Wuppertal Institute
for Climate, Environment
and Energy

Technologies for climate and resource protection drive the “lead markets” of the future!

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Thesis

1. **Decoupling economic growth from the use of nature** by fostering **resource productivity**: An ecological neccesity and a benefit for sustainable development, security of supply and climate mitigation!

- **Absolute decoupling** in the **North**: Support „Ecological Industrial Policy“, „Sustainable Lifestyles“ and „Lead markets for GreenTech“
- **Relative decoupling** in the **South**: Avoid lock-in into outdated technologies and unsustainable consumption patterns of the North; reduce energy growth by fostering „leap frogging“-technologies (e.g. energefficiency)

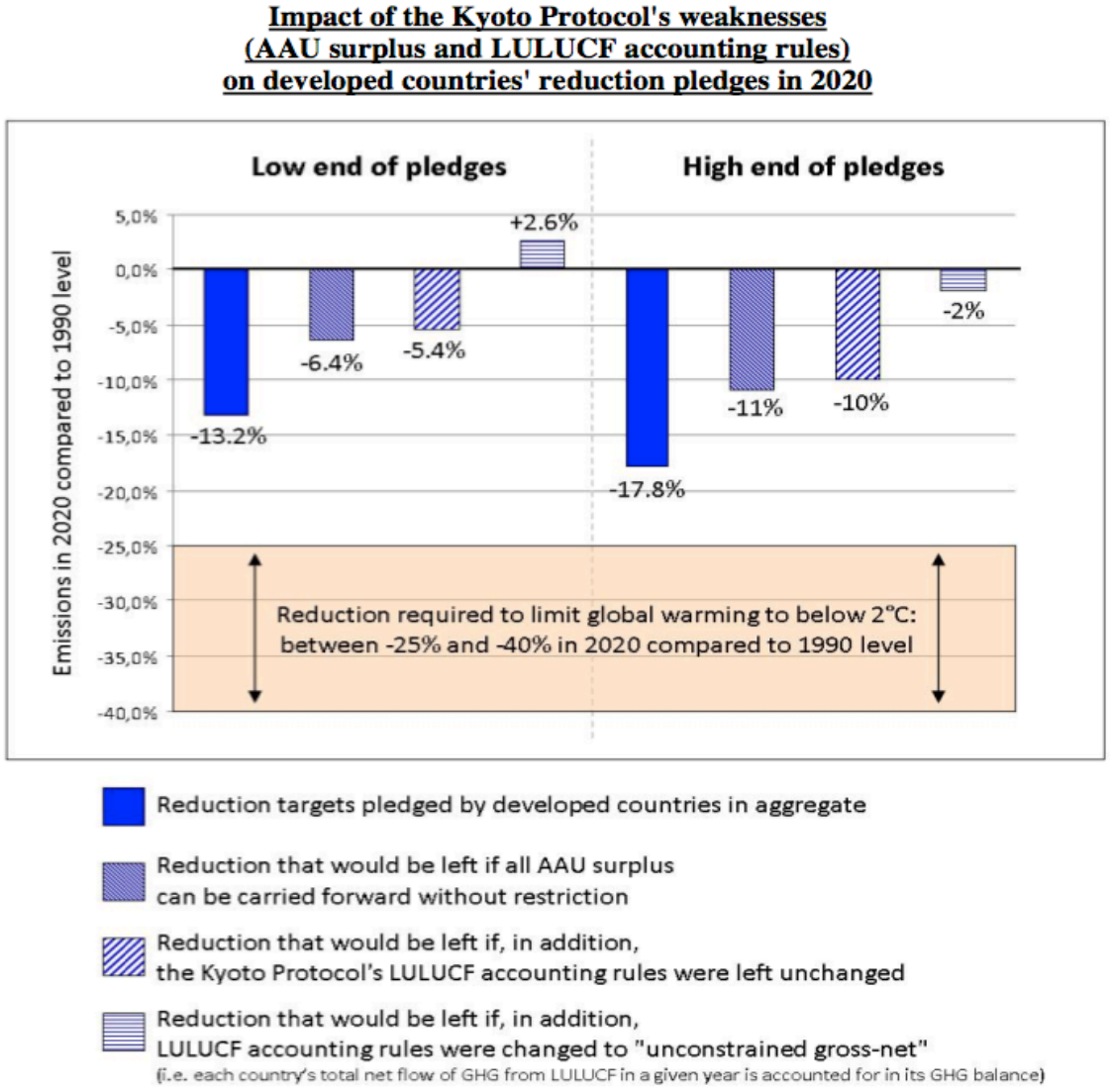
2. **The key** for sustainable energy systems: Focussing on a **“robust technological corridor”** with “three green pillars”: more efficient use of energy, co-/trigeneration and renewables

