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THE EUROPEAN WIND ENERGY ASSOCIATION



Wind energy and Climate policy

Fixing the Emission Trading System

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1st February 2012

EWEA Members – Across entire supply chain



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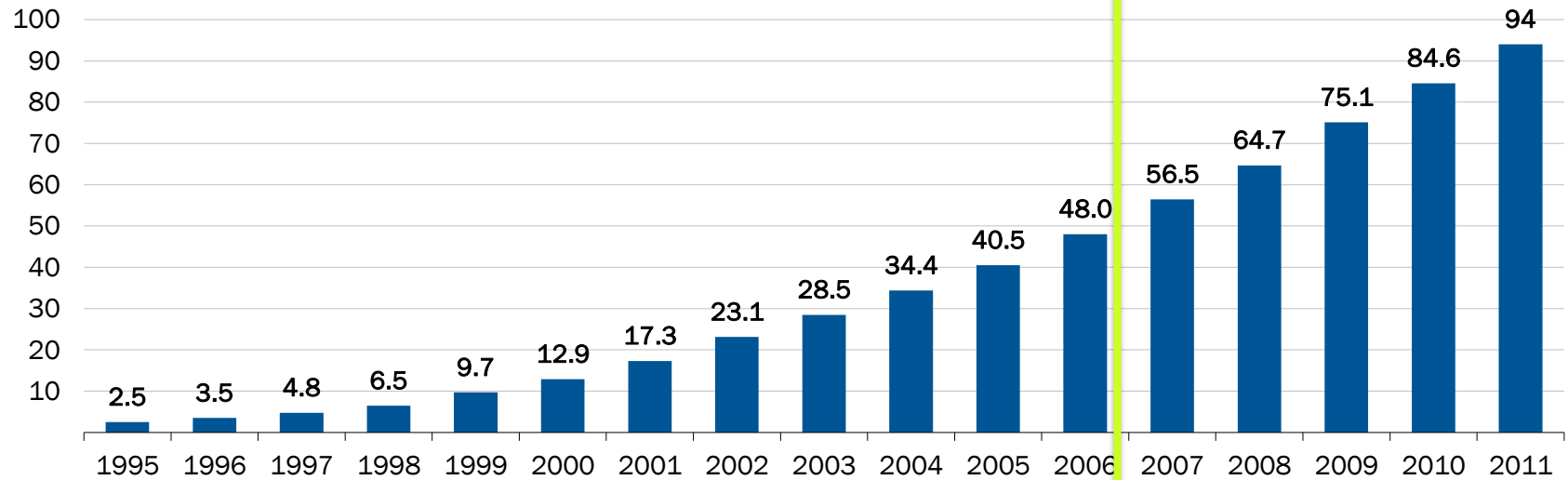
Outline

- EU power – A clear shift towards renewables
- Reducing emissions is possible - 30% is a minimum
- Macro-economic benefits of wind
- Fixing the Emission Trading System

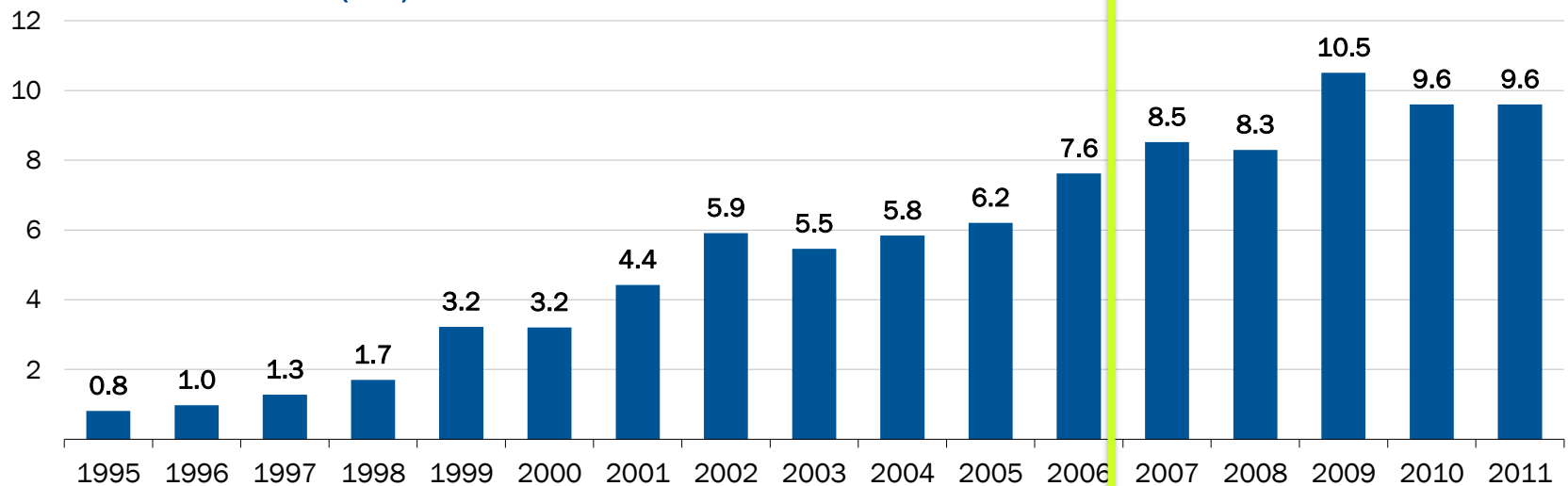
 Additional content

Current status

Cumulative installations in EU (GW)

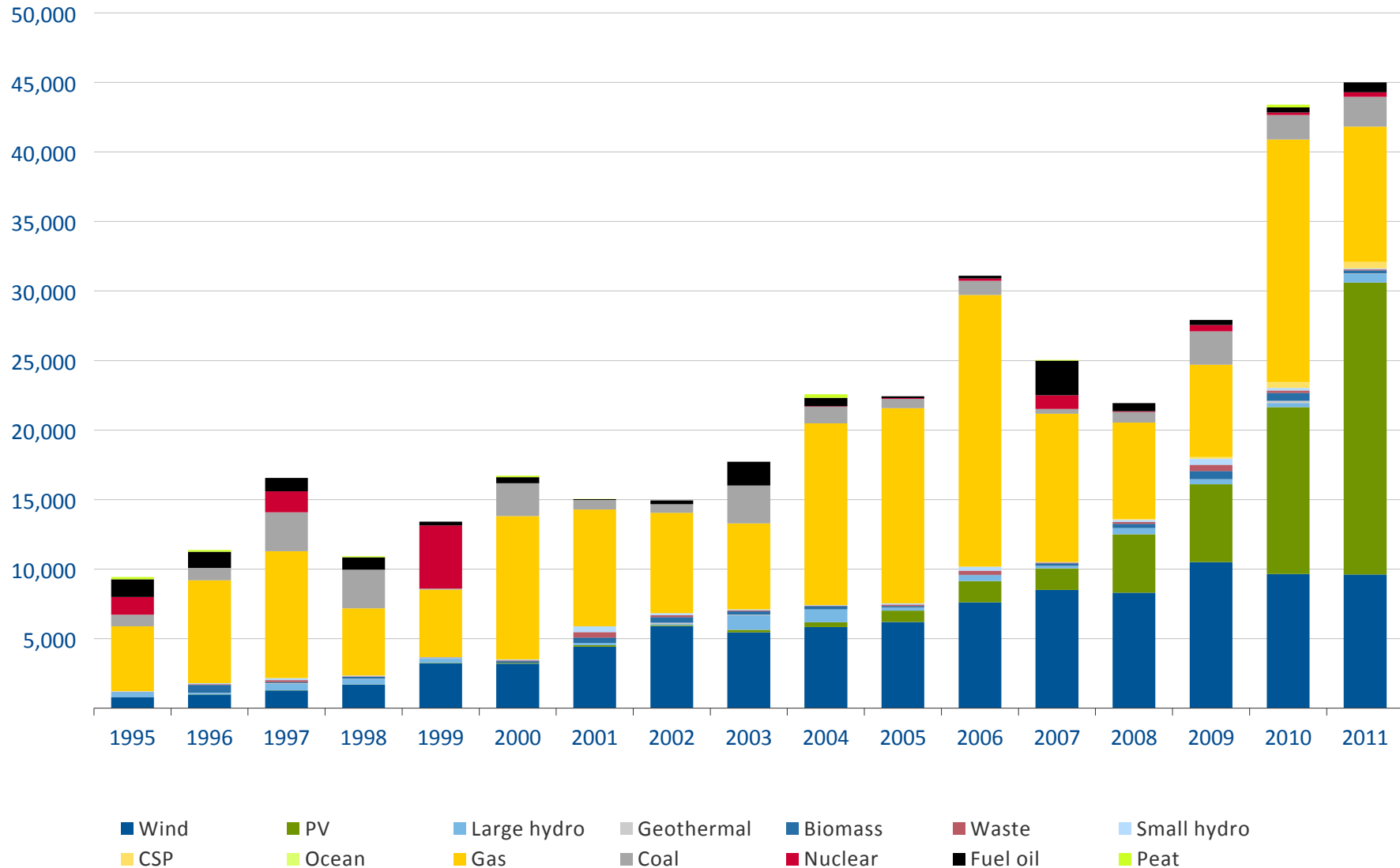


Annual installations in EU (GW)

