



The Role of Nuclear Power in Clean Energy Generation

Grenville Harrop

University of Manchester, UK

Abstract:

Nuclear power is one of the largest contributors of carbon-free electricity generated globally and is a vital component in the limiting of climate change. The Paris Agreement limits cannot be achieved without the sustained growth of nuclear energy, alongside the increased application of renewables such as wind or solar power.

With more than 440 nuclear power plants currently operative in over 30 countries worldwide, nuclear energy provides about 10% of the world's electricity. Nuclear power has thereby avoided over 50 Gt (50,000,000,000 tonnes) of CO₂ emissions over the past 50 years. This is not surprising given that a single 1000 MWe coal fired power plant burns approximately 9000 tonnes of coal per day.

It is now over 60 years since the first commercial nuclear power station achieved full power and during that time the industry has received criticism for high capital cost and construction delays, together with concerns over safety and the long-term solutions to radioactive waste.

The most modern nuclear stations are now designed for the plant modules to be manufactured in a factory and assembled on site, thereby reducing overall cost, construction schedule and risk. These plants are available with passive safety features that will shut the plant down automatically and keep it cool, without human intervention or AC power, for seven days. This approach has also been applied to certain new Small Modular Reactors (SMRs): Reactors that are capable of providing base-load power on smaller grids that may have non-steady power sources, such as solar or wind power. Electric cars help reduce local air pollution levels but do not assist with climate control unless they are recharged from a source of low carbon power

Nonetheless, nuclear power can have economic challenges if competing with the capital costs of other alternatives, such as natural gas. If the potential penalties of additional carbon emissions are not taken fully into account when considering these choices of electricity generation, the world is more likely to fail to achieve the necessary climate change control targets.



Biography:

Experienced Independent Nuclear Advisor with a demonstrated history of working in the industry at executive level. Skilled in Project and Contract Management of mega projects. Has successfully directed nuclear new build. Awarded the degree of Master of Science in Control Theory.

Recent Publications:

1. https://www.researchgate.net/publication/294529897_Ten_Fold_Capacity_by_2020
2. https://www.researchgate.net/publication/267581530_The_AP1000R_PWR_Project_Moving_Toward_Completion_in_China
3. <https://books.google.co.in/books?id=Cg2cEz10X-pMC&pg=PT220&lpg=PT220&dq=grenville+harrop+research+gate&source=bl&ots=gbdEG-5fMY1&sig=ACfU3U0zr7My8mJbiRz7xj8moUxlW-f7ajQ&hl=en&sa=X&ved=2ahUKewibw9X9stHrAh-WKyDgGHU2kDBAQ6AEwDnoECAIQAQ#v=onepage&q=grenville%20harrop%20research%20gate&f=false>
4. <https://www.nature.com/articles/s41467-019-14074-5>
5. <https://linkinghub.elsevier.com/retrieve/pii/S0034425719306303>

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