2. **„The future will be decentralized“ (Siemens)**: Technology and competition driven technologies and power plants will **converge** worldwide - they will be „cleaner, leaner and greener“

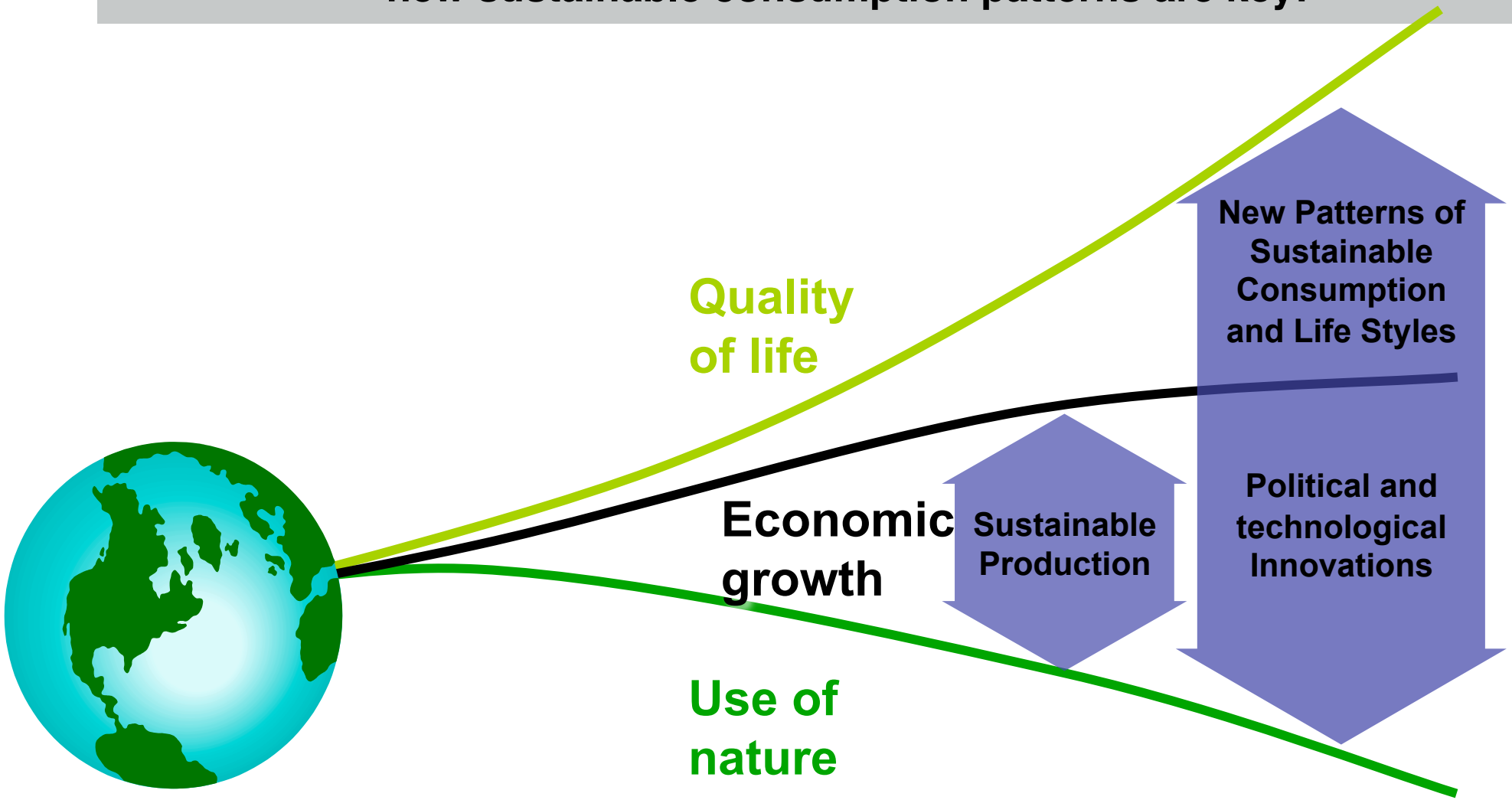
3. **A globally coordinated „energy efficiency + renewables initiative“** is needed, it includes:

