



## Renewable Energy Financing

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World Future Energy Summit, Abu Dhabi, 19 – 21 January 2009

- /// **Renewable energy:** a fast growing sector
- /// **Political support** is stable
- /// **Wind power:** a competitive power source
- /// **Risks** are well understood
- /// **Project finance** is vital to the sector
- /// **The market is very uncertain**

# Dexia is a market leader

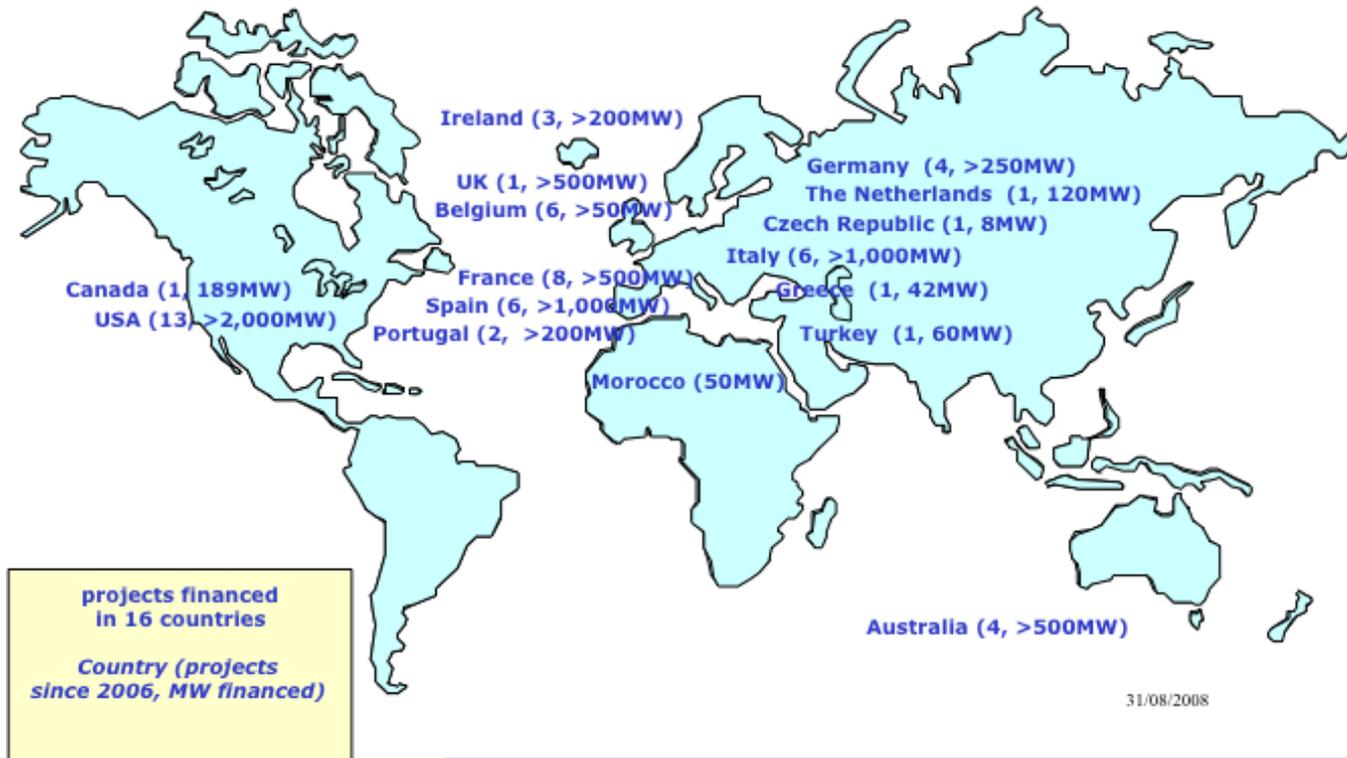
*...in structuring debt financing worldwide*

- /// Consistently “**Renewable Energies Arranger of the Year**” in league tables since 2003
- /// Over 90 transactions in 16 countries
- /// 50 arranging mandates in the wind sector over the past 6 years, and 15 in the solar sector over the past 2 years.
- /// The only arranger of offshore wind financing as of today
- /// EUR 1.7 billion exposure to the wind sector
- /// EUR 0.8 billion exposure to the solar sector

# Dexia is a market leader

...with a wide geographic diversification

- /// Dexia has the most diversified wind portfolio of any bank in the sector, spanning 16 countries on 5 continents



# Dexia is a market leader

*..with a wide industry knowledge*

- /// Dexia is a member of AWEA, EWEA, EPIA, and IEA PVPS Task 8
- /// Close relationship with utilities, developers, and manufacturers
- /// An Equity Research team dedicated to the Renewable Energies sector
- /// A Corporate Finance / Advisory team dedicated to the Renewable Energies sector

# Dexia is a market leader

*...as investor*

- /// Dexia is sponsor and flag investor in the Dexia Carbon Fund. The fund is investing in diversified carbon assets, First successful closing for EUR50M this year. **EUR150M target size.**
- /// Dexia is the anchor investor in the Impax New Energy Investors fund, a EUR125M private equity fund which invests equity or subordinated debt in renewable energies (brown-field).
- /// Investor in 5 other Energy/Utility funds.
- /// Dexia owns its own, 20MW wind farm in France.

# Dexia is a market leader

*...and participates to GHG emissions reduction effort*

- /// First bank to publicly set out an internal carbon intensity objective for its energy debt portfolio
- /// An objective more ambitious than IEA's 450ppm stabilization case (requiring that the share of power generation with no CO2 emissions must increase to 40% by 2030)
- /// A CO2 intensity objective 30% below IEA's, corresponding to 0.25 tons/MWh in 2020
- /// Dexia considered **“one of the most proactive banks in the fight against climate change”** by Friends of the Earth

# Political & regulatory risk

*Is understood and limited*

"How much do you favor or oppose a large increase in the number of wind farms in [the UK, France, Germany, Italy, Spain, the U.S.]?"

