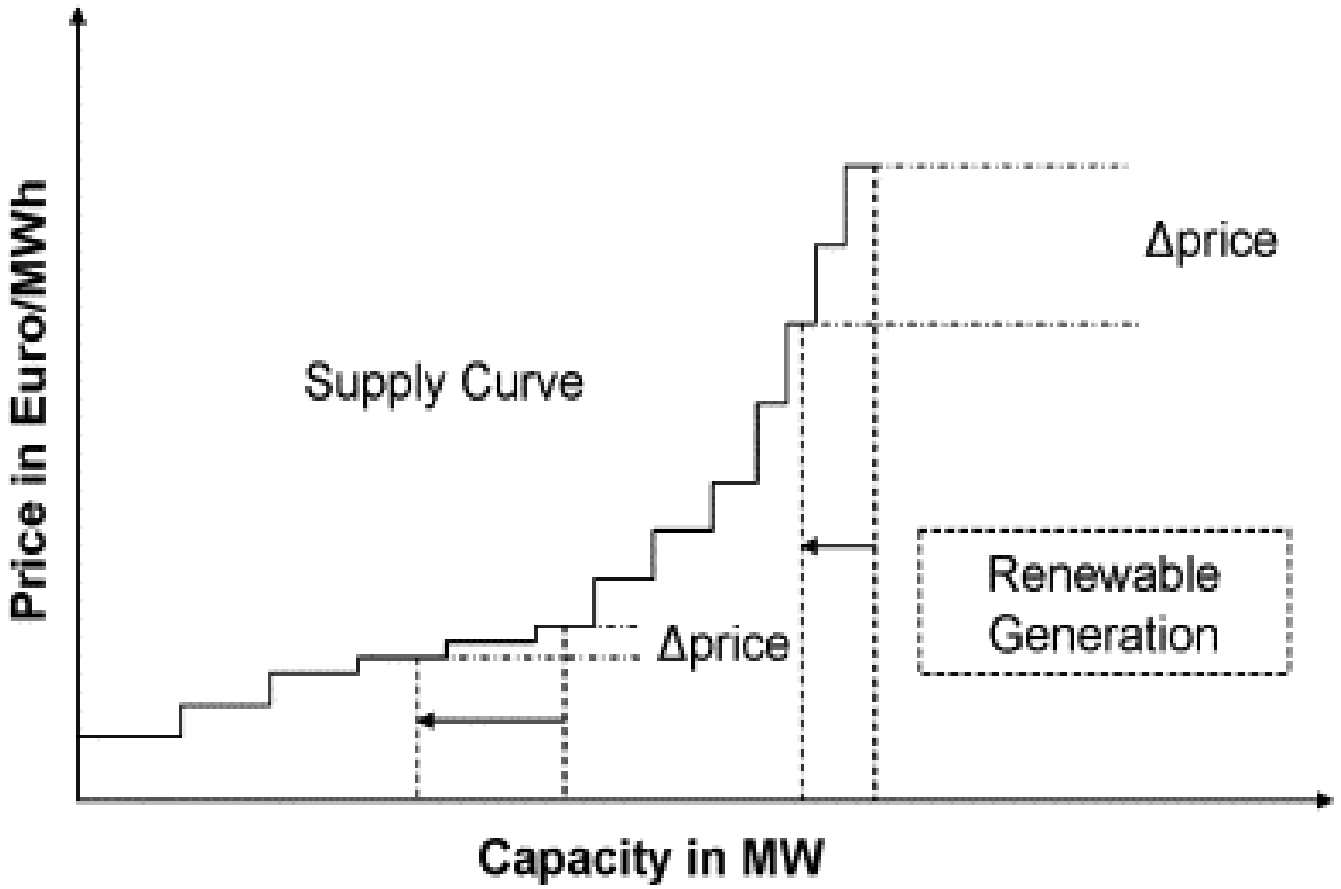
Merit-order effect



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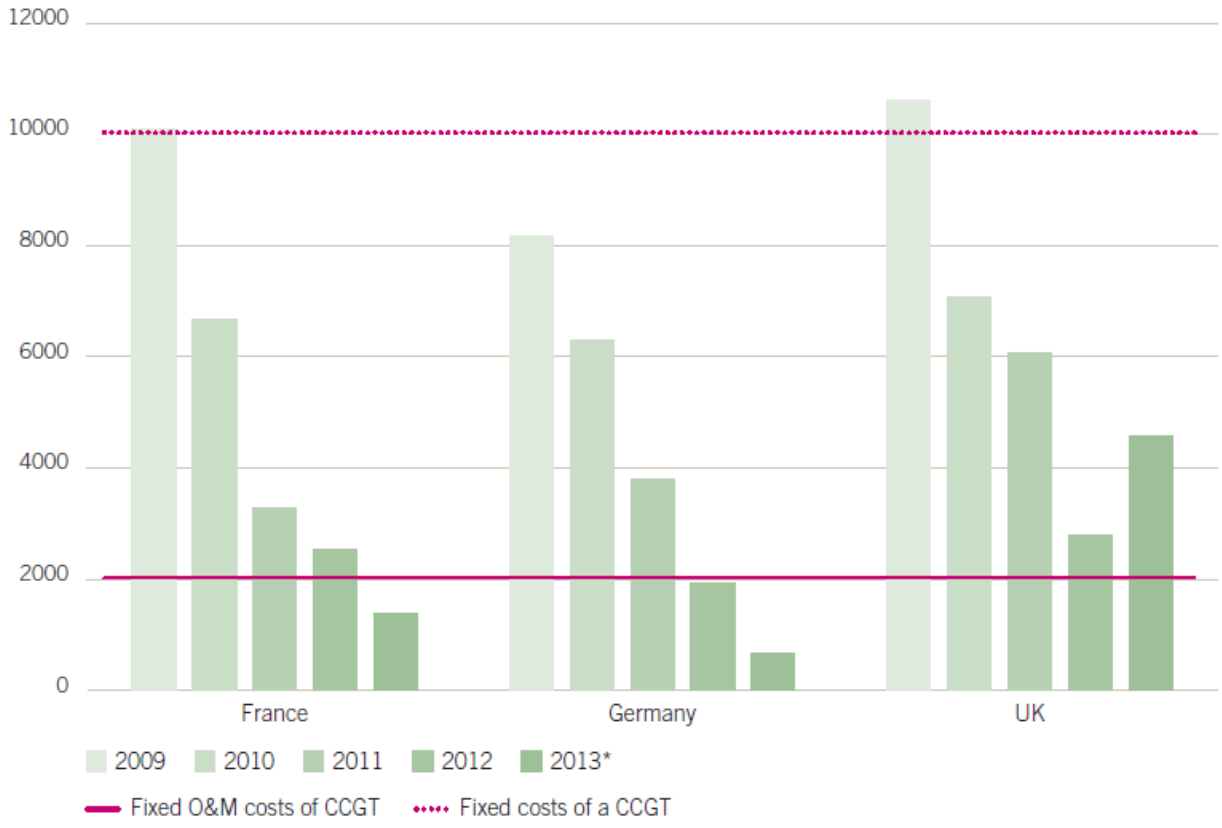
Decrease in revenue for CCGTs (€MW/month)



Analysis: FTI-CL Energy – Revenues calculated from wholesale spot prices excluding estimated short-run marginal costs. Excludes combined heat and power revenues and revenues from ancillary services. Figures for Germany for 2013 are based on 11 months.

