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THE EUROPEAN WIND ENERGY ASSOCIATION

EU Climate and Energy Package: 20-20-20

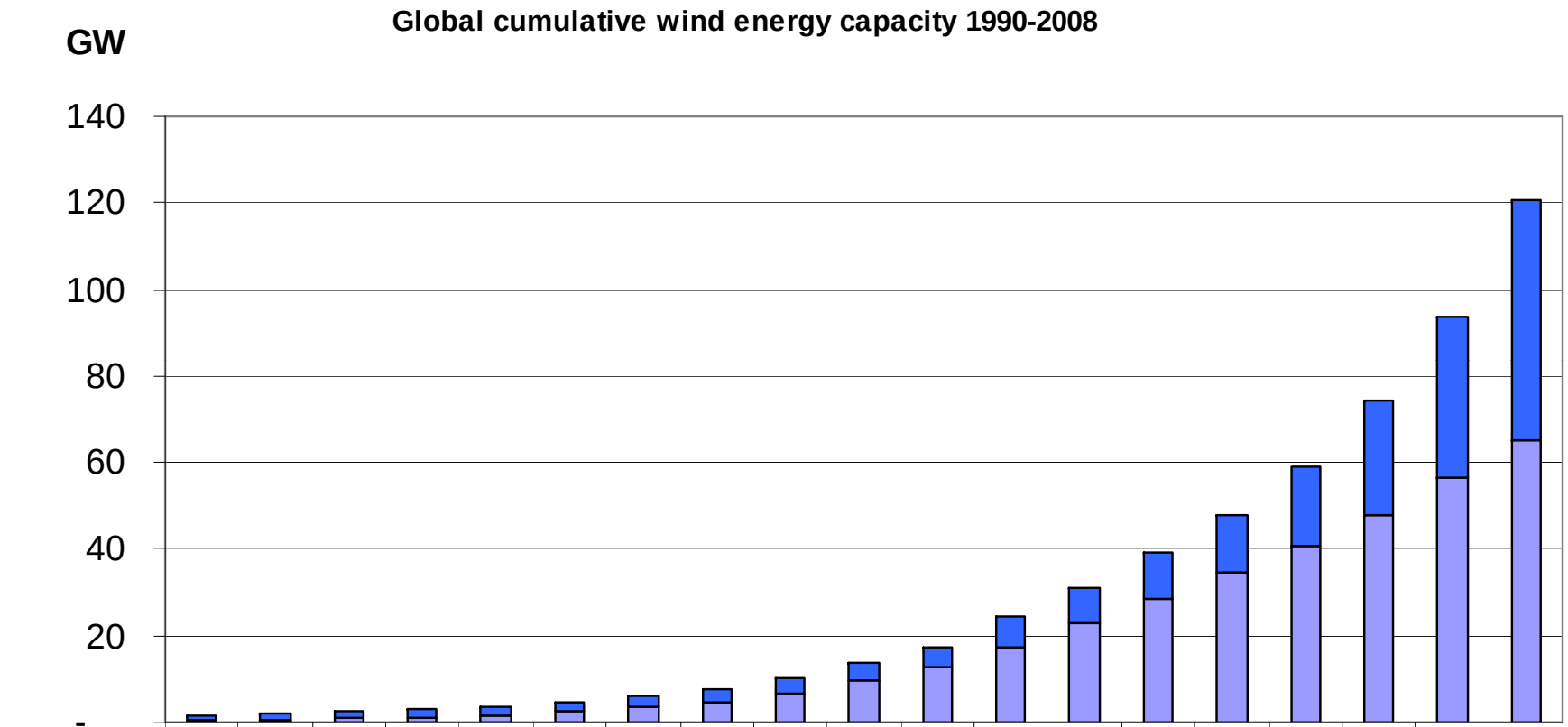
The impact on European wind power

Official Side Event
Wind power, carbon markets and mitigation

COP 15, Copenhagen, Denmark
17 December 14.45-16.15
Bella Center, Room Niels Bohr