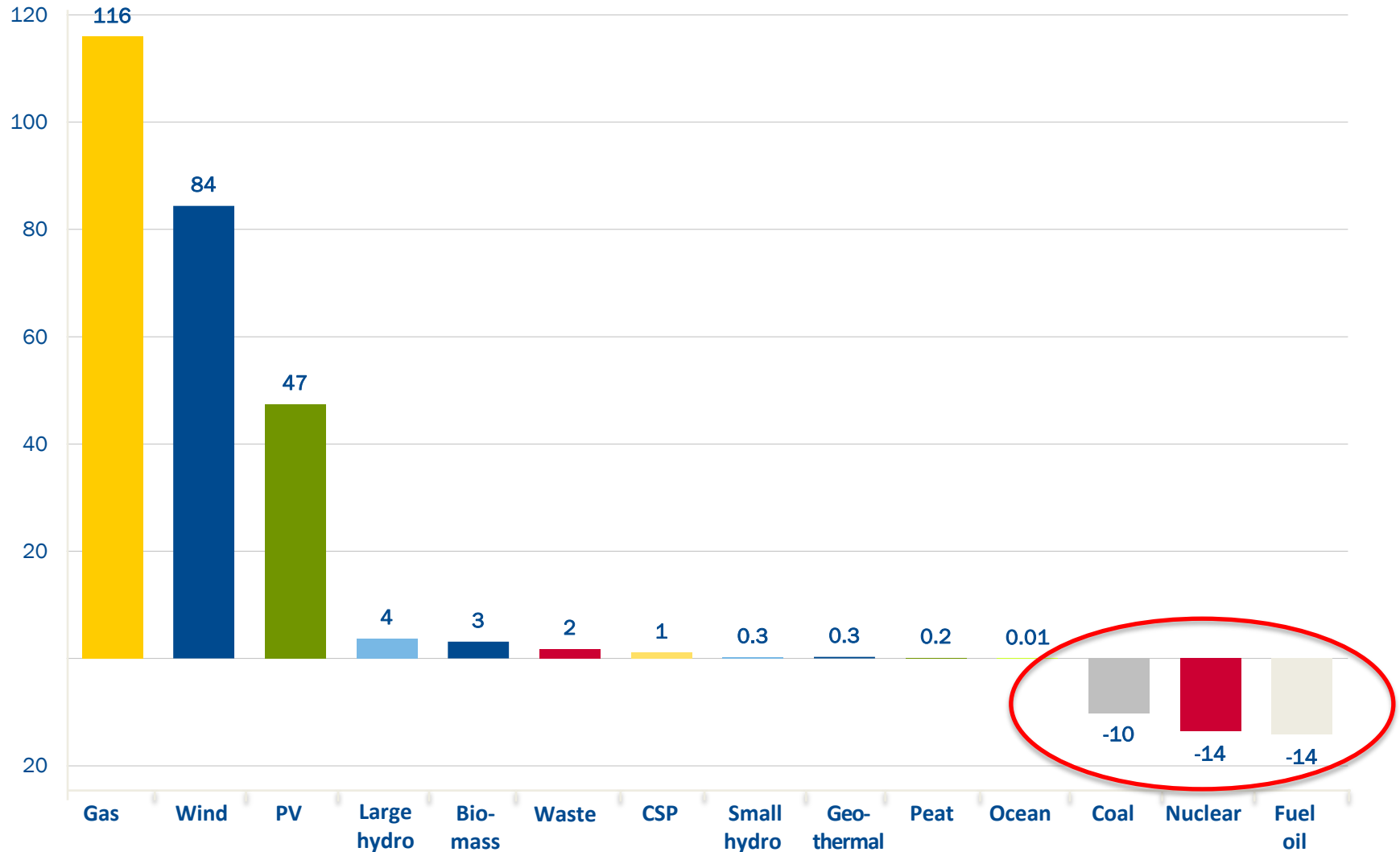




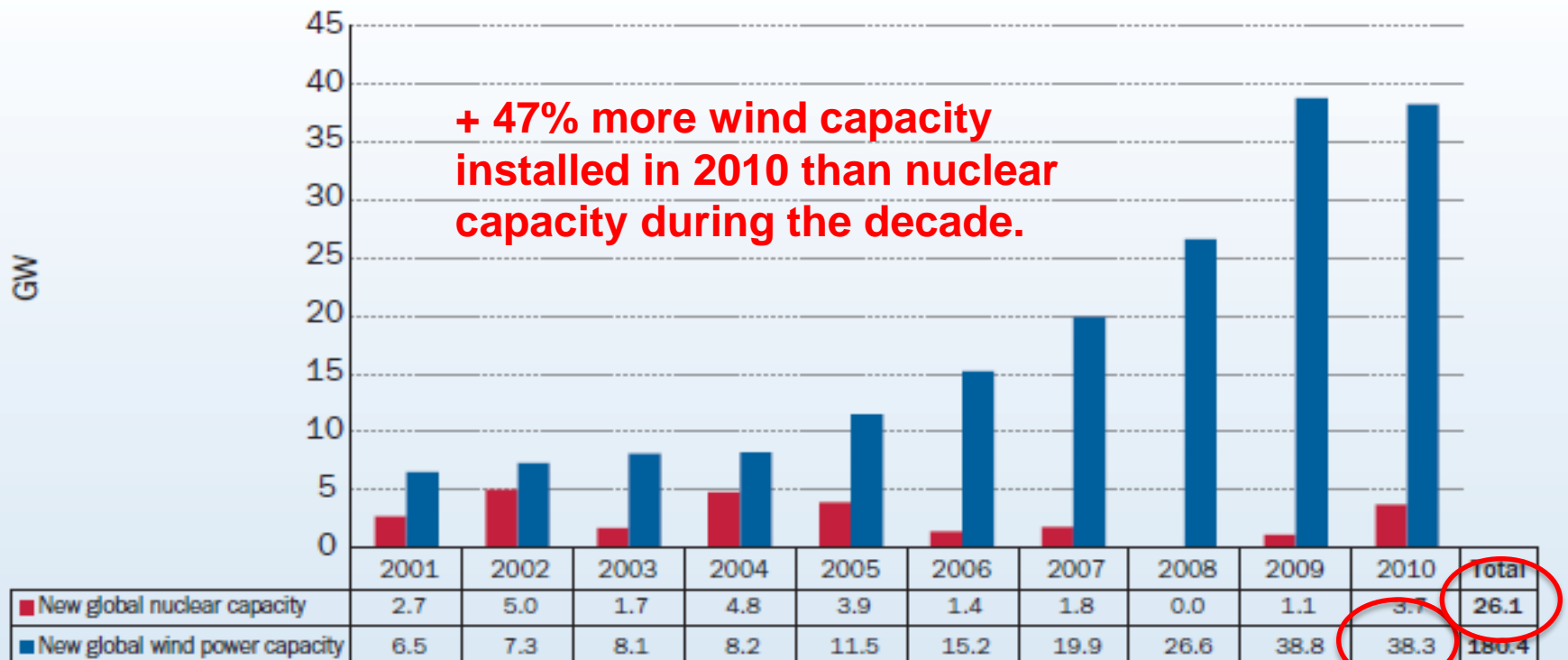
EU installed power generating capacity per year (MW)



Net electricity generating installations in EU 2000-2011 (GW)



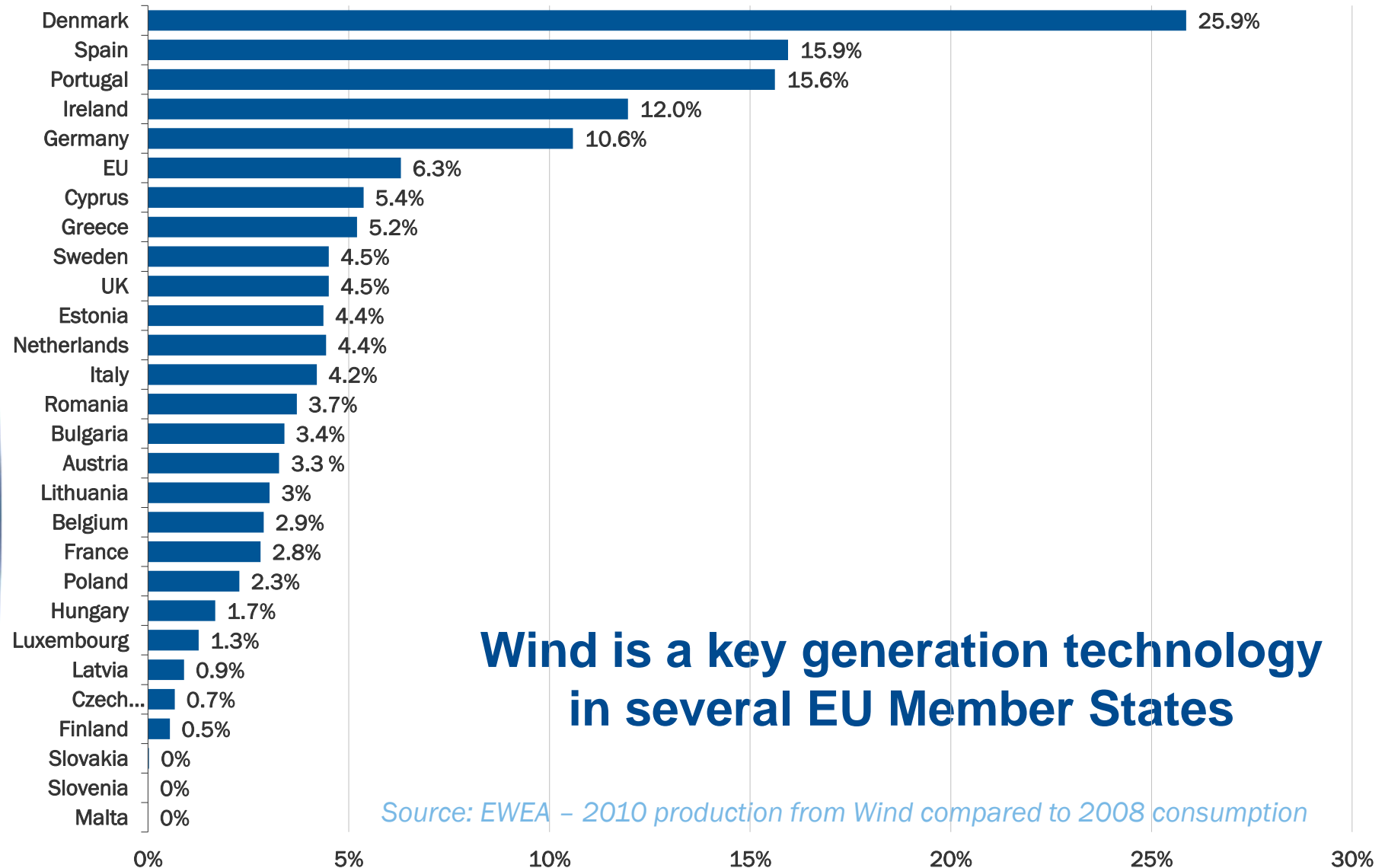
New global annual wind and nuclear capacity from 2001 to 2010



Source: EWEA, GWEC and International Atomic Energy Agency (IAEA)



Wind share of electricity consumption

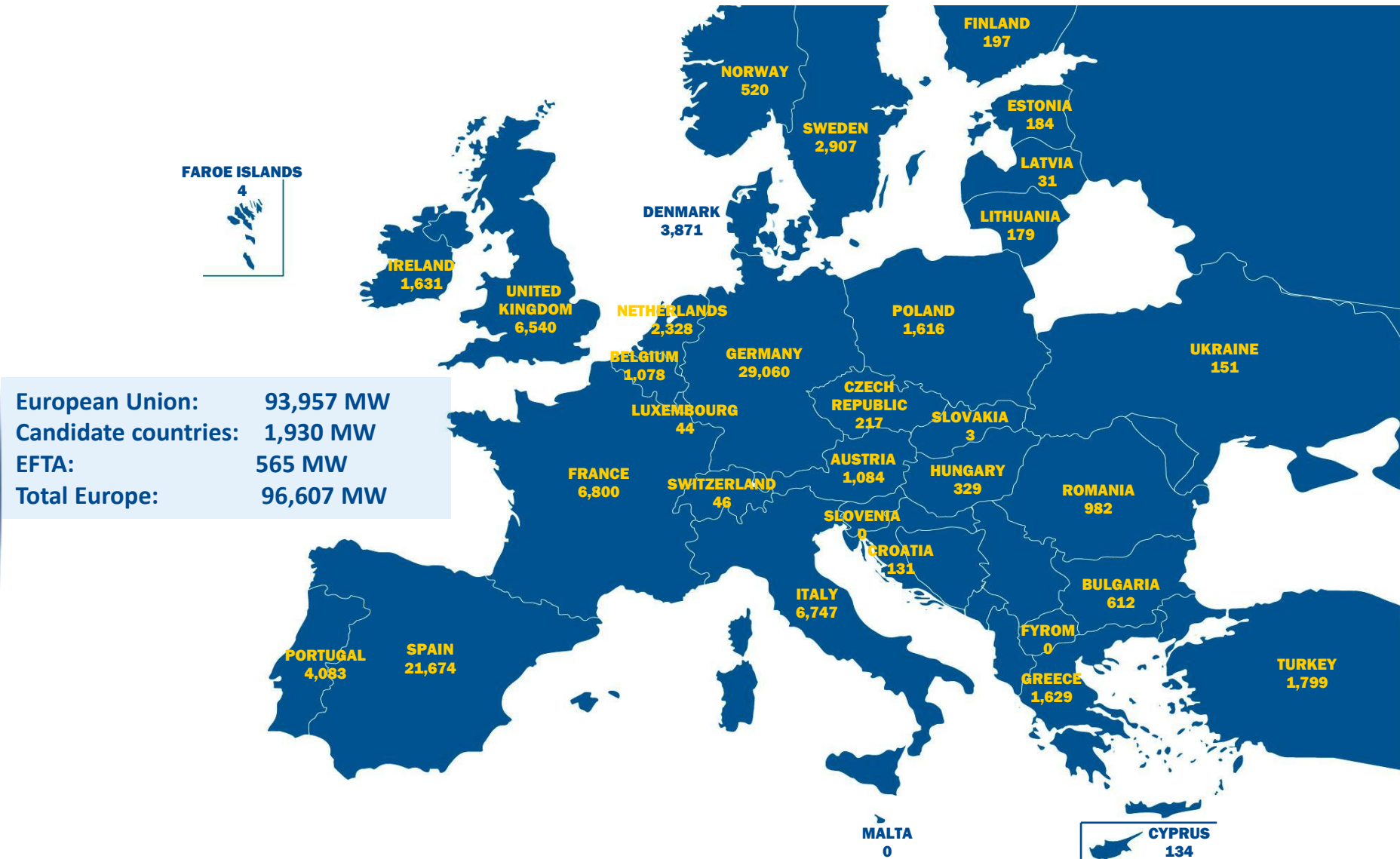


**Wind is a key generation technology
in several EU Member States**

Source: EWEA – 2010 production from Wind compared to 2008 consumption

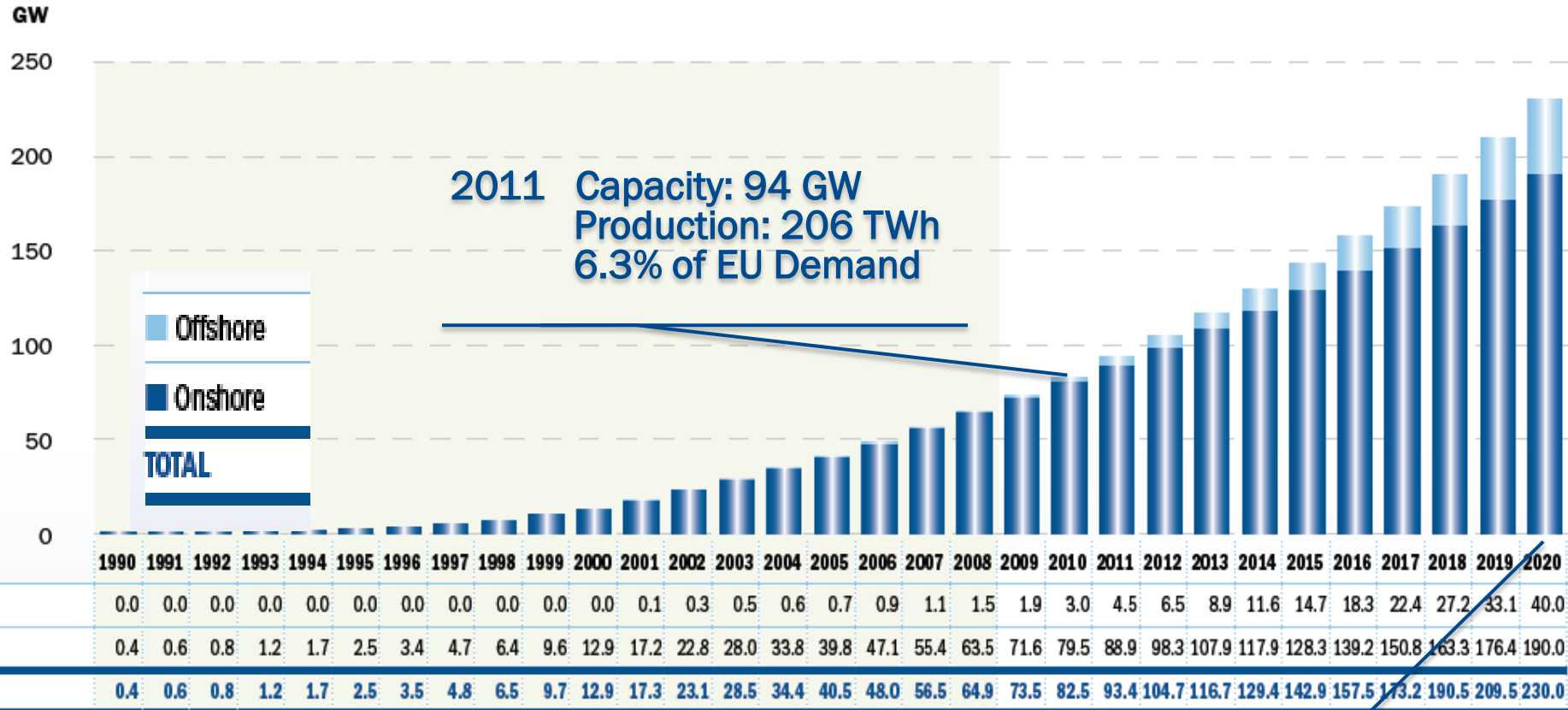


Wind power installed in Europe by end of 2011 (MW)





Wind installed capacity - Development and 230GW scenario to 2020



Similar targets in other 2020 scenarios...
IEA = 199 GW NREAPs = 213 GW EC = 222 GW

