



**EWEA**  
THE EUROPEAN WIND ENERGY ASSOCIATION

Harness the wind to tackle climate change

M O R E  
**W I N D**  
= less CO<sub>2</sub>



## Wind power...

### ...fights climate change

The wind is an abundant energy resource. Wind energy is a real alternative to emission producing fossil fuels and, crucially, can be deployed and begin reducing CO<sub>2</sub> emissions immediately.

Wind energy is already fighting climate change: in 2008, wind power in the EU avoided the emission of 91 million tonnes (Mt) of CO<sub>2</sub>.

### ...pushes polluting electricity producers out of the market

Wind power replaces fossil fuels and their sizeable CO<sub>2</sub> emissions, and therefore helps combat climate change. Because wind turbines do not consume fuel and their operation and maintenance expenses are low, the marginal cost of wind power is minimal. Therefore, an increase in the amount of wind power in the electricity mix means that more expensive and polluting technologies (oil, coal and gas) are pushed out of the market.

To calculate how much CO<sub>2</sub> is avoided by producing electricity from wind power, it can be assumed that each kWh of wind power displaces a kWh created by the energy mix of coal, oil and gas at the time of production. On average in the EU in 2008, each kWh produced by wind energy saves approximately 666 grammes of CO<sub>2</sub><sup>(4)</sup>.

<sup>(4)</sup>EU Commission – European Energy and Transport – Trends to 2030 – Update 2007



## ...has the lowest lifecycle emissions of all power plants

As soon as you turn the lights on you need a power plant, and all power plants have a CO<sub>2</sub> impact during their construction. Lifecycle emissions include the building of the plant, fuel extraction and transport, operation and maintenance. A turbine reimburses the energy and CO<sub>2</sub> it cost to build it in three to six months. Wind energy has the lowest lifecycle emissions of all energy production technologies (see graph “Lifecycle GHG Emissions per Technology”).

## ...avoids climate change costs

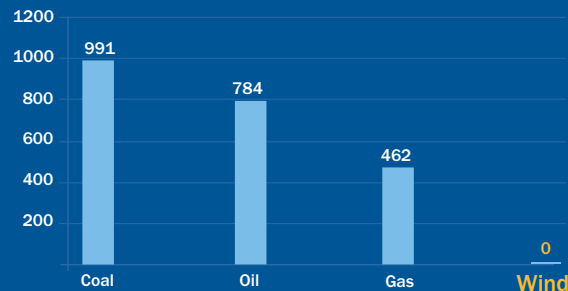
The EU’s Emissions Trading System puts a cost on emitting CO<sub>2</sub>. By auctioning permits to the power sector for emitting CO<sub>2</sub>, major polluters have to pay for releasing greenhouse gases. It sends a clear message to investors: the cost of climate change, currently borne by society, will be increasingly shifted towards the polluter.

## ...many environmental benefits

Wind power offers additional environmental benefits, compared to conventional plants, such as:

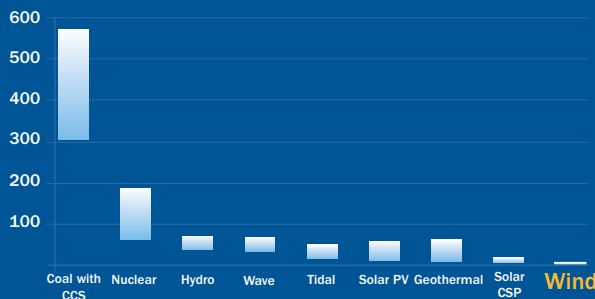
- No NOx emissions (precursors for ground level ozone causing health impacts and GHG warming).
- No other air pollutants like sulphur dioxide (causing acid rain) or particles which have carcinogenic effects and severely affect human health.
- No water use during operation.
- Zero fuel extraction.

Average CO<sub>2</sub> emissions from Fossil Fuel in EU

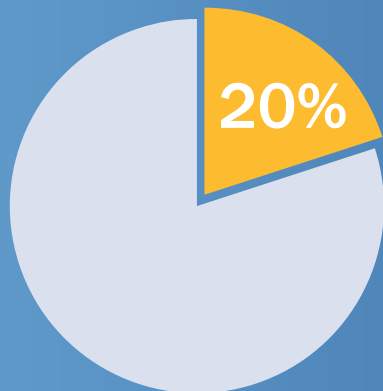


Source: IEA – World Energy Outlook 2008 – Emissions from fossil fuels

Lifecycle GHG Emissions per Technology (g/kWh)



Source: Mark Jacobson – Stanford University – February 2009  
Review of solutions to global warming, air pollution and energy security.  
Energy & Environmental Science, 2009, 2, p148-173