Christian Kjaer
CEO
European Wind Energy Association

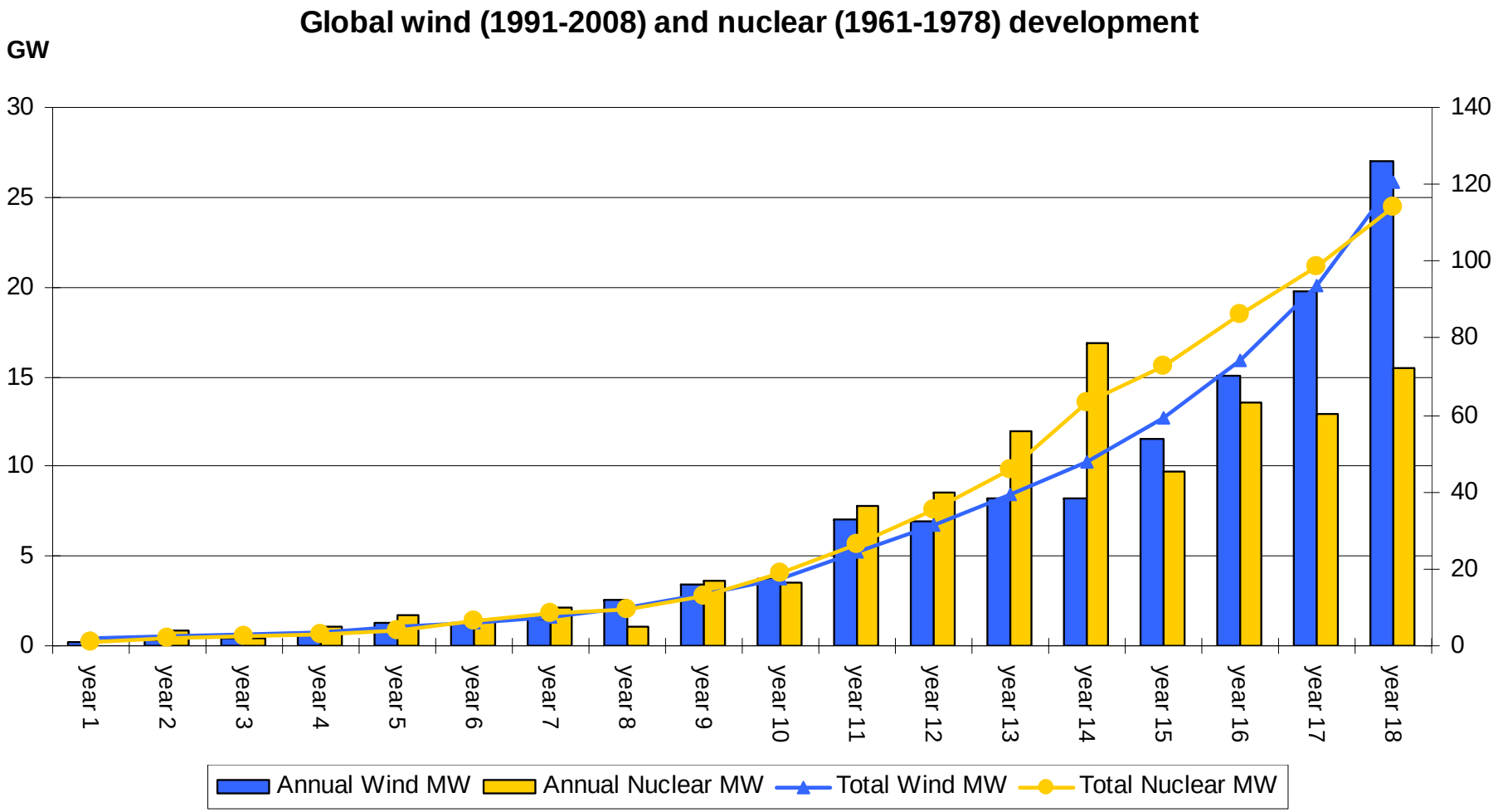
Global market 1991-2008



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Rest of World	1,304	1,354	1,477	1,590	1,848	2,324	2,628	2,883	3,700	3,916	4,470	7,133	8,150	10,940	13,248	18,591	26,102	37,285	55,856
EU	439	629	844	1,211	1,683	2,497	3,476	4,753	6,453	9,678	12,887	17,315	23,098	28,491	34,372	40,500	48,031	56,517	64,935