**2020 230GW
581 TWh
16% of EU demand**

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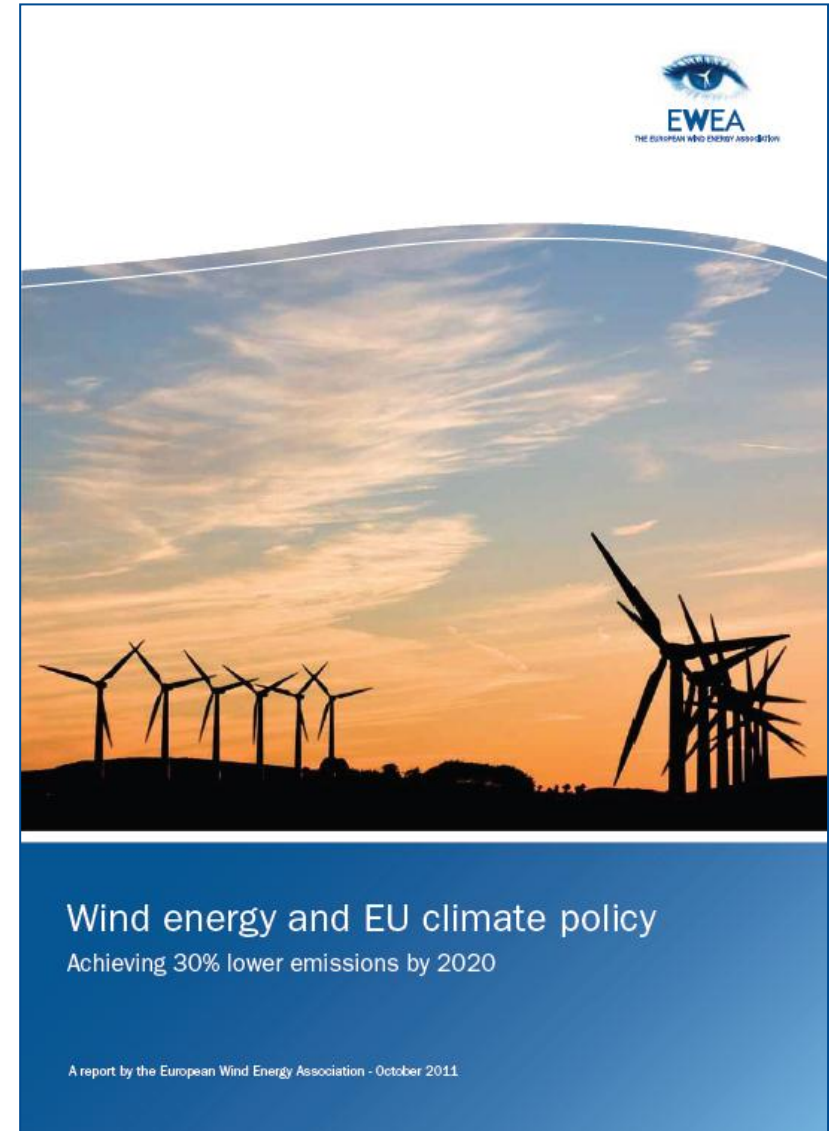
 Additional content



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EWEA Report – Wind Energy and EU climate policy

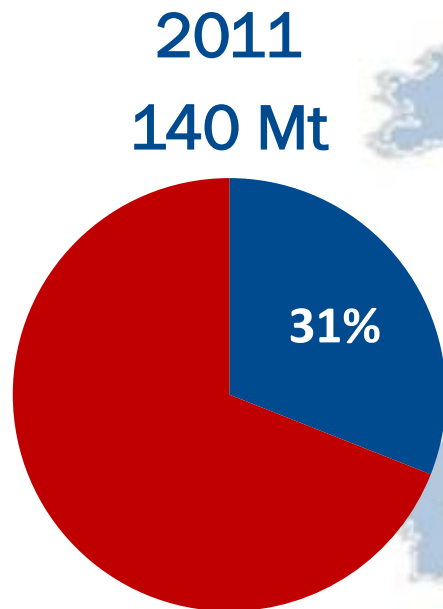
- Objectives:
- Evaluating mitigation potential of wind energy
- Examining EU targets and UNFCCC pledges
- Analysing the EU Emission Trading System
- Conclusions on the ideal climate policy mix



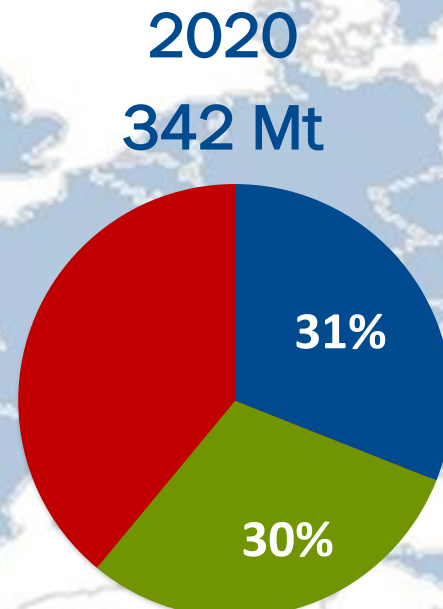
Wind power will avoid as much CO₂ as...

Renewable electricity makes a move to 30% possible in the EU

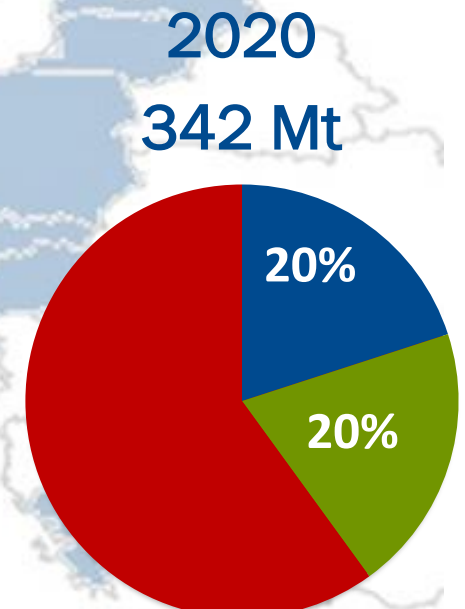
■ Wind ■ Other RES ■ Offsets



31% of the EU's
Kyoto target



31% of the EU's
20% target

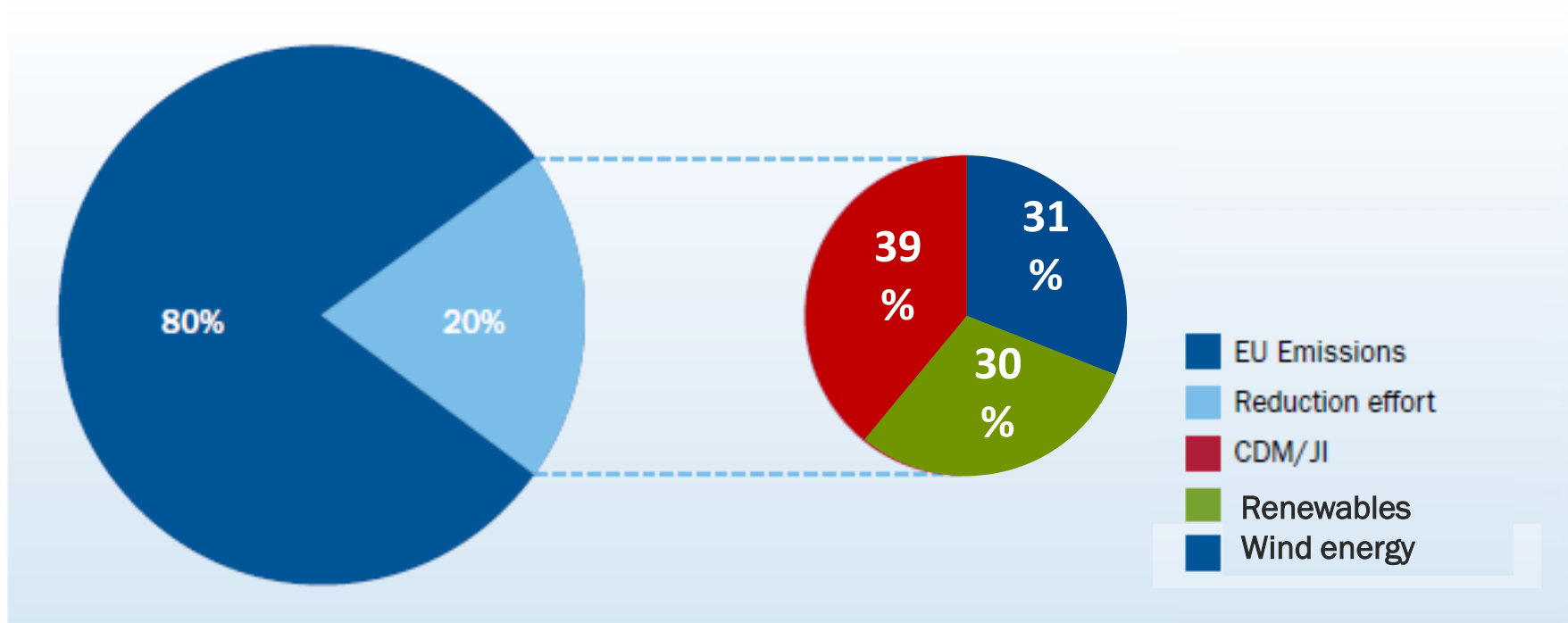


20% of the EU's
30% Target

Wind power = domestic reductions

- EU climate package allows for about 60% CDM/JI
- Domestic reductions can be only 40% of the total effort

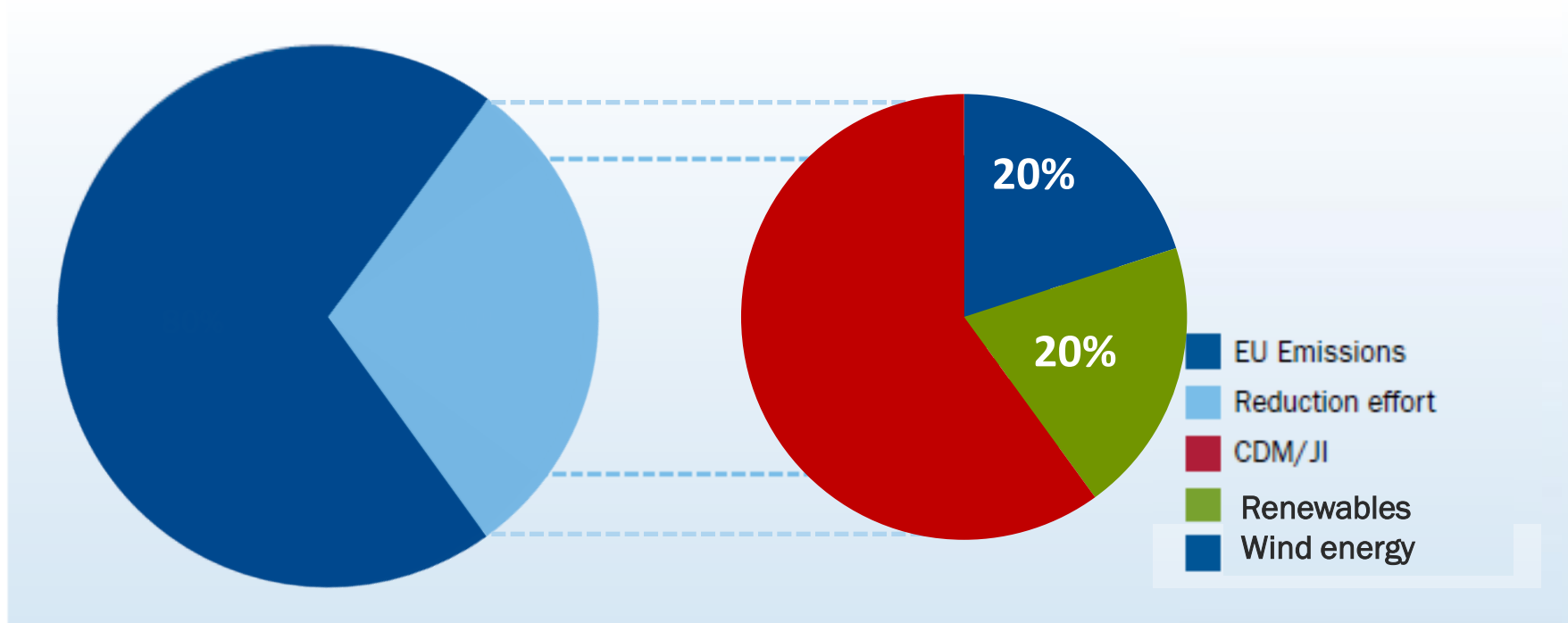
FIG 3: EU EMISSION REDUCTION TARGET – TOTAL PERCENTAGE AND ACCESS TO OFFSETS (CDM/JI)



