# Renewable energy

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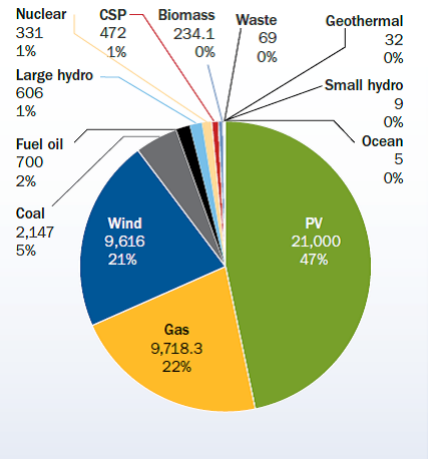
## Renewable energy is the future: nuclear energy is the past

Renewable energy is a viable option for replacing the world's dirty, dangerous and terribly expensive nuclear reactors. The nuclear disaster at Fukushima in March 2011 again exposed the inherent dangers of nuclear reactors. In Japan, the triple meltdown of reactors following the tsunami and earthquake that hit the eastern shore of Japan was caused by the failure of the human institutions that were supposed to protect the public from nuclear accidents.

Institutional failure has been the main cause of all past nuclear accidents, including the accident at Three Mile Island in the US and the disaster in Chernobyl in Ukraine. Similar institutional failures are a repeated in many countries with reactors, putting millions of people who live near reactors at risk. Fukushima is a warning to the rest of the world.

## Replacing nuclear with renewable energy

New installed capacity of renewable power – especially wind and solar photovoltaics – is much larger than new installations of nuclear power by an order of magnitude for over a decade. In fact, the overall capacity of the fleet of nuclear power plants is in constant decline. For example, in the EU over 6,000 megawatts (MW) of installed nuclear reactor capacity was retired during 2011, and only 311MW of new capacity was added to the electricity grid. In the same period, over 30,000MW of new wind and solar capacity was connected to the grid. The Greenpeace Global Energy [R]evolution scenario shows that sources of renewable energy could supply 38% of global power demand by 2020 and 95% by 2050.




Source: EWEA 2012

The growth of renewable energy has been unprecedented over the past 25 years. Wind and solar have maintained double-digit growth rates since 2000. No other segment of the energy sector has grown this fast. Wind power is the most economic new power plant technology, due to reduced installations costs, no fuel costs and construction time of less than one year, compared to over 10 years to construct nuclear power plants. In addition to replacing nuclear, renewables could lead to phasing out of over 90% of fossil fuels in the power and heating sectors by 2050, while in the transport sector the use of fossil fuels could be reduced from the current 98% down to about 30% by 2050.

Countries can create an indigenous, locally produced energy supply based on renewables and cut the drain on their resources of buying energy. Since renewable energy doesn't have fuel costs, the global savings on fuel costs could be $282bn a year through to 2030 and about $964bn a year from 2030 to 2050.

**Some examples of the success of renewables:**

- Spain generated more than half its electricity demand on 9 November 2009 with wind energy.
- Spain's wind energy overtook coal as its third-largest producer of power in 2009.
- During 2010, China built roughly one windmill every hour.
- The wind industry installed just over 41,000MW of new clean, reliable wind power in 2011, bringing the total installed capacity globally to more than 238,000MW at the end of last year. This represents an increase of 21%, with an increase in the size of the annual global market of just over 6%.
- Today, about 75 countries worldwide have commercial wind power installations, with 22 of them already passing the 1 gigawatt (GW) level.
- More than half of all new wind power was added outside the traditional markets of Europe and North American in 2010, for the first time.
- New Zealand generates 10% of its electricity needs from geothermal power.
- Portugal's renewables went from 15% to 45% in its electricity grid in just five years.

## Nuclear energy and the conflict with renewables

The nuclear industry often claims that nuclear energy is needed to combat climate change. This is wrong. Research by Greenpeace and others shows that continuing to operate nuclear plants prevents the large-scale integration of renewable energy into the electricity grid. Nuclear also channels investment away from renewables where investment can make a difference in fighting climate change.

The argument that nuclear power could help fight climate change is seriously flawed. If the entire global fleet of reactors was quadrupled, a completely far-fetched scenario, this would lead to, at most, a 6% reduction in global $CO_2$ emissions, and only after 2020, well beyond the deadline that climate scientists have set for avoiding catastrophic climate change.

A key problem with nuclear power is that it must run around the clock with a constant output capacity, which is called ‘baseload’. The nuclear industry presents this as an advantage, which it is not. First, a permanent power generation mode – independent from the actual need in the power grid – is needed to generate as much electricity as possible to make generation costs low. If the operational hours were reduced to half, the cost would double. So the ‘baseload’ strategy is more an economic than a technical concept.

Second, unlike modern gas turbines, which can react within seconds to fluctuating demand in the electricity grid, nuclear power stations are unable to react to the demand curve, and demand must follow the operation mode of nuclear power plants. This leads to the inefficient use of electricity. In almost all countries with a winter heating demand, a large share of nuclear in their power mix goes hand in hand with the expansion of highly inefficient electrical heating systems. For example, France, with about 80% nuclear in its power mix, had an overall power demand of 101GW on a cold day in February 2012, while Germany, which has 15 million more people than France, with 20% nuclear in its power mix had a demand of just over 50GW on the same cold day. (Bunesnetzagentur – German Grid Authority – 9 February 2012). Germany has far better insulated houses and a significantly lower share of electrical heating systems.

The inflexibility of nuclear reactors has a negative effect on renewables. For technical and safety reasons, nuclear plants cannot easily be turned down so wind operators are often told to shut off their generators to give priority to electricity from nuclear plants, an economic and ecological mistake. As a result, nuclear energy blocks the development of renewable energy technologies by commandeering space on the electricity grid and reducing income for wind operators.

Renewable power plants can be built much more quickly than nuclear and are safe. In addition, renewables can replace several times more of the carbon that is leading to climate change for the same cost as nuclear and at a far faster pace.

At present, over 90% of the Japan’s reactors are offline. The rest may be offline by May 2012. Given that only three of 54 reactors are operating and there have been no significant problems with the electricity supply, Japan has shown that it can survive without nuclear power.

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