Base: All EU adults in five countries and US adults

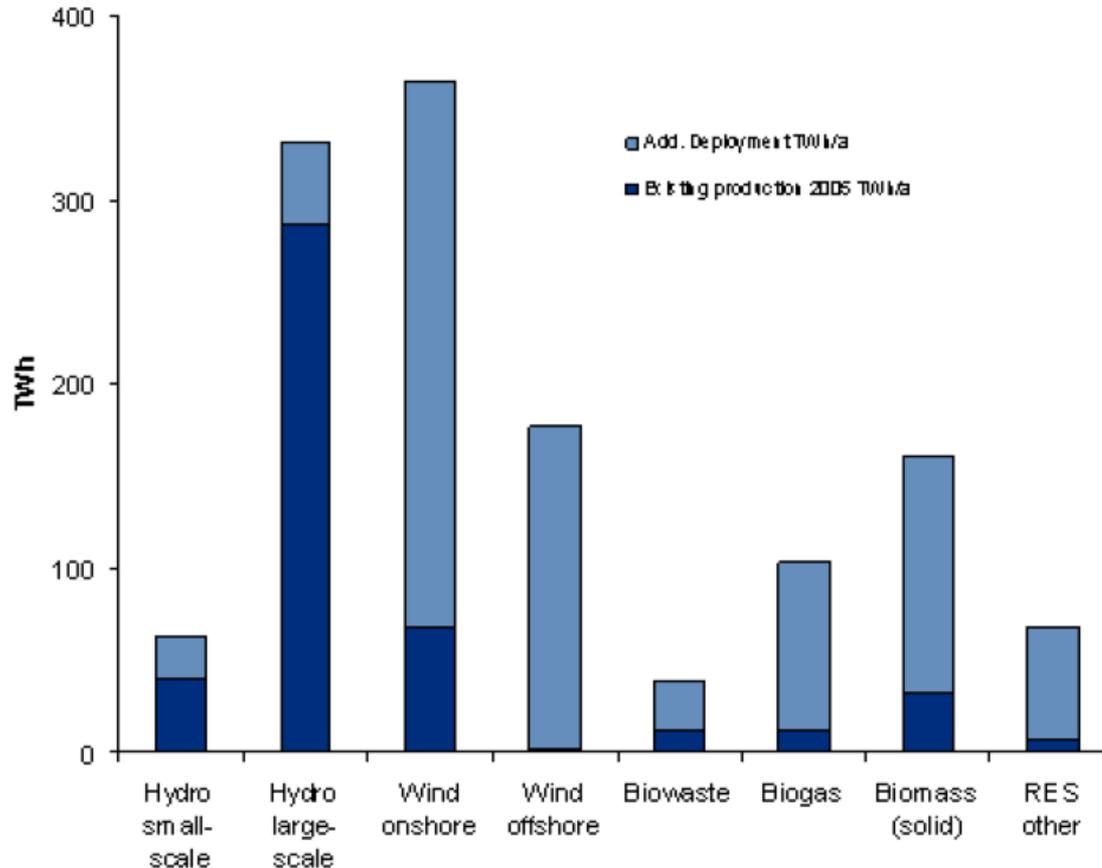
	Great Britain	France	Italy	Spain	Germany	United States
	%	%	%	%	%	%
Unweighted base	1087	1076	1045	1109	1111	1020
<b>FAVOR (NET)</b>	<b>87</b>	<b>89</b>	<b>91</b>	<b>90</b>	<b>79</b>	<b>92</b>
Strongly favor	48	49	64	55	34	61
Favor more than oppose	39	40	27	35	45	31
<b>OPPOSE (NET)</b>	<b>13</b>	<b>11</b>	<b>9</b>	<b>10</b>	<b>21</b>	<b>8</b>
Oppose more than favor	9	8	8	7	14	7
Strongly oppose	4	3	2	3	7	1

/// The regulatory framework in Europe is stable, well understood and benefits from strong popular and political support.

(poll source: [Harris Interactive](#), February 2008)

# A fast growing sector

...now reaching macro-economic significance



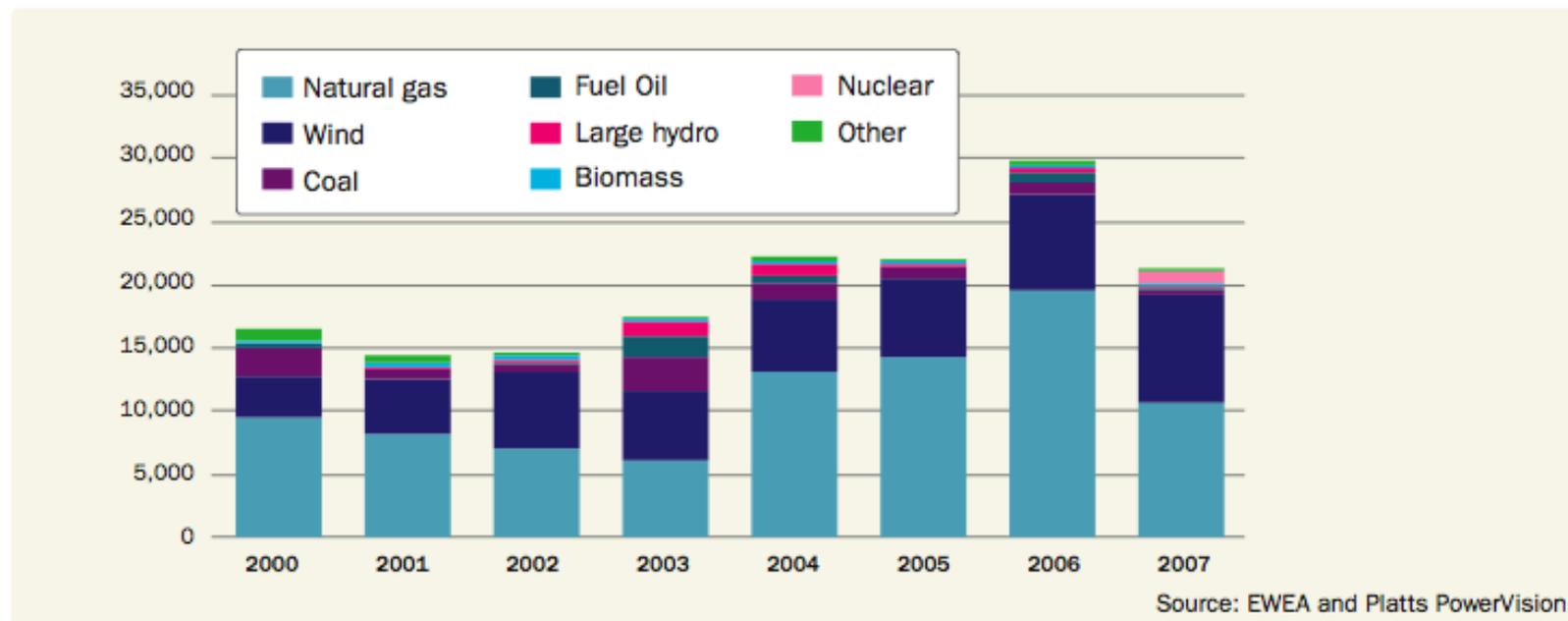
Wind will be the major contributor to the EU's goal of reaching 20% of electricity generation from renewable sources.

[Implication of Large-Scale Wind Power in Northern Europe](#), Klaus Skytte, Econ Poyry, presentation to EWEC 2008

# A fast growing sector

*...now reaching macro-economic significance*

FIG 1.6: New power capacity EU 2000-2007 (in MW)



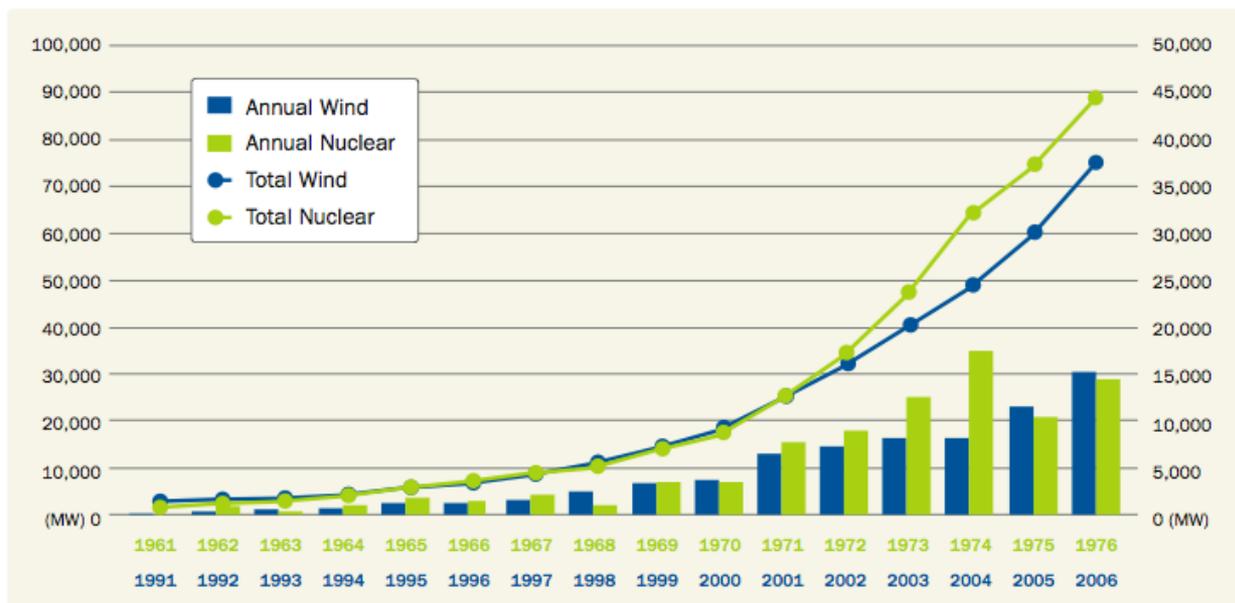
Wind has represented close to 40% of new installed power generation capacity (in MW) in Europe since 2000, and more than half of the investment.

