Environmental (climate) dimension of the EEP

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Environmental (climate) 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.
  - Renewables.
  - Energy Efficiency.
  - Research and development, new technologies (CCS).
- Protection of local environment – covered mainly by EU environmental policy.
  - Air, land and water pollution, noice, light pollution.
  - Industrial (energy) waste.
  - Protection of biodiversity.
  - Extraction of non-conventional sources of energy.

Environmental (climate) dimension of EEP

Two interlinked (but not identical) processes:

- **International climate change mitigation regime (EU plays a significant role).**
- Interlinked but independent climate policy of the EU (part of the EU energy policy).

International climate regime

- Intergovernmental Panel on Climate Change – 1988.
- Rio Summit on Earth – 1992 (UN Conference on Environment and Development) → UNFCCC.

= Political consensus on the climate change as well as the contribution of human activities to this process.

- Kyoto protocol.
- 1997, in force 2005.

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 %

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Environmental (climate) dimension of EEP

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- **Interlinked but independent climate policy of the EU (part of the EU energy policy).**

2020 climate and energy package

Targets set by the EU leaders in 2007, enacted in legislation in 2009.

- 20% cut in greenhouse gas emission (from 1990 levels)
- 20% of EU energy from renewables (10% share of RES in the transportation sector).
- 20% improvement in energy efficiency –the only non-binding target.

+ Reform of the EU ETS (target of 21% in comparison with 2005).

+ National emission reduction targets in housing, agriculture, waste, transport (effort sharing decision).

2030 climate and energy framework

For the period of 2021 – 2030. Adopted in 2014, revised (RES and EE) upwards in 2018. To show leadership at Paris COP21.

- At least 40% cuts in greenhouse gas emissions (from 1990 levels) – binding EU target.
  - EU ETS 43% compared to 2005, no external credits. Non-ETS 30% compared to 2005 (national targets).
- At least 32% (originally 27%) share for renewable energy – binding EU target, no national targets.
- At least 32.5 (originally 27%) improvement in energy efficiency. Non-binding target, indicative national targets.

+ Governance system to deliver Energy Union.

+ National Energy and Climate Plans + National long-term strategies.

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2050 long-term strategy

´A clean planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy´.

- Presented as a vision in 2018, with the aim of climate neutrality and fair transition. Covers nearly all EU policies.
- In line with Paris Agreement – 2°C, aiming to 1.5°C.
- EU-wide debate followed by a strategy adopted by early 2020 under the umbrella of the Paris Agreement.

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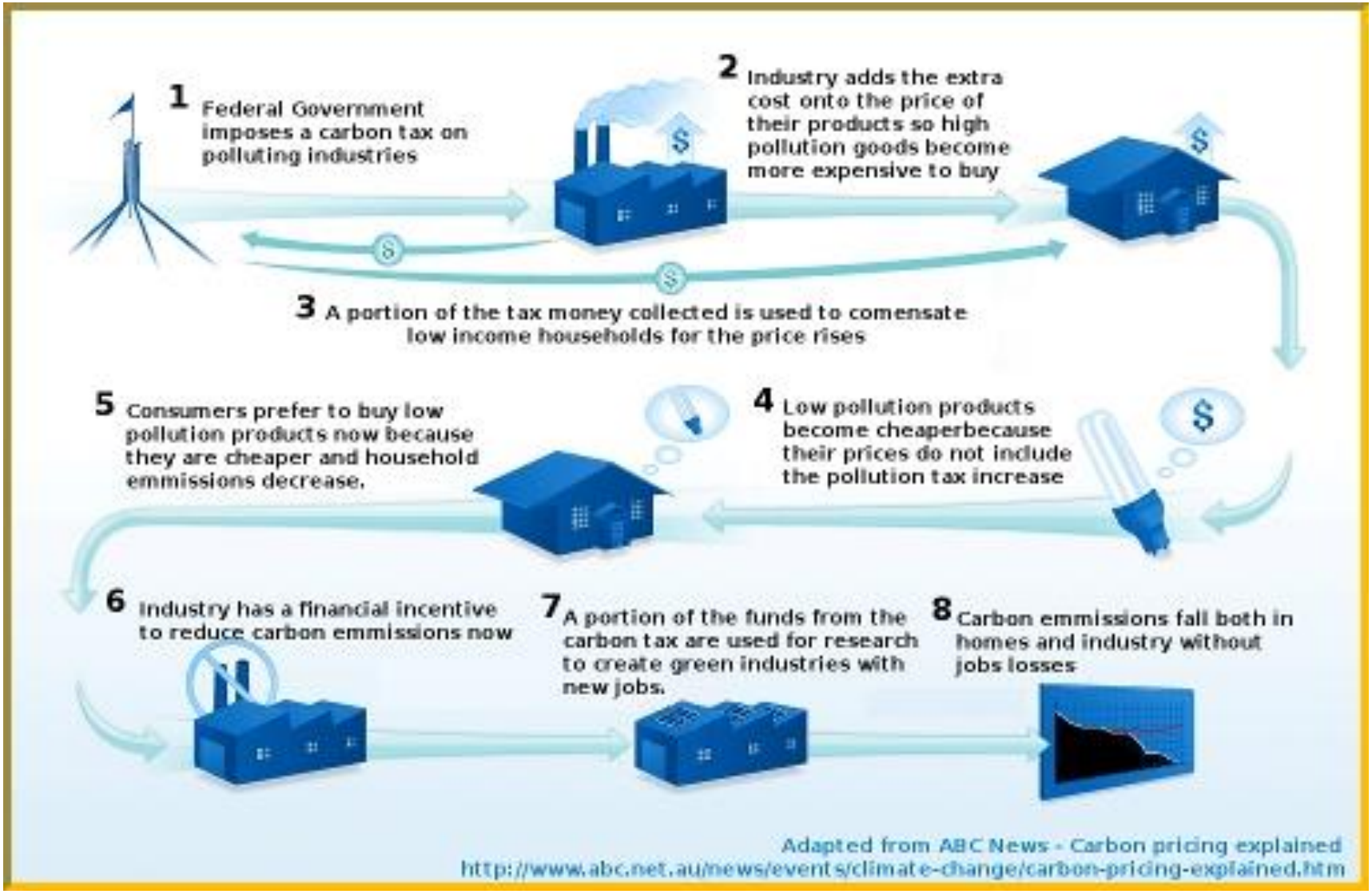
EU and climate change: carbon tax