Sources: EPEX. APX. IHS CERA

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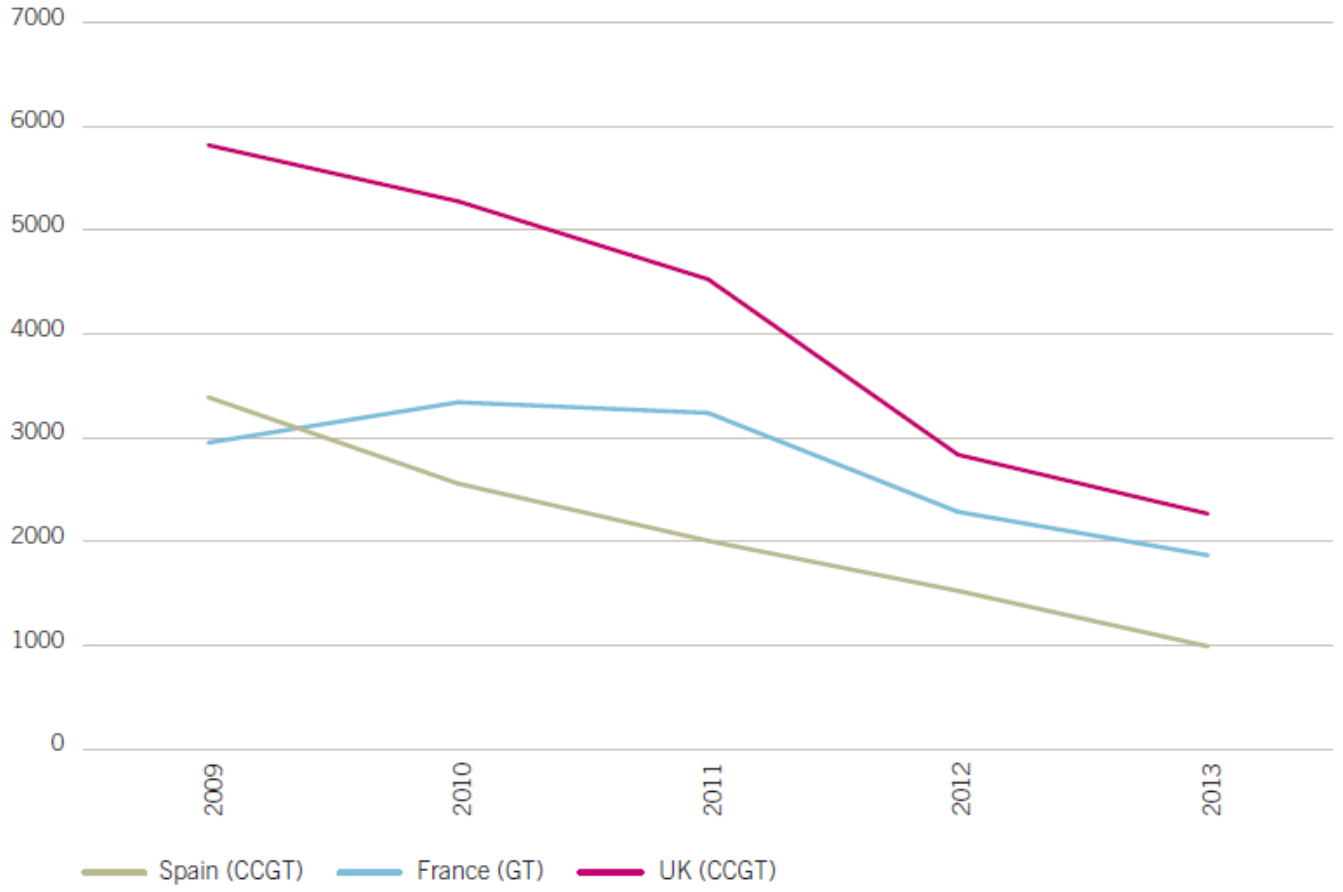
Utilisation rate for gas-fired power plants in Europe



Analysis: FTI-CL Energy

Sources: RTE, REE, ENTSO-E, DUKES[3]

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Electricity market puzzle

- Rise of renewables
- Collaps of carbon prices
- Cheap U.S. coal
- Economic downturn (vs. optimistic expectations)

= many of Europe´s conventional generation assets uneconomic

= wasted investments (24 GW mothballed, 7 GW decomissioned)

= generators needed to provide energy security (generation capacity adequacy + balancing and flexibility adequacy).