Wind power = domestic reductions

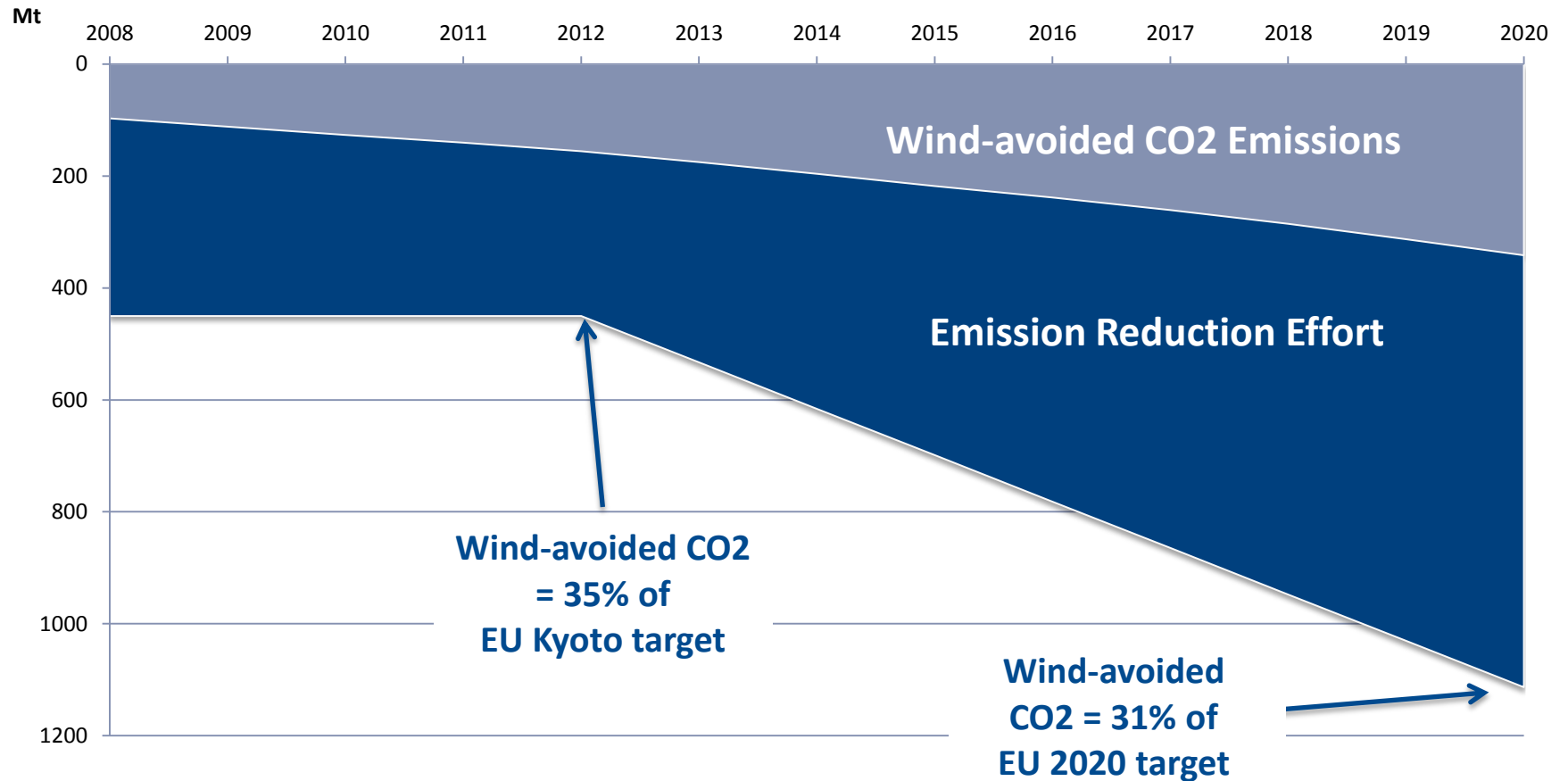
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FIG 3: EU EMISSION REDUCTION TARGET – TOTAL PERCENTAGE AND ACCESS TO OFFSETS (CDM/JI)





Reduction Effort and wind-avoided CO2 Kyoto Protocol + Climate Package (2008-2020)



EU 2020 – Wind power versus car emissions

2010 – Wind avoids
126 MtCO₂, eq. to
➔ 64 million cars
➔ 30% of EU fleet !

2020 – wind avoids
342 MtCO₂, eq. to
➔ 173 million cars
➔ 81% of EU fleet !

EU fleet - 214 million cars



Global Wind contribution to Cancun pledges

Aggregated Annex I pledges

➔ **12%-18% of 1990 emissions**

Versus Global Wind in 2020

- 1081 GW installed capacity
- 2650 TWh produced

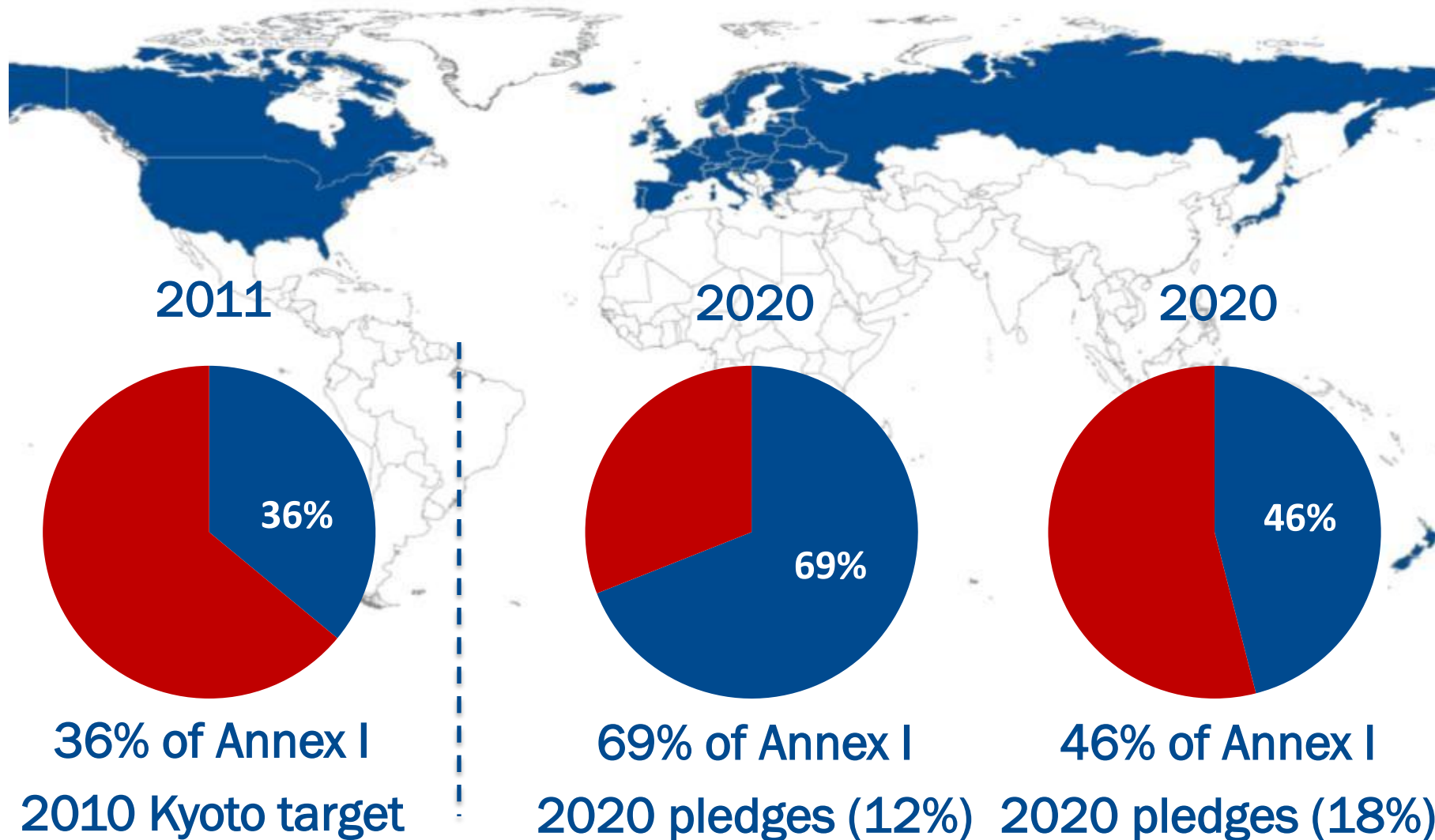
➔ **1591 Mt CO₂ avoided**

Party	Information relating to possible QELROs		Status of possible QELROs	Inclusion of LULUCF ^a
	Range or single value by 2020	Reference year		
Australia	-5 to -15%; or -25%	2000	Officially announced	Yes
Belarus	-5 to -10%, or -15%	1990	Under consideration	Only the upper value of -15% contains contributions from LULUCF of 5%
Canada	-20%	2006	Officially announced	Preliminary range of -2 to 2% of total 2006 emissions
Croatia ^b	+6%	1990	Under consideration	Yes
European Community (EU-27 ^c)	-20 to -30%	1990	Adopted by legislation	No for -20%; Preliminary range of -3 to 3% of 1990 emissions for -30%
Iceland	-15%	1990	Officially announced	Substantial contribution
Japan	-25%	1990	Officially announced	TBD
Liechtenstein	-20 to -30%	1990	Officially announced	No
Monaco	-20%	1990	Officially announced	No
New Zealand	-10 to -20%	1990	Officially announced	Yes
Norway	-30 to -40%	1990	Officially announced	Around 6% (3 Mt CO ₂ eq)
Russian Federation	-22 to 25%	1990	Officially announced	TBD
Switzerland	-20 to -30%	1990	Officially announced	Yes
Ukraine	-20%	1990	Under consideration	TBD



Annex I - Global Wind in 2020 will avoid...

Copenhagen pledges: 12-18% reduction



Report conclusions on Wind energy and climate policy

- Wind - Extensive development of wind energy will significantly reduce emissions
 - In EU, as much as 31% of the current EU GHG target
 - Renewable electricity could avoid 100% of EU domestic reductions
 - Wind globally could reduce emissions as much as 69% of pledges
- EU policy framework
 - A move to 30% reduction is very achievable
 - ETS is undermined by economic crisis and needs fixing
- UNFCCC: Annex I pledges are much too low and need raising
 - ➔ **Climate signals to investors are rapidly disappearing !**

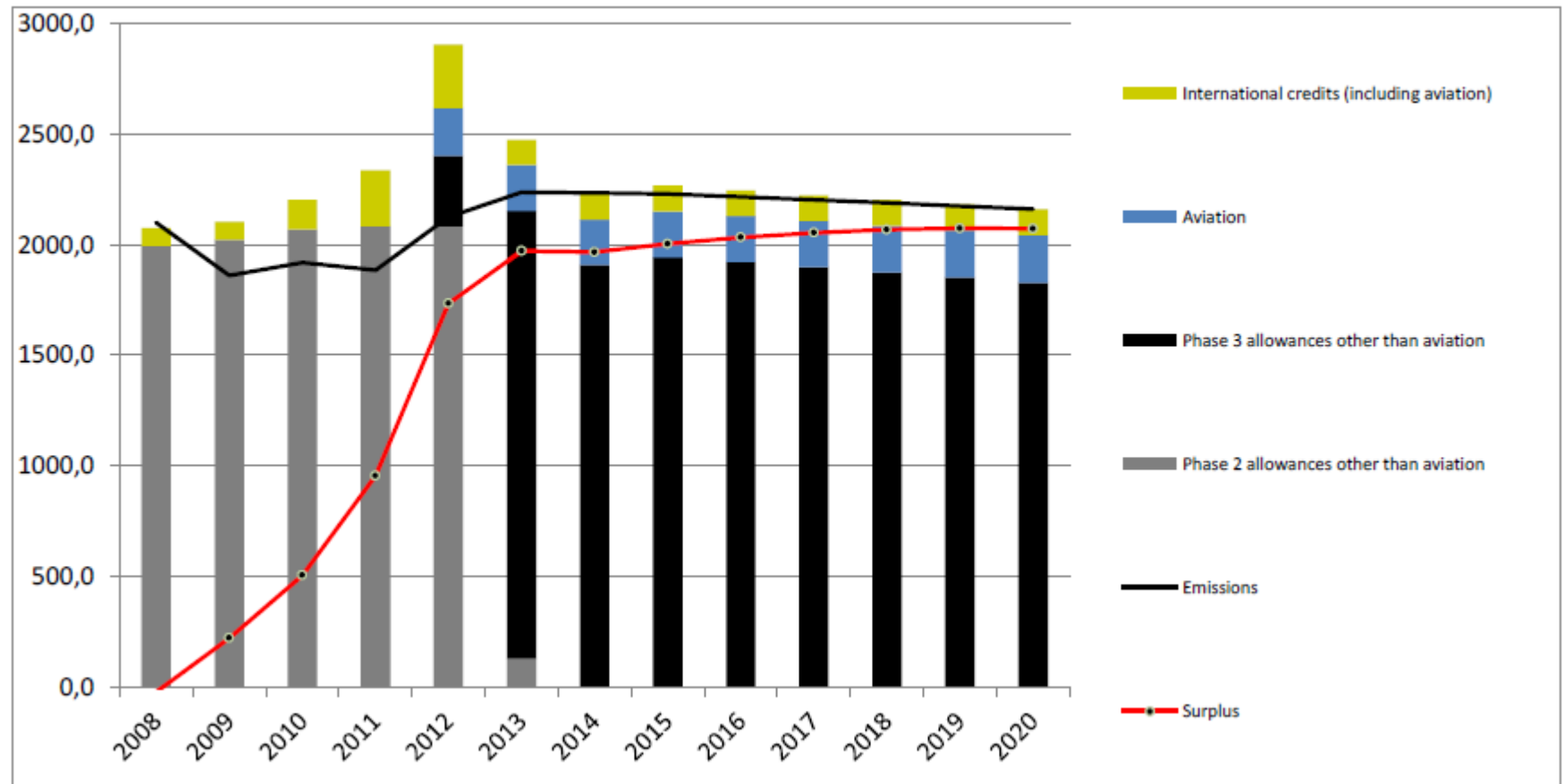
Outline of presentation

- EU power – A clear shift towards renewables
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 Additional content