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 or pay the fee.

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

= in areas where emission could be easily measured, reported, and verifyied.

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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) offers 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).

Run-up to the EU ETS

- 1988 EC´s communication „The Greenhouse Effect and the Community“.
- 1998 EC´s communication „Climate Change - Towards an EU post-Kyoto strategy“.
- 1999 EC´s communication „Preparing for Implementation of the Kyoto Protocol“.
- 2001 – EU ETS legal preparation launched, approved in 2003.
- Designated the first period from 1.1.2005 to 31.12.2007, covering about 11 500 facilities in 25 MS = 45% CO_2 emitted in the EU.

EU ETS: The first phase 2005 - 2007

Country	Mil. EUAs	Share of the overal amount of EUA	Number of incl. facilities	The aim of Kyoto
Belgium	188,8	2,9	363	-7,5
Czech Republic	292,8	4,4	435	-8
Denmark	100,5	1,5	378	-21
Estonia	56,85	0,9	43	-8
Finland	136,5	2,1	535	0
France	469,5	7,1	1 172	0
Ireland	67	1	143	+13
Italy	697,5	10,6	1 240	-6,5
Cyprus	16,98	0,3	13	-
Luxembourg	10,07	0,2	19	-28
Lithuania	36,8	0,6	93	-8
Latvia	13,7	0,2	95	-8

Zdroj: Massai, 2012, s. 174

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EU ETS: The first phase 2005 - 2007

- *For the more detailed description of the development see OIES paper in non-mandatory literature.*

- Only CO_2 from power generators and energy intensive industries.
- Almost all allowances for free, penalty at EUR40/t CO_2.
- MSs responsible for cap setting. (NAPs submitted to EC for approval) - Absent historic verified emissions data, most MSs distributed allowances on the basis of estimated emissions.
- Overestimations of emissions – with the exemption of Germany and Slovenia (4% surplus).
- Drop in the prices of allowances + very limited impact on emissions of greenhouse gases.
- NAP – only Austria, Denmark, Finland, Germany, Ireland and Slovenia in time.
- Banking not allowed, oversupply of 150 million of EUAs.

Figure 2: EU ETS emissions allowance prices: April 2005 - December 2009

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EU ETS: The first phase 2005 - 2007

Difficult calculations due to:

- Proneness to cheating.
- Changing level of industrial production.
- Changes in energy prices.
- Increasing deployment of RES (canibalism of targets).
- Permit stockpiling.
- Weather.
- And others.

Not only GHGs decrease is desirable, but also the stability of the price of EUAs.

EU ETS: The second phase 2008 - 2012

- Cap lowered by 6,5% in comparison with 2005 production.
- Iceland, Liechtenstein, and Norway joined the EU ETS.
- Aviation added, but only for EU flights.
- Nitrous oxide emissions from the production of nitric acid were included by several MSs.
- The proportion of free allocation fell to around 90%, with several countries auctioning the remaining 10%.
- The penalty for non-compliance was increased to €100/t CO_2.
- Banking allowances from phase II to phase III was allowed.

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EU ETS: The second phase 2008 - 2012

- More stringent approach of EC – cuts of NAP (litigation at ECJ), but still decentralized cap-setting.
- Relatively stable (but low) price of allowances.
- Pressure to change the whole system.