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Solution 1: Energy-only market

- Generators paid solely on the basis of the volume of power that they produce
- No remuneration for being available during peak hours when intermittent sources aren´t producing
- Peak loading pricing theory = capacity adequacy is maintained because prices will rise if market players anticipate an impending shortage and invest accordingly

- Political constraints
- Boom and bust cycle
- Limited ability of the system to store electricity, supply and demand uncertainty, inelastic demand, steepness of the supply curve = high price volatility when reserve margins are low

Solution 2: Capacity mechanisms/payments

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Nordics
Strategic reserves with phase-out provisions
Great Britain
Centralised capacity auctions
Ireland
Capacity payments
Germany
Re-dispatch reserve and winter reserve; discussion over possible market-wide mechanism
Poland
No mechanism, but strategic reserve discussed
Belgium
Strategic reserve/tender for new plant
France
Decentralised forward capacity obligation
Italy
Temporary capacity payments; considering centralised auctions for reliablity options
Spain and Portugal
Separate capacity payments for availability and investment (phased out in Portugal, recently reformed in Spain)
Greece
Capacity payments

Environmental dimension of the EEP

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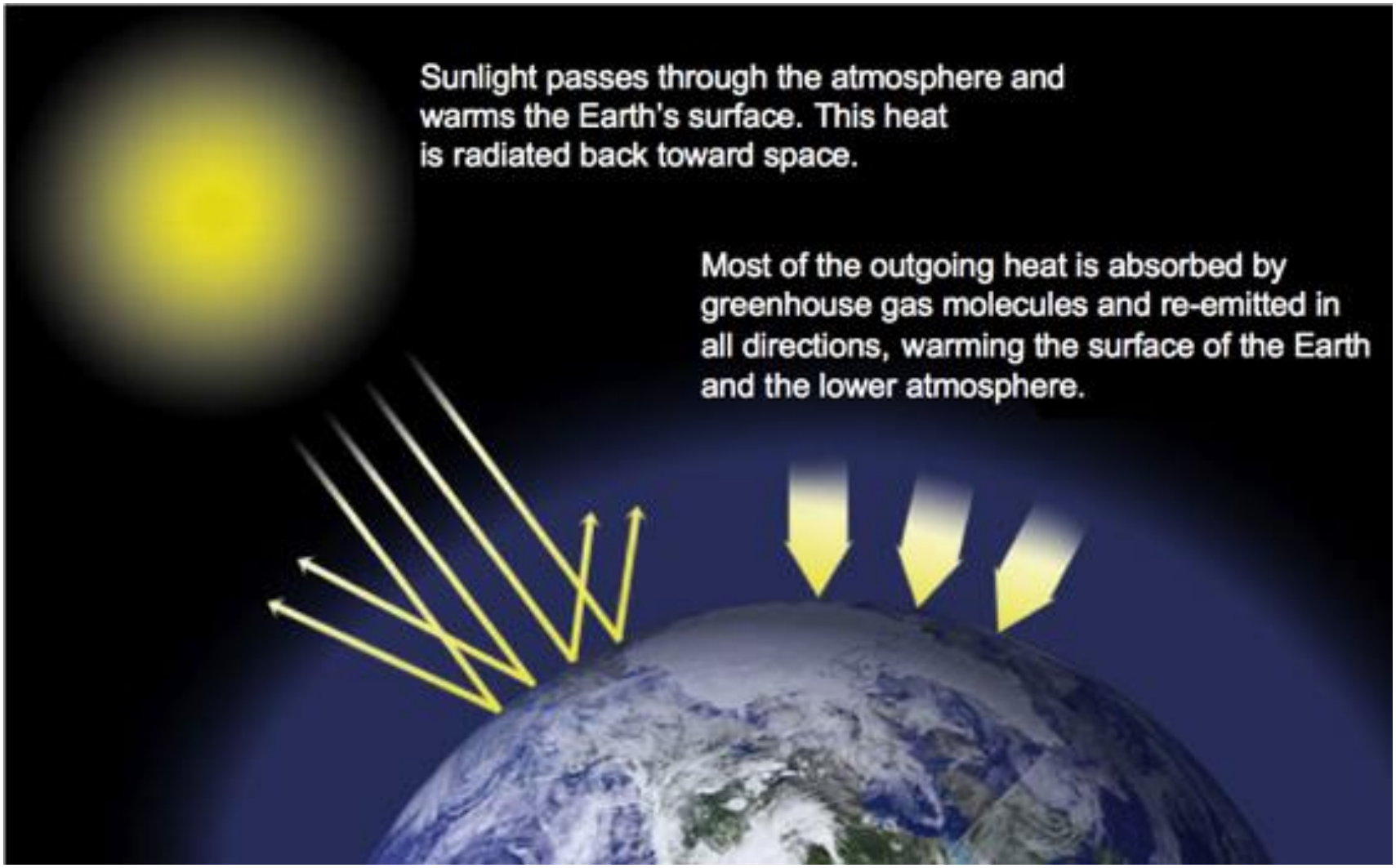
Environmental dimension of EEP