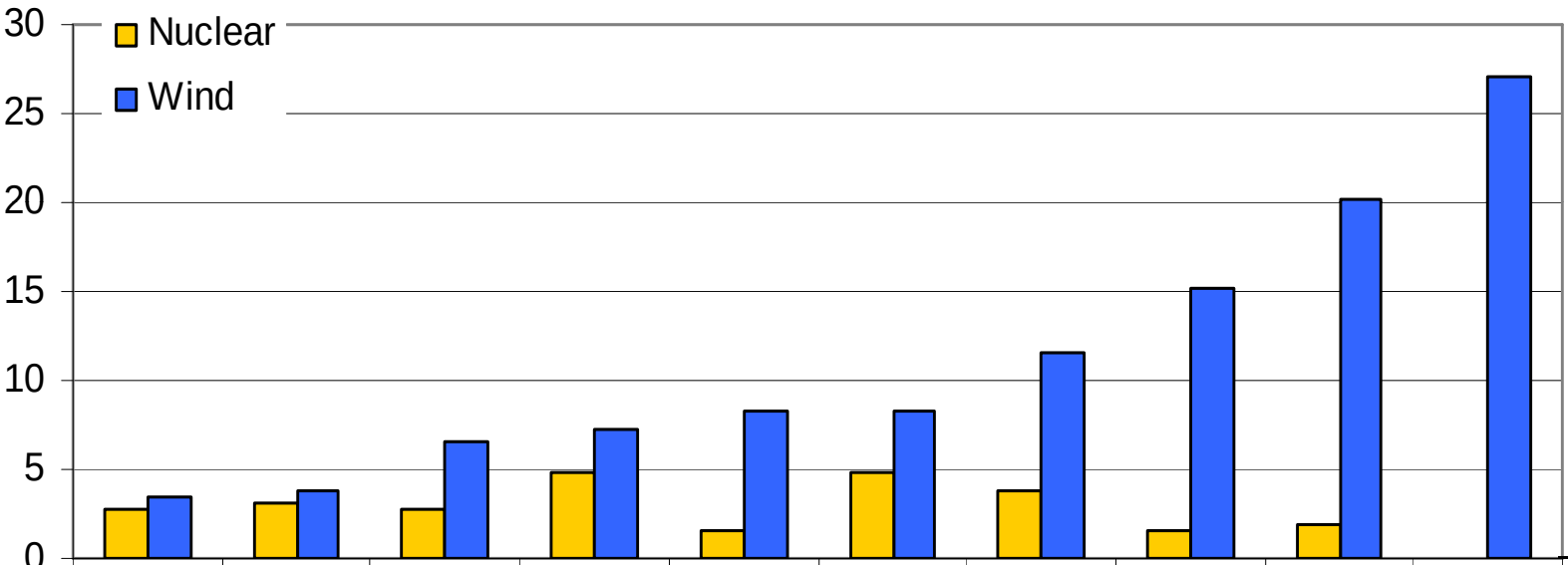
Annual market 2008: €35 billion

Nothing unusual about wind market growth



How fast can you build 27.1 GW

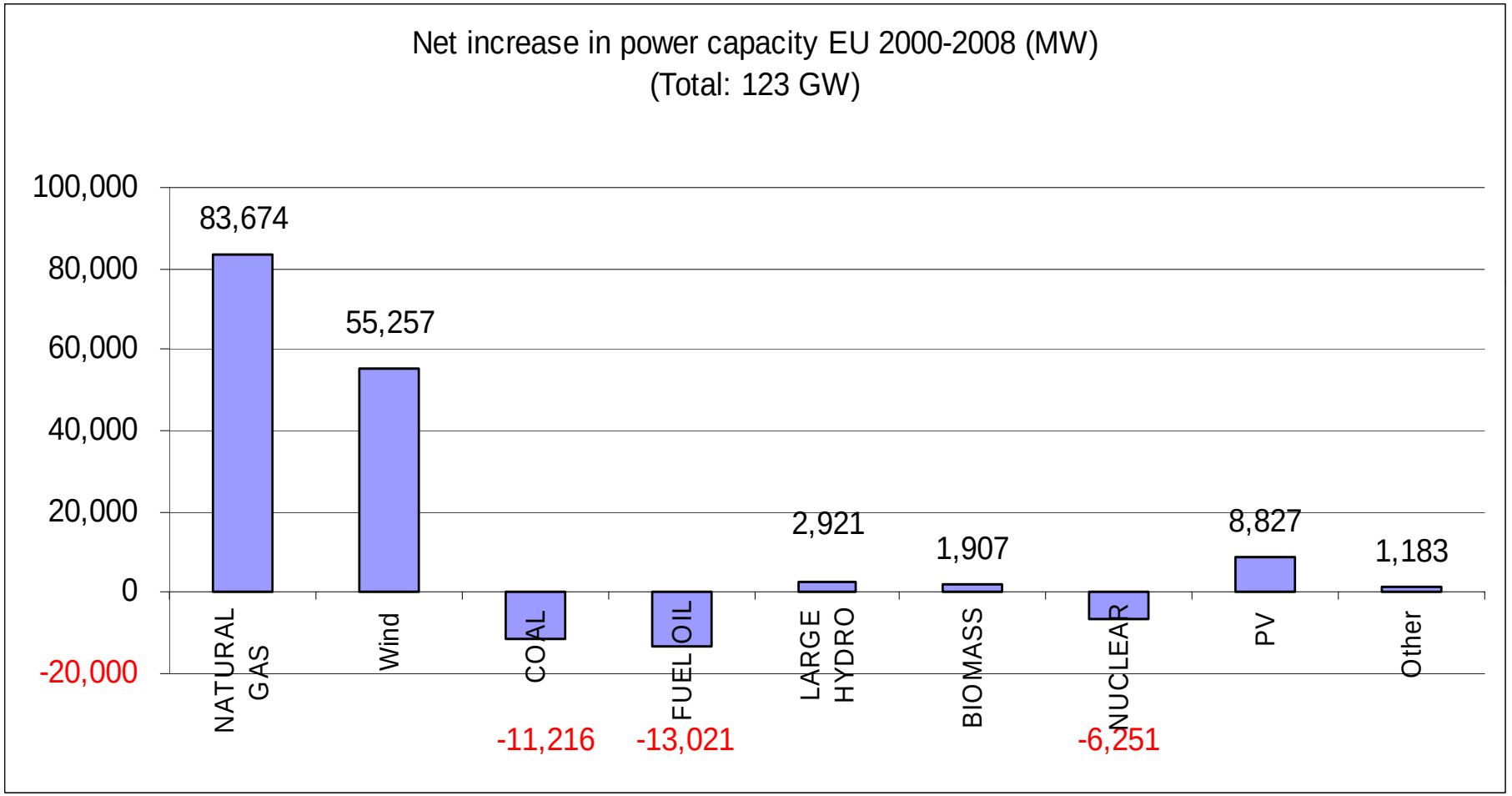
Global annual investments in wind and nuclear 1999-2008 (GW)



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Nuclear	2.8	3.1	2.7	4.9	1.6	4.8	3.8	1.5	1.9	0	27.1
Wind	3.4	3.8	6.5	7.3	8.2	8.2	11.5	15.2	20.1	27.1	111.3