- *„Nearly all 25 EU MS did not meet the 30 June 2006 deadline for the submission of the second phase NAPs (only Estonia was on time). Pre-infringement letters were sent by the EC to 14 MS (Austria, Belgium, Cyprus, the Czech Republic, Denmark, Finland, Hungary, Latvia, Malta, the Netherlands, Portugal, Slovenia, Slovakia and Sweden).“*

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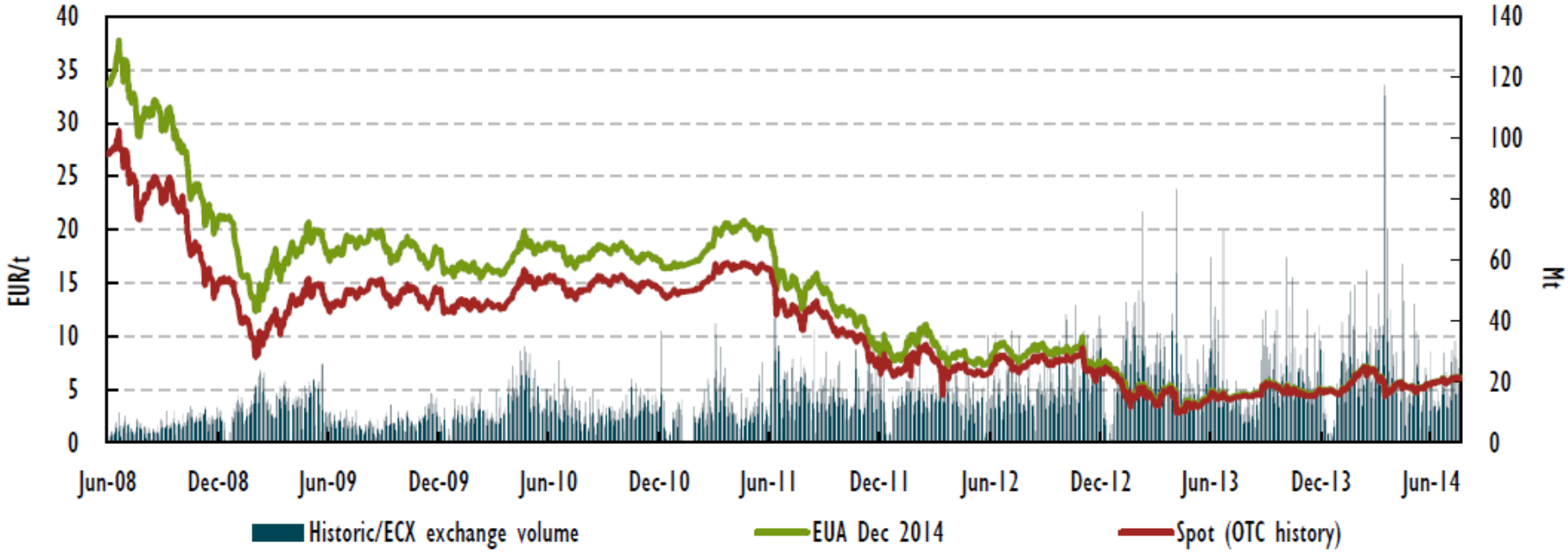
Historic evolution of volumes and spot prices for emission allowances under EU ETS



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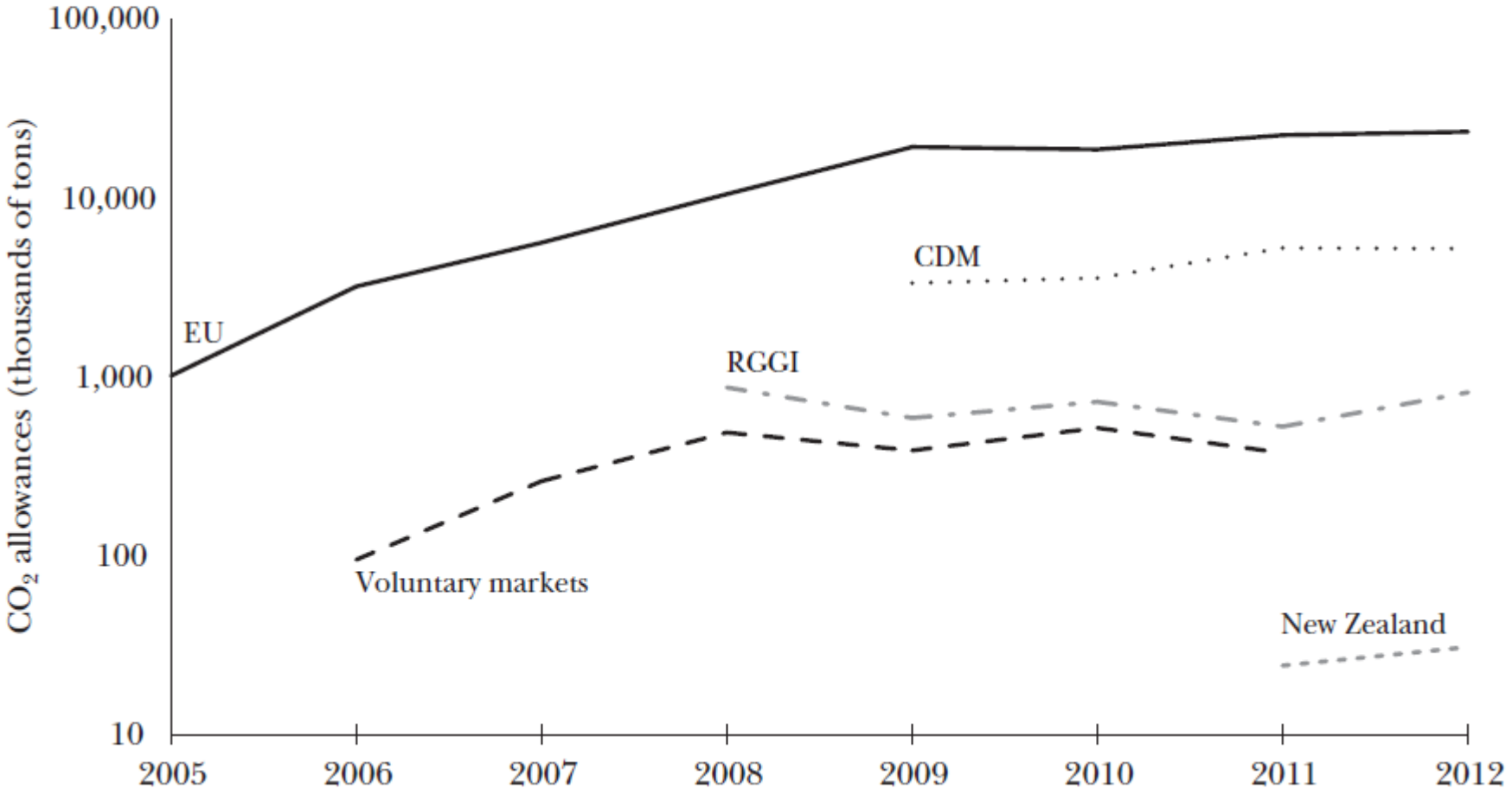
EU ETS: The second phase 2008 - 2012

