

# Everything you've always wanted to explain about nuclear power, but were afraid to do...

## *Questions and answers - Myths and misunderstandings about nuclear energy*

When collecting signatures for the *1 Million against Nuclear Power* campaign, you will meet all kinds of arguments in favor of nuclear energy. In this double-paged sheet of *Questions and answers* we explain why these arguments are invalid.

### 1-*"Nuclear energy is experiencing a comeback"*

There is a lot of political talking about nuclear being the solution to all our energy problems but in practice not much happens. In 1989 there were 172 operating nuclear reactors in Europe. Now there are 15% less: 147. Since the Chernobyl disaster in 1986 only one construction process for a nuclear power plant has started in Europe: the prototype EPR reactor in Olkiluoto, Finland. Due to technical difficulties it is already 9 months behind schedule, barely a year since work began. Other plans (France, UK, Baltic countries) are still only at the political stage.

### 2-*"We need nuclear energy because we will not have enough energy in the future"*

Nuclear power plants produce only electricity. The present share of nuclear energy in the total global energy consumption is only 2,7%. The number of nuclear power plants worldwide is 442. At the same time there is a huge unused potential of energy saving, energy efficiency and renewable energy, which in combination are much cheaper and definitely much safer than building new nuclear power plants.

### 3-*"Nuclear energy is an infinite source"*

Nuclear energy makes us dependent on uranium, which is a limited resource. If we would maintain the nuclear energy production at the current level, we would have dug up all (currently and expected) accessible uranium in 50 years. There is more uranium on the planet, but it is either very hard and expensive to get, or not usable for electricity production. The associated energy use and CO<sub>2</sub> emissions would rise steeply. Originally, nuclear energy was supposed to have a closed energy production cycle, using fast breeder technology. This technology failed however and the big European fast breeders are closed down (the 'Superphenix' in France) or were never completed (Kalkar in Germany).

### 4-*"There are new solutions for dealing with radioactive waste"*

The suggested solutions have been at a 'very promising research' stage for decades. One suggestion ('transmutation') entails separating the radioactive isotopes from the waste and rework these separated parts into something less dangerous, that is: dangerous for a shorter time span. It is still not possible to isolate isotopes and moreover, even if it ever will work, it is not fit for the present generation of waste. It will need special, new-to-build reactor types. In other words: the high-level radioactive waste that is produced today will be with us for 240.000 years. No final storage has been developed in any country so far; often the waste is stored near the reactor or in temporary bunkers. Experiments with storing low-level radioactive waste in earth layers have not proven fully safe so far.

### 5-*"Nuclear energy is cheap"*

Nuclear energy is cheap for the individual consumer but costs are paid through the tax bill. The costs for decommissioning are high, and although most reactors have a fund for this, experience so far has shown that these are by far not sufficient. The cost for safeguarding radioactive waste for more than hundred thousand years cannot even be calculated. Moreover, nuclear energy receives a lot of subsidies in many different ways. There is a lot of public money going to nuclear research, to safety investments, and to cheap loans to the nuclear industry. It is very difficult to find private investors in the liberalized energy market that are willing to provide the huge amount of money necessary for building a new nuclear power plant. Therefore public financial participation is considered essential, e.g. in the form of guarantees. In that way investment risks befall on society, whereas profits go to the privatized sector. Of the total annual energy subsidies in the EU between 1990 and 1995, 23% went to nuclear energy and only 7% to renewable energy sources.

### 6-*"We need nuclear energy to combat climate change"*

During the complex production cycle of nuclear energy production (uranium mining, enrichment, production, reprocessing, decommissioning, waste storage) a lot of energy is needed, energy that mostly comes in the form of fossil energy. Nuclear energy is a very energy-intensive way of producing electricity. For the common energy production of 1 kWh of electricity and 2 kWh of heat, the amount of greenhouse gasses emitted during the nuclear (+ oil-fired for heat) variant of this complex production process is nearly as much as that of energy production by a co-generation

gas-powered plant. If we were to replace older fossil-fuel burning power stations with new cogeneration systems, for the same amount of electricity and heat generation the total greenhouse gas emissions would be similar to those in a system based on electricity from nuclear power and heating from fossil fuels. Full commitment to energy saving, energy efficiency and renewable energies are faster and cheaper ways to combat climate change. See [http://www10.antenna.nl/wise/621-22/621-22\\_en.pdf](http://www10.antenna.nl/wise/621-22/621-22_en.pdf) for more background.