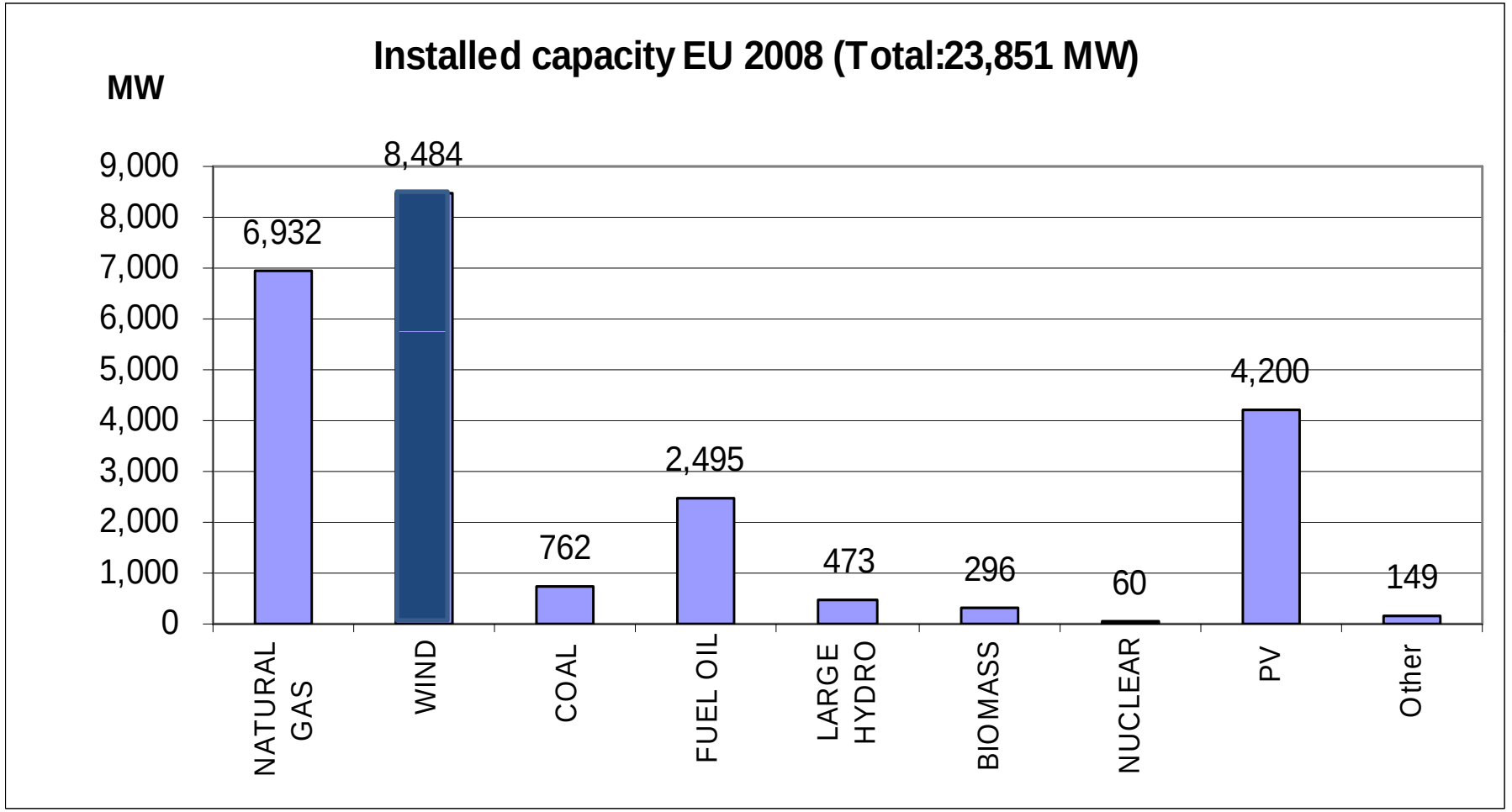
Source: EWEA and IAEA

EU energy mix is changing



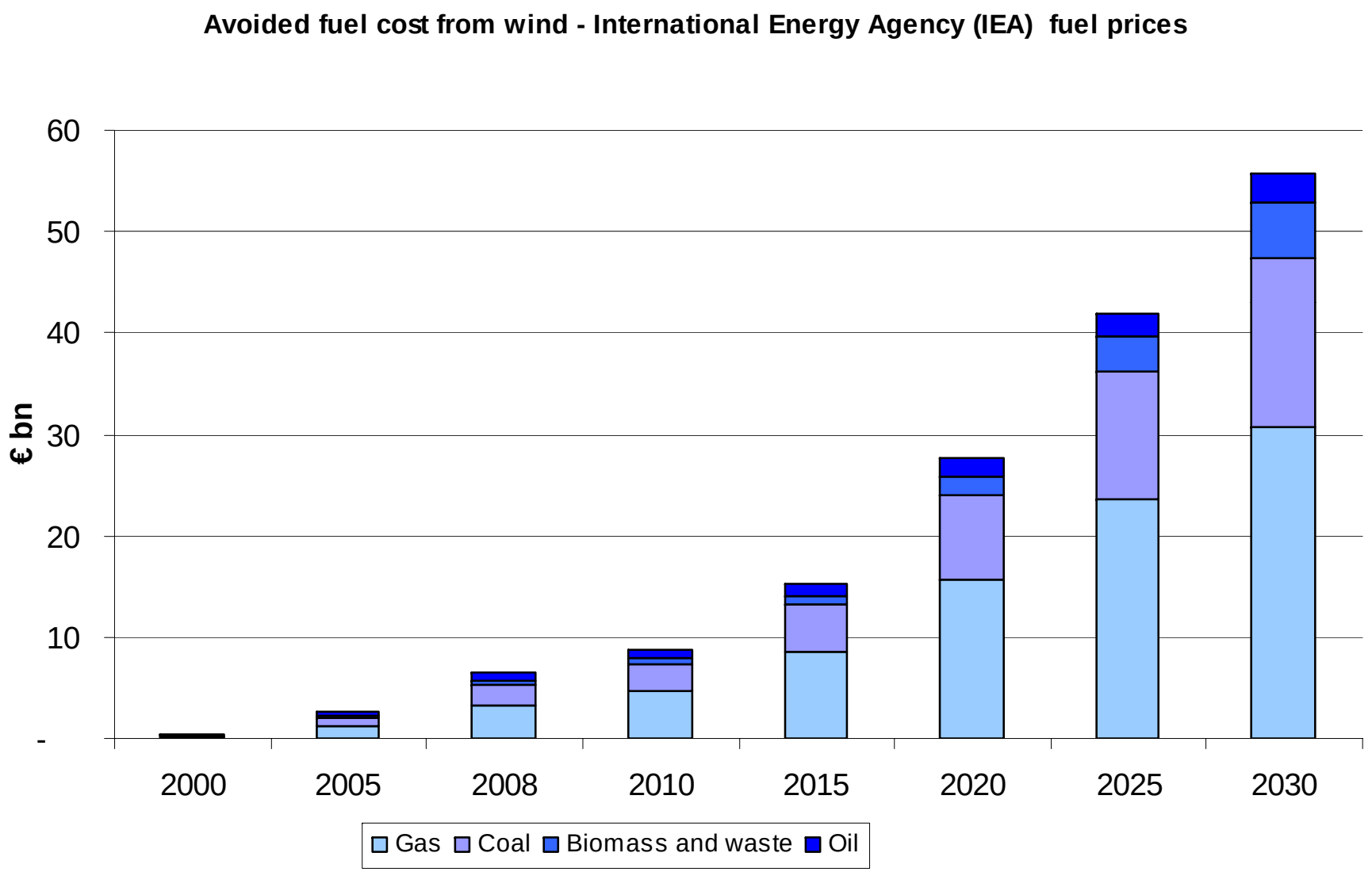
Source: Platts Powervision, EWEA, EPIA

Wind largest source of new capacity in 2008



Source: Platts Powervision, EWEA, EPIA

Wind energy avoided €6.5 bn in fuel cost in 2008



Cumulative wind power installations (end 2008)