- Energy sector (extraction, transport, processing and combustion) harms the environment significantly
- Climate change (regional/global level) – measures to reduce GHG emissions
  - EU ETS, GHGs outside of the EU ETS
  - RES
  - Energy Efficiency
  - Research and development, new technologies (CCS)
- Local environment protection – covered mainly by Environmental policy
  - Air, land and water pollution, noice, light pollution
  - Industrial (energy) waste
  - Protection of biodiversity
  - Extraction of non-conventional sources of energy



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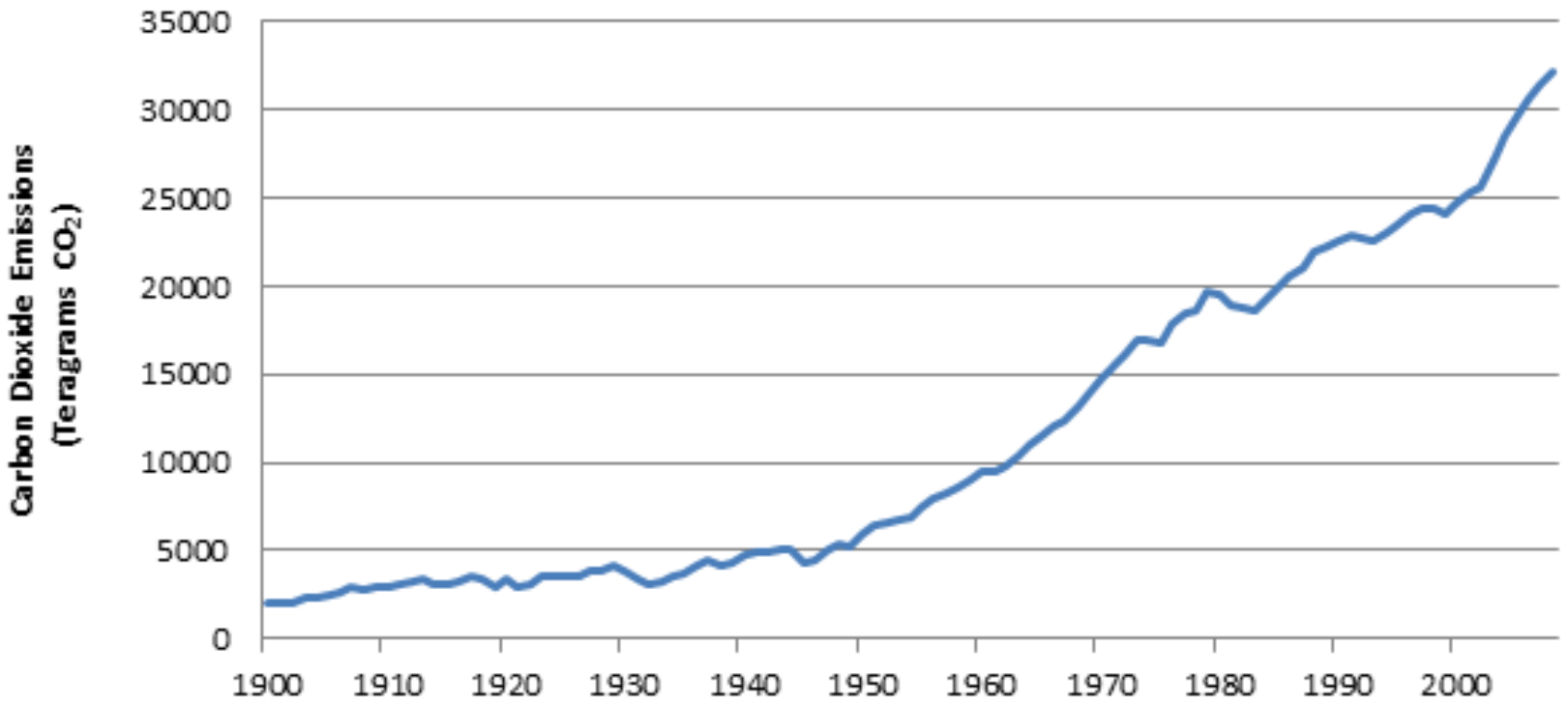
Global Carbon Dioxide (CO_2) emissions from fossil-fuels 1990-2008