65 GW  
Wind energy capacity in

**2008**



Avoided the emission of 91 million tonnes of CO<sub>2</sub> per year – equivalent to **20% of the EU's Kyoto greenhouse gas reduction target**

Avoided CO<sub>2</sub> costs of approximately €2.3 billion and fuel costs of €6 billion

Produced 137 TWh met 4% of total EU electricity demand



105 GW  
Wind energy capacity in

**2012**



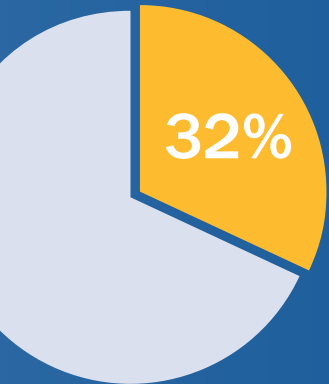
Will avoid the emission of 100 million tonnes of CO<sub>2</sub> per year – equivalent to **10% of the EU's Kyoto greenhouse gas reduction target**

Avoiding CO<sub>2</sub> costs of approximately €2.3 billion and fuel costs of €6 billion

Producing 234 TWh met 4% of total EU electricity demand



***Wind energy can reduce emissions before 2020***



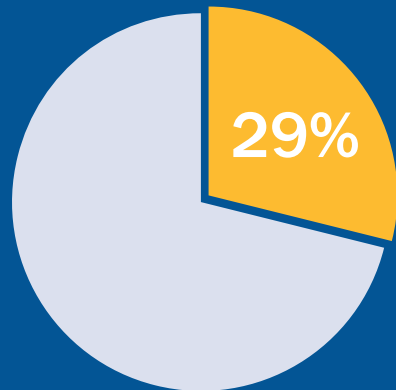
emission of 146 million tonnes of CO<sub>2</sub> equivalent to **32% of the EU's Kyoto as reduction target**

costs of approximately €3.6 billion and €0.1 billion

Producing 582 TWh, meeting 7% of total EU electricity



**230 GW**  
Wind energy capacity in  
**2020**



Will avoid the emission of 333 million tonnes of CO<sub>2</sub> per year – equivalent to **29% of the EU's greenhouse gas reduction target (-20%)**

Avoiding CO<sub>2</sub> costs of approximately €8.3 billion and fuel costs of €24.8 billion

Producing 582 TWh, meeting 17% of total EU electricity demand



Photo: Vestas

## Wanted: ambitious climate agreement in Copenhagen

### Why?

- Because without a global solution, temperatures will rise above 2°C, and climate change will overwhelm human civilisation.

### When?

- By 2020, we need a target consistent with the range of 25%-40% identified by the IPCC to give us a 50% chance of avoiding the 2°C temperature rise.
- By 2050, anything below an 80%-90% reduction in greenhouse gas emissions falls short of recent scientific evidence.

### Who?

- Industrialised countries must agree a minimum 30% absolute, economy-wide reduction target by 2020 compared to 1990 levels, excluding offsets which must come on top.
- The more advanced developing countries must avoid the use of fossil fuels and move rapidly to a renewable energy economy, with ambitious 2050 targets.
- Least Developed Countries should not be burdened by reduction targets but helped by financial means and project based mechanisms towards GHG-free development

### Where?

- CDM offsets must not supplement domestic action and need to be reformed.
- Renewable energy projects like wind power lock in truly clean development. Revised additionality rules should make it easier for wind projects to be eligible for CDM under a future agreement.

- CDM projects need a better geographical spread and lower administrative burdens.

### What?

- Putting a price on carbon will make wind power more cost competitive by removing a market distortion.
- Carbon markets can raise revenues that can be used to support policies to mitigate climate change.
- Caps on emissions or reduction targets must be ambitious.
- Sectoral agreements and other tools should be explored as ways to reduce emissions

### Wind!

## Is a key solution in the fight against climate change!

In order to meet the goal of the global average temperature increase being limited to not more than 2°C above pre-industrial levels, as advocated by the Intergovernmental Panel on Climate Change, global greenhouse gas emissions will have to peak by 2015 and decline thereafter<sup>(2)</sup>.

<sup>(2)</sup>IPCC 4th Assessment Report, 2007



[www.ewea.org](http://www.ewea.org)

## About EWEA

EWEA is the voice of the wind industry, actively promoting the utilisation of wind power in Europe and worldwide. It now has over 600 members from almost 60 countries including manufacturers with a 90% share of the world wind power market, plus component suppliers, research institutes, national wind and renewables associations, developers, electricity providers, finance and insurance companies and consultants.