- **A vision** (Convergence and reduction to „2000 Watt per capita societies“; at least 60% C02-reduction up to 2050)
- **Binding targets for IC; know how transfer and financial support** for **DC**
- **A supporting framework** to create world wide **markets for energy services (e.g.bigEE/SBN; REN21)**

The Post-Copenhagen pledges (1/ 2010) of developed countries: to weak to stop climate change! (Source: EC 2010)



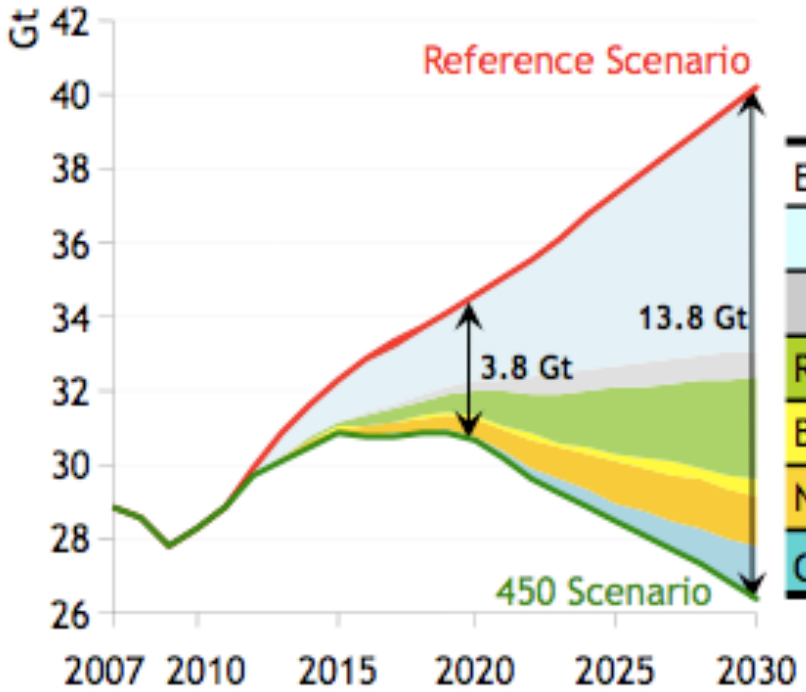
Absolute decoupling of the quality of life from the use of nature – increasing resource productivity and new sustainable consumption patterns are key!



World Energy Outlook: End use efficiency = 50% of the solution!

