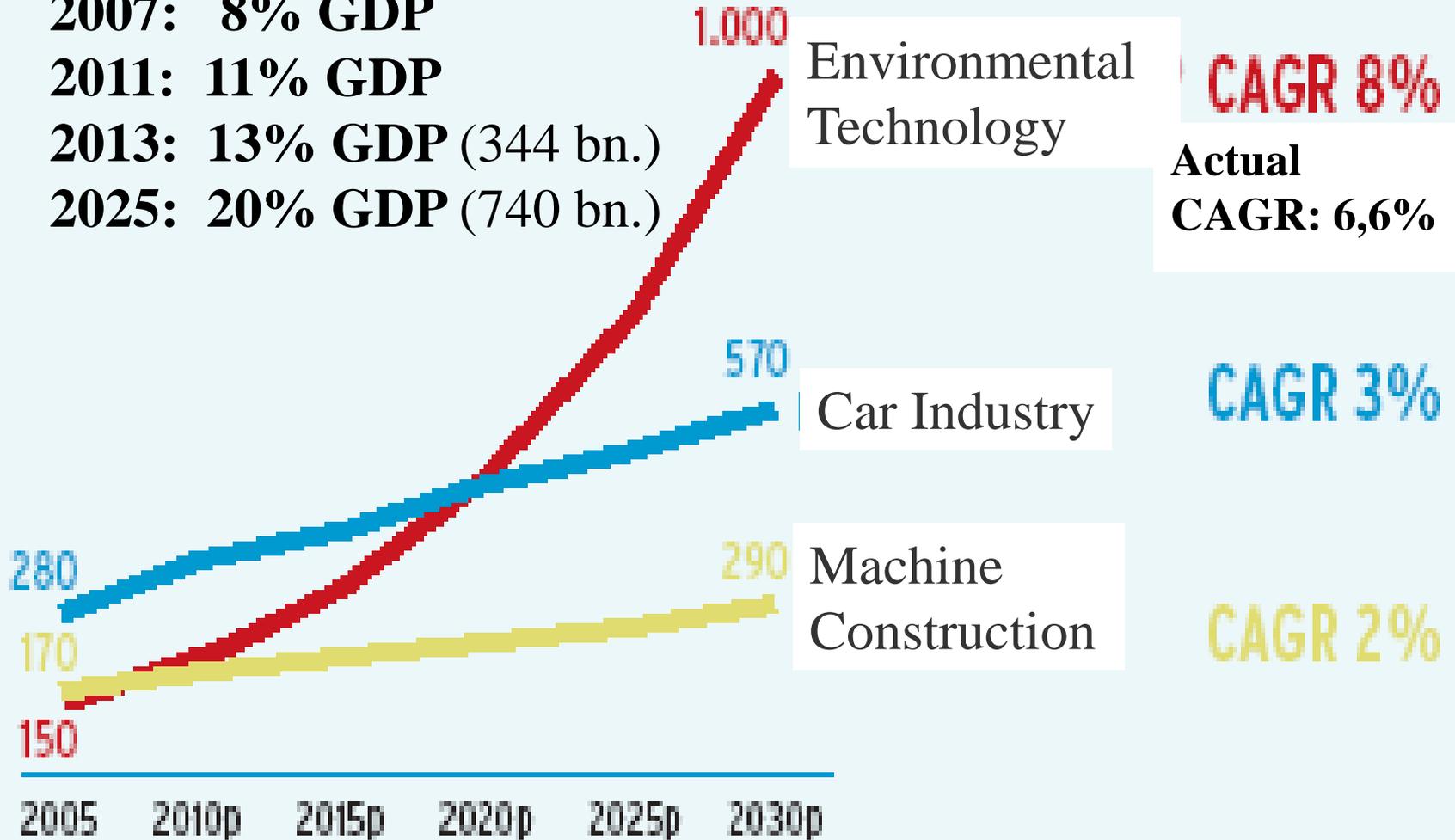
(2005: 4% GDP)

2007: 8% GDP

2011: 11% GDP

2013: 13% GDP (344 bn.)

