

Wind in Europe a Status



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Agenda

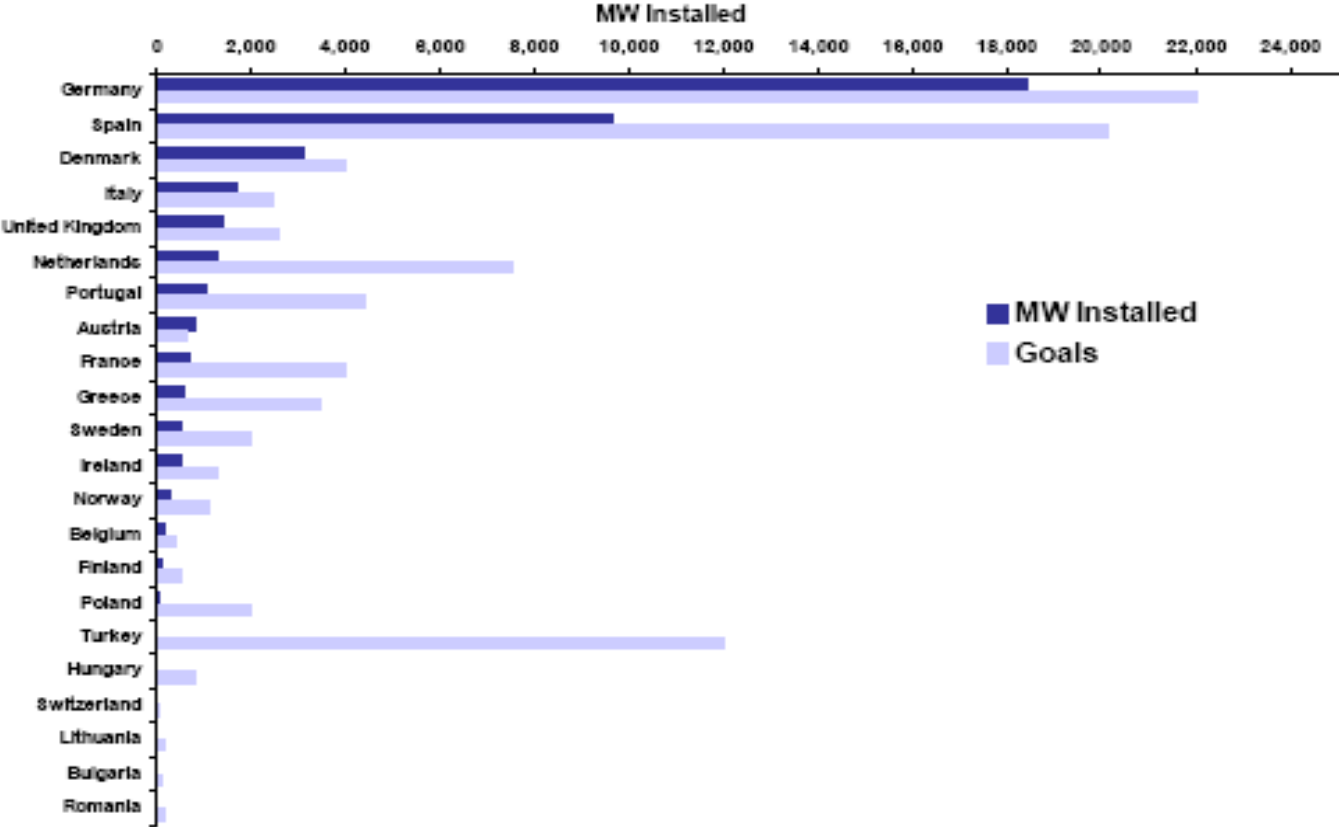


- Progress in EU
- Wind v Conventionals
- Drivers in EU
- A more difficult future
- A LAC perspective
- Useful bodies sources that can help