- Beween 2008 – 2012 the CO_2 price declined from around €20 Mt CO_2 to around €8 Mt CO_2.
  - The reduction of energy demand due to the financial and economic crisis starting in 2008.
  - Inflow of international credits (Certified Emission Reduction CER of CDM).
  - Impact of other EU policies such as RES and energy efficiency policy.
  - Rising prices of fuels.
  - The design of the EU ETS doesn´t allow the adjustment of supply of EUA in reaction to the changes in demand.
- Since the banking is allowed between the second and third trading period = surplus of 2-2,5 bn. EUA.

Volume of CO_2 Allowance Trades

(daily average)



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EU ETS: The third phase 2013 - 2020

- Changes introduced by Energy and climate package 2009.
- EU-wide emission cap to replace NAPs. A linear reduction factor of -1,74 %/y applied.
- Auctioning of permits as a default method. More than 40 % of EUAs to be auctioned in the first year of 3rd period with progressively rising shares each year.
  - End of free permits to the power sector. In other sector the progresive transition to the auctioning.
- 300 million EUA in the New Entrants Reserve to fund innovative RES technologies and CCS.
- An expanded list of restrictions on the use of credits from the CDM.

EU ETS: The third phase 2013 - 2020

- The establishment of EU-wide harmonized rules and performance benchmarks for the free allocation of allowances.
- CCS installations, production of petrochemicals, ammonia, non-ferrous and ferrous metals, gypsum, aluminium, nitric etc. added.
- International aviation – requirements for extra-EU flights operating from or to non-EU countries suspended temporarily.
- Distribution of auction revenues (88% to MS, 10 to MS with low per capita income and 2% to MS that had achieved a 20% emission reduction in their Kyoto protocol base by 2005).
- At least half of these revenues to combat climate change.

Exeptions and derogations

- Countries producing more than 30% of their electricity from one fossil energy source or poorly interconnected to European grids could provide from 70% -> 0% of the allowances in the period of 2013 – 2020 for energy sector freely.
  - Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Lithuania, Poland and Romania.

- A risk of carbon leakage.
  - Process industries may get part or, if subject to carbon leakage, all of their EUA for free at the level of harmonized industry best practice practice.
  - Carbon leakage lists (2009, 2015-2010, 2021-2030).

