

# Renewable energy vs nuclear power

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## Renewable energy is the future

Renewable energy has grown at an impressive rate over the past 25 years. Wind power and solar energy, two of the key sources of renewable energy, have outpaced the growth of every other segment of the energy sector, maintaining double-digit growth since 2000.

The strong growth rate for renewable energy has made it a viable option for replacing the world's dirty, dangerous and hugely expensive nuclear reactors. In 2011 alone, over 30,000MW of new wind and solar capacity was connected to the electricity grid.

## Nuclear power is the past

The development of nuclear energy has been in decline for years. In 2011, 6,000 megawatts (MW) of nuclear energy was retired in the EU. Only 311MW of new capacity from nuclear was added to the grid.

With the rise of renewables, the world no longer needs to live with the inherent dangers of nuclear power, which were once again exposed in Fukushima, in March 2011. The triple meltdown was and subsequent contamination of the land, air, and sea far from the plant 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 repeated in many countries with reactors. Hundreds of millions of people live near reactors: they are all at risk. Fukushima is a warning to the rest of the world.

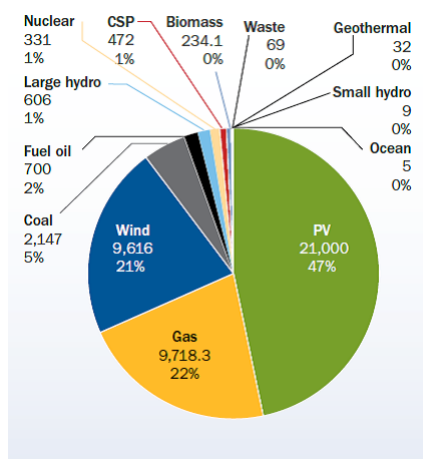
## Replacing nuclear with renewable energy

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.

In Japan, the government has wasted valuable time since the Fukushima disaster. The Energy [R]evolution for Japan, released in September 2011, shows that the country could have permanently switched off all its reactors in 2011, and could increase electricity production from renewables to 47,000MW from 3,500MW by 2015.

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 build 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 reach \$282bn US dollars a year through to 2030, and about \$964bn a year from 2030 to 2050.



Source: EWEA 2012

Some examples of the success of renewables:

- In last quarter of 2012 wind was the main electricity producer of Spain
- 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 2011. 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 power and the conflict with renewables

Often the nuclear industry wrongly claims that nuclear energy is needed to combat climate change. The serious flaw with the industry's argument is that if the world's reactors were quadrupled – a far-fetched scenario to say the least – at best it would cut global CO<sub>2</sub> emissions by a mere 6%, and only after 2020 – well beyond the deadline that climate scientists have set for avoiding catastrophic climate change. Operating nuclear plants prevents the large-scale integration of renewable energy into electricity grids, according to research by Greenpeace and others. Nuclear also robs investment away from renewables where investment can actually make a difference in fighting climate change.

## Operational problems of nuclear power

Nuclear power must run around the clock with a constant output capacity, which is called "baseload". This is a key problem with nuclear. 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 concept than a technical one.

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, only two reactors out of 54 reactors in Japan are online, and there have been no significant problems with the electricity supply. Japan has proven that it can survive without nuclear power.

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