EU Targets



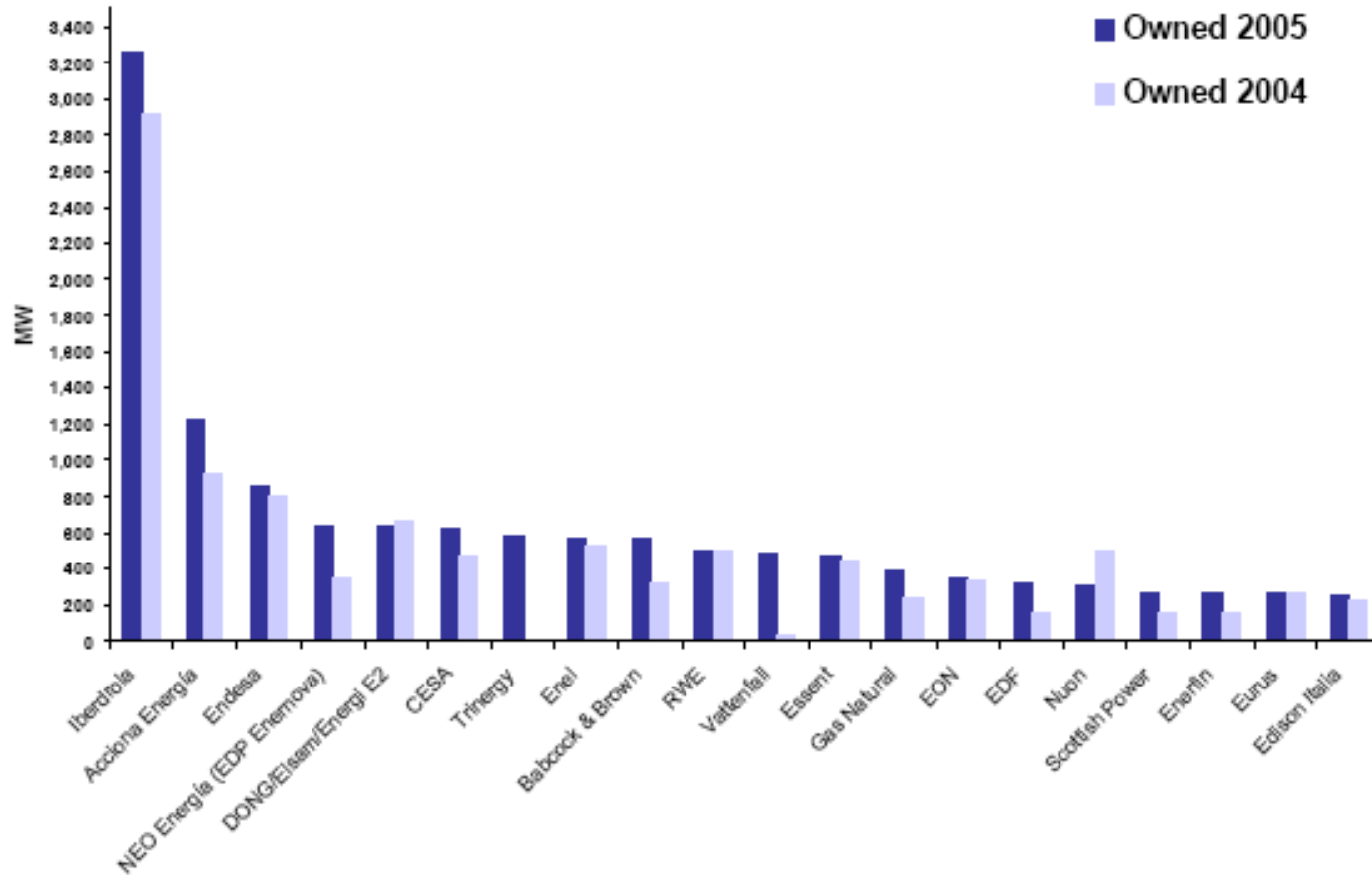
Exhibit 2-3: Wind Energy Targets



Source: National governments, Emerging Energy Research



Biggest 20 actors in Europe