Source of data: Boden, T.A., G. Marland, and R.J. Andres (2010). Global, Regional, and National Fossil-Fuel CO_2 Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2010.

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Period between 1985 - 2000

New incentives for energy on the EC level

- Weak competitiveness of European industry – first proposals to create the internal energy market. Competition and transparency instead of national monopolies and closed markets.
- Climate change – tools to prevent impact of usage of energy on local and global level. (to reduce the amount of emissions produced in the EU)
- Disintegration of Soviet block – proposals to manage relations between producents and consumers (EU MS) of energy

Environmental dimension of EEP

Two interlinked (but not identical) processes:

- International regime of climate change mitigation (EU plays a significant role)
- Independent climate policy of the EU (part of Energy policy)

International climate regime

- Intergovernmental Panel on Climate Change – 1988
- Rio Summit on Earth – 1992 (UN Conference on Environment and Development) → UNFCCC
- Kyoto protocol
- 1997, in force 2005

= Existence of a generally accepted consensus on the climate change as well as the contribution of human activities to this process

Kyoto protocol

- 4 GHG (carbon dioxide, methane, nitrous oxide, sulphur haxafluoride) + hydrofluorocarbons and pefluorocarbons
- Annex I. parties (37 industrialized countries + EU15), Non-annex I. parties
- Reducing of GHG emissions by 5,2 % for the period of 2008-2012. (4,2 % after USA left). Base year 1990
- Flexible mechanisms – Emission trading, CDM, JI
- Art. 4 – burden sharing agreement of European Community

- Common but differenciated responsibility

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ANNEX II

Table of quantified emission limitation or reduction commitments for the purpose of determining the respective emission levels allocated to the European Community and its Member States in accordance with article 4 of the Kyoto Protocol

	Quantified emission reduction commitment as laid down in Annex B of the Kyoto Protocol (percentage of base year or period)
European Community	92 %
	Quantified emission limitation or reduction commitment as agreed in accordance with article 4(1) of the Kyoto Protocol (percentage of base year or period)
Belgium	92,5 %
Denmark	79 %
Germany	79 %
Greece	125 %
Spain	115 %
France	100 %
Ireland	113 %
Italy	93,5 %
Luxembourg	72 %
Netherlands	94 %
Austria	87 %
Portugal	127 %
Finland	100 %
Sweden	104 %
United Kingdom	87,5 %

EU and climate change

- Environmental awareness
- Preemptive environmental measures
- Common market
- Raison d'être

130r (TEU) „…Community policy on the environment…shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified as source and that the polluter should pay"