(source: [Pure Power](#), EWEA)

# A fast growing sector

*...now reaching macro-economic significance*

FIG 0.1: 16 years of global wind energy development (1991-2006) compared to the first 16 years of nuclear development (1961-1976)



Wind has grown as fast as the nuclear industry did 30 years before, and is now reaching visible penetration levels

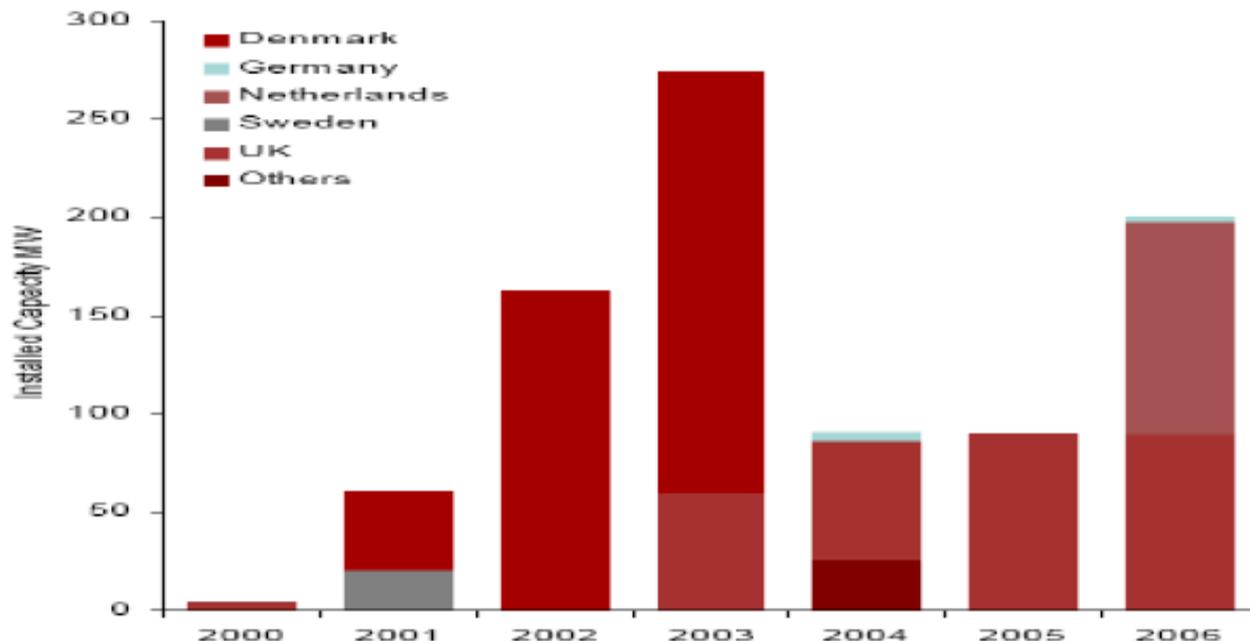
Investment in renewable energy is expected to exceed USD100 billion per year

(source: [Pure Power](#), [EWEA](#))

# Offshore wind



*...still in its infancy*



Source(s): Douglas-Westwood

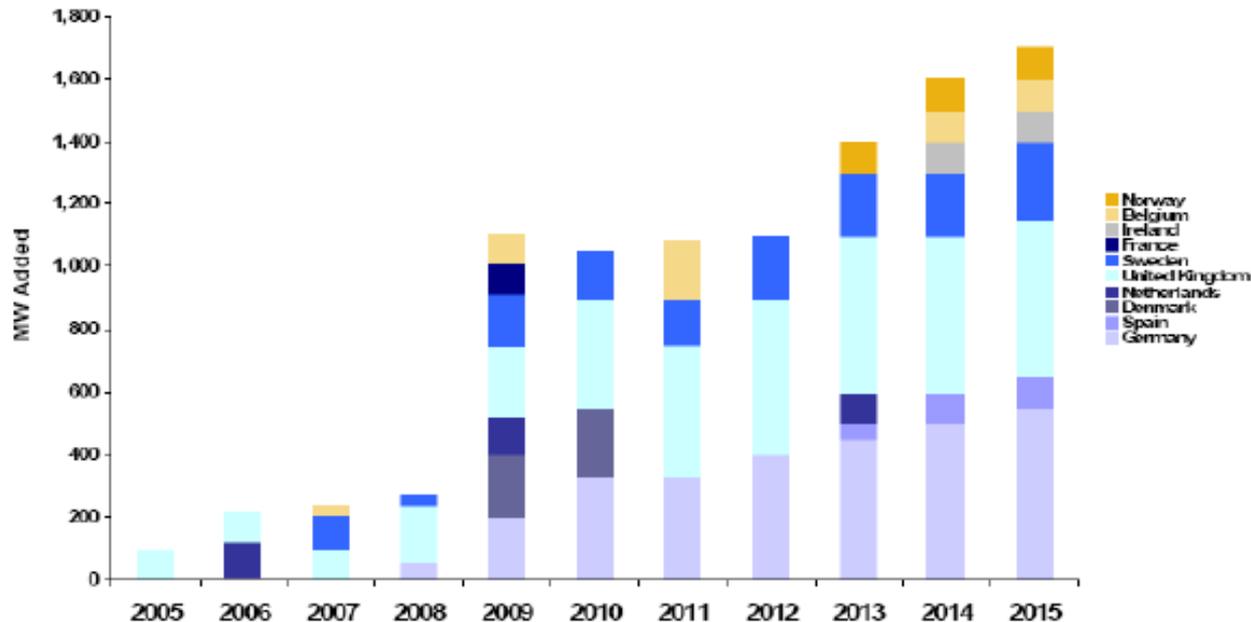
- Offshore wind is still at the « pilot project » phase
- A few scattered projects