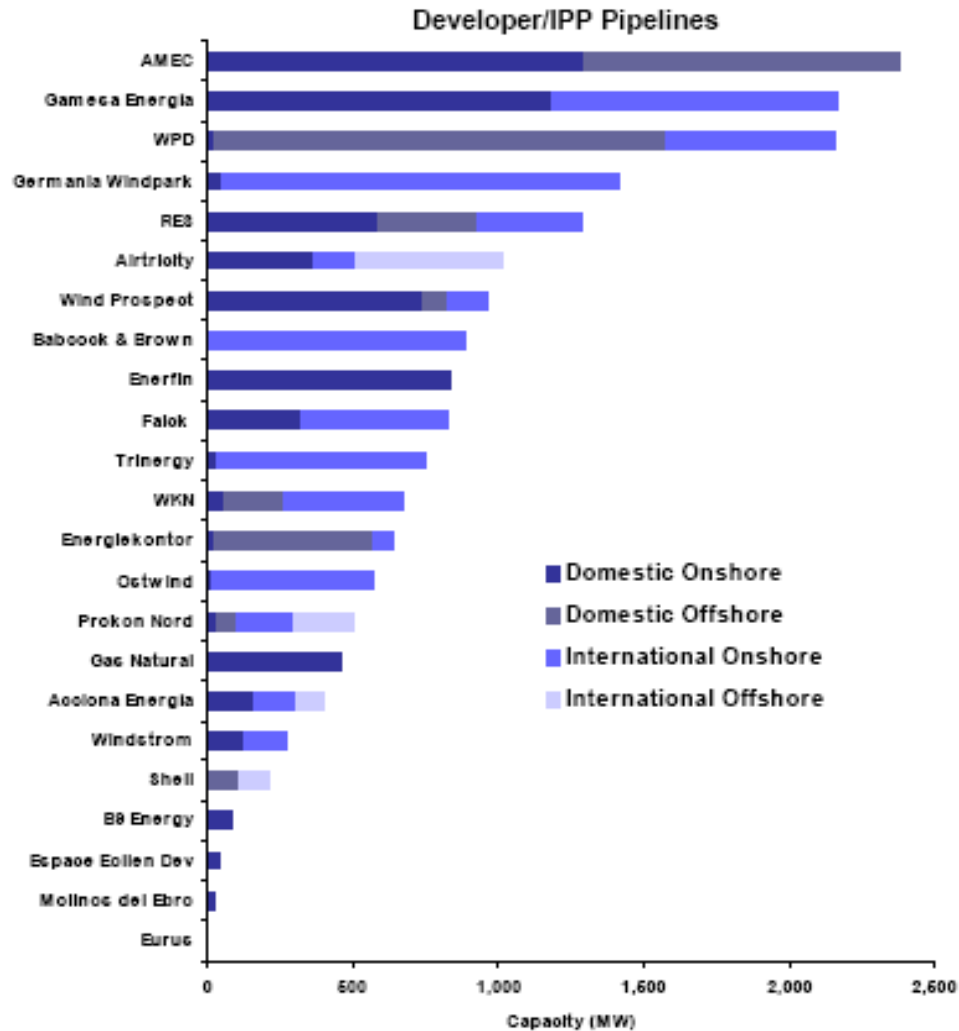


Note: Not included: Acciona Energia acquired CESA for 577 MW in January 2006; Nuon sold off DESA in Spain (232 MW); 1H06 figures not available for all companies.