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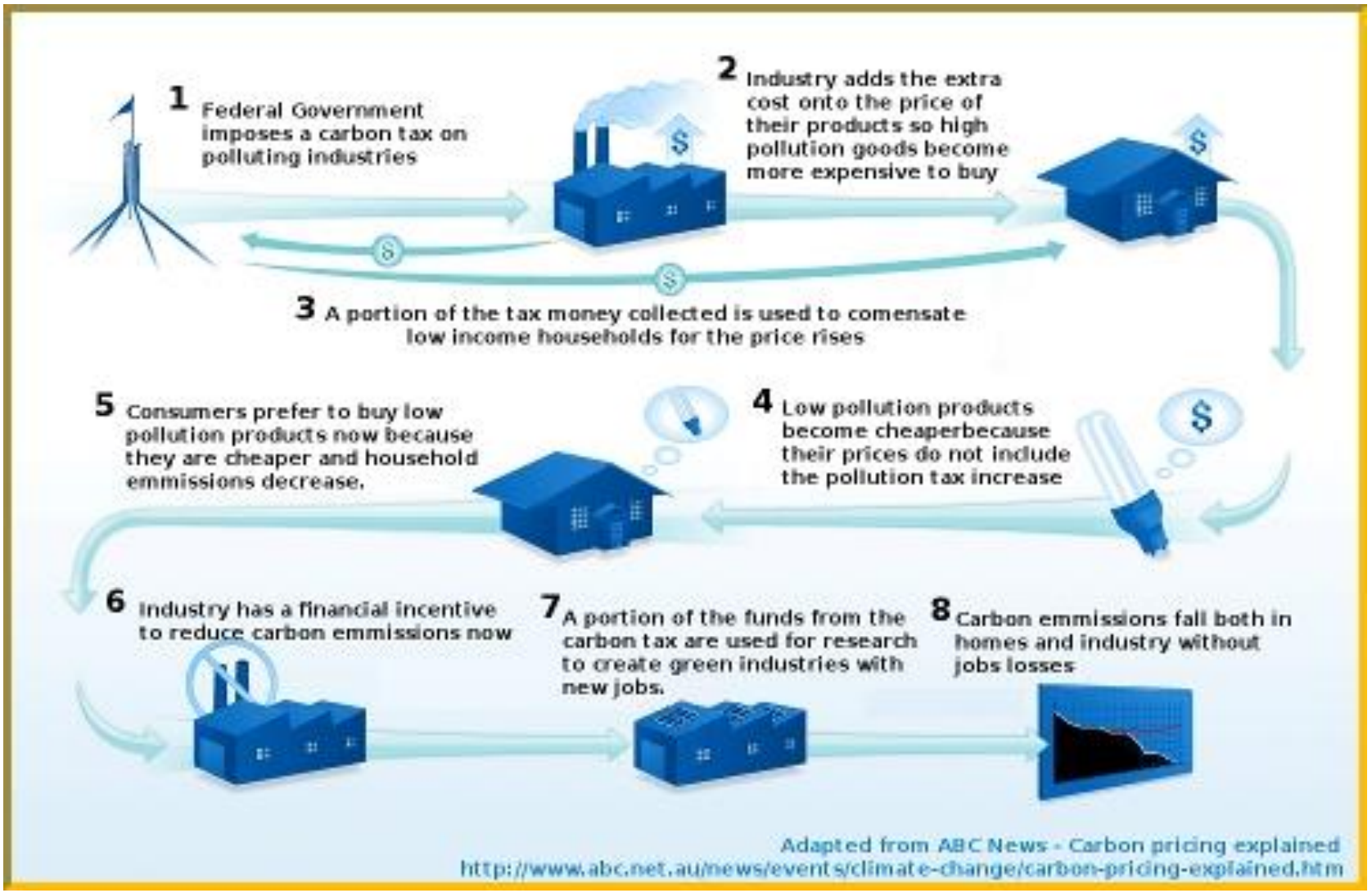

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Emission trading

- EU firstly sceptical about international emission trading
  - See it morally wrong – trading authorizes pollution, turning it into commodity to be bought and sold
  - Questionable with regard to equity – that the richer industrialized countries can buy their way out of their obligations instead of lowering their disproportionate consumption of scarce sources
- But – change in the possition of the U.S. placed the EU in the forefront of the climate change movement

EU and climate change: emission trading

ET: Central authority … sets a limit …on the amount of pollutant to be emitted … the cap is sold/allocated …. as permits ….companies are required to hold those permits …if they need to increase this volume…have to buy those premits

= the buyer is paying a charge for polution = he is motivated to invest in less-poluting technologies

How the system works?

