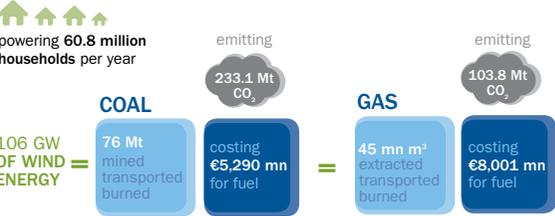
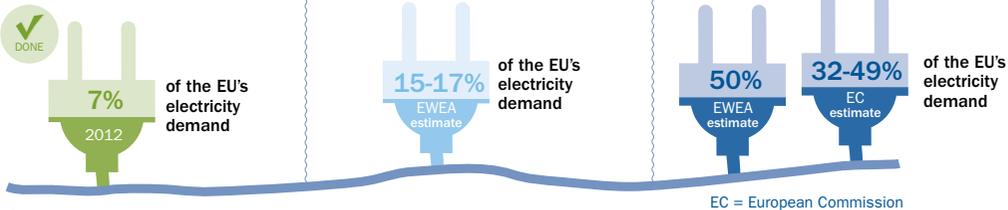


# WIND ENERGY STATISTICS AND TARGETS



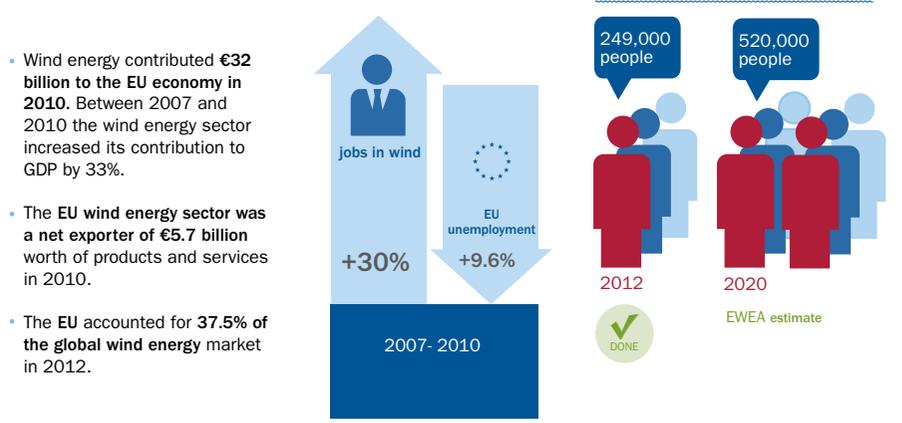
"Every time we spend \$1 subsidising renewable (energy sources), we spend \$6 on subsidising fossil fuels."

*Connie Hedegaard, Commissioner for Climate Action, December 2012*

# TECHNOLOGY



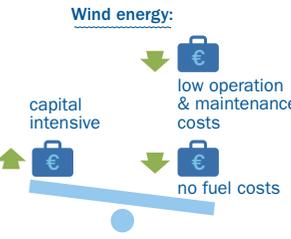
# JOBS AND GREEN GROWTH



"Strong renewables growth to 2030 could generate over 3 million jobs, including in small and medium sized enterprises."

*European Commission, Communication - Renewable energy: a major player in the European energy market, June 2012*

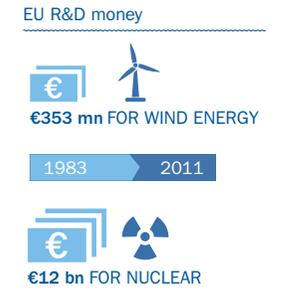
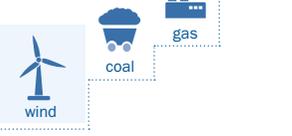
# FINANCE



# COSTS, ENERGY SUBSIDIES AND ELECTRICITY PRICES

Onshore Wind energy is becoming competitive with fossil fuels. Taking into account the fuel and CO<sub>2</sub> costs, wind energy costs less than the energy generated by coal and gas and is considerably cheaper than nuclear.

With a higher carbon price and the right market design, onshore wind could compete with those technologies.