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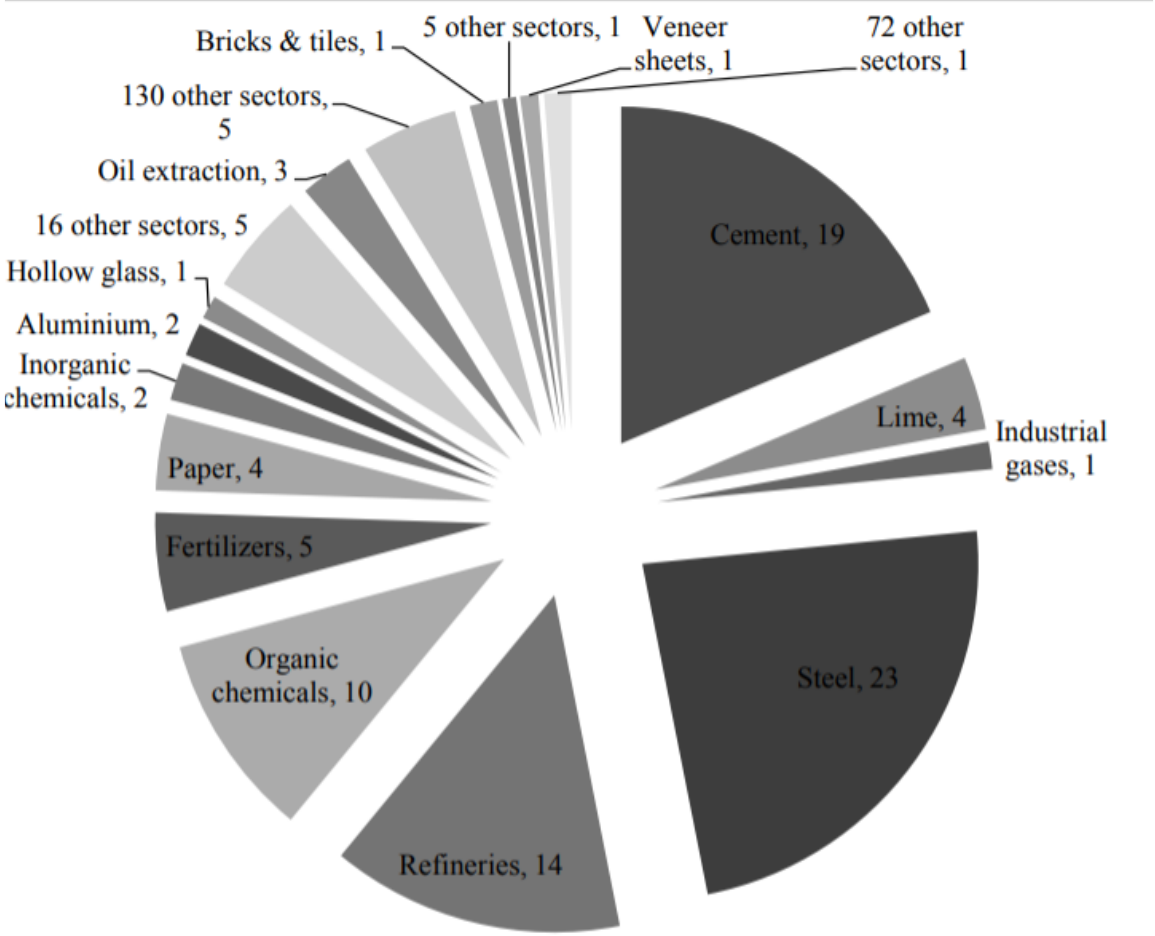
Share of free allocation (%) based on carbon leakage list 2015 - 2020



6,6 bn EUAs given out for free in the period 2013-2020.

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Surplus of allowances

- At the end of 2nd period 900 mil. EUAs.
  + selling of the left-over allowances in national phase 2.
  + new entrant reserves.
  + early auctioning to meet sector hedging demand.
  + the forward selling of phase 3 allowances to generate funds for the NER300 program.
- In the third period surplus increased to (estimated) 2 – 2,2bn.
- Backloading: delaying the auctioning of emission allowances intended to be allocated in 2014-2016 until 2019-2020 (now directly to MSR).
- Market Stability Reserve (from 2019) – to address the surplus of EUAs (more than 822 million of EUA in circulation) by automatically adjusting the supply of EUAs to be auctioned.

Revision for the phase 4 (2021-2030)

- Reflects the EU´s 2030 Climate and Energy Policy Framework from 2014, prepared in 2015-2016.
- The overal number of EUAs to decline at an annual rate of 2,2% from 2021 (inst. of 1.74% now). 43% compared to 2005 levels.
- Market stability reserve reinforced.
- Better targeted allocation of free allowances:
  - Update of benchmarks to reflect the technological progress.
  - More targeted carbon leakage classification.
  - Free allocation better aligned with production levels.
  - Innovation fund – support for innovative technologies,
  - Modernisation fund – to boost energy efficiency of power sector in 10 lower income MS (free allowances still available in these countries).

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EU ETS – Assesment

+ it works at a technical level. It is the first and the largest international scheme for trading allowances. 31 countries (EU28+Iceland, Liechtenstein, Norway). Central pillar of the EU´s climate change policy. More than 11 000 installations, 45% of the EU´s GHG emissions.

+It has a modest (but limited) effect on carbon emissions. Emission stayed within the cap.

+It generates some revenue to promote climate change objectives.

EU ETS – Assesment

- Low prices of EUA
- Tensions with other instruments - International Emissions Trading Association analysis estimated that between 2008 and 2020 the Energy Efficiency Directive had been responsible for an EUAs surplus of approximately 515 $MtCO_2$, while the Renewable energy directive had accounted for a reduction in EUA demand of approximately 210 $MtCO_2$.
- Perception of competitiveness problems.
- Lack of credibility.
- Limited contribution to the real decrease in emissions.