- It creates a dynamic monetary incentive so companies can sell their allowances to other producers and make profit
- This incentives are based on real needs (scarcity) of allowances and on adequate monitoring and enforcement
- This system (at least in theory) offer certainity of emission reduction corresponding to the stringency of the cap
- Unlike domestic schemes effective international systems are more difficult to establish
- Even a well-designed system is not to work if it is not implemented correctly by the participants in the system (MS)

Sources

- Linklaters (2014): Capacity mechanisms. Reigniting Europe´s energy markets.

Generation adequacy

- Aging generation fleet (20% of coal and oil-fired plants constructed 40-50 years ago. Almost half nuclear capacities run 30-40 years)
- During 2016-2025 thermal installed capacity of around 150GW is expected to retire
- IEA concludes that „…*generation adequacy at the EU-wide system level can be met in most situations but adequacy margins are considerably decreasing until 2025*“

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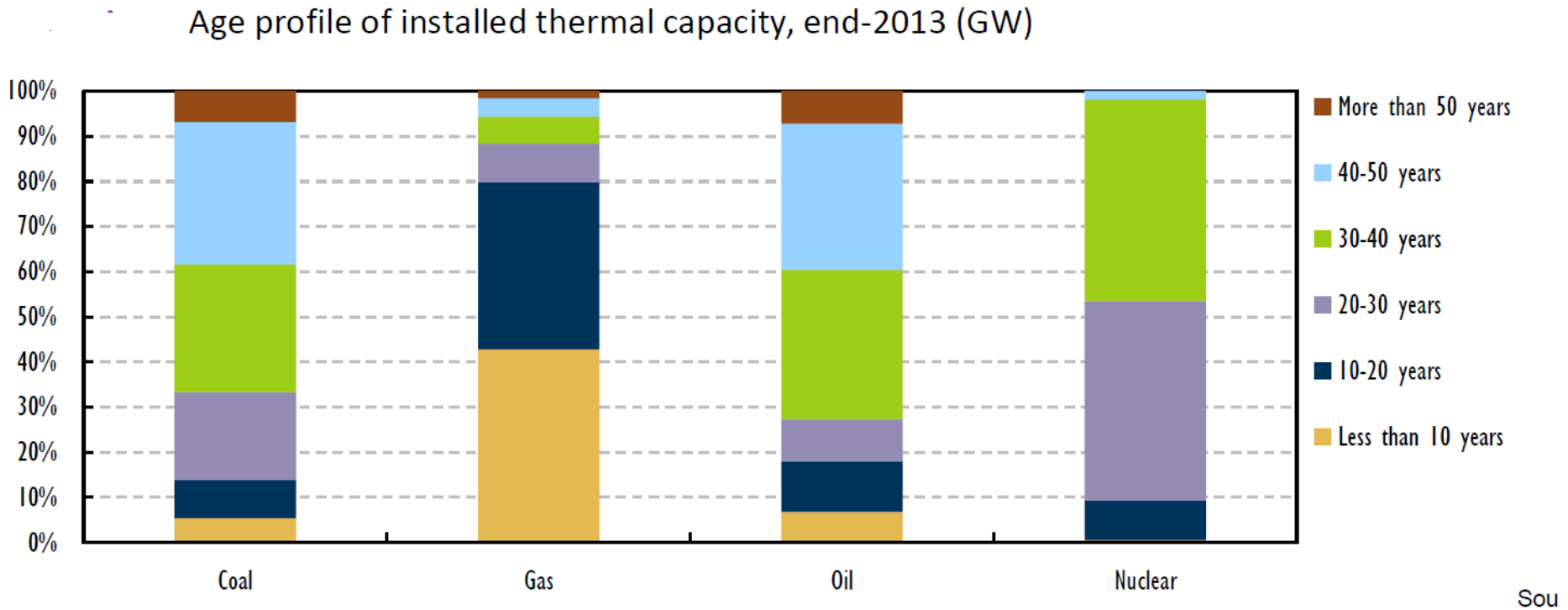
Generation adequacy



Source: Platts World Electric Power Plants Database, December 2013 edition.

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Capacity mechanisms

= capacity remuneration

- To solve problem of weaken investment incentives
- But they replace market-driven investment with central planning – considerable regulatory risk and cost for investors and consumers

Sources

- IEA (2014): Energy Policies of IEA Countries – The European Union.

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