Current build-out of the oversupply to 2020

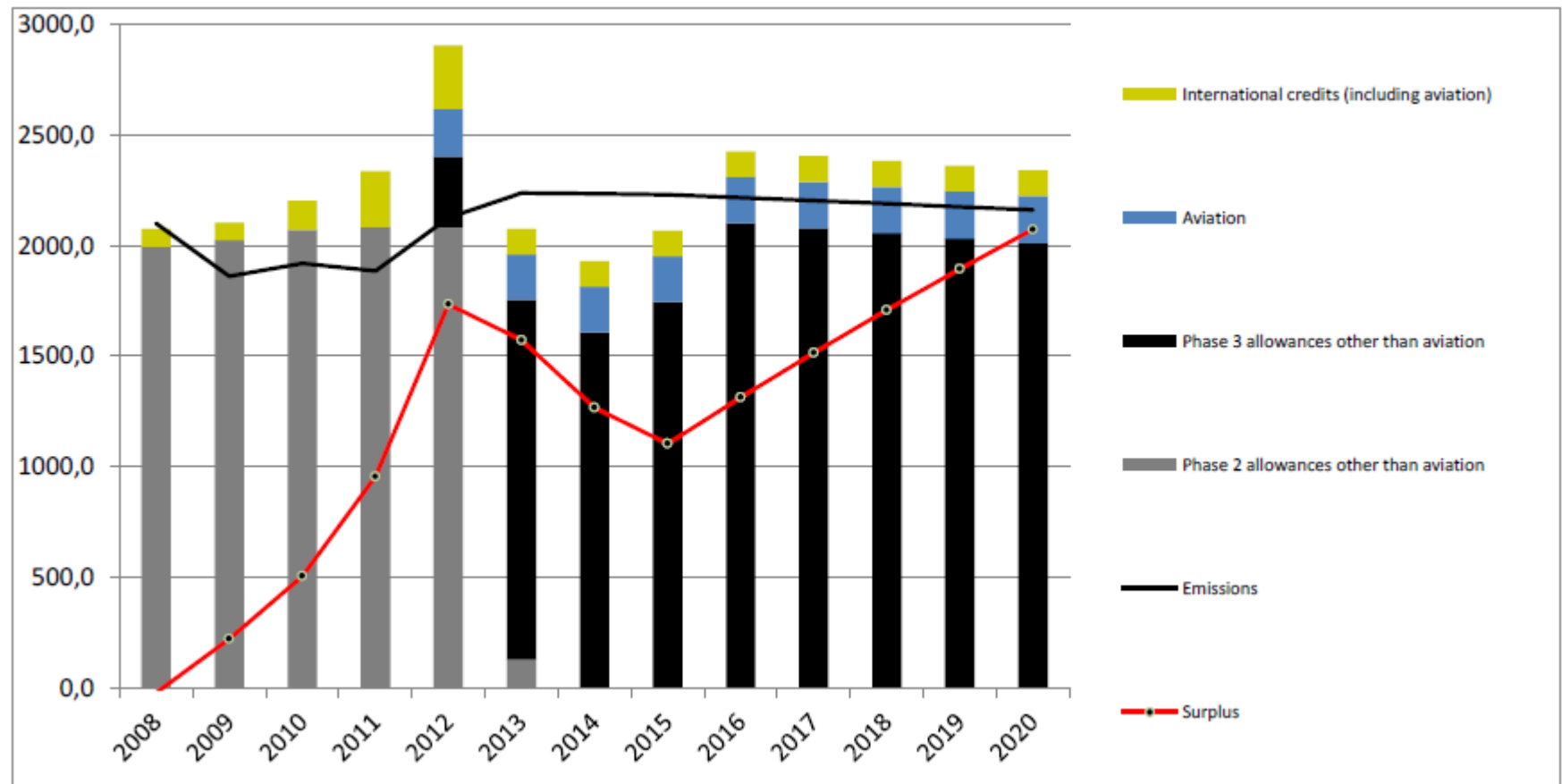
Figure 6: Example of a possible profile of annual issuance of allowances, use of international credits and surplus development





Backloading 900M allowances has a limited impact

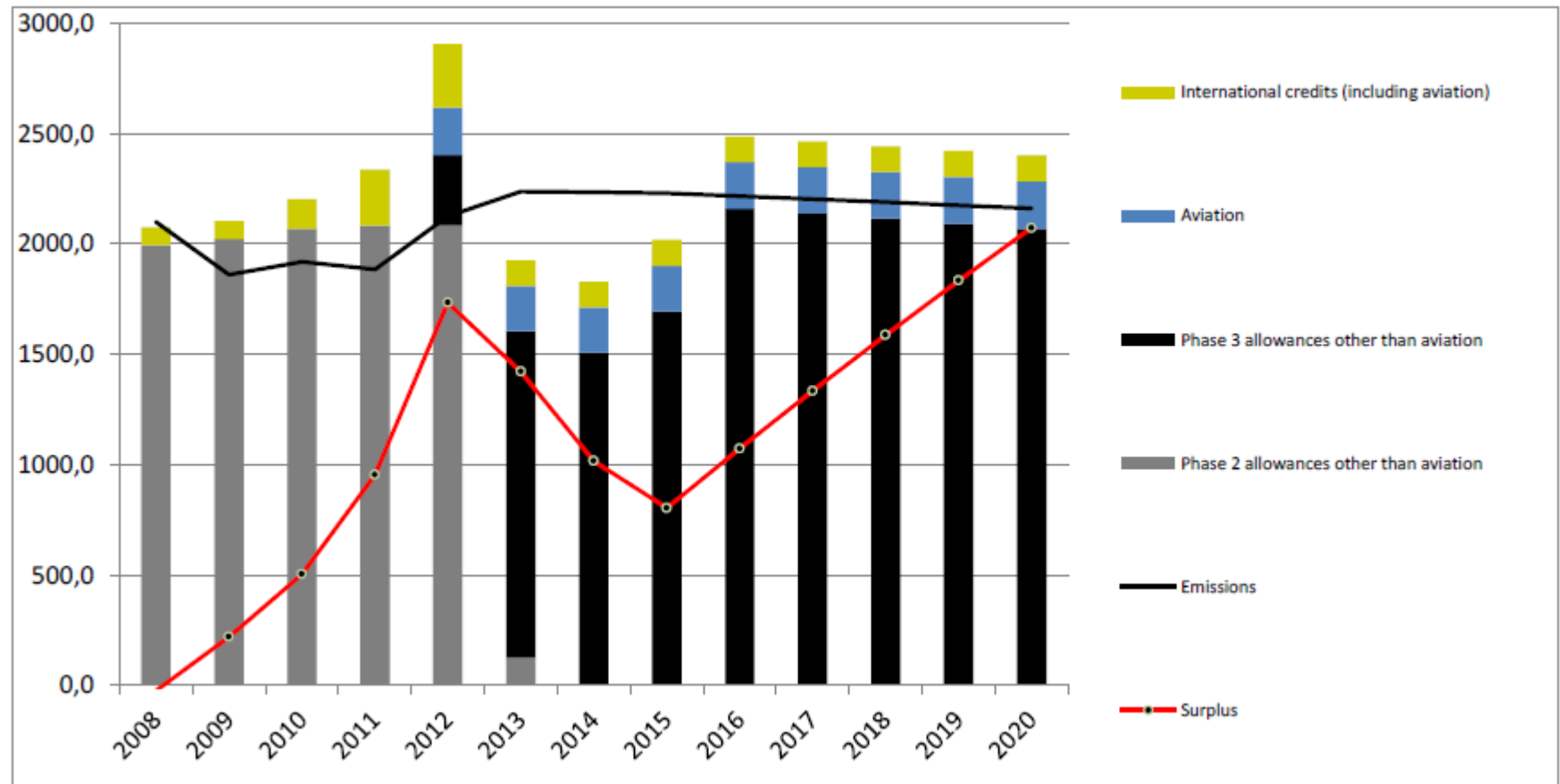
Figure 8: Example of a possible profile with medium change in the auction profile





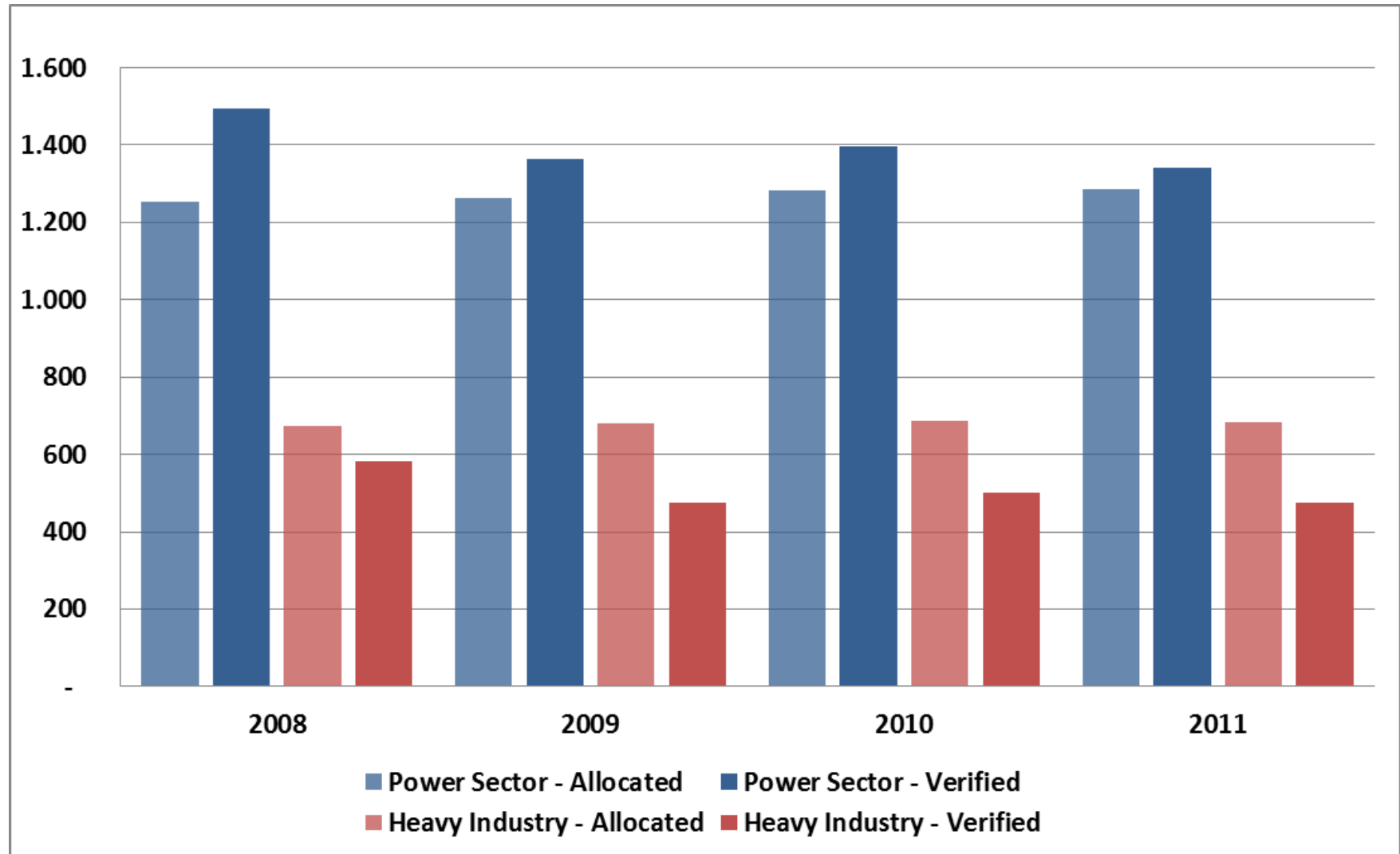
Backloading 1,2bn Allowances is still not enough

Figure 7: Example of a possible profile with large change in the auction profile





The ETS – a hidden subsidy to heavy industry



34% oversupply for heavy industry = low CO₂-price - €7.89



The ETS – A hidden subsidy to heavy industry

- Heavy industry
 - has received too many free EUAs
 - sells them on the market (or saves them for later use)
- The power sector
 - doesn't have enough free EUAs
 - buys them cheaply to heavy industry via the market
 - Passes 100% of the cost of carbon to electricity consumers
- Conclusion:
 - EU electricity consumers pay a subsidy to heavy industry via their electricity bill and electricity companies
 - Power sector and heavy industry don't need to reduce emissions

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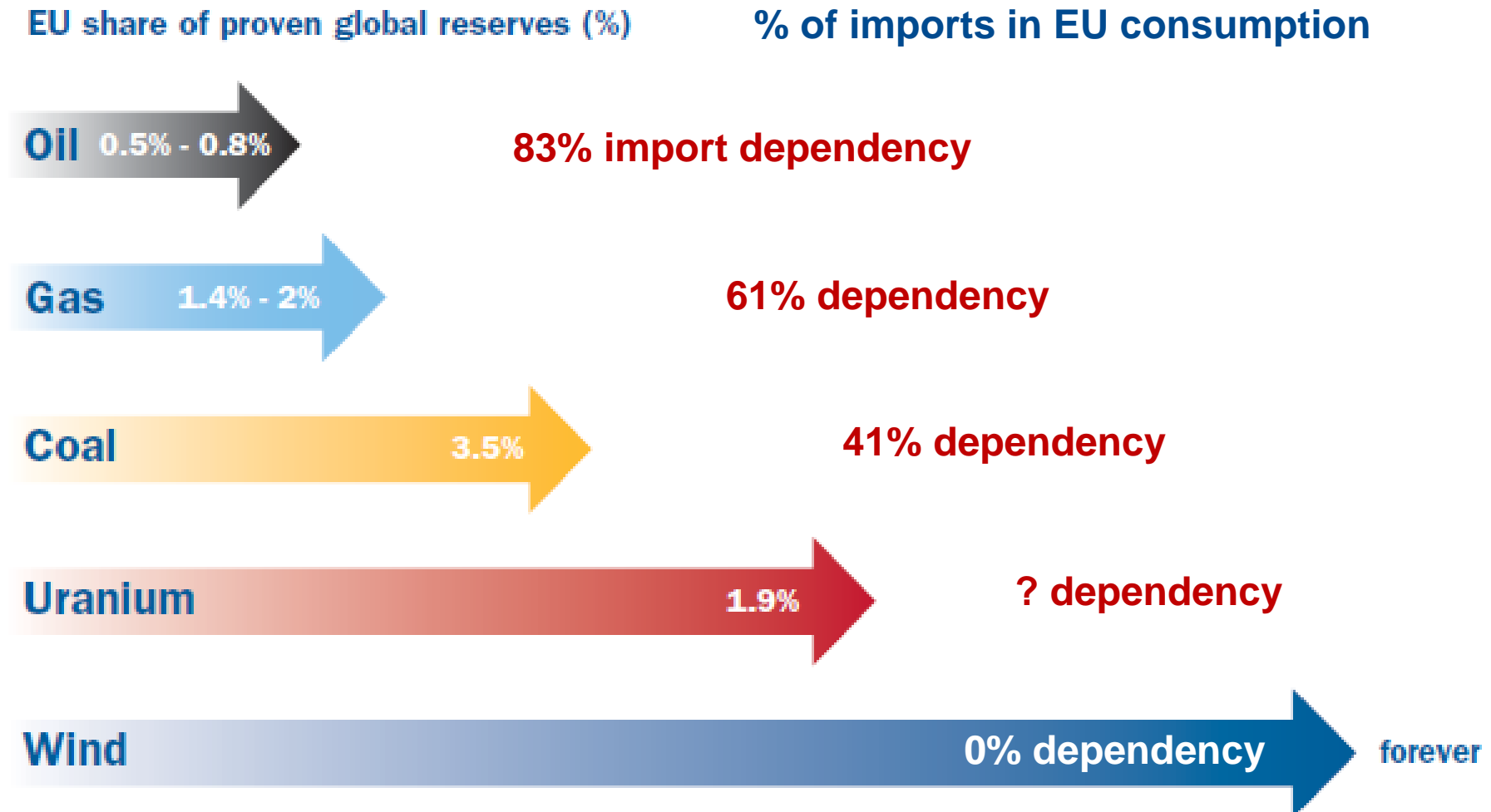