= high price is necessary for profitability of low carbon technologies (CCS, nuclear, renewables)

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DATA: Sandbag

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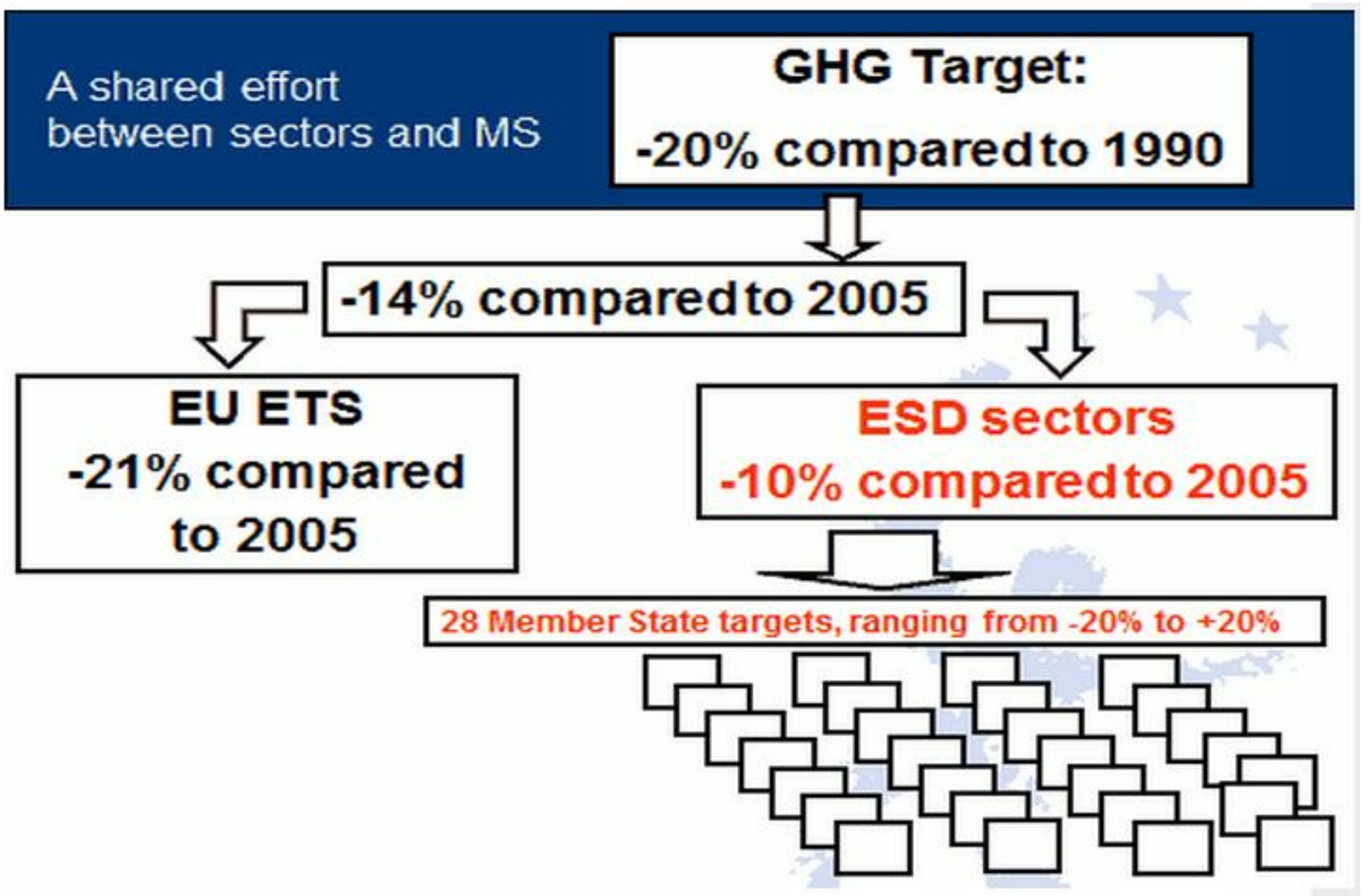
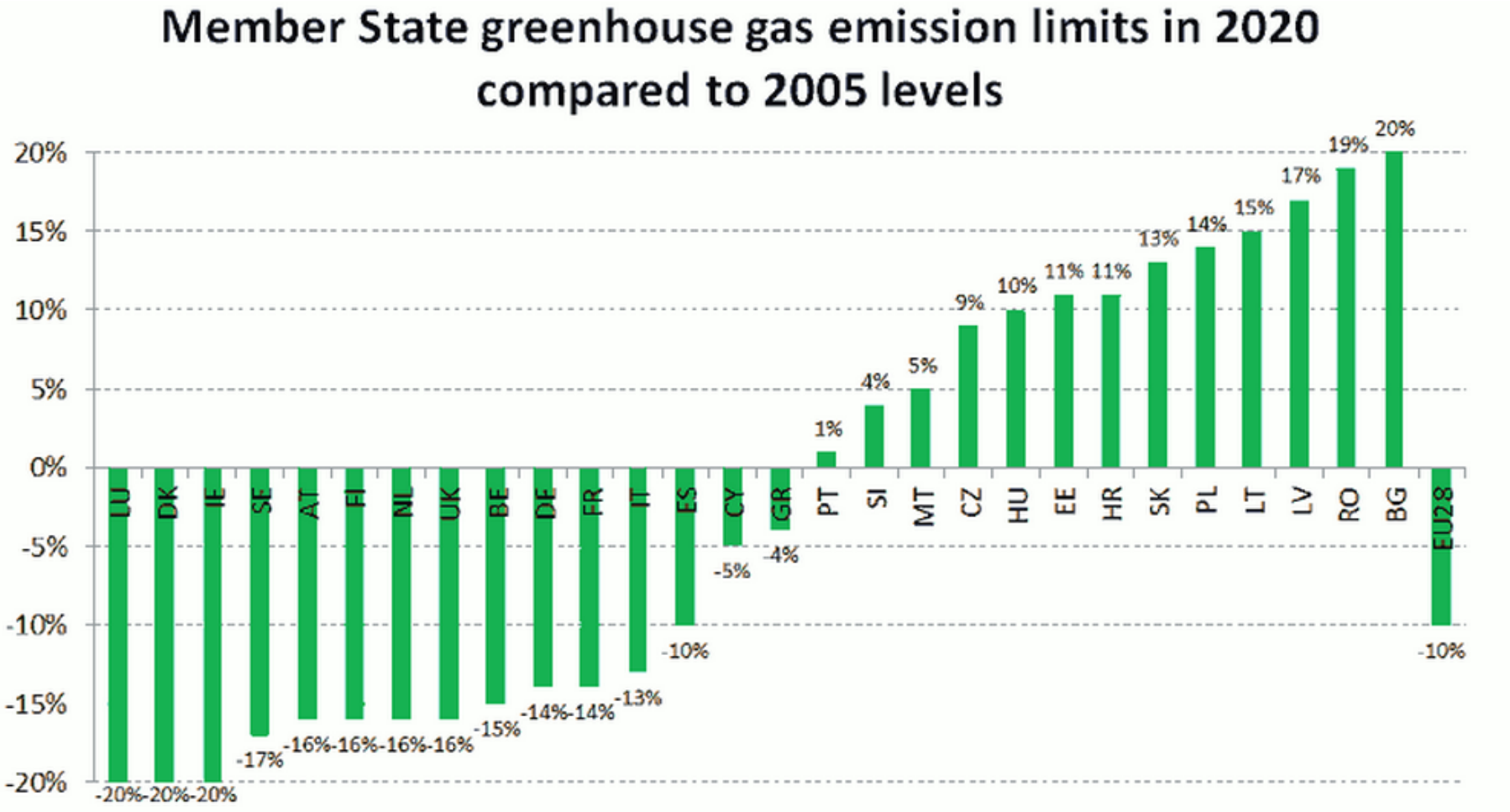
Environmental (climate) dimension of EEP