# Offshore wind



*...is ready to boom*

Graph. 16: European Offshore Wind Capacity Added, 2005-2015

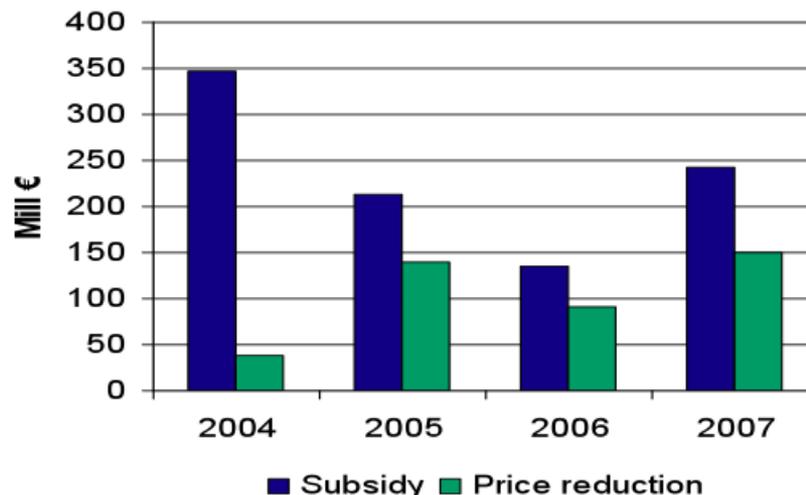
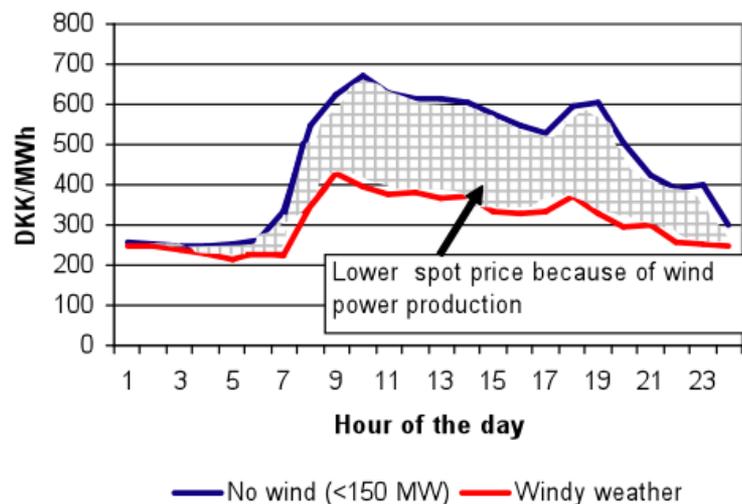


Source(s): Emerging Energy Research

- /// The industrialization of the industry is underway
- /// Germany and the UK are expected to be the main markets

# Political & regulatory risk

*Is understood and limited (2)*



- Under market price setting mechanisms, wind power (which has zero marginal cost) brings wholesale prices down when it is available
- The overall effect (price reduction multiplied by the relevant volume) now brings savings to consumers in Denmark that are equivalent to the gross cost of feed-in tariffs, and significantly higher than the net subsidy.

(source: [The effect of wind power on spot market prices](#), Rune Moesgaard , Poul Erik Morthorst, EWEC 2008)

## 3. Results for the merit-order effect: Annual analysis

	Simulated renewable generation	Average price reduction	Volume merit-order effect	Merit-order effect per Renewable MWh	Average feed-in tariff
	TWh	Euro/MWh	Billion Euro	Euro/MWh	Euro/MWh
2001	24.3	1.7	1.07	44	86.9
2004	41.5	2.5	1.65	40	92.9
2005	45.5	4.25	2.78	61	99.5
2006	52.2	7.83	4.98	95	103

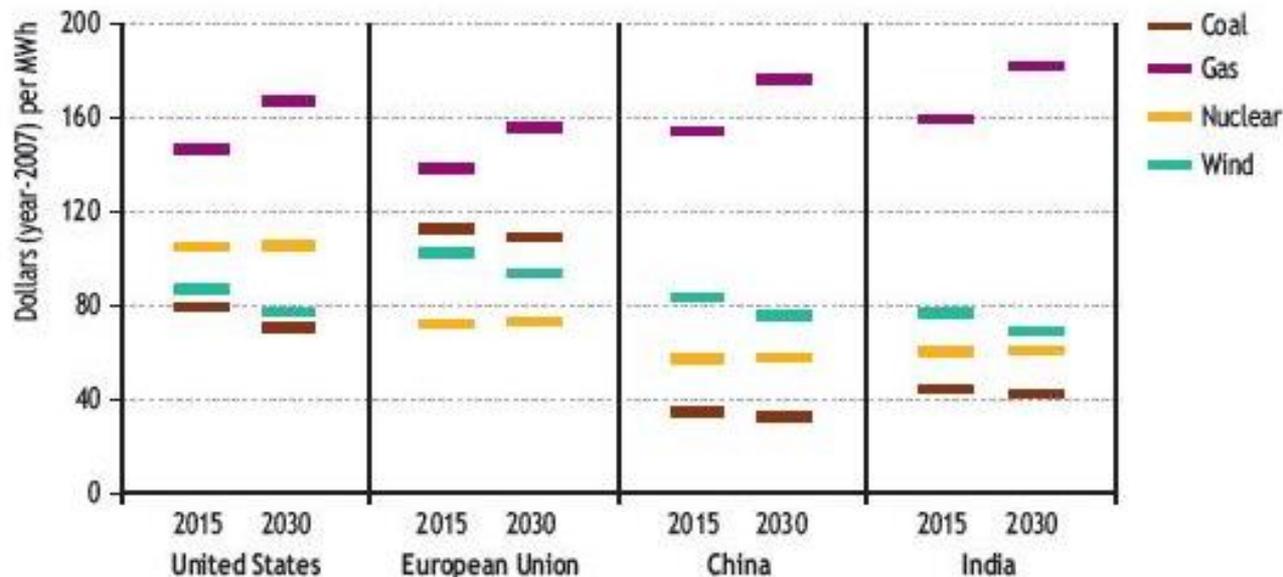
- /// Germany (11% of electricity coming from wind) shows similar results.
- /// This will help ensure that support for wind power is not seen as an « unaffordable luxury » if economic conditions continue to worsen

(source: [Assessment of the impact of renewable electricity generation on the German electricity sector](#), Mario Ragwitz, Frank Sensfuss, Fraunhofer Institute , EWEC 2008)

# Wind power is competitive

*...against traditional power generation*

**Figure 6.8** • Electricity generating costs in selected regions



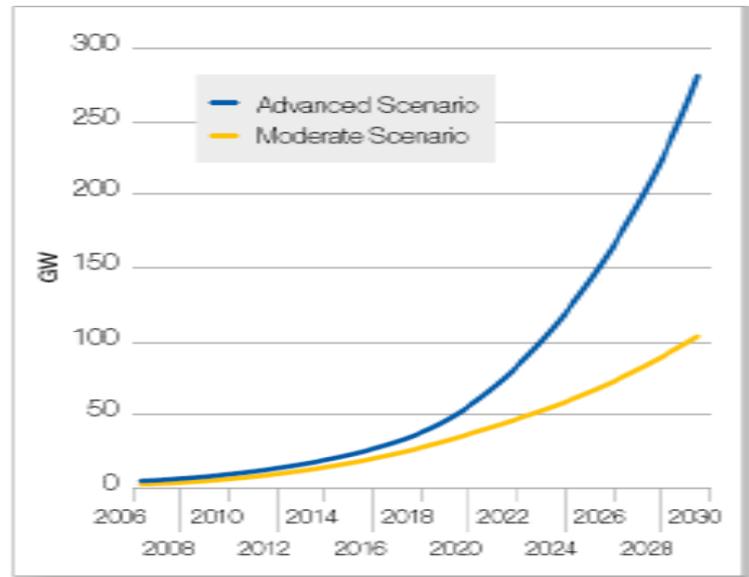
Note: Costs include a carbon value of \$30 per tonne of CO<sub>2</sub> in the European Union. In 2015, coal refers to supercritical steam. In 2030, coal refers to IGCC for the United States, ultrasupercritical steam for Europe and China, and supercritical steam for India. Gas refers to CCGT.

Source: IEA analysis.

Wind power is now a competitive, utility-scale, proven technology.