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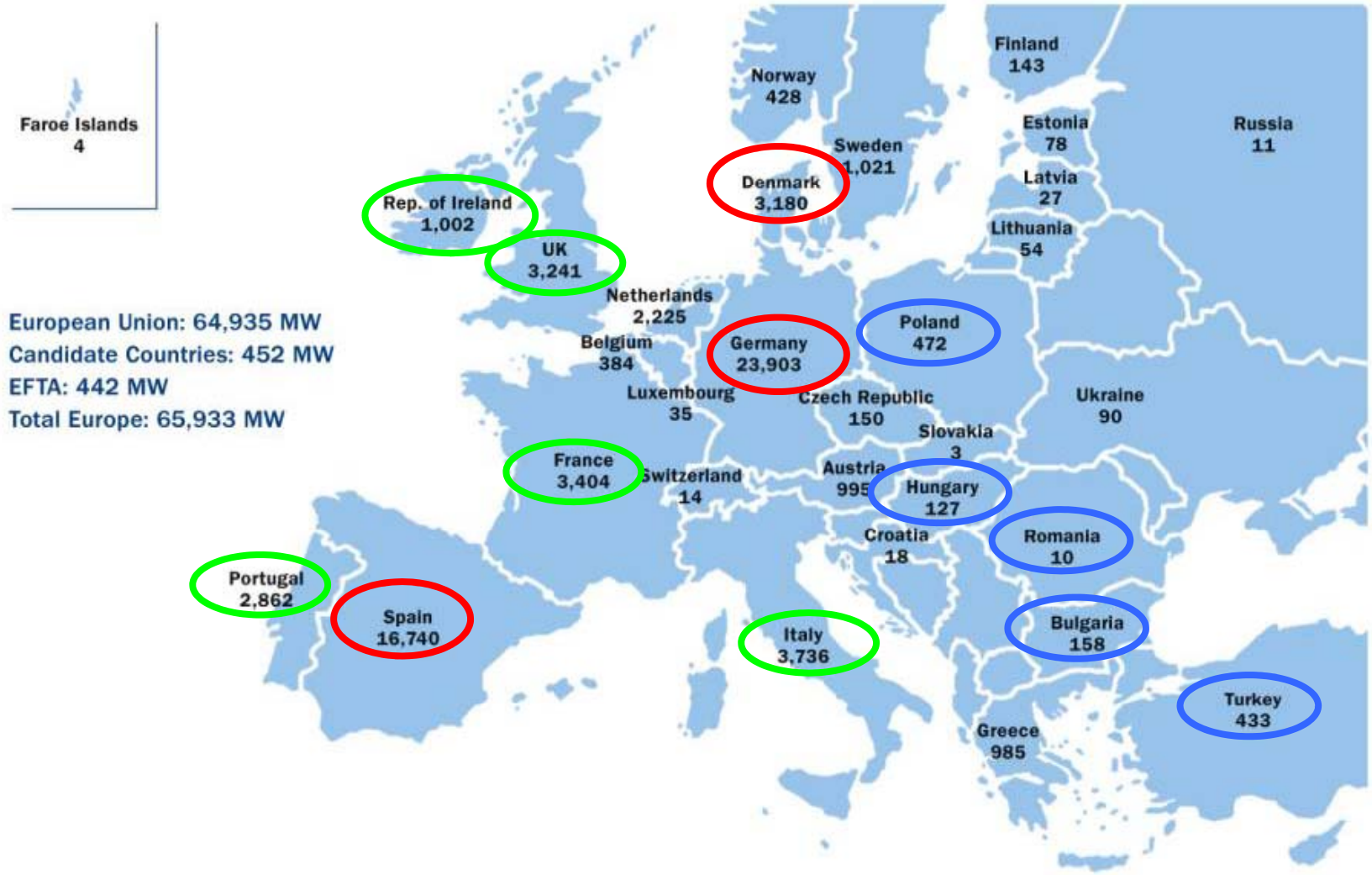
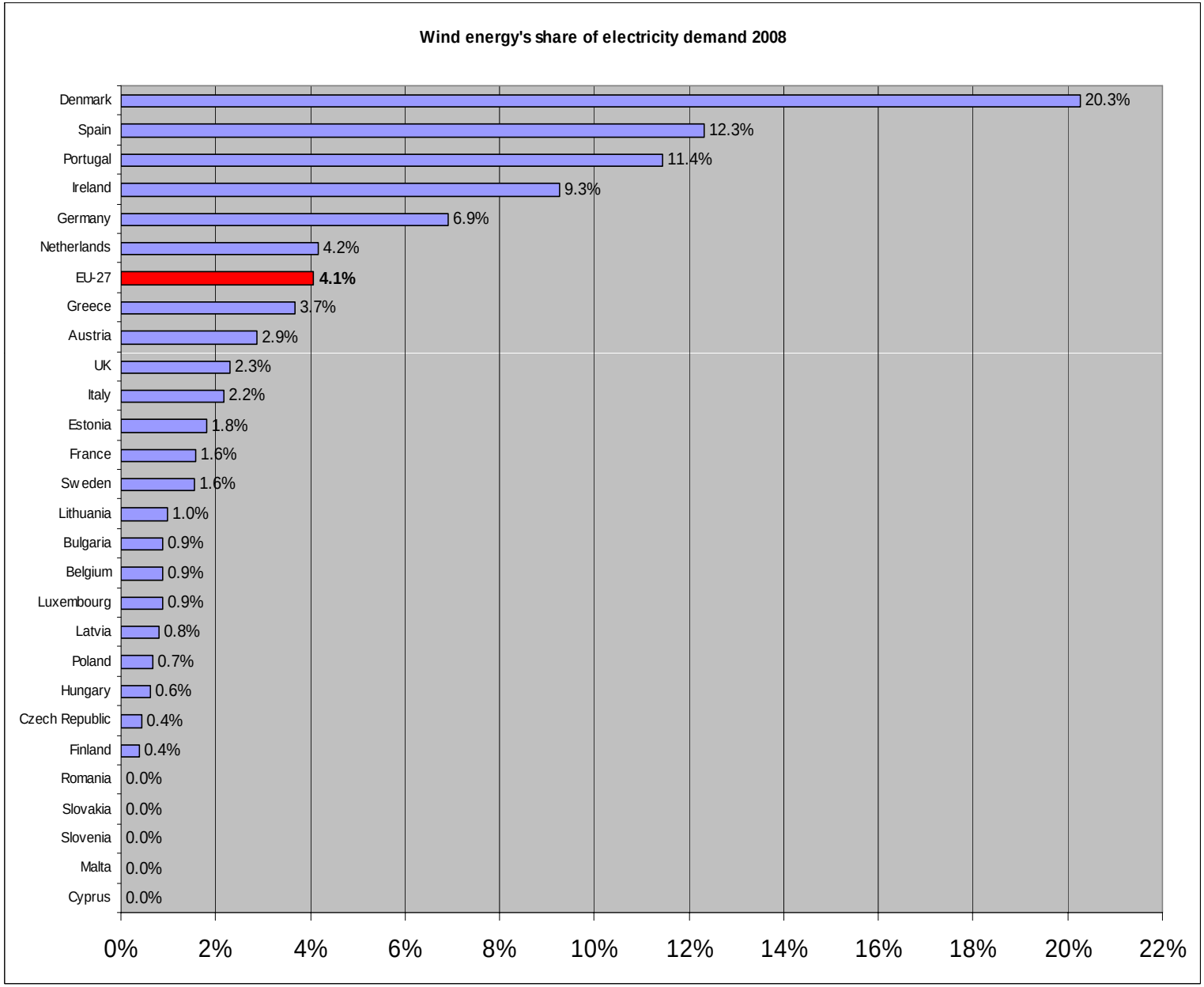


