

Nuclear energy: a major asset in the fight against climate change



A fossil fuel power plant

Reducing the CO₂ emissions that cause climate change is one of the great social, economic and environmental challenges of our time. Promoting a global low-carbon economy is a major priority. The nuclear industry, unlike its fossil fuel counterparts, emits virtually no greenhouse gases (GHG). But nuclear's environmental credentials go further than that.

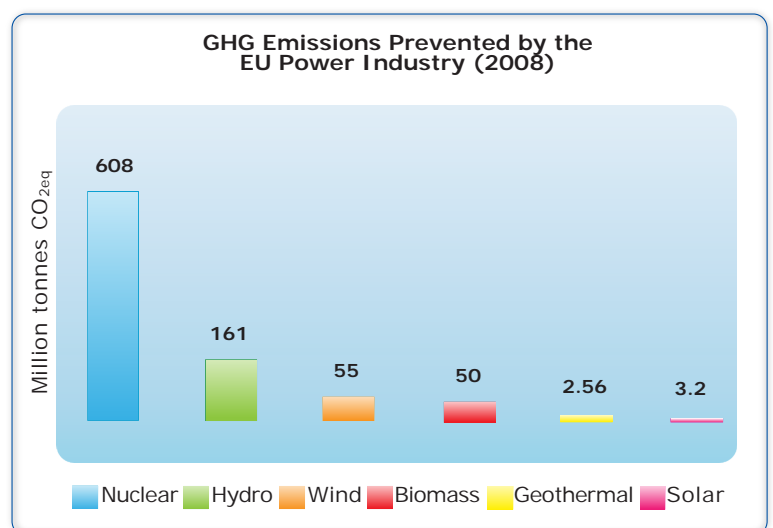
Energy production and electricity generation are fundamental factors in the global climate change equation and are crucial when it comes to reducing the emission of GHG that cause it. According to the European Commission, energy production accounts for 80% of all emissions in the EU.

"I now turn to nuclear power, which is enjoying growing acceptance as a stable and clean source of energy that can help to mitigate the impact of global warming. Many Member States have made it clear that they attach great importance to launching new nuclear power programmes, or expanding existing programmes." Yukiya Amano, IAEA Director General, 9 December 2009.

Negligible life cycle emissions

Nothing is entirely CO₂ free. Throughout the nuclear energy cycle, from construction and operation to decommissioning, GHG emissions are negligible compared with their fossil-fuel equivalents. They are comparable to those resulting from renewable energy sources. Furthermore, the GHG emissions that occur during the nuclear energy cycle result primarily from fossil fuel combustion during the uranium enrichment and plant construction phases. But even these sources of emissions are expected to decline as new technologies come on board.

Nuclear energy, unlike its fossil fuel counterparts, emits no GHG while it is generating electricity. As a non-CO₂ emitting energy source nuclear saved



Source: Eurostat



nearly 608 million tonnes of CO₂eq (equivalent) emissions in Europe in 2008.

To put it into perspective, the overall Kyoto GHG emissions reduction target for the EU is approximately 446 million tonnes CO₂ eq per year. In 2007, the EU made a commitment to reduce 20% of CO₂ emissions (compared to 1990 levels) by 2020. This figure could rise to 30% if an international agreement is reached. Furthermore, nuclear accounts today for two thirds of Europe's CO₂-free generated electricity.

Looked at globally, nuclear energy saves annually about 2.1 billion tonnes of CO₂eq emissions. This compares with the UNFCCC (United Nations Framework Convention on Climate Change) estimate that the Kyoto Protocol's Clean Development Mechanism (CDM) will bring about an emissions reduction of 1.2 billion CO₂eq by 2012.

Nuclear does not emit any of the pollutants, like sulphur dioxide and nitrogen oxide, that cause acid rain, because it does not burn fossil fuels. In fact, thanks to nuclear 4.8 million tonnes of sulphur dioxide and 2.6 million tonnes of nitrogen oxides are avoided each year in the EU. This constitutes a major contribution to maintaining Europe's air clean.

When you consider the full industrial cycle from the construction of a nuclear power plant, through its operational duration, to its decommissioning, nuclear energy has one of the lowest impacts on the environment of any energy source because it emits virtually no air or water-borne pollutants and isolates



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Radioactivity sampling from water, St Laurent NPP (France)

its waste from the environment. Before a reactor begins operating, an environmental impact assessment is carried out to examine all potential impacts of the plant's operation on the surrounding community, air quality, water quality, flora and fauna.

We are convinced that the new sustainable economy of the European Union requires notably decarbonising our electricity supply...nuclear power can complete the range of low-carbon energy options. José Manuel Barroso, European Commission President, 8 March 2010.

Plants are designed, built and regulated to prevent radioactive emissions. The average level of ionising radiation registered around a nuclear power plant is limited to a fraction of the natural background radiation level and, in the course of a year is less than 0.04 micro-sieverts (mSv). This compares with 0.1 mSv exposure every time you have a chest x-ray; an average natural radiation level worldwide of 2.4 mSv per year or 10.0 mSv each time you have a hospital scan.

Exhaustive monitoring and controls by public authorities and independent laboratories ensure that emissions remain well within the limits stipulated by international guidelines.

The nuclear industry is constantly applying the latest technological innovations to optimise its environmental and operational performance. This will help it reduce still further its carbon footprint applying the latest technological innovations.



Almaraz NPP, Spain