

Nuclear power is the answer to the world's energy problems

Introduction

The debate about nuclear power for electricity generation is one that has run for decades, with ever changing terms of reference. The 1970s and 1980s saw a significant expansion in numbers of nuclear power plants in Europe and the US and a parallel growth of anti-nuclear movements which focused on three different areas: health considerations, associated with fears about exposure to radiation; political objections (principally that nuclear fission technology for generating electricity is closely associated nuclear weapons); and environmental objections which, in the 1970s focused on the problem of the safe disposal of radioactive waste, although the emphasis was to change in the wake of two nuclear accidents: The Three Mile Island incident in the US 1979^[1] and the explosion at Chernobyl in the USSR in 1986^[2]. However, in the 1990s there was a big shift in environmental thought as climate change became the dominant concern of greens and this led to a major split in opinion on nuclear energy, with many environmentalist groups remaining anti-nuclear^{[3],[4]} while some prominent environmentalists became advocates of nuclear power as a part of the solution to greenhouse gas emissions^{[5],[6]}.

Today, the discussion has shifted considerably again following the Fukushima nuclear disaster in Japan in April 2011^[7] as concerns over the safety of nuclear power plants are once more at the forefront of people's minds^[8]. The governments of some countries, such as Italy^[9] and Germany^[10], have decided to discontinue their nuclear power programmes in the wake of the disaster. In contrast, in July 2011, despite strong opposition, the go-ahead was given to start work on Britain's first new nuclear power station in 20 years^[11].

Some key questions remain over the part that nuclear power should play in a strategy for the future of energy generation. Considering its potential to contribute to reduced carbon emissions is the nuclear a road we should go down? Or are the risks too high? If we do not, how are we going to provide the energy we need?

[1] http://www.encyclopedia.com/topic/Three_Mile_Island.aspx

[2] <http://environment.about.com/od/chernobyl/p/chernobyl.htm>

[3] <http://www.greenpeace.org.uk/nuclear/problems>

[4] http://www.foe.co.uk/campaigns/climate/issues/nuclear_index.html

[5] http://findarticles.com/p/articles/mi_m4070/is_228/ai_n21067828/

[6] <http://ecolo.org/base/baseen.htm>

[7] http://www.economist.com/blogs/babbage/2011/05/japans_nuclear_disaster

[8] <http://www.bbc.co.uk/news/world-13047267>

[9] <http://online.wsj.com/article/SB10001424052702303714704576383452729642270.html>

[10] <http://www.telegraph.co.uk/earth/energy/nuclearpower/8546178/Germany-to-shut-all-nuclear-reactors-by-2022.html>

[11] <http://www.guardian.co.uk/environment/2011/jul/29/planners-approve-nuclear-power-station-preparatory-work>

Arguments for nuclear power

There are three key elements to the pro-nuclear argument: The first is that nuclear energy is cheap and reliable^[12] which puts it in a favourable light compared to some renewable sources such as wind energy which is still expensive to produce^[13]; the second is that it is preferable to fossil fuel sources of energy because of carbon dioxide emissions^[14]; and third is that we need nuclear to meet our present and future energy requirements since we are not going to be able to get sufficient power from renewables in the near future. In the UK about 14% of our electricity is generated by nuclear power plants^[15], although this figure is artificially low when you consider that the UK buys electricity in from France, where 80% of electricity comes from nuclear sources. By comparison less than 5% of the UK's energy currently comes from renewable sources and even the most ambitious projections

suggest that this figure could rise to 35% by 2020^[16]. Thus the pro-nuclear lobby argue, if we are to phase out our use of coal, oil and gas as energy sources to meet greenhouse gas emissions targets then we are going to have to maintain or even increase our use of nuclear^[14]. Another key argument for building more nuclear power stations is the need for 'energy security': to avoid having to rely on supplies of oil and gas from countries such as Russia and Iran which are considered unstable^[17].

The advocates of nuclear power emphasise the remarkable safety record of the nuclear industry, beating all other major energy sources in terms of total deaths and deaths per quantity of energy produced each year^[18]. They point out that even in the case of the famous incidents cited above, the consequences were not that great: In the case of Three Mile Island there were no injuries or adverse health effects^[19], the Chernobyl disaster resulted in only 64-75 deaths over a nineteen year period^[20] and so far there have been no fatalities associated with Fukushima^[21].

Finally, advocates of nuclear power point to a relatively safe and clean alternative to uranium-based nuclear power: reactors based on thorium, a technology pioneered in the 1960s but largely ignored or forgotten until a recent reawakening of interest^[22].