IEA 450 ppm CO_{2eq} scenario to achieve 2° target

Main strategy elements energy efficiency and renewables

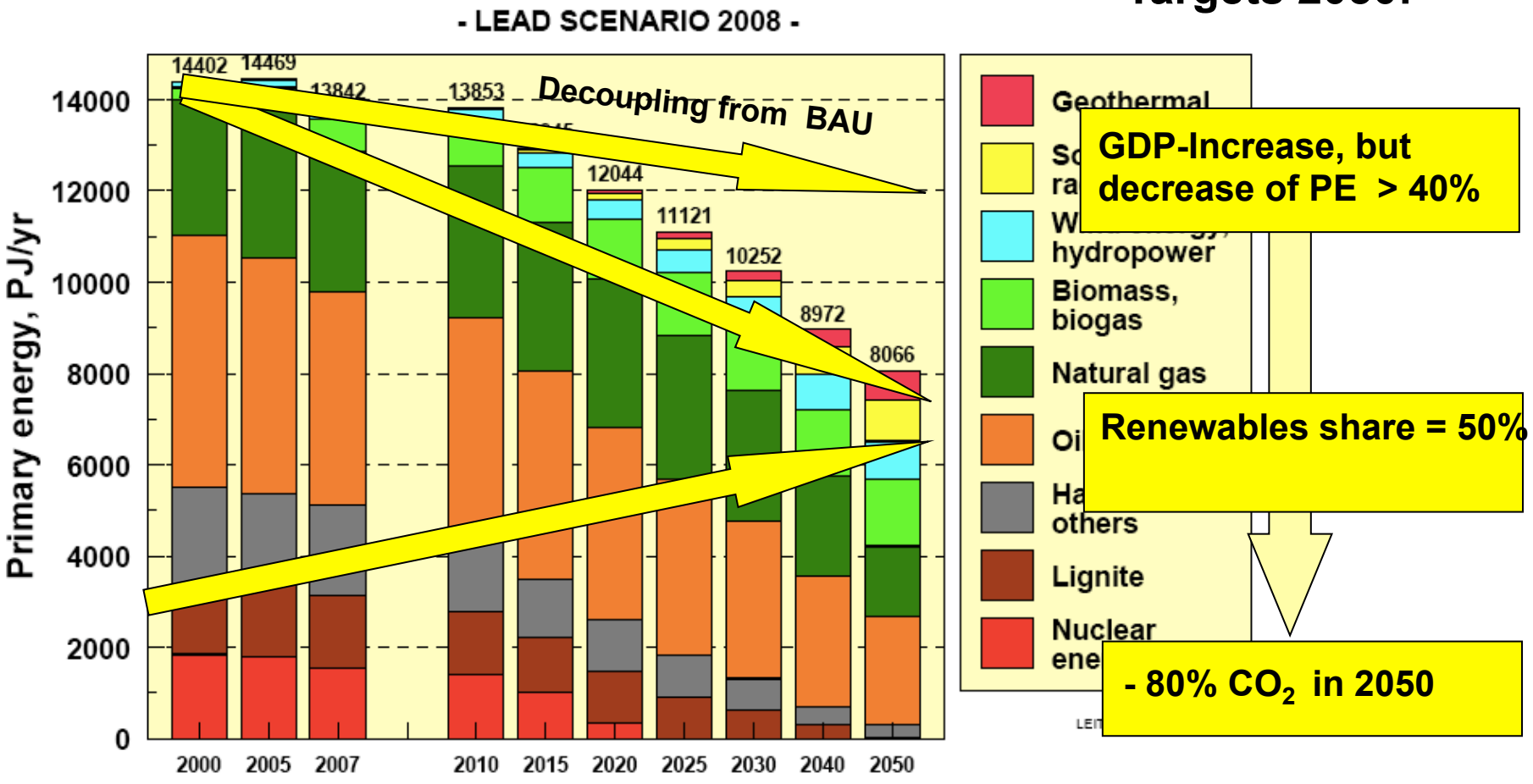


Share of abatement %	2020	2030
Efficiency	65	57
End-use	59	52
Power plants	6	5
Renewables	18	20
Biofuels	1	3
Nuclear	13	10
CCS	3	10

Decoupling of energy and GDP in Germany is possible:

"Lead Scenario" of German Ministry of Environment: Climate mitigation increases economic benefits - from renewables and energy efficiency