# Solar power is booming

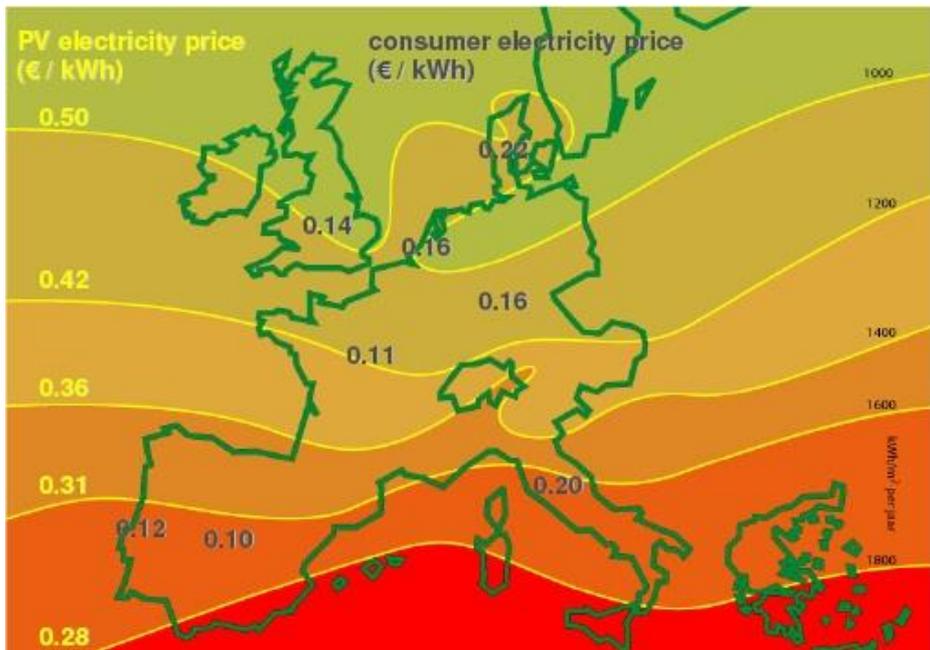
*...if from a low base*



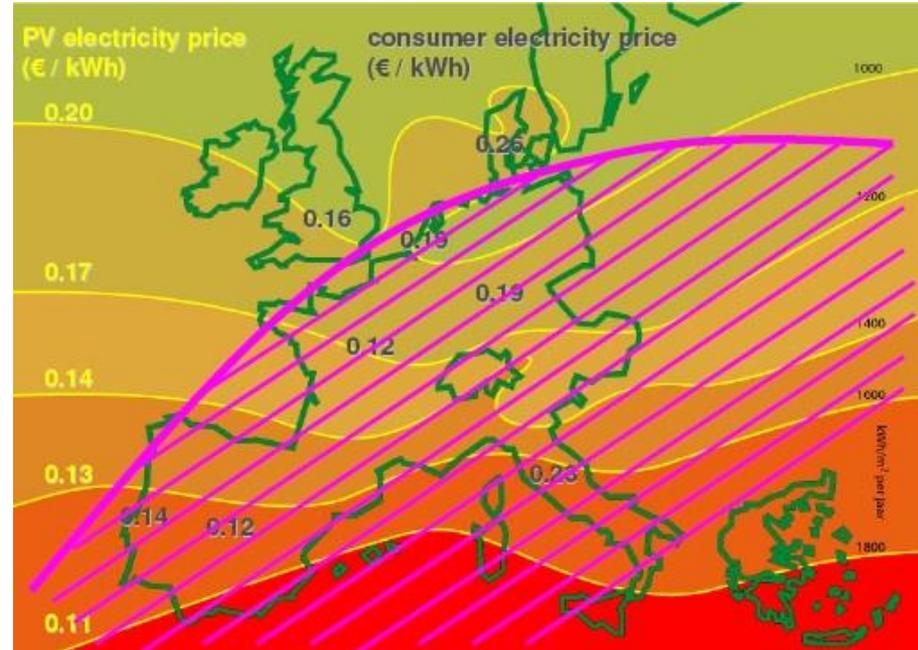
- ✓ Solar power is expected to grow from almost nothing (2,500MW of photovoltaic) to a large installed base (30GW of concentrated thermal and 200 GW of PV) by 2020
- ✓ In France, the plan (recently announced) is to increase capacity from 13MW today to 5,400MW by 2020

# Solar power is the future

...with grid parity expected in the next 15 years



2005



2020

- While solar is still significantly more expensive today, costs are coming down thanks to rapid technology progress.
- In the meantime, solid regulatory frameworks are encouraging investment in the US, Spain, France, Italy or Germany.

# Risks are well understood

*...and no project has ever defaulted as of today*

## // Regulatory risk

- // Stable framework in most European countries
- // Proven political commitment over the years
- // Long term feed-in tariffs protect against regulatory changes

## // Price & volume risk

- // No price risk in countries with feed-in tariffs (largest markets)
- // PPAs from utilities or other acceptable counterparties provide volume risk protection in all transactions, if there is no regulatory off-take obligation
- // Residual merchant risk accepted in some markets (Australia, UK, USA, Italy) under prudent assumptions

# Risks are well understood

*...and no project has ever defaulted as of today*

## // **Wind Construction risk**

- // Wind farm construction is a relatively simple task
- // Very few cases of delays or cost overruns
- // The project finance market takes the risk as a matter of course
- // Many technical advisors available for due diligence

## // **Wind Technology risk**

- // Wind turbine generators are a proven technology
- // Large scale turbines (>500kW) now have 15+year track record
- // Several highly reliable manufacturers

# Risks are well understood

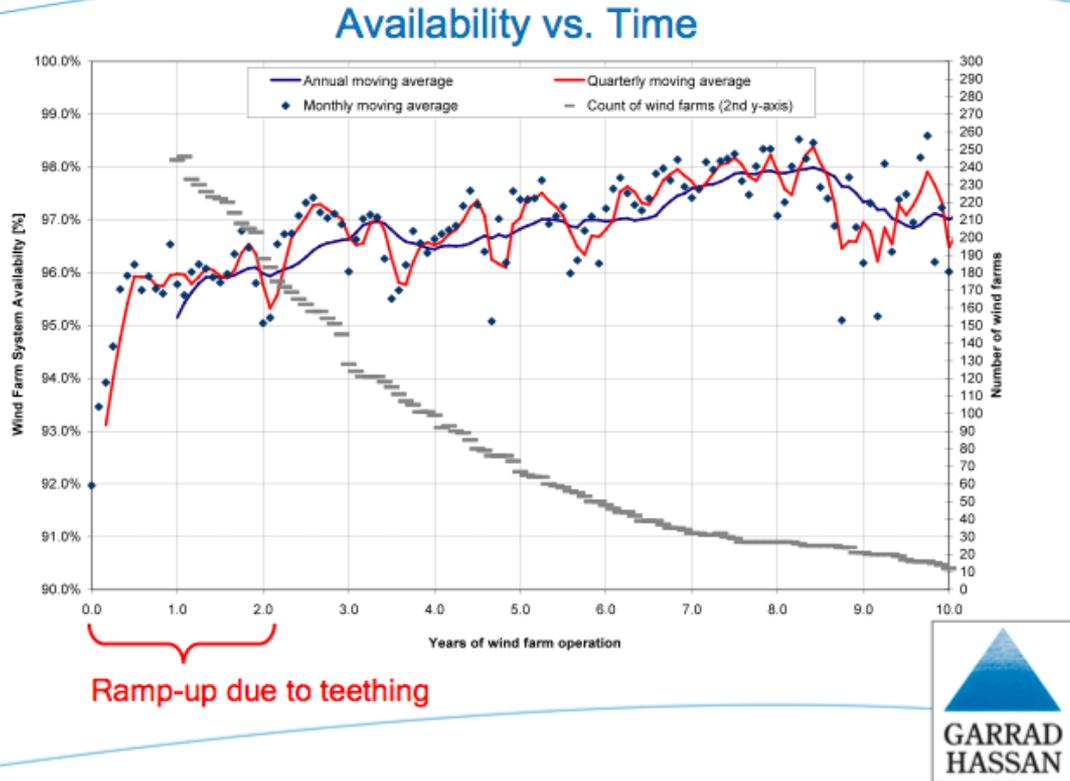
*...and no project has ever defaulted as of today*