Source: Emerging Energy Research

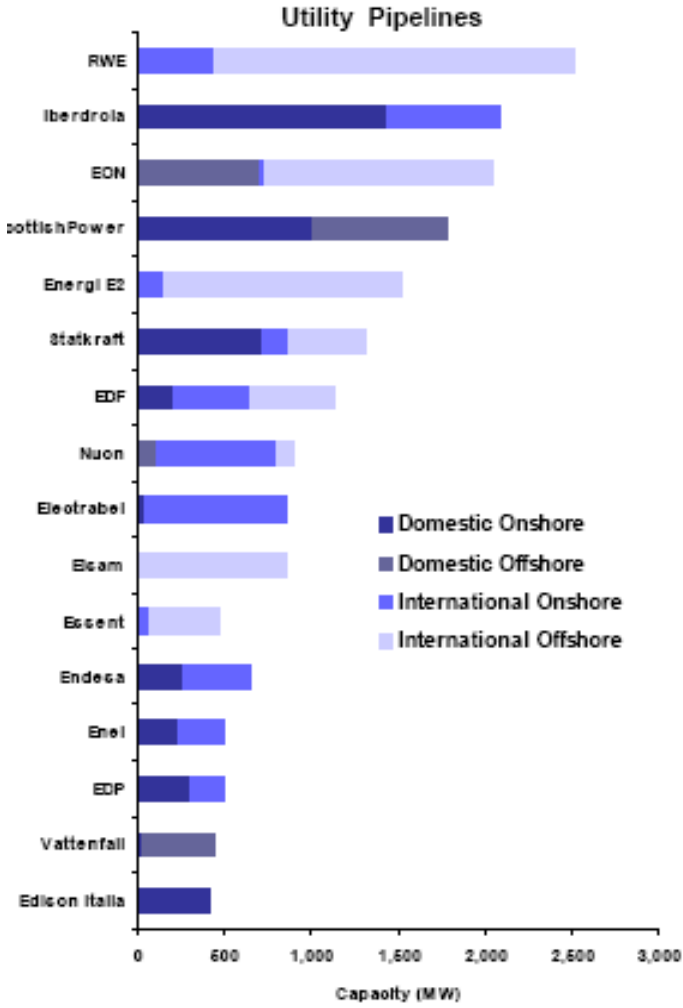
Developer/IPP pipeline in Europe 2005 to 2008