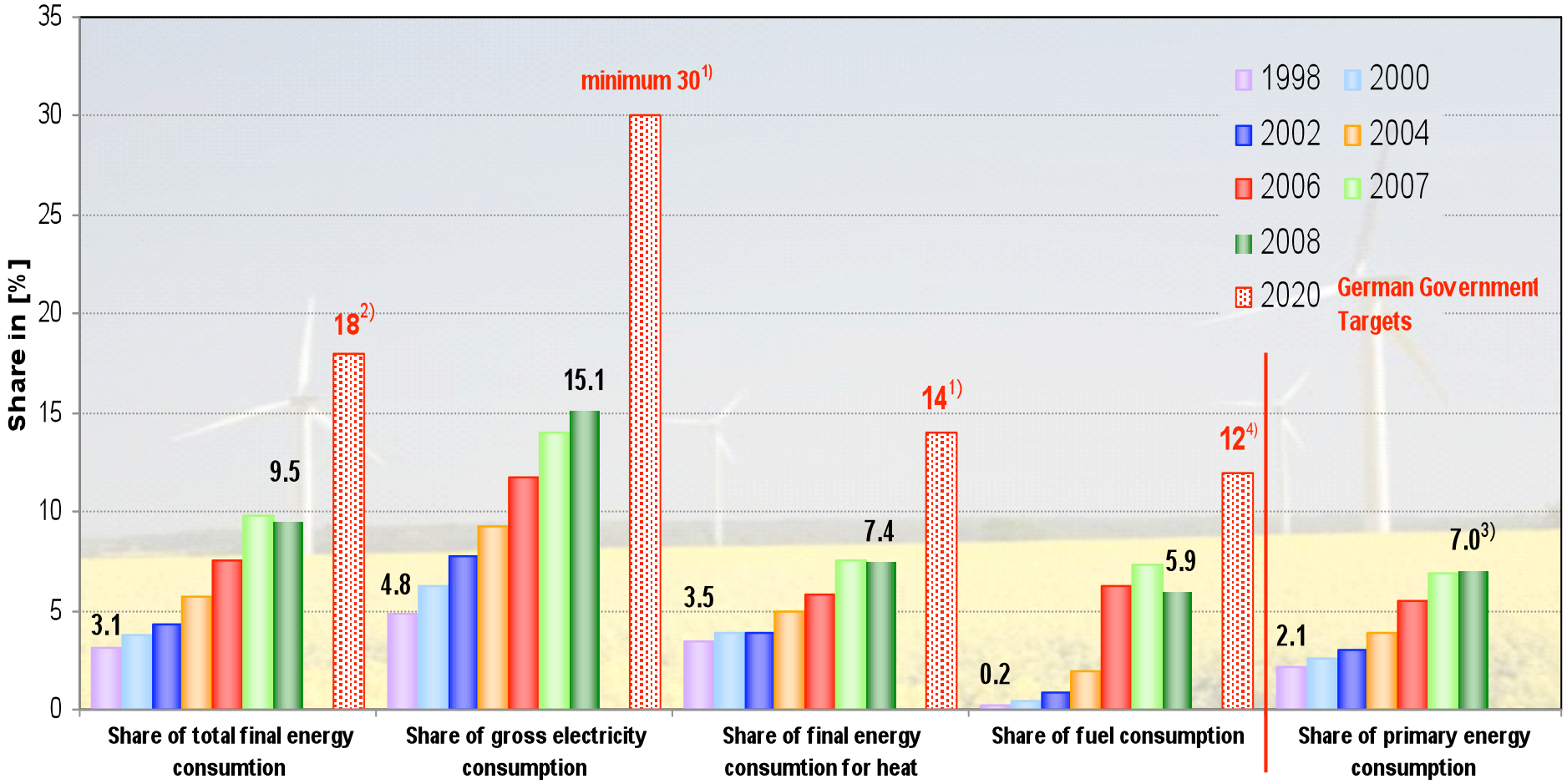
Primary energy demand in PJ



Efficiency method; actual values are not temperature-adjusted

Source: DLR 2008

Renewable energy sources as a share of energy supply in Germany



1) Source: Renewable Energy Sources Act (EEG 2009) from 25.10.2008 and Renewable Energies Heat Act (EE WärmeG) from 7.8.2008