## /// Long term wind operations & maintenance risk

- /// Wind farm O&M is now an established industry
- /// It is a source of stable long term revenues for manufacturers
- /// Competition from independent operators in larger markets ensure that no monopoly positions can be claimed
  
- /// Industry performance track record is excellent (see next slide)
- /// Many technical advisors available for due diligence
  
- /// This is the core risk borne by the banks

# Risks are well understood

*...and no project has ever defaulted as of today*



Wind farm availability has improved over time

(source: [Availability Trends Observed at Operating Wind Farms](#), Keir Harman, Garrad Hassan, EWEC 2008)

# Risks are well understood

*...and no project has ever defaulted as of today*

## // Solar Resource

- // Low volatility of the irradiation
- // Maps of solar radiation easily available on an historical basis
- // Assessment by the Advisor of the solar irradiation on site

## // Solar Regulatory Risk

- // No different for solar than for other renewable energies except the incentive is higher
- // Most countries use a feed-in tariff (sometimes with tax incentives and subsidies) and tariffs are usually paid under long-term contracts with utilities
- // Unsurprisingly, regulatory prices are decreasing especially in Europe. This trend is correlated to the objective of grid parity.

# Risks are well understood

*...and no project has ever defaulted as of today*

## // Thermo-Dynamic Technology risk

- // Usually strong sponsor support (pre-completion guarantee)
- // Proven technology
- // Assessment of the degradation of the solar components (collector, receiver) and more traditionally of the thermal components

# Risks are well understood

*...and no project has ever defaulted as of today*

## // Solar PV Technology risk

- // Low construction risk : civil works, module installation and grid connection are relatively simple
- // Assessment of the modules and system performance on site by the technical advisor is crucial
- // Warranties provided by modules manufacturers are often very strong even if their value is limited.
- // Well-known technology (except for thin-film emerging)
- // Low operating risk



*...brings new challenges*

## // Construction management and coordination

- // Two industries not used to working together
- // Projects are more complex than onshore and require management and planning skills absent in the wind industry
- // Projects very large compared to size of sponsors (other than utilities) and manufacturers
- // Weather uncertainty creates additional risk
- ✓ Nothing that cannot be solved by engineers!



*...brings new challenges*

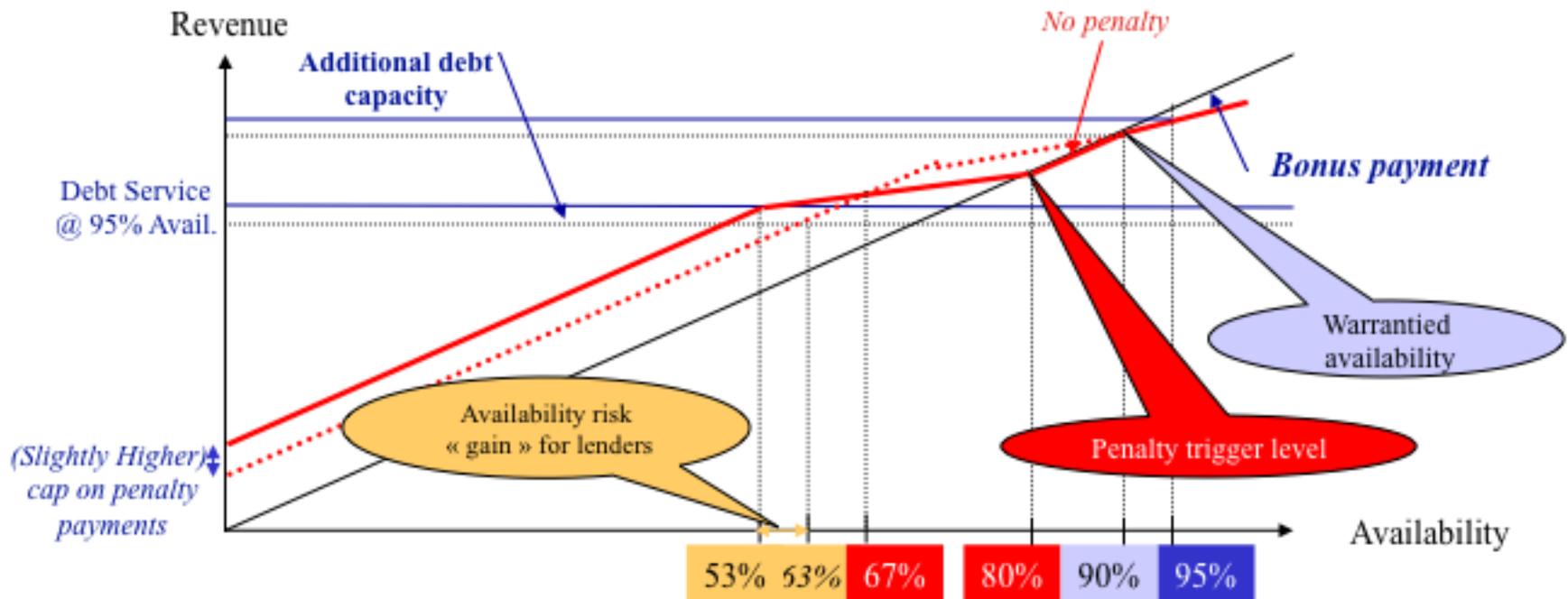
## // Long term O&M is still unknown

- // Combination of more aggressive environment, higher loads and much more challenging access to turbines
- // Very little experience as of today
- // No established procedures or industrial base
- // Access is most difficult when turbines would be most productive -> production losses can pile up
- ✓ Conservative planning and budgets add to cost

# What has been done



2 offshore wind farms financed on a non-recourse basis



Original financial structures are required to deal with current risks, including 3-way negotiations.

# Project finance is vital

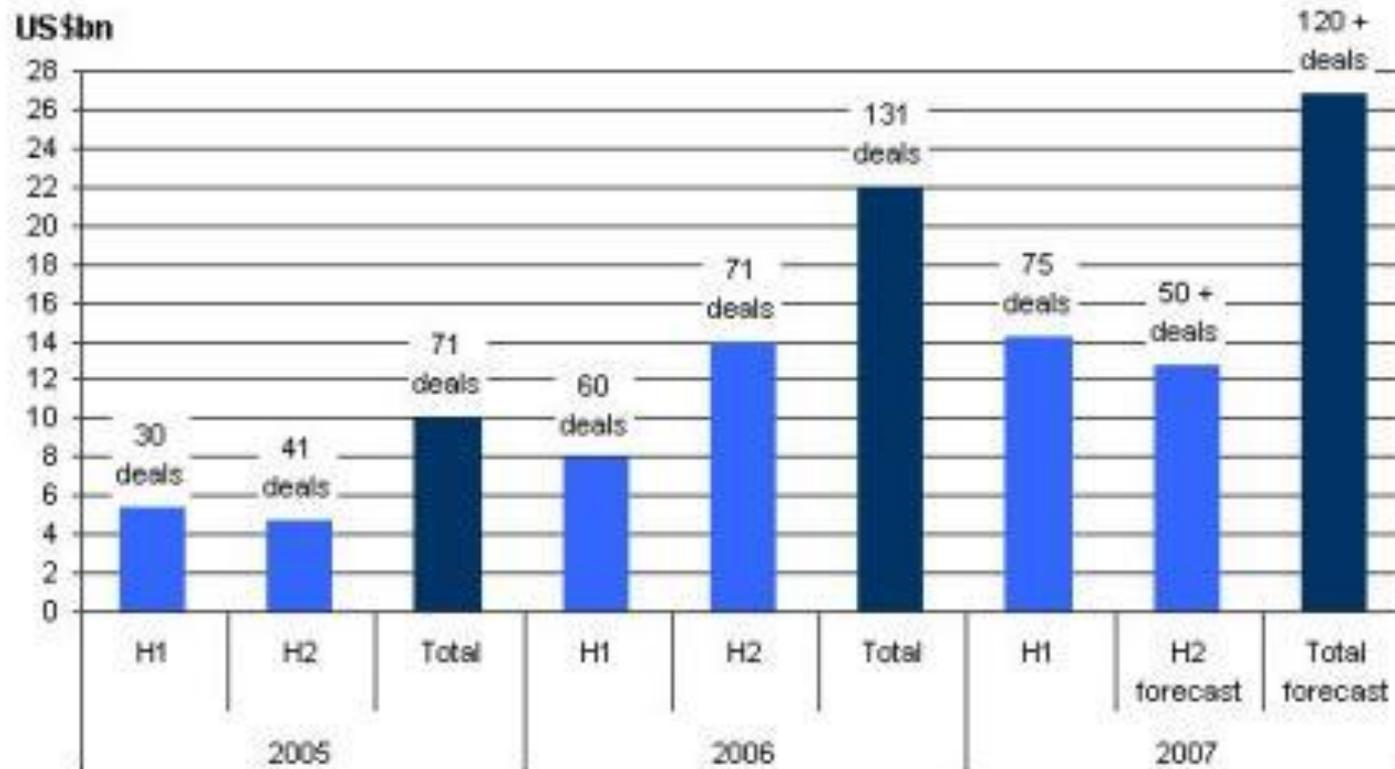
*...for the development of renewable energies*