Source EER





European Utility Project Pipelines 2005 to 2008



European Market Until 2011



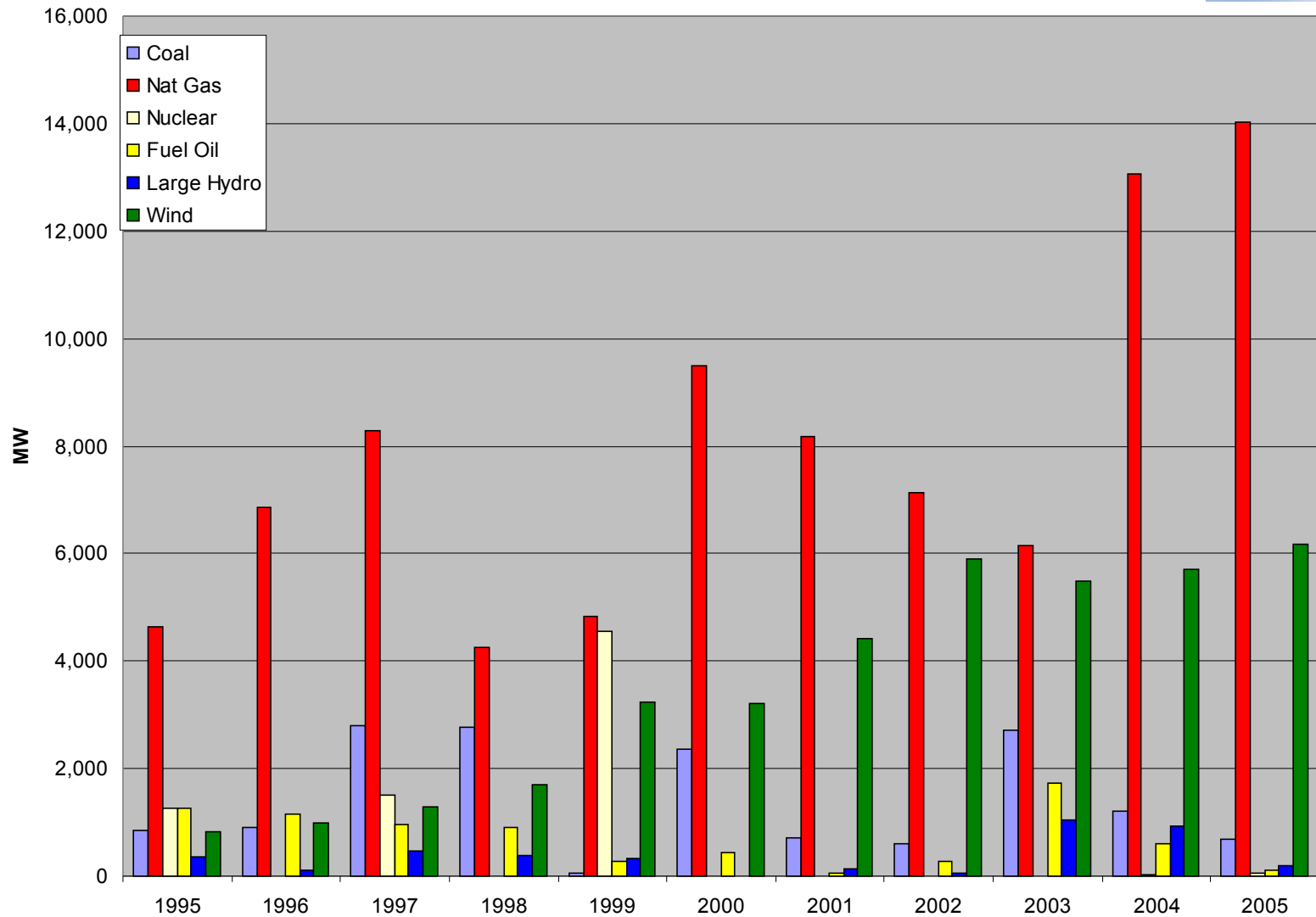
Exhibit 3-3: Onshore and Offshore Wind Power Capacity in Service, 2001–2011 (MW)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	17,362	23,337	28,727	34,487	40,604	46,811	52,797	59,513	67,379	75,300	82,661
EU	17,272	23,162	28,537	34,226	40,223	46,286	52,076	58,560	66,125	73,695	80,675
EFTA	22	102	106	169	279	383	489	595	701	807	913
Other	68	73	84	92	102	142	232	357	552	797	1,072
Onshore	17,272	23,087	28,192	33,889	39,915	45,924	51,820	58,186	64,962	71,463	77,624
EU	17,182	22,912	28,002	33,628	39,534	45,399	51,099	57,234	63,709	69,859	75,639
EFTA	22	102	106	169	279	383	489	595	701	807	913
Other	68	73	84	92	102	142	232	357	552	797	1,072
Offshore	90	250	534	599	689	887	977	1,327	2,417	3,837	5,037
EU	90	250	534	599	689	887	977	1,327	2,417	3,837	5,037
EFTA	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0

