



Nuclear Energy: What part of the solution to Climate Change?

Helga Kromp-Kolb, Professor, Institute of Meteorology, University for Natural Resources and Applied Life Sciences, Vienna

In the past years the issue of Nuclear Energy has been raised at various occasions, in particular with regard to Climate Change and the necessity to reduce greenhouse gas emissions and in view of the foreseeable end of cheap oil ("Peak Oil") and their global implications. The necessity to urgently and significantly reduce greenhouse gas emissions has become increasingly accepted. This, together with rising fuel prices over the last months as well as the wish for security of energy supply makes a case for reducing the use of fossil fuels, but it does not follow that electricity from nuclear power is a viable alternative. There are several reasons for this:

- Climate change science asks for a peaking of GHG emissions within a decade and reductions of 15-30% by 2020. Nuclear Energy can not make a significant contribution to these aims: Limits to development potential and speed, availability of capital and qualified staff curb the possibilities of Nuclear Energy, even in case of strong political backing. In fact, the coming decade will more likely see a continuing reduction than an increase of the nuclear contribution.
- Nuclear Energy is not the most cost effective option to reduce GHG emission at the present price level. Price increases for nuclear energy due to increasing uranium prices, but also due to the dramatic increase in construction costs for new plants will make nuclear even less attractive. At the same time the learning curves for renewables bring their costs down.
- As compared to energy efficiency, Nuclear Energy so far has not made a significant contribution to the reduction of greenhouse gas emissions; energy efficiency measures have proved to be more effective and less costly and, in addition, have much higher potentials that can be drawn on in short term.
- Reserves of fissile uranium for current nuclear technology are limited – estimates range between a few decades and a century depending on assumptions regarding the extent of nuclear build up and uranium resources – and they are also concentrated in very few countries. The European Union imports 98% of its uranium. Advanced technologies based on natural uranium cannot meet the time constraints imposed by climate change.
- Following the UN Framework Convention on Climate Change (UNFCCC) and the EU Sustainable Development Strategy, the political and societal solutions to the climate and energy problems must be environmentally sound and sustainable. But even when ignoring the possibility of severe accidents, Nuclear Energy is burdened with a

large number of environmental problems and risks, such as possibly health damaging low level radioactive emissions in normal operation and the worldwide unresolved problem of final repositories for nuclear waste. From a legal point of view the core of the applicability of the principle of sustainability lies in the distribution of the asset "environment" and the burdens of Nuclear Energy production between the present and coming generations. In analogy to the principle of proportionality of the law of the European Community the energy demand of the present generation must be kept as low as possible and at the least possible environmental costs; the costs and burdens of energy production are to be borne by the generations benefiting from it. The sustainability principle therefore rules out the use of Nuclear Energy in its present form and in others envisaged today.

Besides, there are better options: energy efficiency and renewables are do not burden future generations, they have lower resource intensity and less potential to do harm. They are economically more attractive, not requiring the immense initial investment, and they come in all scales, adjustable to individual needs in all parts of the earth. Especially developing countries frequently have a very reliable supply of solar energy that can be used in a decentralised manner, requiring no large grids. The costs for creating a low carbon infrastructure are therefore much lower than for the nuclear option. There could be contributions from those that fail to abate GHG emissions.

But the ultimate solution to climate change and the energy crisis will not be found on the supply side, important though the transition to renewable energy systems is. The Club of Rome stated in "Limits to Growth" in 1972 that exponential growth in a limited system first leads to overshooting and then to the collapse of the system. Resource depletion, GHG concentrations and many other consequences of human activities have shown exponential growth over decades. A number of indicators, such as the global ecological footprint, signal that the overshooting phase has been reached. The environmental burden is a function of the number of people, their lifestyles and the underlying technologies. It will not suffice to improve technologies. There is no doubt that the life style of the industrialized countries is not sustainable on a global scale. Therefore we are facing a psychological rather than a technological problem, when trying to avoid collapse. The question is not – how can we provide a solution to the soaring energy demand? - but how can we find a sustainable lifestyle accessible to all and thus dramatically curb the demand for energy and other resources.