- Climate change – EU aims to develop a low-carbon economy.

- Measures primarily to reduce GHG emissions
  - EU ETS – covers 40% of EU emissions.
  - individual targets of MS for the non-EU ETS sectors (housing, agriculture, transport, waste) – cover 60% of EU emissions.
  - CCS.
- Measures to transform the energy sectors
  - RES
  - Energy Efficiency
  - Research and development, new technologies


A shared effort
between sectors and MS
GHG Target:
-20% compared to 1990
-14% compared to 2005
EU ETS
-21% compared
to 2005
ESD sectors
-10% compared to 2005
28 Member State targets, ranging from -20% to +20%

Individual targets of MS



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Non-EU ETS emissions (Effort Sharing Decision)

- 20% target is divided between a) a 21% target compared to 2005 for EU ETS emissions and b) a 10% target compared to 2005 for the non-ETS emissions.
- Based on MSs relative wealth (GDP per capita).
- Kyoto gases covered (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) + NF_3.
- The later goal is split into national sub-targets.
  - Reduction of transport needs, public transport, low-GHG transport, biofuels, urban planning, improved energy performance standards for public building, labeling system, eco design, more climate-friendly farming practices…
- To support it some measures at the EU level – emission standards for vehicles, fuel quality directive, eco-design for energy related products…
- Flexibilities between states (banking, borrowing, buying between MS).

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Non-EU ETS emissions (Effort Sharing Decision) in 2021 - 2030

- In 2018 targets for 2030.
- Non-EU ETS sector 30% reduction by 2030 compared to 2005.
- 0% to -40% compared to 2005 levels. Based on GDP per capita, adjusted for cost-effectiveness.
- Includes Iceland and Norway.

EU achievements

- EU GHG emissions reduced by 23% between 1990 and 2018, while the economy grew by 61% over the same period.
- From 2017 to 2018, emissions declined by 2%, mainly in the EU ETS sectors, mainly in power plants. Emissions from stationary installations covered by the EU ETS decreased by 4.1% compared to 2017. Emissions not covered by the EU ETS (transport, buildings, agriculture, waste…), decreased by 0.9%. This reduction comes after three years of slightly increasing emissions from these sectors.
- Emissions from international aviation continued to increase in 2018, and are up 19% over the last five years.
- Malta, Germany, Ireland, and Austria may not fit into their effort sharing (non-EU ETS) limits over the period 2013 – 2020. EU as a whole is expected to overachieve the targets.
- Commitments of Kyoto first period (2008-2012) to be met. EU on track to meed targets under the second commitment period (2013-2020).