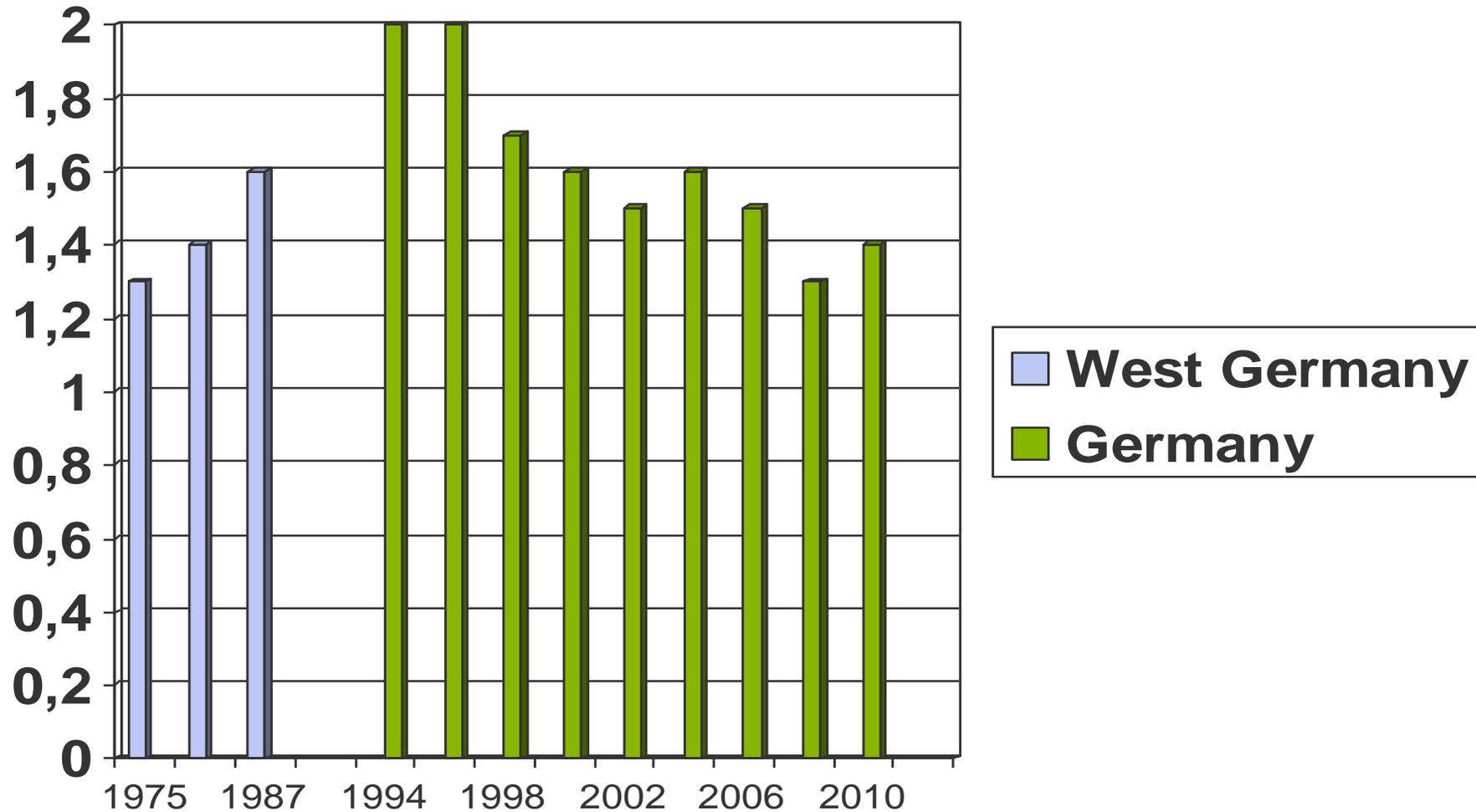
2025: 20% GDP (740 bn.)