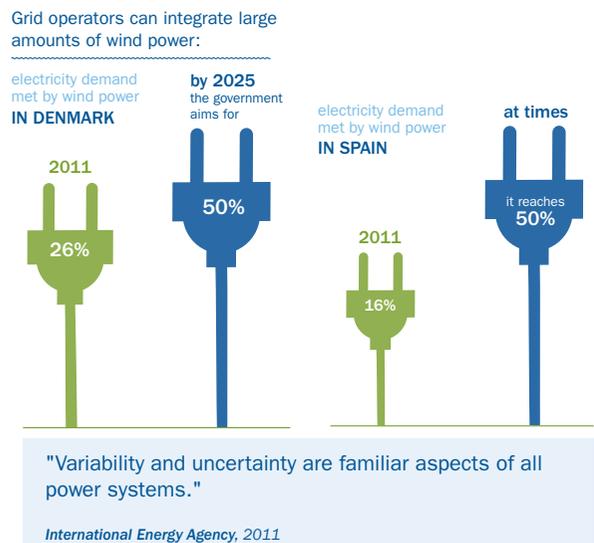
**EWEA**  
THE EUROPEAN WIND ENERGY ASSOCIATION

EWEA is the voice of the wind industry, actively promoting wind power in Europe and worldwide. It has over 700 members from almost 60 countries making EWEA the world's largest and most powerful wind energy network.

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

- In 2012, wind energy avoided €9.6 bn of fossil fuel costs. Wind energy will avoid €22-27 bn of fuel costs a year by 2020, increasing to €47-51 bn by 2030.
- Wind power can drive down wholesale electricity prices. This is already happening, according to credit agency Moody's and financial analysts UBS.
- The EU's oil and gas import bill in 2012 is estimated at €470 billion - 3.4% of the EU's GDP. This bill has increased by €200 billion over the past three years.

# EUROPE'S ELECTRICITY SUPPLY



- The power grid needs to be reinforced and better interconnected to improve security of supply - regardless of the source of energy - and in order to improve competition in the electricity market, which would bring down prices.
- For an efficient integration of wind and other renewables, intraday and balancing power markets are needed, with demand-side management.
- Reinforcing key parts of the grid will provide massive savings of €1-2 billion per year.

## WIND ENERGY & NATURE



NO fuel  
NO greenhouse gases  
NO air pollution  
NO toxic substances  
NO water pollution  
MINIMAL water use

Birdlife, WWF, Greenpeace, Friends of the Earth and others **support wind energy**. Birdlife recently stated that **climate change** was the single **largest threat** to birds and wind and renewables were a **clear solution** to climate change.

The potential environmental effects of a wind farm are assessed before construction is allowed to start.

"Climate change poses the single greatest long-term threat to birds and other wildlife. Wind power is the most advanced renewable technology, available at a large scale, over this time period. The RSPB supports a significant growth in offshore and onshore wind power generation in the UK."

Royal Society for the Protection of Birds (RSPB)

## PUBLIC OPINION

Eurobarometer survey (2013)

EU citizens:

70%  
wind energy



A 2013 Eurobarometer study found that 70% of EU citizens think renewable energy should be prioritised as an energy option for the next 30 years.



- The growing participation in the annual Global Wind Day (15 June) shows **support for and interest in wind energy is increasing**. [www.globalwindday.org](http://www.globalwindday.org)
- The Global Consumer Wind Study 2012 by Vestas and TNS Gallup shows that **85% of consumers surveyed want more renewable energy**.

## HEALTH



Noise levels from turbines meet **World Health Organisation (WHO)** recommendations for residential areas.

There is **no evidence** "that the audible or sub-audible sounds [including infrasound] emitted by wind turbines have any **direct adverse physiological effects**", concluded a study, 'Wind Turbine Sound and Health Effects', conducted in 2009 by a panel of medical professionals from the US, Canada, Denmark, and UK.

The most audible sound of wind turbines is a **light swishing** - and usually the wind itself is louder.

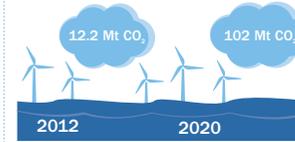
Wind energy emits **no particles**, unlike fossil fuels, which severely affect human health.