2) Source: Directive of the European Parliament and the Council on the promotion of the use of energy from renewable sources (2009/28/EC);

3) For calculating the share of primary energy consumption (PEC), the (official) physical energy content method has been used (acc. to the substitution method: 9.2 %);

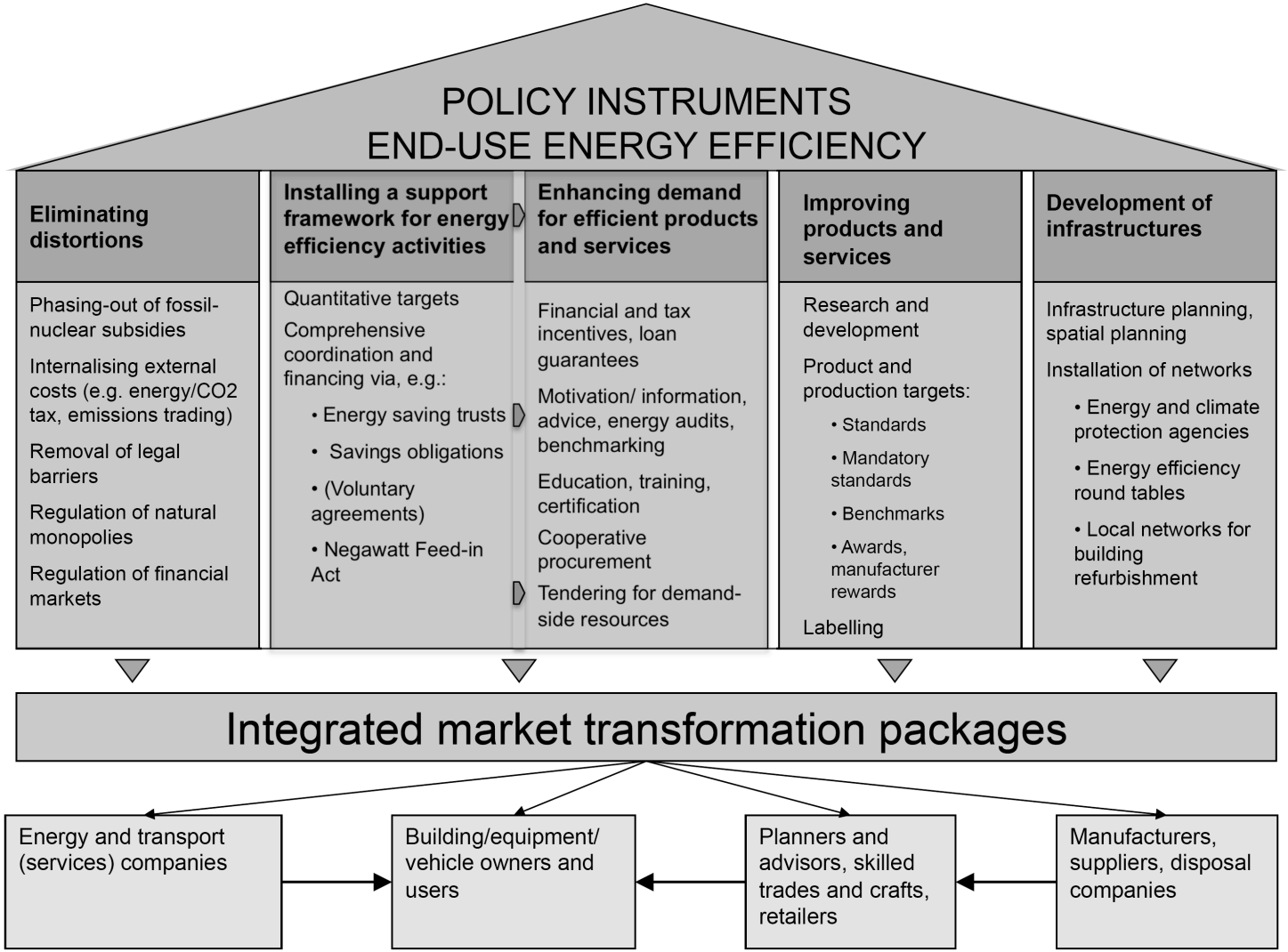
4) Goal: 12 % energetic; Source: National Biomass Action Plan for Germany