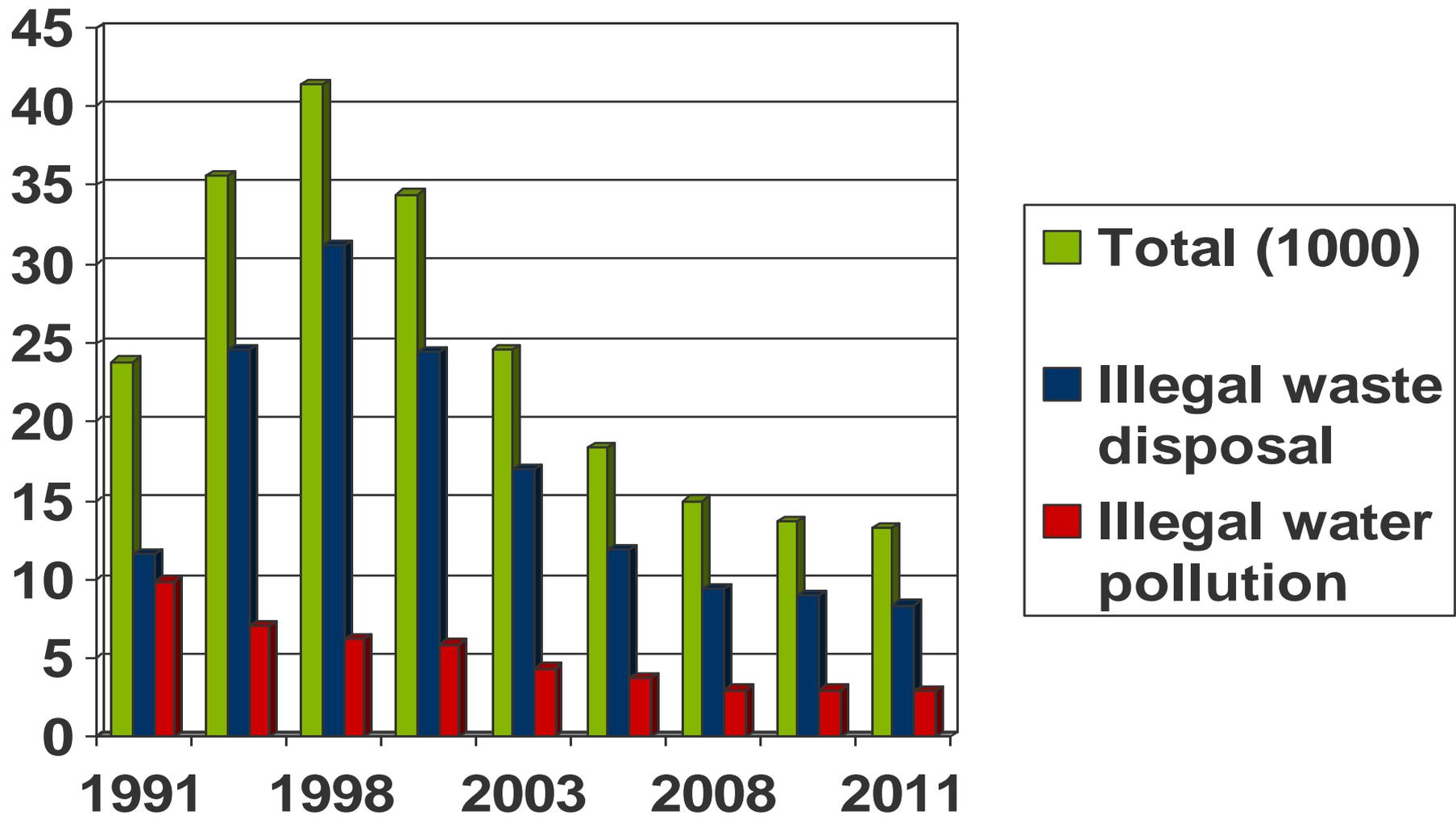


- **Energy efficiency:** € 100 bn. (12% of the world market).
- **Climate-friendly energy:** € 73 bn. (17% ,,)
- **Sustainable mobility:** € 53 bn. (17% ,,)
- **Sustainable water management:** € 53 bn. (11% ,,)
- **Resource efficiency:** € 48 bn. (13% ,,)
- **Recycling:** € 17 bn. (17% ,,).
-
- **Total cleantech sector Germany:** € 344 bn. (14% ,,).
- **Forecast 2025:** € 740 bn. (>20% ,,)
- **Average annual growth rate: 6,5%**

	2000	2013
Turnover (bn. €):	135.0	190,6 (+ 41,2 %)
Added Value (bn. €):	40,1	51,8 (+ 20%)
Energy Consumption (TJ):	727.089	645.470 (- 12,6%)
GHG Emissions (Mt.)	50,7	45,1 (- 11 %)
Water Use: (bn.cbm)	3,31	2,62 (- 20,8%)
Final waste (Mt.):	2,31	0,88 (- 61.9%)

- The Co-Benefits of Ecological Modernisation and increased resource efficiency may have reduced the industrial resistance against environmental policy.