Source: Emerging Energy Research

Wind v Conventional

Source Platts & EWEA

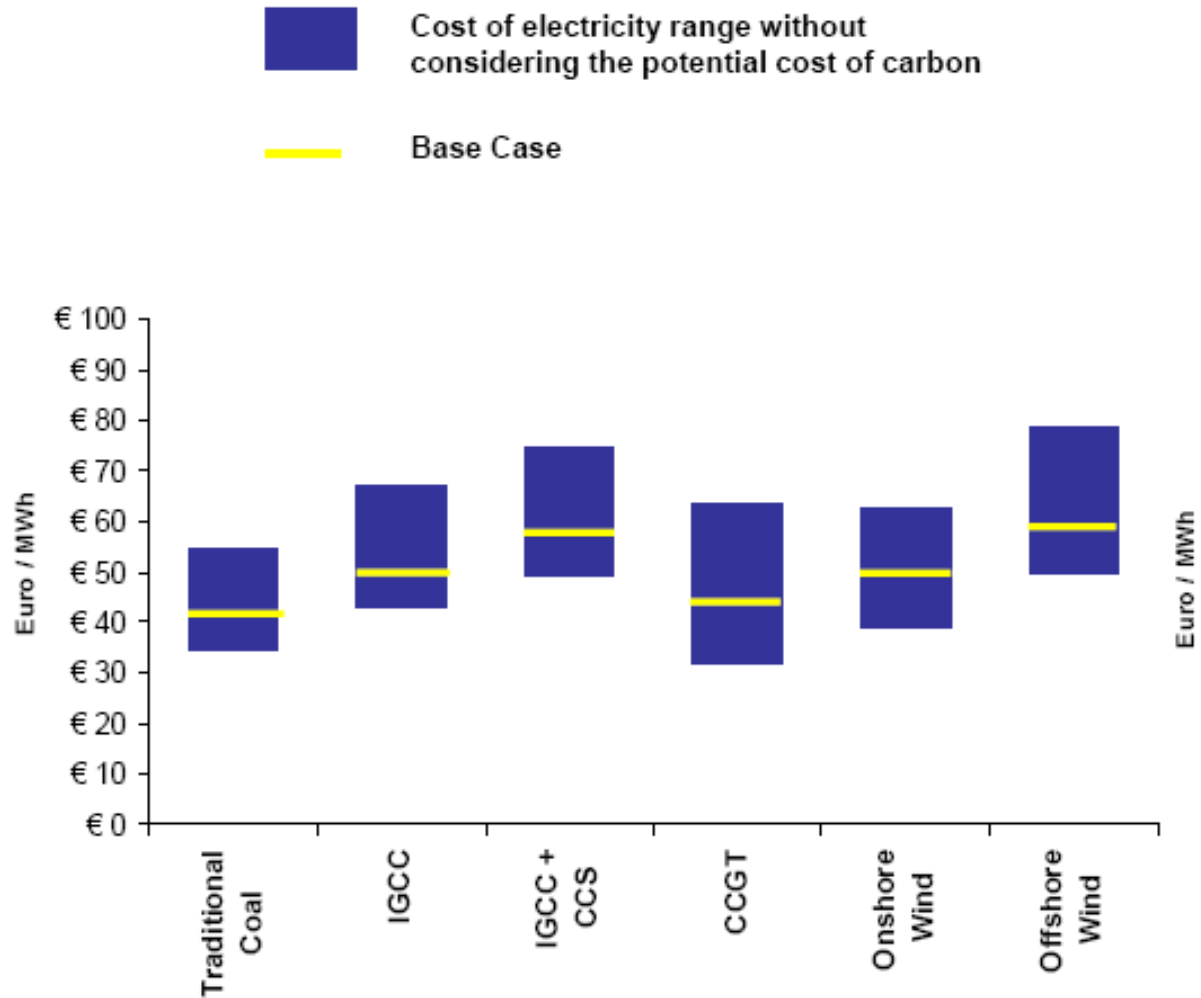


What does new build generation cost

(Source EER)