- // All types of sponsors use project finance:
  - // Small developers need the funds
  - // Financial investors need the leverage
  - // Utilities use it to reduce balance sheet commitments
  
- // Non recourse financing is a proven tool
  
- // USD 30 billion worth of renewable energy projects were financed in 2007 (IJ Online) out of roughly USD 50 billion of investment.

# Project finance is vital

*...for the development of renewable energies*

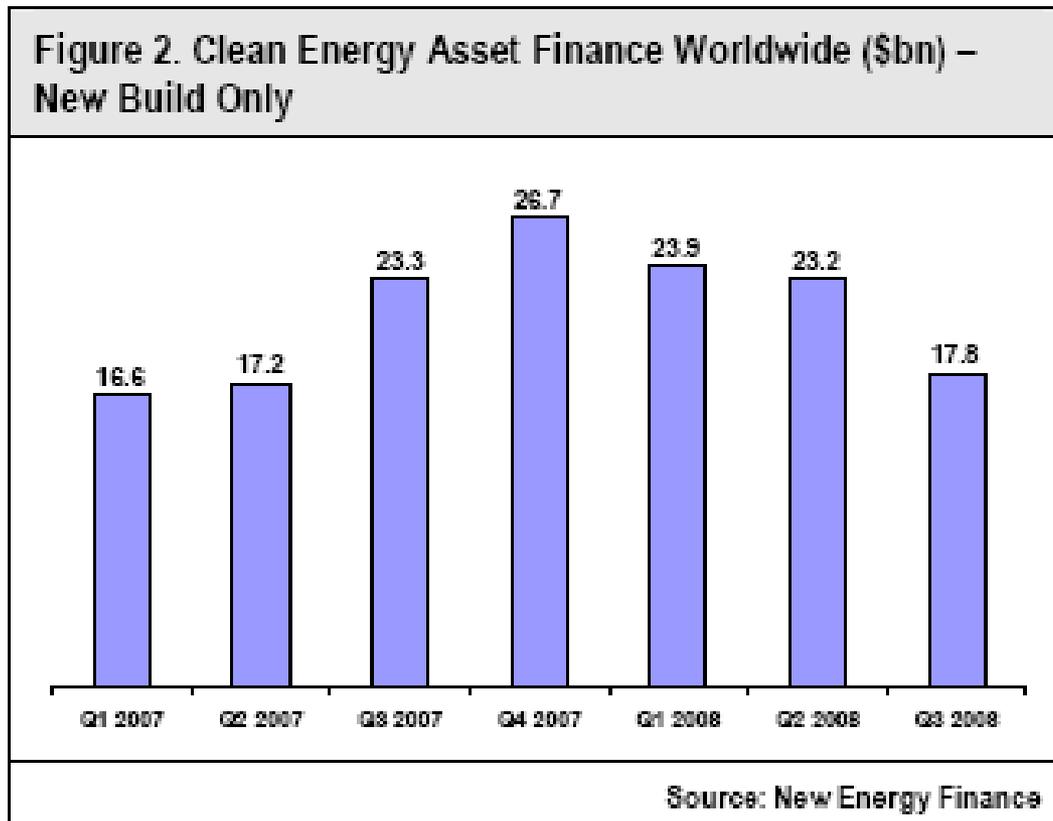
## Global Renewables Project Finance 2006-2007



Source: Infrastructure Journal R&A

# Project finance is vital

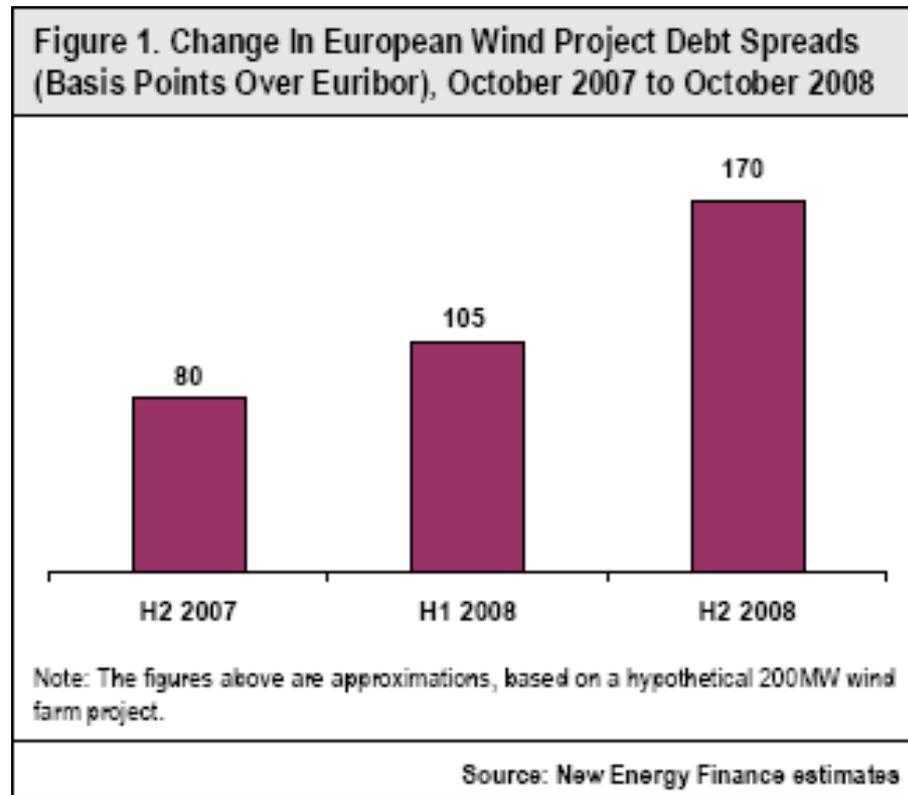
*...but the trend has changed*



- For the first time in Q3 2008, there were fewer projects debt-financed than a year ago.