Problems and Clarifications of the Co-Benefit Approach

- *What* is the *kind of benefit*: specific opportunities, improvements or advantages relating to relevant interest of specific actors (e.g. employment in the construction sector) – or consists the benefit only in long-term reduced costs, damages or risks (e.g. in agriculture or in coastal cities), where the visibility is low in the present situation?
 - *Who* are the potential beneficiaries who have the advantage: economic actors, societal groups or the state - or the general public.
 - *Where* are the benefits: at the global, national, provincial or local level, in Europe or in Africa? The gender co-benefit of clean energy re-sources (cooking) can only be observed in developing countries.
 - *When* will there be a co-benefit: in near times or in a long-term future?
- If the chosen multiple-benefit approach tries to mobilise specific interests for climate protection objectives, *the specific, short-term advantage for relevant and near actors will be essential.*

Economic Co-Benefits:

- Employment:
 - Energy sector
 - Construction Sector
 - Machine Construction
 - R&D, Chemical Industry
 - Agriculture, etc.
- Productivity /competitiveness
- New markets
- Energy security
- Improved trade balance
- Innovation
- Local taxes
- Lower pollution control costs
- Rural development

- New resources / materials

Other Co-Benefits:

- Poverty alleviation
- Health effects by reduced air pollution:
 - + Kerosene substitution
 - + power sector emissions (including mercury, arsenic)
 - + traffic emissions
 - + emissions from buildings
- Fresh-water supply
- Energy access
- Better micro climate
- Biodiversity

Economic co-benefits (IPCC):

- Employment
- New business opportunities
- Energy security
- Lower production costs

Social co-benefits:

- Energy/mobility access
- Poverty alleviation
- Health impact
- Gender impact

Environmental co-benefits:

- Eco-system impact (air pollution)
- Water supply (cooling!)
- Biodiversity

Additional economic benefits:

- Local income / local taxes
- Organic farming / bio products
- Local resources (wood, recycl.)
- Manufacture (local resources)
- Eco-tourism (nature protection)
- Low energy costs
- Site attractiveness (investment)
- Energy consulting
- High-quality fertilizer
- e-mobility (car sharing/leasing)
- Additional services
- Recreation and health services
- Internet-based jobs

- **Strong Co-benefits are: specific, short-term, nearby, and advantages for specific beneficiaries.** They are more than the avoidance of risks and potential disadvantages.

Examples:

- reduced pollution by coal power stations
- reduced fresh water requirement for cooling of thermal power
- reduced costs / productivity / competitiveness (energy efficiency)
- local and sectoral employment effects
- rural development.

- **Weak Co-benefits: unspecific, far away, later on with unspecific beneficiaries:**

Examples:

- long-term protection of global common goods
- intergenerational justice.

Thank You!

See also:

- M. Jänicke: Horizontal and Vertical Reinforcement in Global Climate Governance, *Energies* 2015, 8, 5782-5799.
- M. Jänicke: Dynamic Governance of Clean-Energy Markets: How Technical Innovation Could Accelerate Climate Policies, *Journal of Cleaner Production*, 22 (2012), 50-59.
- M. Jänicke: „Green growth“: From a growing eco-industry to economic sustainability, *Energy Policy* 48 (2012), 13-21.
- M. Jänicke: German Climate Change Policy, in: R. K. W. Wurzel / J. Connelly (Eds.): *The European Union as a Leader in International Climate Change Politics*, London, New York 2011 (Routledge).
- M. Jänicke: *Megatrend Umweltinnovation*, 2. Ed. München 2012 (2008) .
- M. Jänicke / K. Jacob (Eds.): *Environmental Governance in Global Perspective. New Approaches to Ecological and Political Modernisation*, Berlin 2007 (Chinese ed. 2012).

- Should we use a broad or a narrow definition of „co-benefits“?
- Where is China different from Europe or Germany?
- Which co-benefit approaches are used in China?

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**“Mobilizing the Co-Benefits
of Renewable Energies”**

Shenyang September 23, 2016

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Pollution control costs,
 Balance of trade

Climate benefit only

Multiple (co)benefits

Burden-sharing

More opportunity-sharing

Norm-driven

More interest-driven *)

Obligatory

More Voluntary

Fixed targets

**More dynamic Targets /
Progression over time**

*) Schaik, L. G. van / Schunz, S. (2012): Explaining EU Activism and Impact in Global Climate Politics, *Journal of Common Market Studies*, Vol. 50, Issue 1, 169-186.

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- Where is China different from Europe or Germany?
- Which co-benefit approaches are used in China?