RES - Renewable energy sources; Source: BMU-Brochure "Renewable energy sources in figures – national and international development", KI III 1; Version: June 2009; all figures provisional

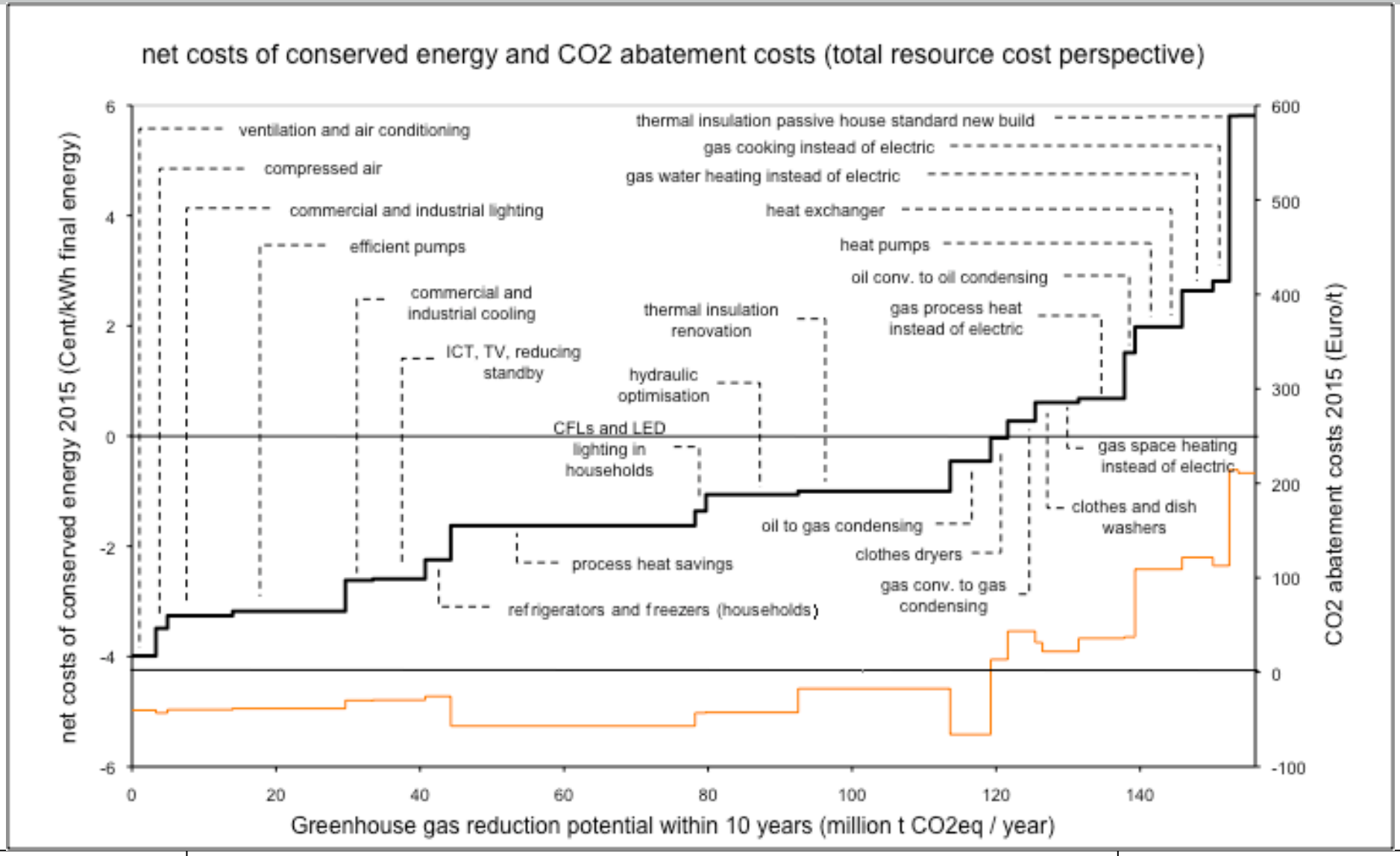
▪Source: BMU – KI III 1 Version: June 2009