# Things are getting tougher

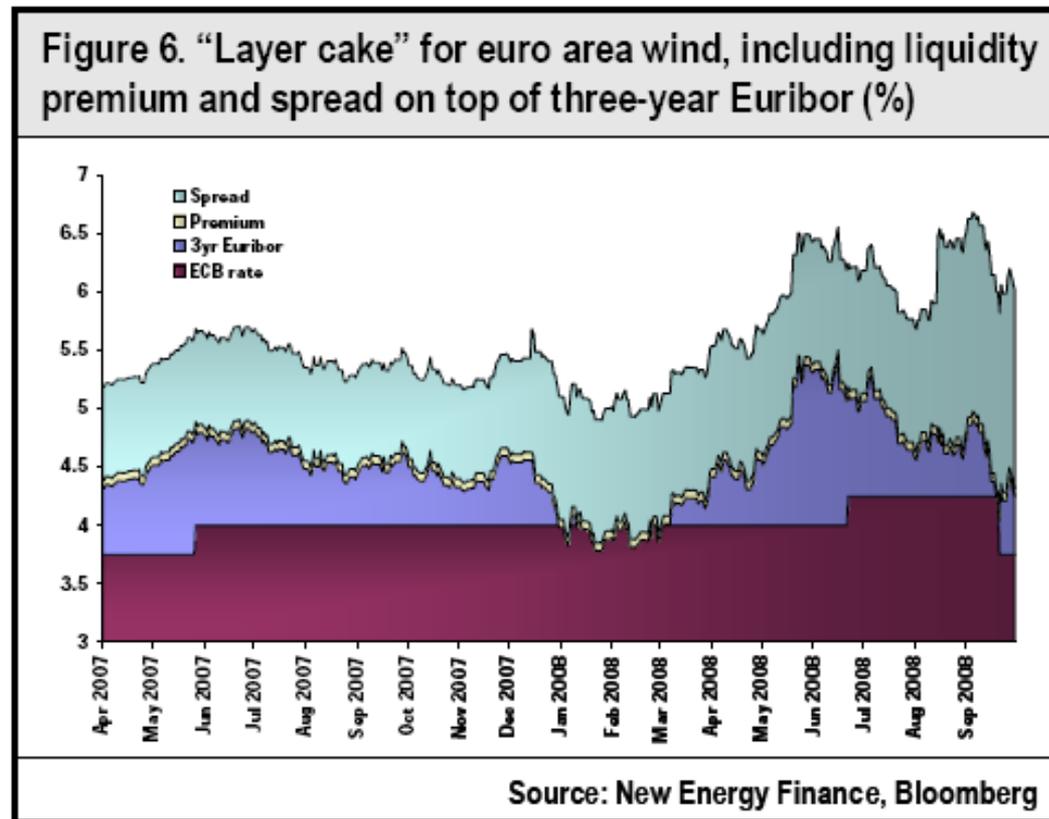
*...for borrowers*



Conditions are becoming more difficult for deals that do come to the market

# Things are getting tougher

...for borrowers



/// The margin increases (for new deals) have been mitigated by the lower Central Bank rates.

## // Underwriting and syndication risk

- // Until the recent crisis, renewable energy project finance was a deep, mature market with many experienced arrangers and a large pool of participants.
- // The syndications market crisis has driven the market towards club deals in 2008, and it is likely to restart on that basis once the short term liquidity crisis is over
- // Many transactions are relatively small (EUR40-200M) and can easily be arranged by groups of 1-4 banks
- // Larger transactions (portfolios and offshore wind) are likely to be delayed until market conditions improve significantly.

## // The impact will differ by region

- // The USA are likely to be most hit, as tax equity is much less available, and dollar funding is an issue for the European banks that dominate the sector. On a positive note, the tax legislation has been renewed (with an 8-year renewal for solar) and the incoming administration is pledging further support for renewable energies.
- // European countries with feed-in tariffs (France, Portugal), a tradition of small developments (Germany, Spain) or competitive banking markets (Netherlands) will be relatively less impacted.
- // Countries with a dominance of merchant risk or large projects like the UK are likely to suffer more.

## // Structures will become more conservative

- // Debt-equity ratios are likely to be at 80:20 or lower rather than the 90:10 that were seen until last year.
- // Maturities will trend lower as long term liquidity is scarce
- // Cover ratios are unlikely to change much, but the most aggressive structures will disappear
- // Pricing will increase across the board, both fo liquidity constraints and as part of a general re-pricing of risk.
- // Covenants will be tightened, in particular with respect to MAC clauses, change of control, market disruption, reporting ...

## // Banks will be more selective

- // An exclusive focus on arranging roles (if need be as part of a club deal, with all banks on the same level)
- // A strong preference for strategic clients, already known to banks, and able to propose attractive side business;
- // A likely focus on a more limited number of countries for each bank – core markets, countries with favorable and stable regulatory regimes, areas of activity of strategic clients – and countries where local currency funding is not an issue.



*...will be variable*

- /// **Onshore wind** is likely to see continued activity
- /// **Solar** is likely to see continued growth (discounting the Spanish pre-tariff change « peak » of activity)
- /// **Offshore wind** is likely to be dominated by utilities and to see few non recourse operations in the near future – but these will happen)



## *2 offshore wind farms financed on a non-recourse basis*

### **Q7 (The Netherlands)**

Closed 25/10/2006

Rabobank, Dexia, EKF

EUR 219 M LT debt

EUR 160 M ST debt

- ◆ 120 MW project (60 **Vestas** V-80 turbines)
- ◆ EUR 383 M investment
- ◆ 2 separate construction contracts (Vestas & Van Oord)
- ◆ Revenues from sale of electricity (PPA) plus green certificates @97 EUR/MWh for 10 years under Dutch law)
- ◆ Long term O&M by Vestas
- ◆ Sponsors ENECO (50%) and Econcern/EIH (50%)
- ◆ Construction complete, project now operational

### **C-Power (Belgium)**

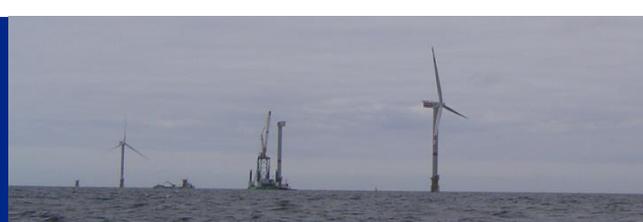
Closed 23/05/2007

Dexia (& Rabo for mezz)

EUR 126 M LT debt

EUR 62 M ST debt

- ◆ 30 MW project (6 **Repower** 5MW turbines)
- ◆ EUR 152 M investment
- ◆ 3 separate construction contracts (Repower, Dredging /Fabricom, ABB cable)
- ◆ Revenues from sale of electricity (PPA) plus green certificates @107 EUR/MWh min. for 20 years by law.
- ◆ Long term O&M by Repower
- ◆ Sponsors EDF EN, Dredging & regional investors
- ◆ Construction underway, scheduled in late 2008.



## 2 offshore wind farms financed on a non-recourse basis

### Q7 (The Netherlands)

*EKF participates as a "normal" lender and guarantees 47 M of the TLF and 20 M of the CF*

#### **Syndicated** (BNP Paribas as MLA, BoTM, HSH, NIBC)

- ◆ EUR 189 M Term Loan Facility (9.5y after completion)
- ◆ EUR 30 M Contingent Facility

#### **Not Syndicated**

- ◆ EUR 17 M Mezzanine Facility (provided by Rabobank)
- ◆ EUR 160 M L/C facilities for the contractors

### C-Power (Belgium)

#### **Syndicated** (KBC, Rabobank, SocGen)

- ◆ EUR 90 M Term Loan Facility (15y after completion)
- ◆ EUR 5 M Working Capital Facility
- ◆ EUR 11 M Contingent Facility

#### **Not Syndicated**

- ◆ EUR 20 M Mezzanine Facility (provided by Rabobank)
- ◆ EUR 21 M L/C facilities for the contractors
- ◆ EUR 25 M Grid Subsidy Facility
- ◆ EUR 16 M Equity Bridge Facility