Quo vadis, nuclear energy?

Houston, USA – When nuclear fission was first discovered, many people imagined that the energy released from splitting atoms could provide a never-ending source of cheap energy powering a utopian society of flying cars and ubiquitous robots. More than half a century later, nuclear energy is as scorned and unpopular as "dirty" fossil fuels.

The shining futuristic visions of the 1950s were a product of a more innocent era, in which the dangers of nuclear energy were not widely known. The Three Mile Island accident was a close call, but the horrors of Chernobyl and the more recent Fukushima crisis burned a fear of nuclear power into the global psyche. Although each of these accidents involved some combination of freak coincidence and colossal incompetence, the anxiety and suspicion remains.

The wave of anti-nuclear sentiment encouraged the German government to abandon nuclear power altogether and gradually close its nuclear facilities in favor of cleaner renewables. In light of this news, it is time to ask ourselves if the dream of abundant cheap nuclear power is as anachronistic a fantasy as the flying car.

The World Nuclear Association reported in February that over 60 reactors are currently under construction, most in Asia, and some 440 reactors supply energy in 31 countries.[1] Green technologies such as wind and solar provide uneven supplies and lack sufficient storage capacity. Oil, coal and gas produce carbon dioxide, and require massive investment to reduce their environmental impacts. Nuclear power is the only low-carbon alternative that can be implemented on a sufficiently large scale right now.

In its The World in 2050 study, PwC noted that nuclear power must play a key role in the energy mix going forward. Along with increased use of renewables, nuclear is a key replacement for fossil fuel technologies. There are two principal problems to overcome. The first is the general public's suspicion and distrust of nuclear power, and the second is the prohibitive expense.

Nuclear power must be tightly regulated and controlled, and these fail-safes, inspections, and redundant safeguards all cost money. Safety costs are high, and construction costs are also prohibitive. New nuclear reactors take time to build, and this means that calculating future electricity prices is a murky proposition. Some commentators see nuclear plants as a "bet-the-farm risk" — the years of construction and exorbitant prices mean a long return on investment without any guarantee that the electricity generated will be sold at acceptable prices.

At the same time, nuclear proponents face a public weary of nuclear power, especially after Fukushima. "The catastrophic risks of nuclear energy — like the meltdowns of nuclear reactors in Japan or Ukraine — far outweigh the potential benefits," Greenpeace writes on its website. These fears, along with the high costs, have led policymakers and utilities to reevaluate their stance on nuclear power, culminating in Germany's abolitionist policy. The U.S. Bureau of Labor Statistics expects the employment of nuclear engineers to have declined 4% from its 2014 level by 2024, and the U.S. Energy Information Administration expects nuclear job losses to accelerate as older plants close.

However, this doesn't mean a dearth of career openings in nuclear energy. The overall aging of the population has become a factor in in this sector as well. A 2015 estimate from the Nuclear Energy Institute pointed out that 39% of the nuclear energy workforce will be of retirement age by 2018, and will need 20,000 people to replace its retirees.[2] The problem is finding these people. Undergraduate enrollment in nuclear engineering fell 9% in 2013 to 1,990, and graduate program enrollment fell 5% in the same year.

[1] http://www.world-nuclear.org/information-library/current-and-future-generation/plans-for-new-reactors-worldwide.aspx
[2] http://www.power-eng.com/articles/npi/print/volume-8/issue-1/nucleus/who-will-replace-nuclear-power-s-aging-work-force.html

Job opportunities vary from country to country. India is a growing nuclear power, choosing it over coal, and the New Delhi government announced a massive initiative to build 10 more units of its domestically-developed reactors. The initiative will generate an estimated 33,400 direct and indirect jobs.

It is this milieu of conflicting and complex pressures, which are exacerbated at international and global levels, that makes nuclear power's future so difficult to predict. The expert community agrees that any future energy scenario will and must include nuclear expansion, but this is greatly dependent on political leadership and popular opinion, as well as business realities.

Technological innovation is the only clear enabler of greater nuclear adoption, and the wider adoption of clean energy in general. The emerging technology of small modular reactors (priced at around $1 billion each) present an alternative to expensive and controversial mega power plants. Each producing enough power for a district or large city, SMRs could lower the cost of nuclear power to make it a very attractive alternative while other green technologies become more viable.[3] However, as is the case with any energy policy, political support and vision will be key.

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https://www.pwc.com/gx/en/capital-projects-infrastructure/publications/assets/pdfs/delivering-new-nuclear.pdf
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https://www.eia.gov/todayinenergy/detail.php?id=19271
http://www.world-nuclear.org/information-library/country-profiles/countries-t-z/usa-nuclear-power.aspx
https://www.bloomberg.comnews/articles/2017-02-07/trump-and-u-s-nuclear-power-find-common-ground-in-jobs-push

[3] https://home.kpmg.com/xx/en/home/insights/2016/04/foresight-nuclear-power.html