7-*"The consequences of the Chernobyl accident (the explosion in a nuclear power plant in the Ukraine 20 years ago) are exaggerated"*

It is impossible to calculate the number of victims of this biggest nuclear disaster, because illnesses such as cancer can occur decennia after exposure to radiation and can have multiple causes. The estimates differ from 40 (the direct victims at the explosion) to 100.000 deaths. Last year the IAEA (International Atomic Energy Agency, a UN agency for the promotion of nuclear energy) has published a report that played the number of victims down to 4000. This report is now corrected by co-publisher WHO (World Health Organization of the UN) that found another 5000 victims 'overlooked' in the original report. There are also recent reports, one of Greenpeace counting 93.000 victims and one of European Greens (TORCH: The Other Report on CHernobyl) counting 30.000 to 60.000 cancer victims. The differences are all within the range of scientific uncertainty about how much radiation was emitted at the explosion and how much radiation is fatal.

There is also much suffering and health damage caused by the economic disruption of the accident and then there are those who are surviving after surgery and with heavy medication, but are not counted in these reports.

8-*"Chernobyl' cannot happen again. Nuclear power stations are much safer nowadays"*

All nuclear power stations in Europe are based on technologies from the 1960s and 1970s. Since the Chernobyl accident a lot of money is spent on improving their safety. Nevertheless, there have been 22 major accidents since 1986 and many small ones. For example, in 2005 twenty metric tons of uranium and 160 kilograms of plutonium dissolved in 83,000 liters of nitric acid leaked undetected over several months from a cracked pipe into a stainless steel sump chamber inside the Thorp nuclear fuel reprocessing plant in the UK. The partially processed spent fuel was drained into holding tanks outside the plant. In another case, in 2002, there was a near-disaster in the Davis-Besse reactor in the United States, where the steel reactor head was found punctuated and only a few inches away from meltdown. A major accident can still happen every day.

9-*"We need nuclear energy because there is a growing energy demand, notably from India and China"*

China has announced that it wants to build 30 new reactors but has not in any way clarified where the financial or technical capacity should come from. China is well known for forecasting many nuclear power plants over the last 25 years but so far, it has only built 11, from which 3 are very small. In India, the amount of electricity produced by its 14 nuclear power plants is still smaller than that from its wind power. India's announced nuclear expansion is mainly for military purposes –India wants to expand its nuclear weapons arsenal and is supported in this by the present American government.

Both India and China have a huge unused potential of renewable energy from wind, sun and small hydropower, much more suitable to provide electricity to the poor rural population than expensive, large-scale nuclear power.

10-*"Maybe we should not build new nuclear power plants but it is not a problem to leave the old ones open"*

Lifetime extension of aging nuclear power plants is the trend in the Western world. It is supported by politicians who in this way hope to fulfill Kyoto Treaty obligations and/or try to evade difficult decisions about a reliable and sustainable energy supply for the future. It is a very risky development, because old reactors suffer from aging problems such as corrosion and erosion. Although regular safety checkups are carried out, there have been many near-accidents and emergency shut downs in old power plants over the last years.

11-*"A good control on the Non-Proliferation Treaty (NPT) will prevent the spread of nuclear weapons through nuclear energy"*

The part of the NPT which says that all nuclear weapon states should work on abolition, seems to be forgotten by the 'established' nuclear weapons states (France, United Kingdom, Russia, China and United States) altogether. At present, the United States are undermining the NPT by promising nuclear technology to India to develop its 'peaceful' nuclear program, although India has already tested nuclear weapons. At the same time, technology for the enrichment of uranium is denied to Iran because it would use it for nuclear weapons. This proves that nuclear energy and nuclear weapons cannot be separated. It is the same technology that produces both, the same material that is used, and the same scientists are working on it. Over and over, nuclear knowledge and material is leaked to non-nuclear states, and the IAEA (the UN body overlooking the NPT) has so far found no way to prevent it. If we want to get rid of nuclear weapons, we must stop producing nuclear energy.

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PS See also <http://www.million-against-nuclear.net/background/6reasons.htm>