Source: EWEA, Pure Power (November 2009)

Wind's share of electricity in EU-27



European Union targets for 2020

- 20% - 30% Reduction in GHG
- 20% Renewable energy share
- 20% Energy efficiency (Not legally binding)

20% renewable energy by 2020

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20% Renewable Energy by 2020 requires:

- 34% electricity from RES
- 25% heating from RES
- 10% biofuels from RES

Electricity 2005: 15% from renewables incl. 10% large hydro and 2.5% wind

Excluding large hydro the share of renewable electricity must increase fivefold from 5% to app. 25%, in 15 years

How Much Wind Power in 2020?

European Commission

- Renewable Energy Roadmap, 2006
  12% (180 GW - 9.6 GW / year)
- Investing in Low Carbon Technologies, 2009
  20% (260 GW – 16 GW / year)

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- 14-17% (230 GW – 13.75 GW / year)

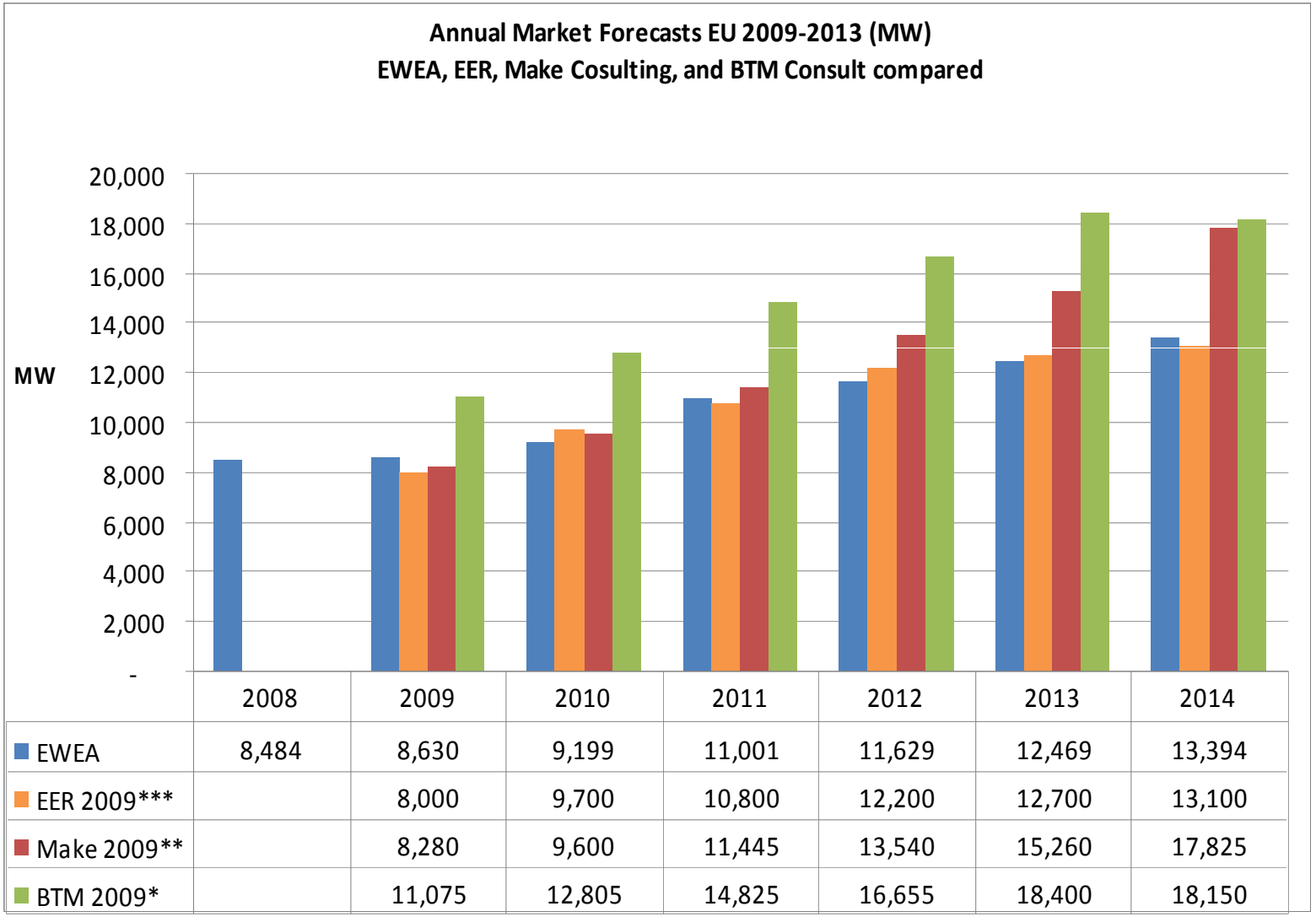
Emerging Energy Research (EER)