Additional content

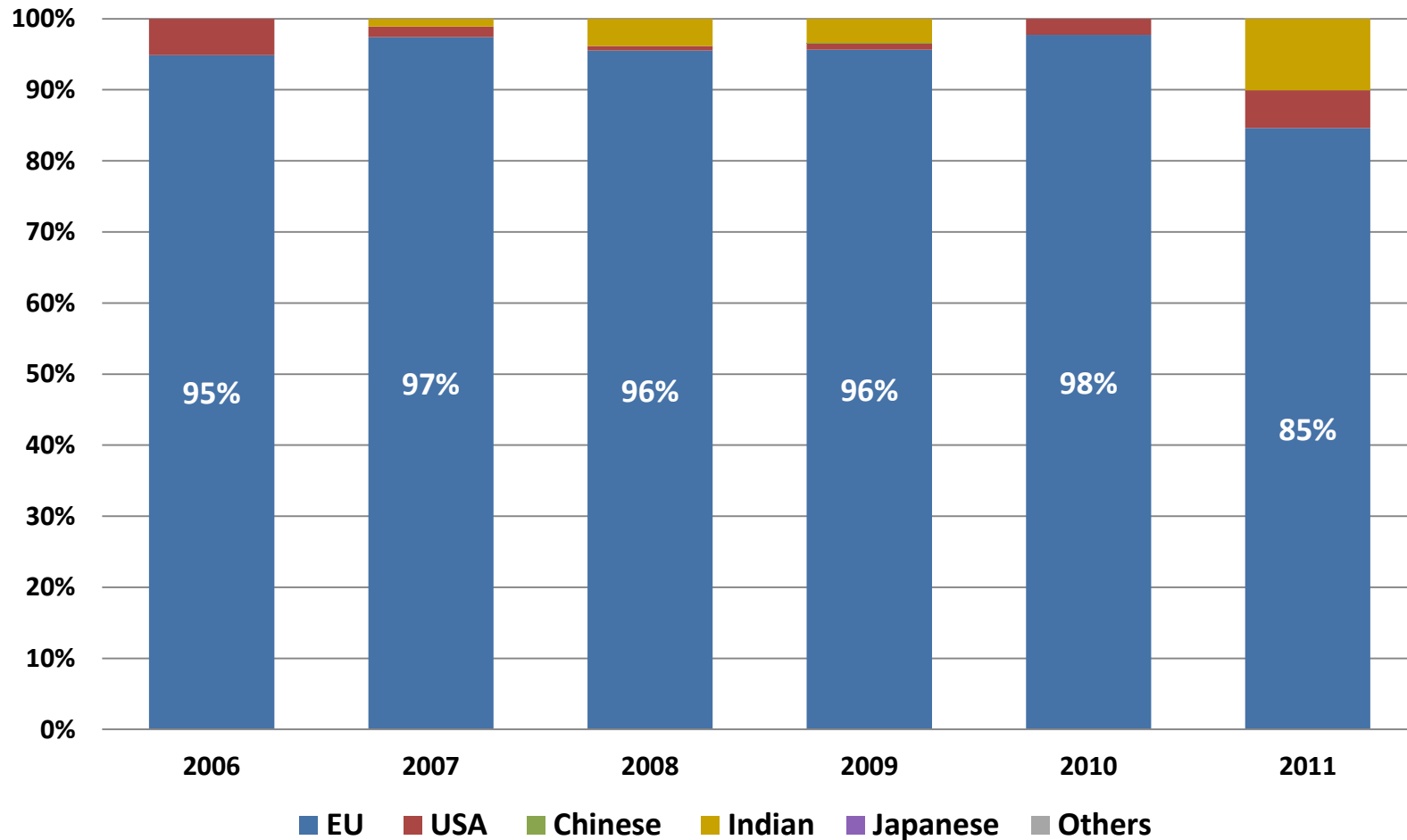
Wind brings macro-economic benefits

- Energy security (EU = 54% dependence)
- Savings from fossil fuel imports (€40bn @ 88\$/bbl)
- Avoided health/environmental costs
- Zero fuel/CO₂ fluctuation risk
- Jobs
 - 188,000 in 2010
 - 450,000 in 2020
- Lower electricity prices – the “Merit Order Effect”
- Export opportunities / Market

54% EU Energy dependency , and growing...



EU market dominated by EU manufacturer s - 2006 to 2011

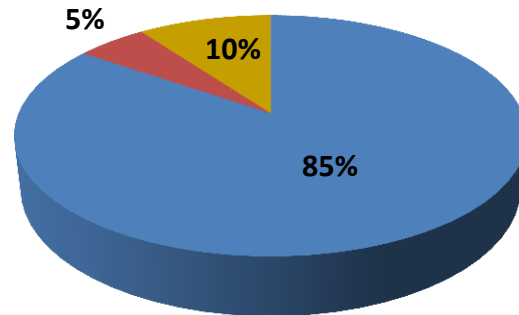


Source: BTM Consulting data for 2006-2009 and MAKE Consulting data for 2010-2011

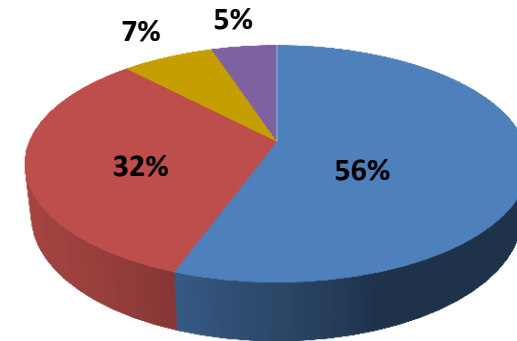
Competitiveness – EU manufacturers are leading on world markets