## OFFSHORE

offshore wind energy capacity



offshore wind power avoided offshore wind power is projected to avoid

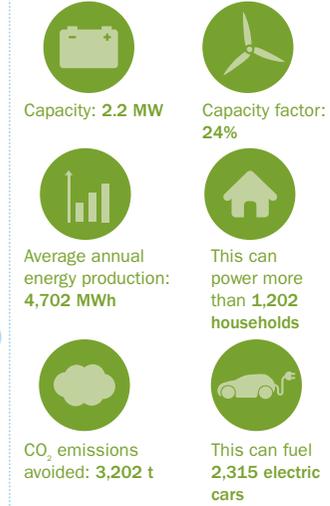


- In 2012, **Europe** was the **world's leader** in offshore wind energy with more than **90%** of the world's installed capacity.
- EWEA estimates that approximately a **quarter of Europe's wind energy** could be produced offshore in 2020.
- In 2012 the **average size** of offshore wind turbines installed and grid connected reached **up to 4.6 MW**, a 11% increase on 2011.
- In 2011 the average size of offshore wind projects was 199 MW. In 2012 it was 271 MW - a 36% increase.
- Offshore wind farms can provide **regeneration areas for fish and other sea creatures** because of reduced trawling activities and because the foundations act as an artificial reef, encouraging the creation of new habitats.

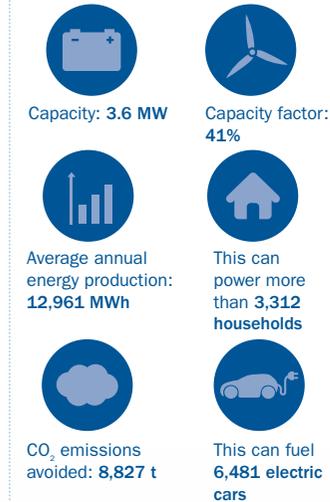
- For every kWh of wind energy used, approximately **696g of CO<sub>2</sub>** will be avoided.

Wind energy produces no greenhouse gas emissions during its operation. A turbine will produce up to **80 times more energy** than is used to **build, install, operate, maintain and decommission** it.

## The average European ONSHORE wind turbine



## The average European OFFSHORE wind turbine



Annual investments in offshore wind farms are expected to increase



## Capacity (MW)

The ability to generate electricity is measured in watts. To describe the capacity of wind turbine or other power plants, the terms kilowatt (kW = 1,000 watts), megawatt (MW = 1 million watts), and gigawatt (GW = 1 billion watts) are most commonly used.

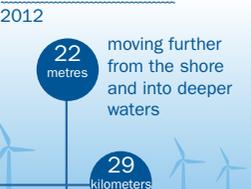
## Electricity production (MWh)

Electricity production and consumption are measured in kilowatt (1,000 watts) hours per hour (kWh). One 50 watt light bulb left on for 20 hours consumes one kilowatt-hour of electricity.

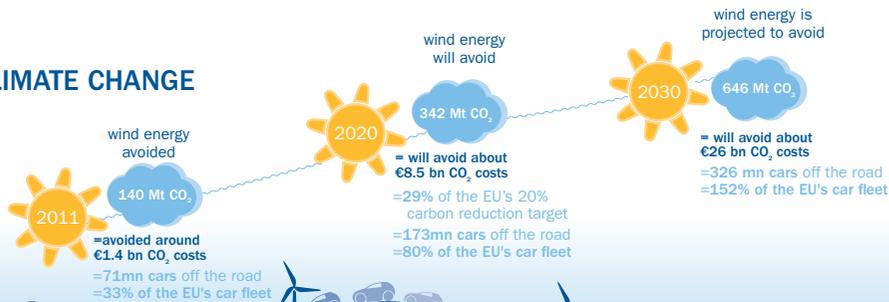
## Capacity factor

A modern wind turbine is available to produce electricity 80-98% of the time, but it generates different outputs depending on the wind speed. During one year, it will typically generate about 24% of the theoretical maximum output (41% offshore), which is the capacity factor (conventional power stations: 50-80%). More comparable with other sources of electricity is the overall efficiency, the relationship between the energy input (the wind) and the energy output (the electricity). The efficiency of a wind turbine has a theoretical limit of 59% (compared to coal with about 35% and gas with about 50%).

Average water depth and distance to shore of offshore wind farms



## CLIMATE CHANGE



- For every kWh of wind energy used, approximately **696g of CO<sub>2</sub>** will be avoided.

Wind energy produces no greenhouse gas emissions during its operation. A turbine will produce up to **80 times more energy** than is used to **build, install, operate, maintain and decommission** it.