Sources

- IEA (2014): Energy Policies of IEA Countries – The European Union.
- Talberg, A.-Swoboda, K.: Emissions trading schemes around the world, 2013.
- Buchan, D.(2009): Energy and Climate Change: Europe at the Cross Roads.
- Buchan, D.-Keay, M.(2015): Europe´s Long Energy Journey: Towards an Energy Union?
- Linklaters (2014): Capacity mechanisms. Reigniting Europe´s energy markets.
- ICAP (2017): EU Emission Trading SystemIEA (2014): Energy Policies of IEA Countries – The European Union.
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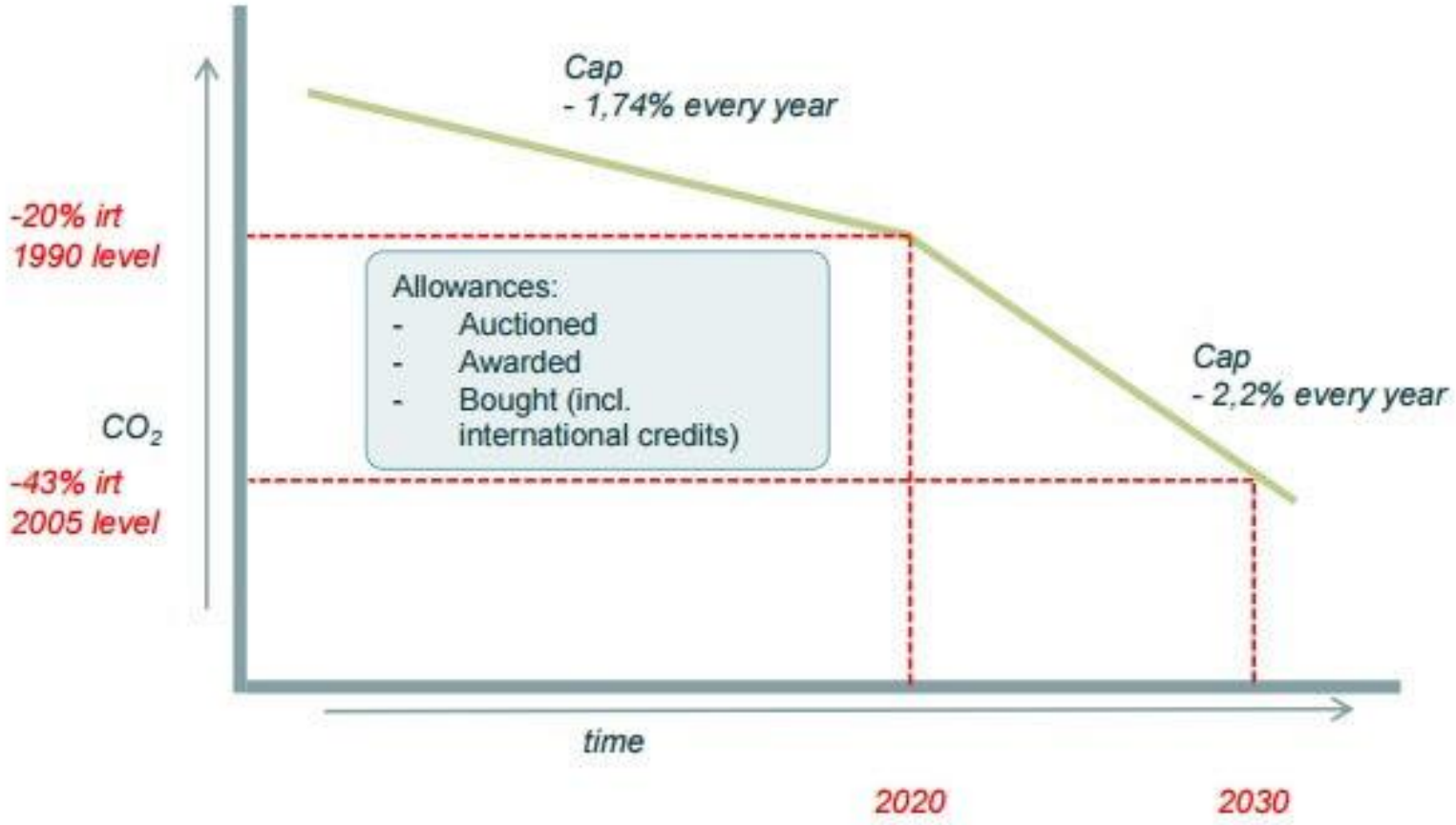

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Sources

- Linklaters (2014): Capacity mechanisms. Reigniting Europe´s energy markets.
- Buchan, D. (2009): Energy and Climate Change: Europe at the Crossroads.

- IEA (2014): Energy Policies of IEA Countries – The European Union.
- Talberg, A.-Swoboda, K.: Emissions trading schemes around the world, 2013.
- Buchan, D.(2009): Energy and Climate Change: Europe at the Cross Roads.
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