2011 - Market share per turbine manufacturers

EU 27

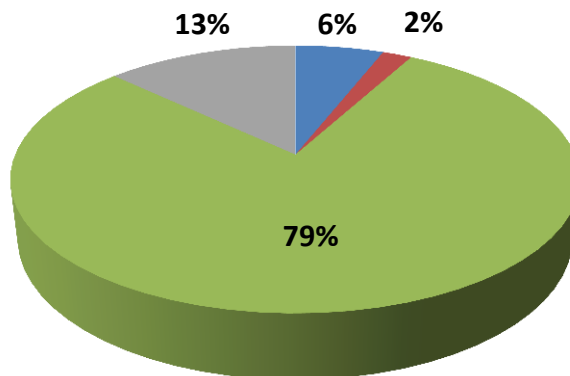


USA

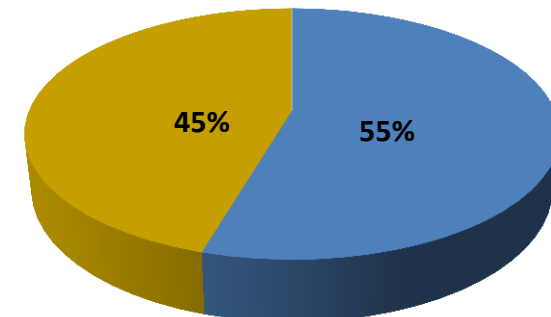


■ EU ■ USA ■ Chinese ■ Indian ■ Japanese ■ Others

PR China

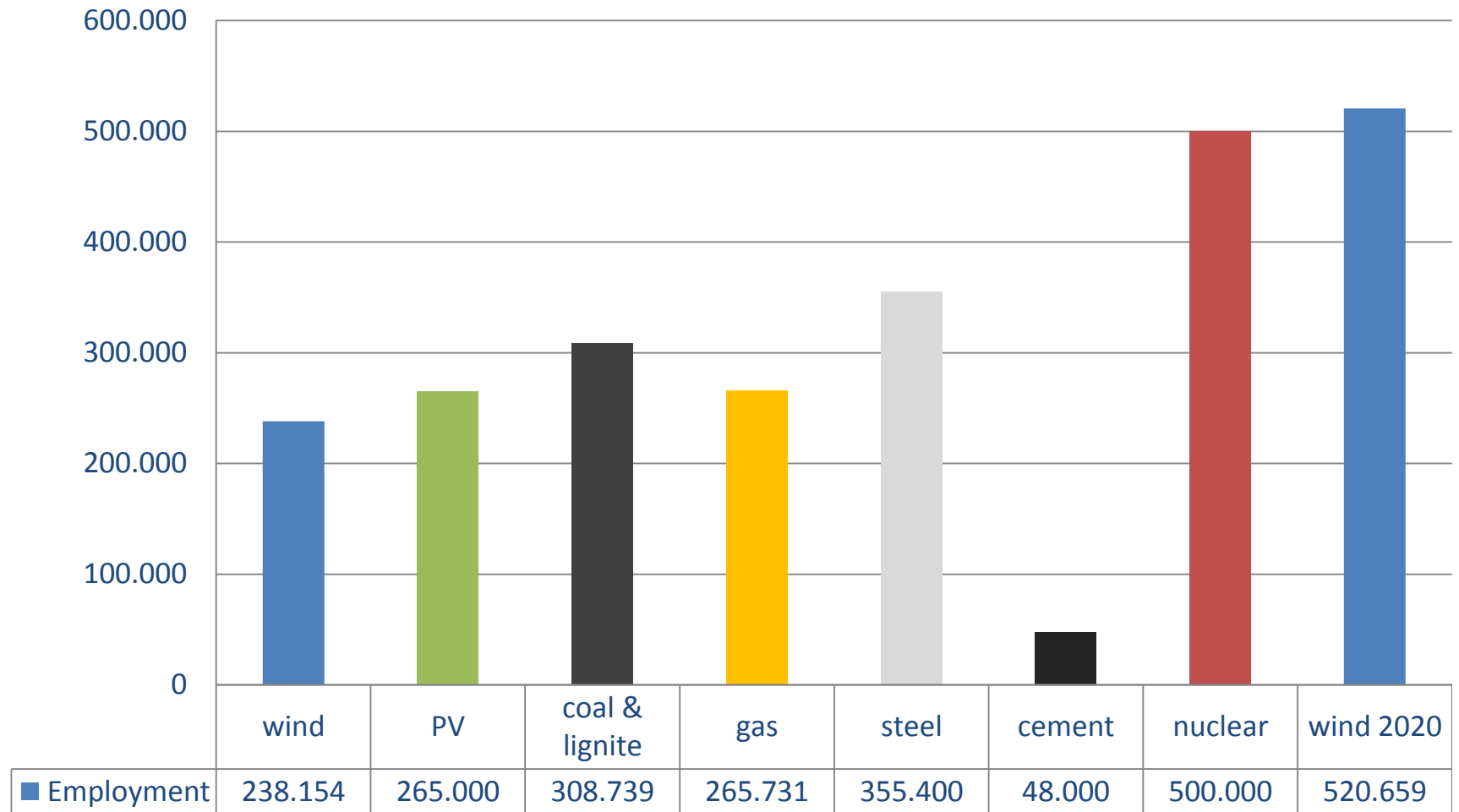


India



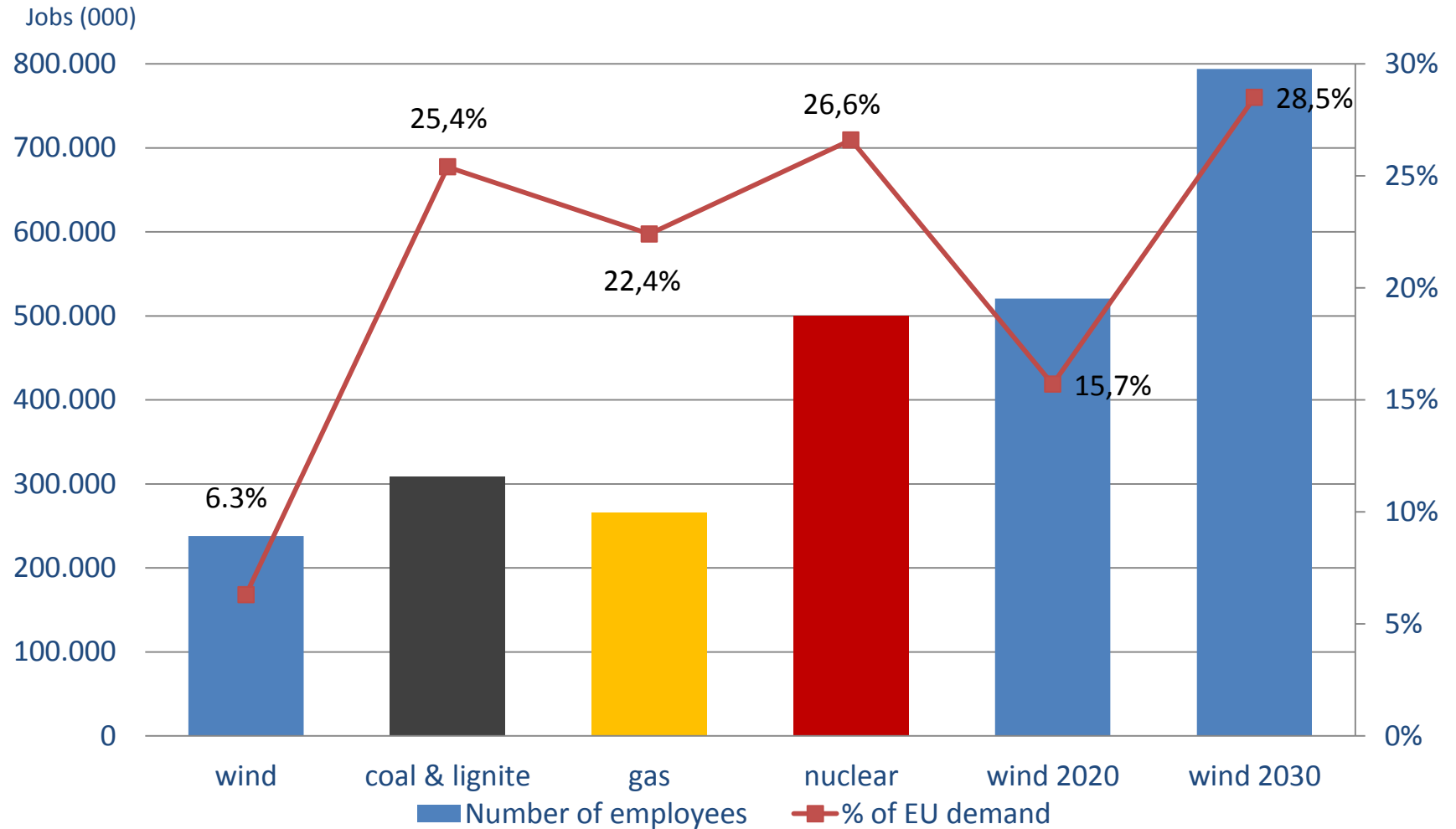


Wind and PV today represent more jobs than nuclear





Wind creates more jobs per kWh than conventional power

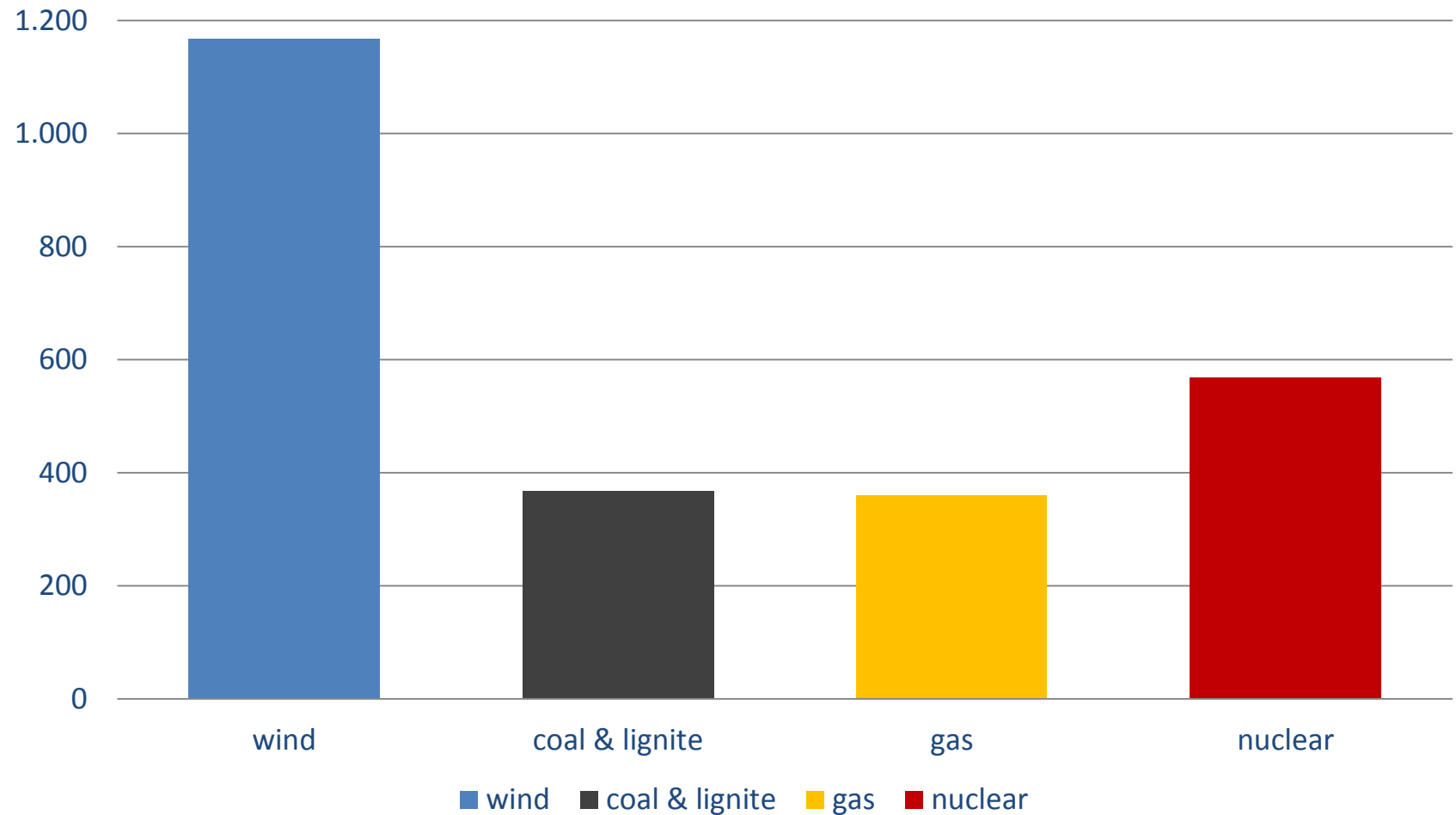


Source: EWEA, EPIA, EURACOAL, EUROGAS, EUROFER, CEMBUREAU, FORATOM
PRIMES 2009 update for electricity consumption



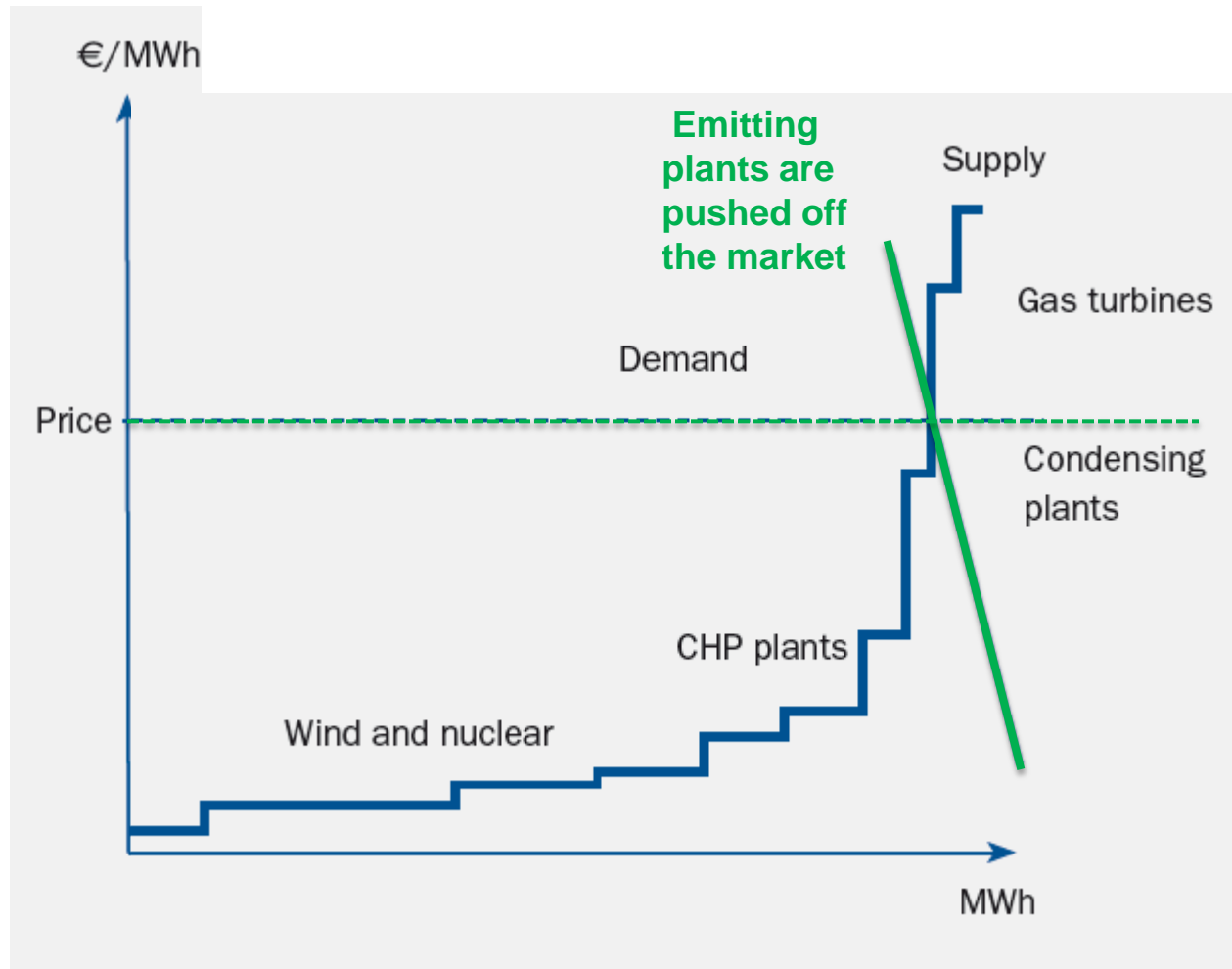
Wind creates more jobs per kWh than conventional power

Employment per TWh of electricity produced, 2010



Source: EWEA, EURACOAL, EUROGAS, FORATOM
PRIMES 2009 update for electricity consumption

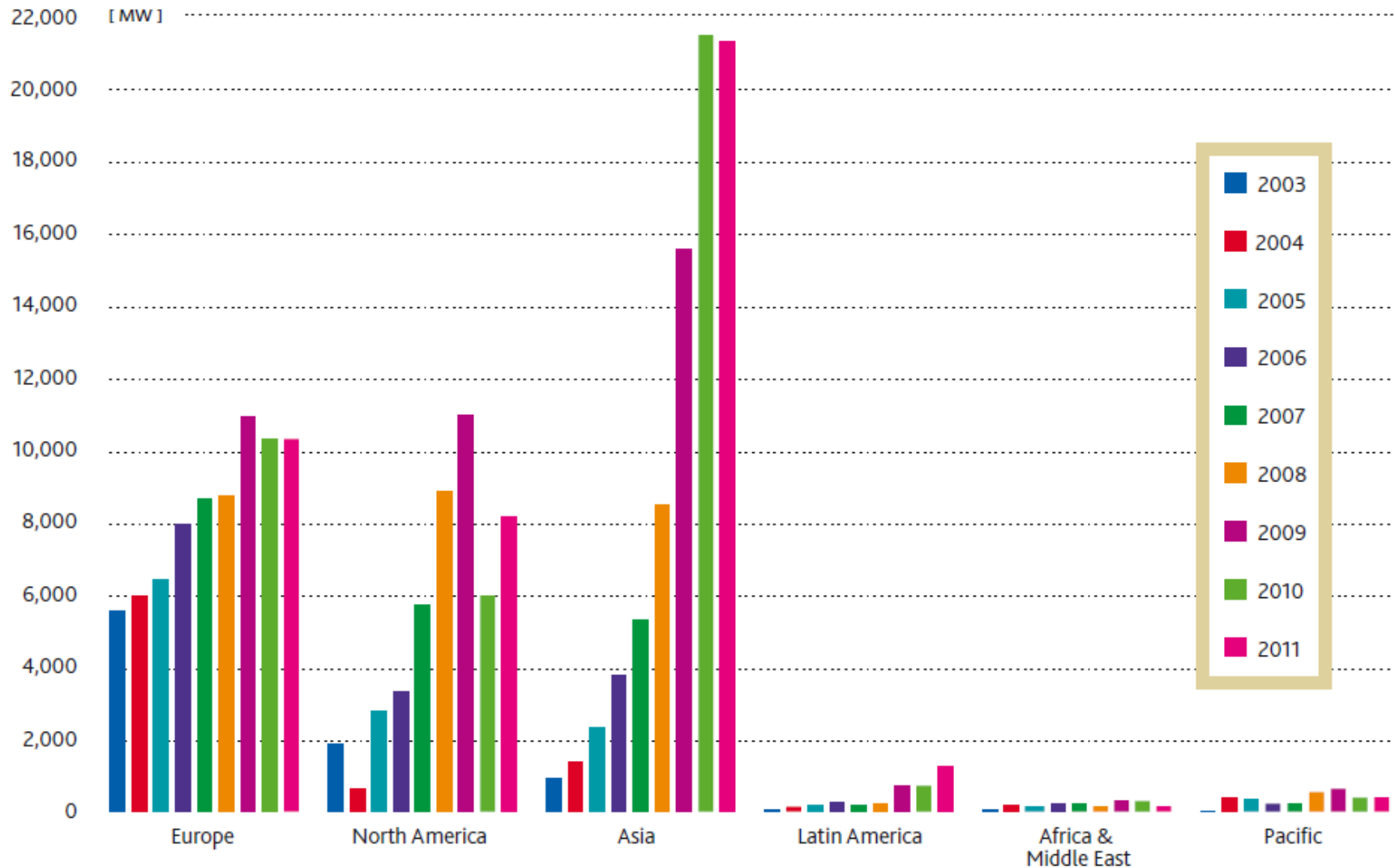
Power market - Wind pushes marginally expensive technologies out of market...



... And lowers electricity prices and CO₂ emissions



Global Wind installations per region 2003- 2011



Conclusions

- The World will reduce emissions and has already started
 - We can either develop our climate products today
 - or wait and buy everybody else's...
- The EU has a technological advantage in renewables
- ➔ **To maintain/enhance EU competitiveness we need:**
 - Climate signals
 - Ambitious climate action : 30% domestic reductions
 - **Higher price of carbon**
 - ➔ backloading of allowances in ETS
 - ➔ structural measures to reform the ETS and re-install scarcity
 - 2030 Renewable energy targets
 - ETS auctioning revenue to fund investments
 - A market-ready pan-European grid
 - Financing the SET-plan - leadership through innovation



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During this presentation EU wind turbines saved 2,700 tCO₂

Thank you very much!