IGCC Integrated Gasification Combined Cycle

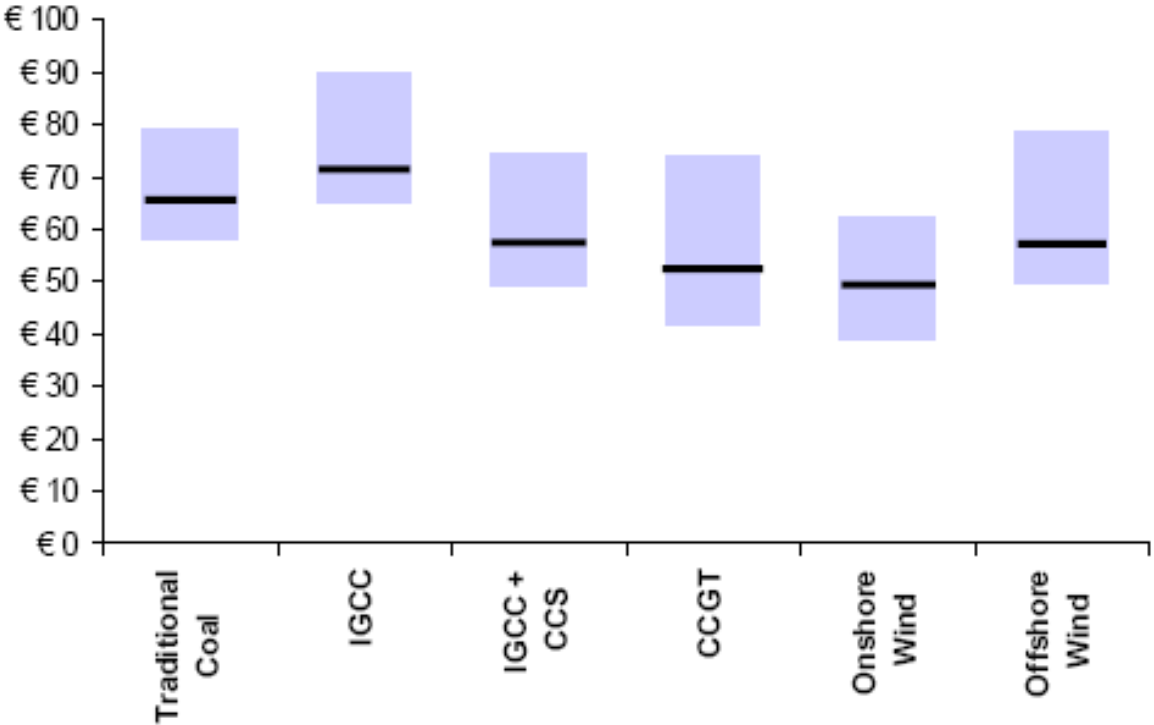


Cost of New Build including the cost of Carbon



■ Cost of electricity range assuming a carbon penalty of €30 / tonne for CO₂ derived from fossil fuels

— Base Case





Fuel Source Comparison

	Efficiency	Supply Stability/ Reserves	Price Volatility	Operation Emissions	Dispatchability	Subsidies
Wind	Capacity factors 25%-40%	High	None	0.00 kg CO ₂ /kWh	Intermittent/Non-dispatchable	Production incentives, capital grants
Coal	Capacity factors 60%-80%	Medium	Medium	0.78-0.96 kg CO ₂ /MWh	Base load/semi-dispatchable	Fuel exploitation subsidies, social subsidies (local mining)
<i>Non-Combined cycle</i> Natural Gas	Capacity factors 60-80%	Low	High	0.40-0.58 kg CO ₂ /kWh	Fully dispatchable	Fuel exploitation subsidies
<i>Combined cycle</i>	Capacity factors 60%-80%	Low	High	0.35 kg CO ₂ /kWh	Fully dispatchable	Fuel exploitation subsidies
Nuclear	Capacity factor 70-90%	Low	High	0 kg CO ₂ /MWh, radioactive waste with half life 100-1,000 years	Base load/semi-dispatchable	Fuel, waste management, security

Source: IEA, Climate Change, Emerging Energy Research.

Drivers in EU



- **Base conditions**

- Good Renewables directive at EU level
- Good R&D support from EU in the past
- Pioneering initiatives in Germany, Denmark and Spain

- **Current drivers**

- High cost of gas
- Security of supply
- Concern on carbon/particle caps

Risks in Europe



- A large drop in gas prices could cause political indifference
- High political stakes in policy game in Europe – Renewables are small players
- Outrage level may fall - indifference in public
- Increase in NIMBY
- Grid connections
- Height restrictions
- Consolidation of Utilities in the EU if they turn grey or black instead of green

The Future energy supply is now a global problem that has to be taken seriously by everybody – each region has to come with its own solutions to avoid future conflict

An LAC Perspective



- Latin America has abundant renewable resources
 - Local resources controlled locally
 - Every kwh produced from renewables is reducing fuel imports
- Renewable energy policies have to be national
 - Adapt technologies to your market situation
 - Create long term transparent policies that make banks comfortable
 - Learn from our mistakes
 - Build your own expert team
- Important to separate renewables policy from CO2 abatement policy.
 - Finance needs stability
 - The renewable industry needs stability

Useful links



- European Renewable Energy Council
 - www.erec-renewables.org
- Global Wind Energy Council
 - www.gwec.net
- European Wind Energy Council
 - www.ewea.org
- Free source of what is going on globally
 - www.planetark.com



- Wind,
 - Clean
 - Sustainable
 - Local
 - Fuel Free Energy

Forever !

»Thank you