- 221 GW (13 GW / year)

BTM Consult

- 312 GW (20.5 GW / year)

Wind Energy Market – EU 2009-2013



	2008	2009	2010	2011	2012	2013	2014
EWEA	8,484	8,630	9,199	11,001	11,629	12,469	13,394
EER 2009***		8,000	9,700	10,800	12,200	12,700	13,100
Make 2009**		8,280	9,600	11,445	13,540	15,260	17,825
BTM 2009*		11,075	12,805	14,825	16,655	18,400	18,150

Source: EWEA, BTM Consult, MAKE Consulting, Emerging Energy Research

Example: wind in the EU

Gas, coal and oil plants produce on av. 666 gCO_2/kWh

Wind production EU
2008: 137 TWh
2012: 234 TWh
2020: 582 TWh

avoids
91 Mt CO_2
146 Mt CO_2
333 Mt CO_2

Kyoto Protocol EU reduction target 2008-2012 = 7.8%
➔450 $MtCO_2e$ per year below 1990 emissions

EU Climate package target by 2020 = 20%
➔ 1160 $MtCO_2e$ in 2020 below 1990 emissions

Source: EWEA, Pure Power (March 2008), DG TREN: Trends to 2030

EU Wind Power will avoid as much CO2 as...

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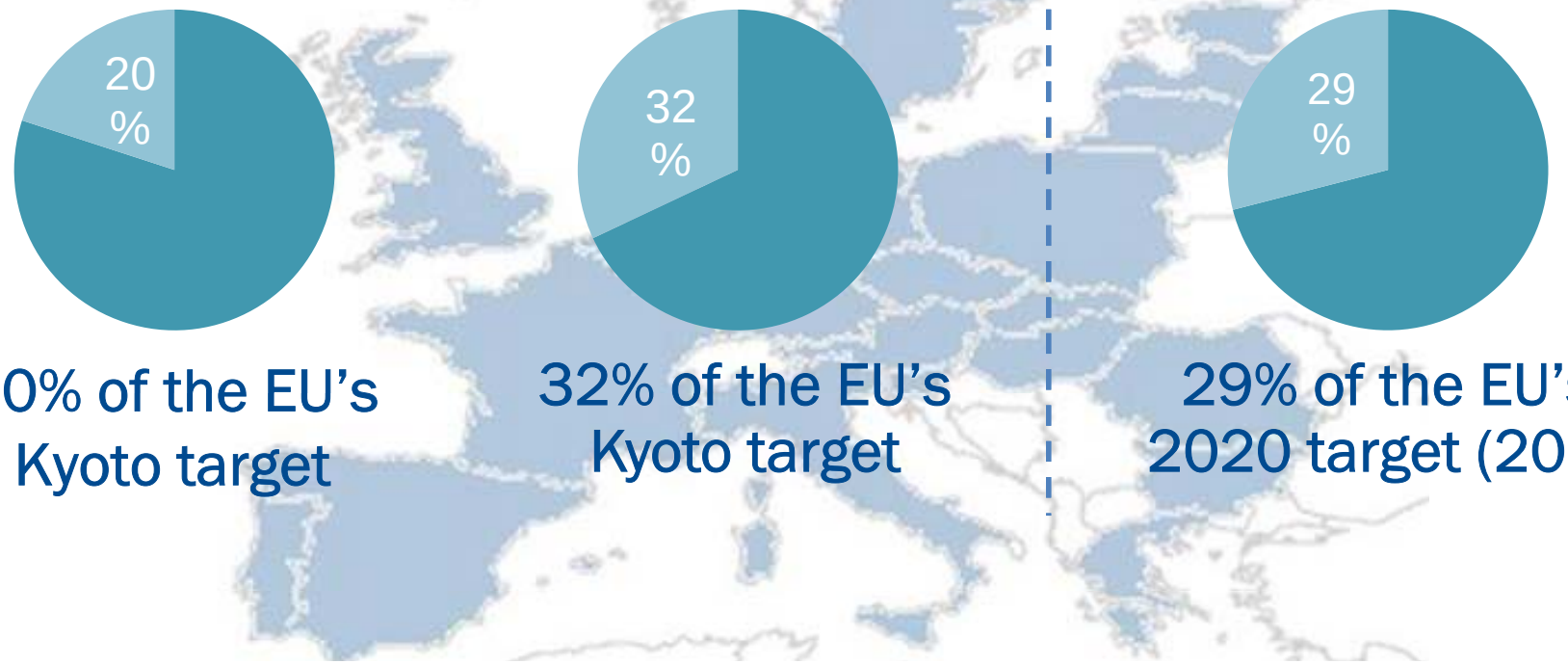
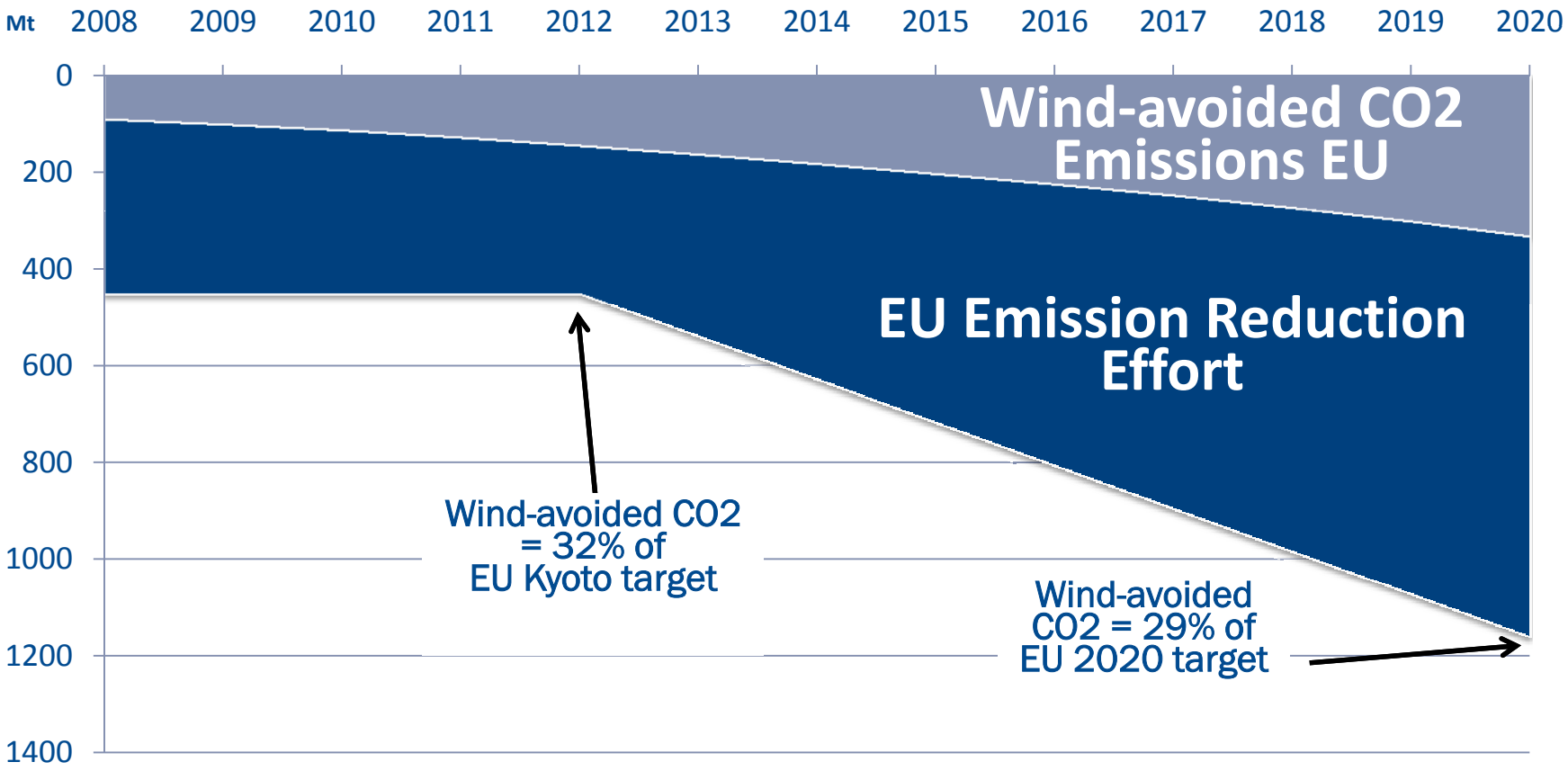


From 2008-2020, wind will avoid 28% of the EU cumulative reduction efforts



EU 2020 – Wind power versus car emission

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2012 (EU)
Wind avoids 146 MT CO_2, eq to:

- ➔46 million cars
- ➔20% of EU car fleet

2020 (EU)
Wind avoids 168 MT CO_2, eq to:

- ➔168 million cars
- ➔80% of EU car fleet

EU fleet - 214 million cars

EU importing 54% of its energy – and rising

	EU share of proven global reserves	Years of domestic production
Oil	0.5% - 0.8%	7.7–7.8 years
Gas	1.4% - 2%	14.4–14.8 years
Coal	3.5%	50 years
Uranium	1.9%	

Source: European Commission, 2008

Three major global challenges…

- Energy Crisis (2017 Oil future contact $99/barrel)
- Environmental crisis (IPCC: 25-40% reduction by 2020)
- Financial crisis

… and three European challenges

- App. 350 GW of new electricity generating capacity must be constructed before 2020 (50% of current total)
- Increasing energy imports at higher cost
- Ineffective competition in EU power markets and lack of power infrastructure investments

Wind power:
The government bond of power investments

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- Cost of wind power is unaffected by changes in carbon and fuel cost – it can be predicted with great certainty: low-risk investment

- Think of wind energy as the government bond of power sector investments

- Need for consistent economic analysis of costs, benefits and risks of each power generation technology

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€700

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Thank you for your attention

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