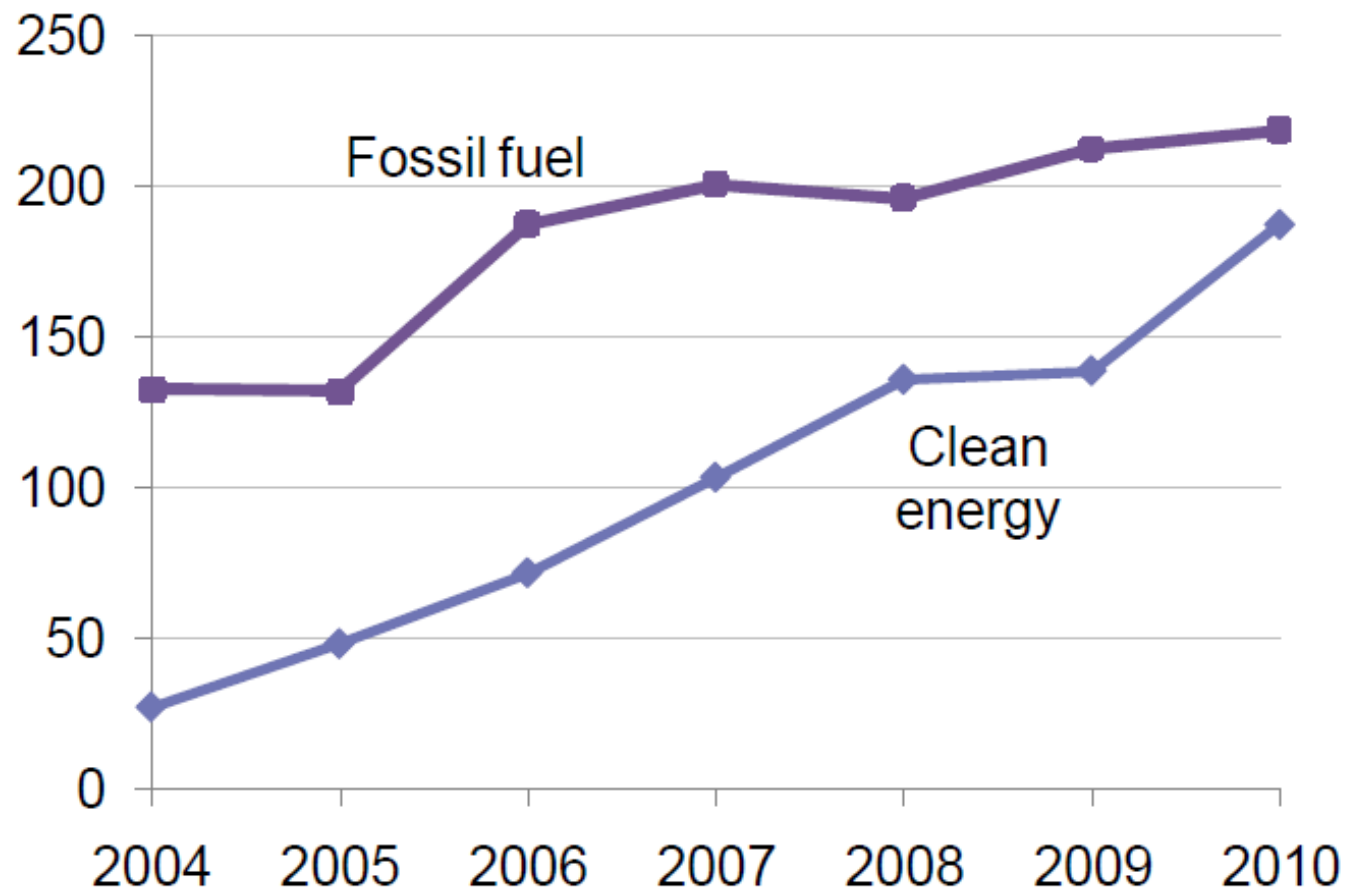
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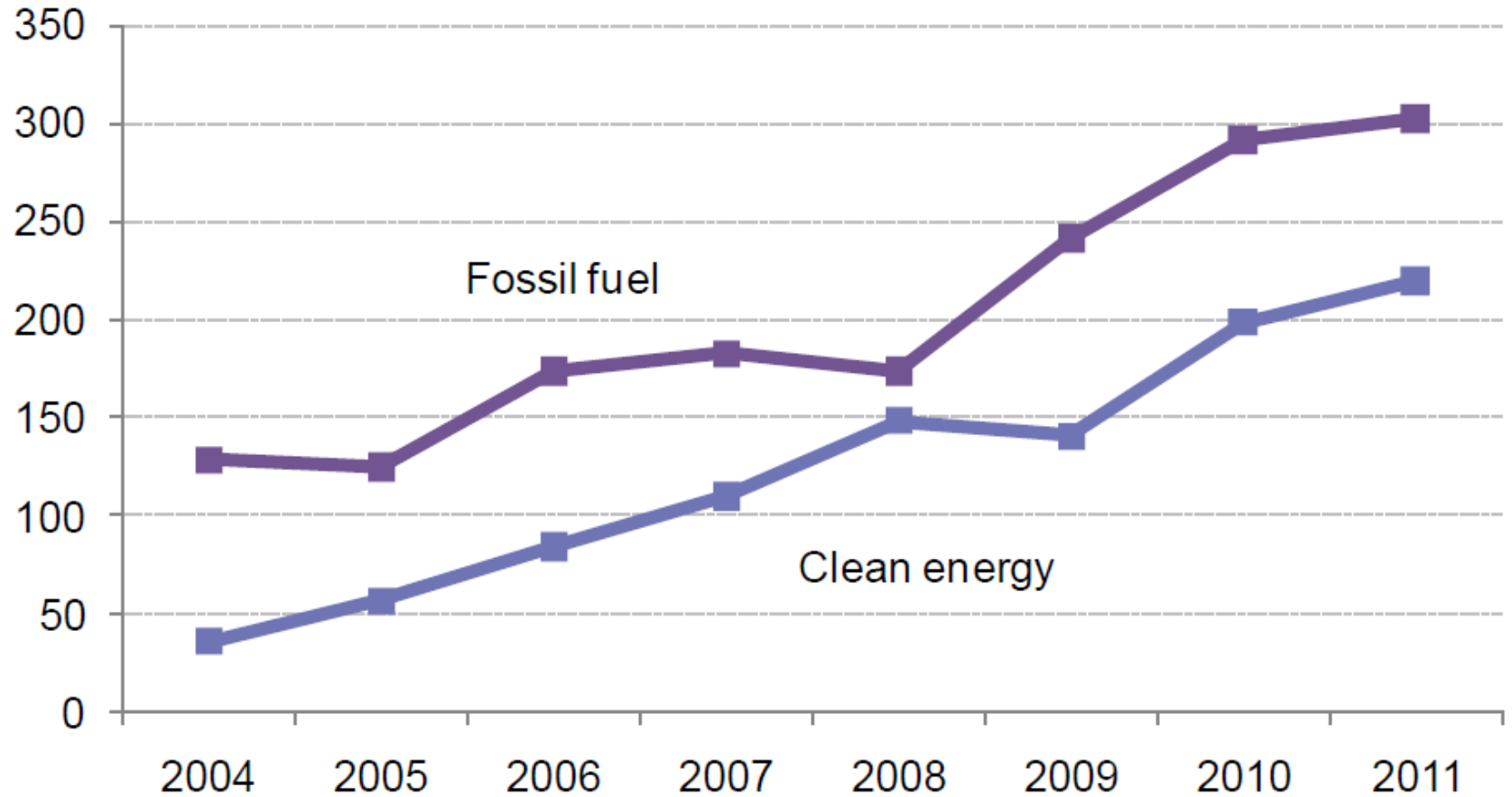
CLEAN VS FOSSIL-BASED GENERATING CAPACITY INVESTMENT, 2004–10 (\$BN)



Note: Investment for new build – fossil fuel calculated from EIA & IEA numbers, clean energy taken from Bloomberg New Energy Finance totals. Clean energy capacity includes small distributed capacity.

Source: IEA, EIA, Bloomberg New Energy Fir

CLEAN VS FOSSIL-BASED GENERATING CAPACITY INVESTMENT, 2004–11 (\$BN)

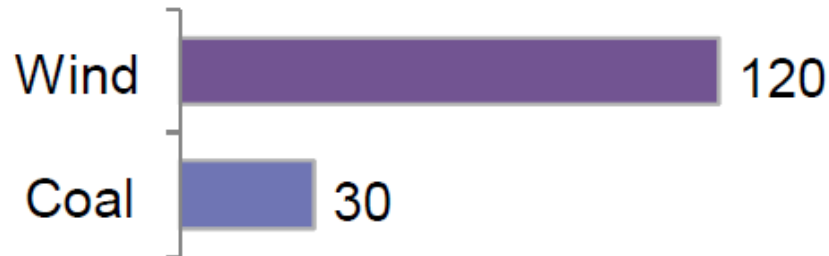


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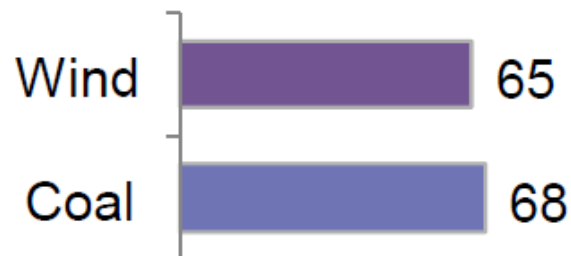
LEVELIZED COSTS: BEST NEW WIND VS NEW COAL (\$/MWh)

Perception:



- New coal must cover cost of capital
- New coal requires advanced pollution control
- Wind turbines back to 2005 prices, but now perform much better

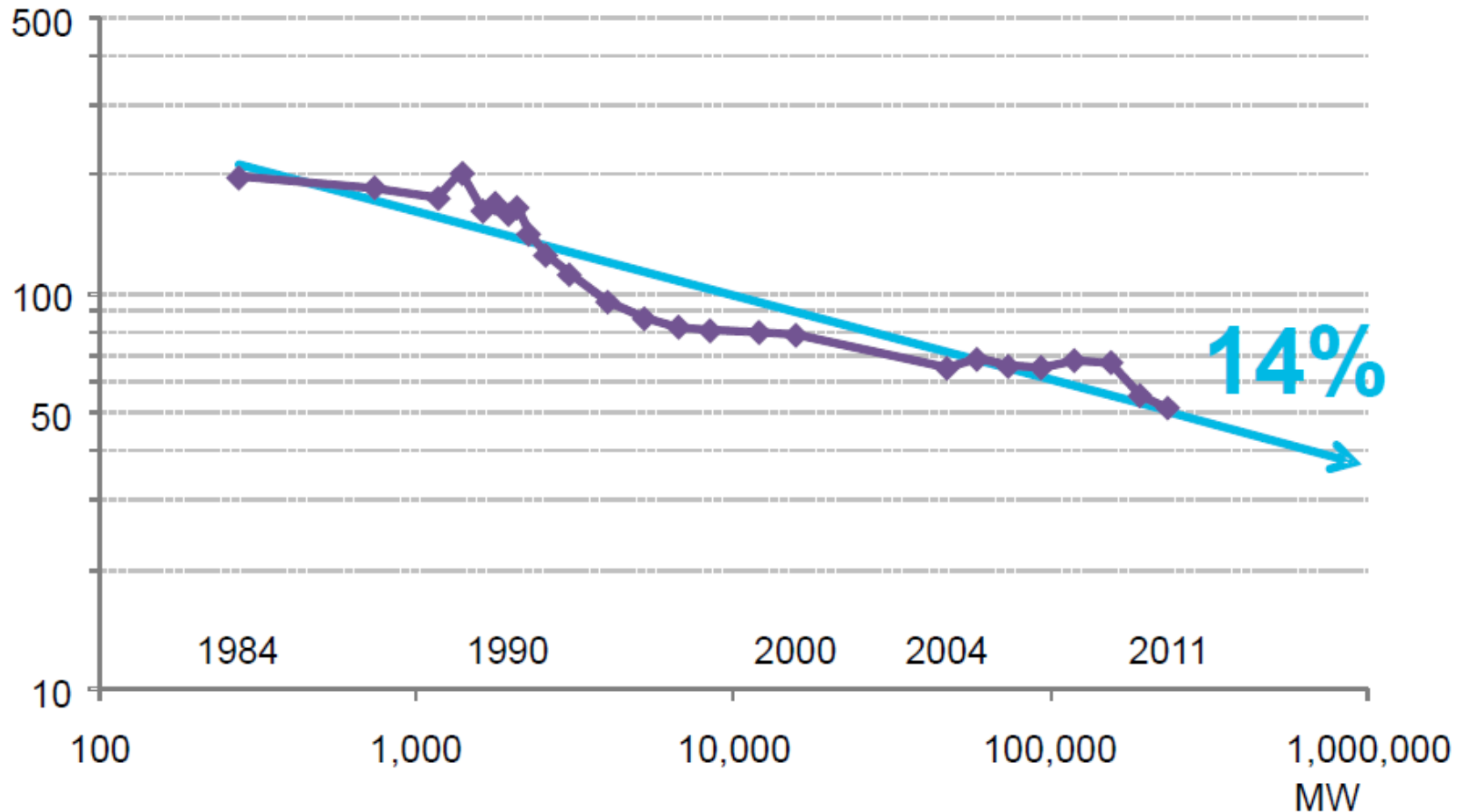
Reality:



- Wind bankability has driven down cost of capital
- Coal suffers from carbon price risk

Source: Bloomberg New Energy Finance

AVERAGE LEVELISED COST OF ONSHORE WIND, 1984-2011 (€/MWH)



Note: Learning curve (blue line) is least square regression: $R^2 = 0.88$ and 14% learning rate.

Source: Bloomberg New Energy Finance, ExT