[12] <http://www.earthscantv.us/articles/%e2%80%9cnuclear-energy-is-cheap-and-reliable%e2%80%9d.html>

[13] http://www.bbc.co.uk/climate/adaptation/wind_power.shtml

[14] <http://thegreatdebate.org.uk/TiltingProc.html>

[15] http://www.bbc.co.uk/climate/adaptation/nuclear_power.shtml

[16] <http://www.wired.co.uk/news/archive/2011-06/14/35-percent-renewable-energy-in-2020>

[17] <http://www.globalissues.org/article/595/energy-security>

[18] <http://planetsave.com/2008/01/15/devils-advocate-10-green-arguments-for-nuclear-power/>

[19] <http://www.world-nuclear.org/info/inf36.html>

[20] <http://www.iaea.org/Publications/Booklets/Chernobyl/chernobyl.pdf>

[21] <http://www.thenewamerican.com/tech-mainmenu-30/environment/9537-no-fukushima-radiation-deaths-no-surprises>

[22] <http://www.ft.com/cms/s/2/52d7bde6-e401-11e0-bc4e-00144feabdc0.html#axzz1YsnndyMZ>

Arguments against nuclear power

The anti-nuclear lobby still use the main arguments outlined as part of their case: radioactive waste remains dangerous for thousands of years; civil nuclear power stations can and have been used to generate materials for nuclear weapons; and radioactivity harms the people who live near nuclear power plants; and, even if the risk is small, the potential consequences of accidents are immense. However these have been augmented by other arguments in recent years.

One argument, which is cited in response to claims about the green benefits of nuclear power is that it is far from carbon free. Fossil fuels are used at various stages in the nuclear cycle such as in mining and shipping uranium ore; in converting uranium ores into forms suitable for power generation and in disposing of radioactive waste^[23]. There is also the issue of uranium mining, a notoriously dirty business in itself, major health issues for uranium miners^[24] added to which there is the danger of contamination when transporting uranium.

After the attack on the World Trade Center in 2001 a major fear that came to the fore was that nuclear power stations could be subject to terrorist attack^[25] or that shipments of waste or fuel could be hijacked and used to manufacture a 'dirty bomb'^{[26],[27]}.

Some anti-nuclear campaigners, particularly those in the green camp, emphasise the alternatives, arguing that there are safer, cleaner ways of generating electricity such as wind turbines, solar power, wave turbines and hydroelectricity and that much can be gained through energy efficiency measures. They argue runs the cost of setting up these alternatives may be very high but that it is worth paying that cost for a safer, cleaner world. Others in the environmental movement argue that it is simply bad for humanity to have plentiful supplies of energy^[28].

- [23] <http://environmentalresearchweb.org/blog/2010/09/how-carbon-free-is-nuclear-1.html>
- [24] <http://www.wise-uranium.org/uhm.html>
- [25] http://www.nuclearpolicy.info/docs/consultations/NFLA_Scot_Security_EnRev06.pdf
- [26] <http://www.cdi.org/terrorism/nuclear.cfm>
- [27] http://www.globalsecuritynewswire.org/gsn/nw_20100511_1219.php
- [28] <http://www-formal.stanford.edu/jmc/progress/anti-nuke.html>

Other Links

“Why the UK must choose renewables over nuclear: an answer to Monbiot” by Jonathon Porritt, , *The Guardian*, July 2011: <http://www.guardian.co.uk/environment/blog/2011/jul/26/george-monbiot-renewable-nuclear>

“Geo-engineering, nuclear power and climate change: playing God is good for the planet” by Mark Lynas, *The Telegraph*, July 2011: <http://www.telegraph.co.uk/science/science-news/8631604/Geo-engineering-nuclear-power-and-climate-change-playing-God-is-good-for-the-planet.html>

“Nuclear vs climate change: the clash of the alarmists” by Frank Furedi, *Spiked online*, June 2011: <http://www.spiked-online.com/index.php/site/article/10567/>

“Unsure about nuclear power? Here's the five questions you must answer to decide” by Damian Carrington, *The Guardian*, April 2011: <http://www.guardian.co.uk/environment/damian-carrington-blog/2011/apr/21/chernobyl-nuclear-power-fukushima>

“Why Fukushima made me stop worrying and love nuclear power” by George Monbiot, *The Guardian*, March 2011: <http://www.guardian.co.uk/commentisfree/2011/mar/21/pro-nuclear-japan-fukushima>

“Uncertainty surrounds Japan's nuclear picture” by Richard Black, March 2011: <http://www.bbc.co.uk/news/world-12723092>

“Getting Real About Energy” Video of *The Great Debate* held at European Geosciences Union General Assembly 2010: <http://www.cntv.at/EGU2010/?modid=18&a=show&pid=95>

“Viewpoint: Fukushima makes case for renewable energy” by Antony Froggatt: <http://www.bbc.co.uk/news/world-asia-pacific-12960655>

Nuclear opposition ‘has added to carbon emissions’, Nov 2010: http://www.lowcarboneyconomy.com/profile/the_low_carbon_economy_ltd/low_carbon_blog/nuclear_opposition_has_added_to_carbon_emissions/11615

Proceedings of *the great sustainable energy debate*, Oct 2008: <http://rcenortheast.eu/EnergyDebate1.html>

Energy Generation in the New Millennium: Proceedings of a debate held in March 2007: <http://thegreatdebate.org.uk/EnergyGenProc.html>

Frequently asked questions about nuclear energy by John McCarthy: <http://www-formal.stanford.edu/jmc/progress/nuclear-faq.html>

“Yes please? No thanks? For and against nuclear power.” *The Independent*, Nov 2005: <http://www.independent.co.uk/news/uk/politics/yes-please-no-thanks-for-and-against-nuclear-power-517402.html>

Nuclear Waste Policy Dilemma – the First Fifty Years: <http://www.state.nv.us/nucwaste/yucca/dilemna.htm>