

Nuclear technology should be as welcome for electrical power as it is for clinical health

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Summary:

A deep-seated culture of radiation phobia dating from the Cold War era still prevents the general acceptance of nuclear power around the world. Current safety regulations, designed to appease public fears, are not supported by biological and medical evidence. New justifiable regulations should be simple, should benefit the environment and personal health, improve safety and reduce energy costs. Related education should help children (and others too) to be more at ease with the natural world including the connection between life and energy (solar, chemical and nuclear).

Abundant energy is essential for human civilisation on its present scale, but the carbon fuels that provide this today have an unacceptable impact on health and the environment. The world has resolved to break this carbon addiction, but siren voices offering cheap gas suggest easy procrastination, reminiscent of St Augustine's Prayer *Grant me chastity and continence, but not yet*. Most non-carbon sources of energy are either too weak or too intermittent to replace fossil fuels, and the German *Energiewende* has failed to reduce greenhouse gas emissions. Only nuclear energy can meet the challenge of providing energy that is plentiful, safe, high density, affordable and available 24/7.

The accident at Fukushima in 2011 confirmed that nuclear power is safe: no worker or member of the public suffered any injury from the released radioactivity and none is likely in future. However both the public and the authorities were deeply upset and frightened by the radiation for which they were quite unprepared. Their panic reactions and the evacuation they ordered led to serious social damage and 1600 fatalities. Worldwide there was further damage, the combustion of more carbon and unreasoned changes in national energy policies.

Effective safety is rooted in familiarity and understanding. An explanation for visible dangers is simple but for hidden dangers like toxins and radiation it depends on science, and so on public education. But regulations carry a cost and, if risks are exaggerated to appease misunderstood concerns, these costs may become unreasonably high without benefit. For radiological regulations the appropriate society-wide comparison of costs and benefits has been neglected, largely because the breadth of knowledge and terms of reference of each safety committee are too narrow for this task. Seeking protection from any unexpected liability these committees have resorted to the Precautionary Principle (dictum *you cannot be too careful*). This is an unscientific philosophy that risks social instability and panic, as happened at Fukushima. A safe world is one in which nature, including radiation, is seen as exciting and providing subjects for discussion and investigation in school, thereby becoming familiar to many at an early age.

It may take time to establish social trust and confidence in nuclear power and radiation through education, though public attitudes can change unexpectedly quickly, as they have towards smoking. A simple account tells how nuclear energy is primeval, natural, powerful but safely isolated within each atom; and then explains how life, always intent on survival and bathed in radiation from the beginning, has evolved ways to protect itself from radiation damage. In class children should learn how a smoke detector with its radioactive source protects a building from fire, and how radiation is used to detect and cure cancer, the legacy of Marie Curie. So the public should be reminded how radiation brings great benefits, in spite of what appears in the media. Exciting accounts of radiation and horror may sell newspapers and films, but real science and medicine tell a different story. Fascinating videos of thriving wildlife at Chernobyl today, Fukushima too, show that it is better to be radioactive and spared the presence of humans. It is we who spoil the environment, not ionising radiation.

Current regulations are built on LNT, a pseudo-scientific assertion that does not admit the medical evidence or the discoveries of modern biology. It is a relic of the lies and nuclear secrecy that prevailed during the Cold War era when radiological protection was fear-driven. Like the Precautionary Principle it assumes that all radiation is harmful so that any radiation exposure should be As Low As Reasonably Achievable (ALARA). The result is to increase the cost and reduce the effectiveness of radiation technology, from nuclear power to medical imaging. However the regulations should be changed radically to match the scientific evidence. Short-term self-interest and fear of challenging the regulatory regime have discouraged the nuclear industry from advocating any such change, but it has imploded as a result, just at the time when it is most needed to mitigate changes in the environment. The climate is very unstable and extinction events have been easily triggered in geological times. Our survival may well depend on the human race getting over its phobia.

There is much more to say. The references linked below explain the evidence in accessible terms faithful to the science.

Radiation and Reason: The Impact of Science on a Culture of Fear (2009) ISBN 9780956275615 website www.radiationandreason.com (where many articles, lectures and videos may also be found) available from Amazon and online from <http://www.ypdbooks.com/science-and-technology/26-radiation-and-reason-YPD00164.html>

Nuclear is for Life: A Cultural Revolution (2015) ISBN 9780956275646 www.nuclear4life.com available from Amazon and online from <http://www.ypdbooks.com/science-and-technology/1369-nuclear-is-for-life-a-cultural-revolution-YPD01574.html>

And a recent article that looks a bit deeper *Nuclear energy and society, radiation and life* https://www.researchgate.net/publication/311175620_Nuclear_energy_and_society_radiation_and_life_-_the_evidence_1