Policies for energy efficiency are cross cutting and built on five pillars.

The ideal „Policy Mix“ (Source: Thomas/Irrek 2010)

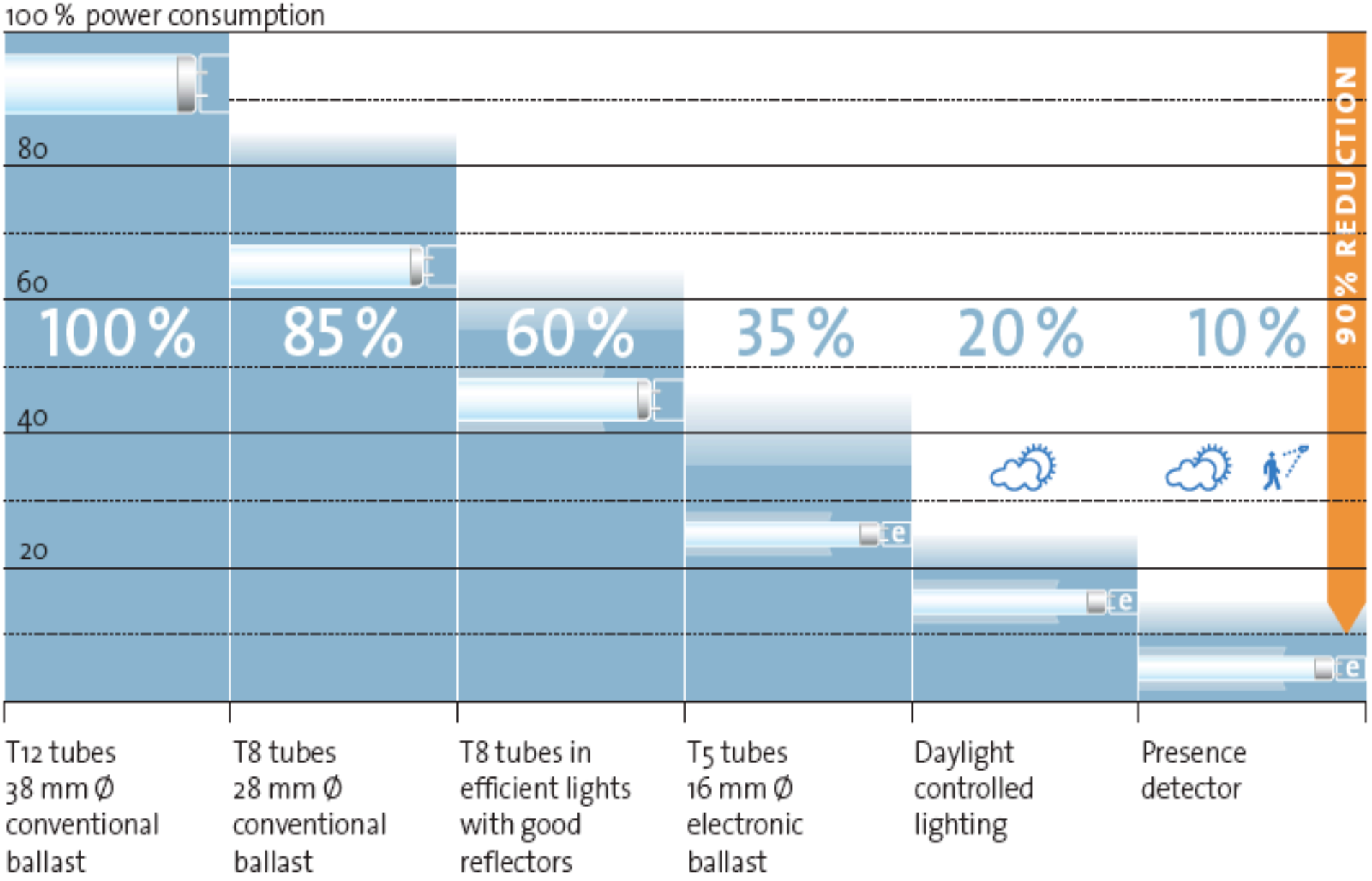


„Cost potential curves“ to allocate investments - the German example: 120 TWh of electricity can be saved with a profit! (Source: WI/E.ON 2007)

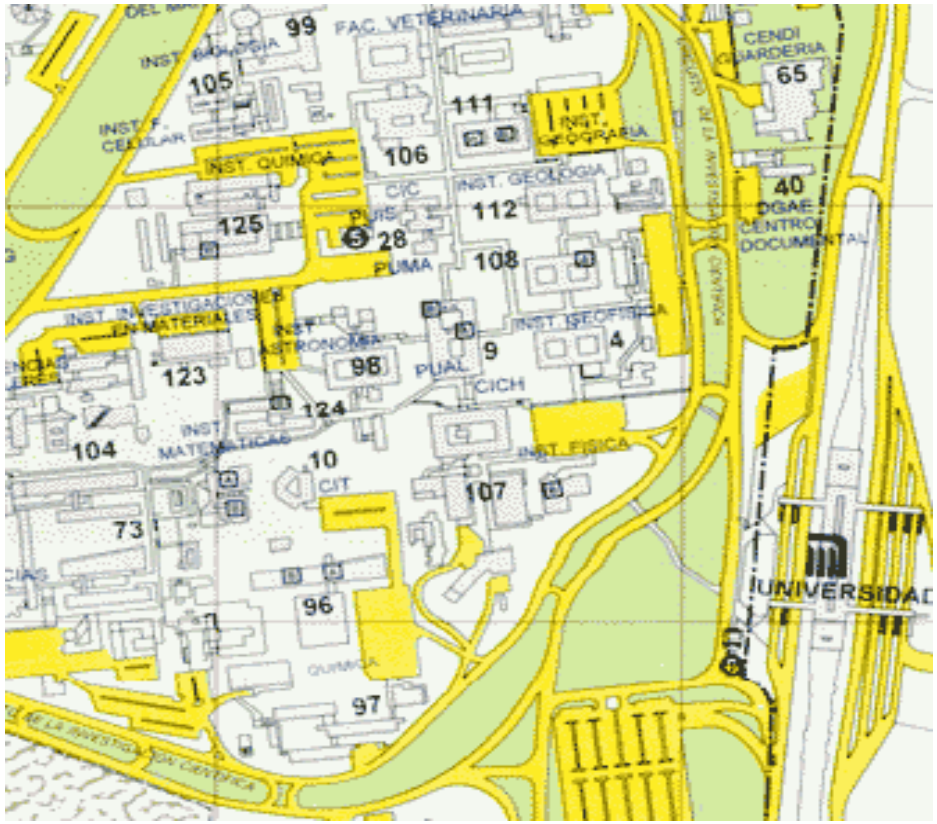


Optimal lighting in offices can cut electricity consumption up to 90%

(Source: Seifried 2009)



Feasibility study and pilots for efficient lighting at the Universidad National Autónoma de Mexico (UNAM: 350.000 students) (Source: Seifried 2009)



- Investment of US$ 14 million saves electricity costs of US$ 48 million over life time
- Investment cuts electricity costs at UNAM by 25% and can be refinanced within 7 years
- Implementation by a local contractor (plus CDM) is possible with no costs for UNAM