Going Nuclear: How the Atom Will Save the World
Tim Gregory (London: Bodley Head, 2025) 384

The book 'Going Nuclear: How the Atom Will Save the World' by Tim Gregory (PhD) is a seminal commentary on the enduring relevance of nuclear science. While the world struggles to find practical ways to achieve global net-zero, this book emerges as a timely contribution. Tim Gregory, a nuclear chemist within the British nuclear enterprise, a renowned author, and a regular presenter on British Broadcasting Corporation **(**BBC) Science, brings both expertise and passion to the nuclear discovery delights in the book. He employs scientific literacy and rational optimism to dispel decades-old fears of nuclear science. With his blend of human warmth and scientific proficiency, he deconstructs complex global security challenges and impediments to their nuclear solutions. The author articulates net-zero technologies, nuclear science, and nuclear energy through scientific reasoning.

Gregory's thirteen-chapter monograph offers a wide-ranging and well-organized overview of nuclear science, tracing its intellectual trajectory from mythological origins to contemporary technological applications. In the opening chapters, he explains how the atom appears in both cultural imagination and empirical inquiry, moving from Promethean myths to the experimental validations of Röntgen, Becquerel, and Curie. This dual framing highlights the persistence of symbolic anxieties surrounding nuclear energy, even as its foundations rest upon reproducible observation and measurement. The main argument of the writer is that nuclear science, often portrayed as mysterious or uncontrollable, is in fact rational, comprehensible, and amenable to systematic management. By starting with the cultural and historical story of atomic discovery, he sets the interpretive lens through which subsequent technical and political discussions are to be understood.

The scientific foundations of nuclear power are then elaborated in detail, encompassing the nuclear fuel cycle, reactor physics, isotopic enrichment,

and atomic criticality. Gregory recalls the landmark experiments of Rutherford, Blackett, and Fermi, situating them within the broader empirical lineage of nuclear knowledge. These technical discussions provide the basis for addressing contentious issues such as radioactive waste and nuclear accidents. He emphasizes that the total volume of high-level waste produced globally could fit within a modest concert hall, and that a one-gigawatt reactor generates approximately thirty tons annually, equivalent to thirty grams per person or the weight of a few grapes. By reframing waste as a manageable technical problem rather than an existential threat, Gregory challenges prevailing alarmist narratives. His treatment of accidents is similarly comparative and evidence-driven. Chernobyl resulted in 30 to 35 immediate fatalities and fewer than 100 thyroid cancer deaths; Fukushima caused none, while nearly 20,000 deaths were attributable to the earthquake and tsunami that precipitated the event. Gregory contrasts these figures with hydroelectric disasters such as Banqiao, which claimed approximately 171,000 lives, thereby situating nuclear risk within a broader energy context and demonstrating that nuclear energy is not uniquely perilous when compared to other energy sources.

The middle chapters advance the discussion by examining peaceful nuclear applications, which Gregory presents as some of the most compelling evidence of nuclear energy's versatility. He documents the role of 160 gamma-irradiation facilities that sterilize roughly 40 percent of single-use medical devices worldwide, and notes the extension of food shelf life for astronauts through similar technologies. He highlights the International Atomic Energy Agency and United Nations Mutant Variety Database, which records more than 3,400 cultivars generated through atomic gardening, producing disease-resistant and nutritionally enriched crops. The Sterile Insect Technique, which irradiates pests without killing them, is credited with preventing one billion dollars in agricultural losses across North and Central America. Nuclear forensics further illustrates the breadth of application, from tracing smuggled rhino horns to investigating Litvinenko's polonium-210 poisoning and recovering a lost radioactive capsule in the Australian outback. Collectively, these examples underscore nuclear science as a versatile instrument of progress rather than a cultural

specter, and they demonstrate the extent to which nuclear technologies have already become embedded in diverse aspects of modern life.

The concluding chapters extend the analysis to geopolitical and futuristic dimensions. Gregory examines recycling practices at France's La Hague facility, where mixed-oxide fuel is produced, and explains the function of fast-breeder reactors in generating plutonium-239 from uranium-238. He envisions nuclear energy as central to space exploration, enabling the electrolysis of water ice into oxygen and hydrogen propellants, reducing transit times to Mars, increasing payload capacity, and mitigating cosmic radiation exposure. In this context, nuclear technology emerges as both a terrestrial resource and a cosmic enabler, integral to sustaining life beyond Earth. Gregory's discussion of nuclear energy in space situates the atom not only as a driver of terrestrial progress but also as a fulcrum for humanity's expansion into extraterrestrial environments.

Taken together, Gregory's work advances a consistent and carefully evidenced argument. Nuclear energy is neither inherently uncontrollable nor uniquely perilous, but a rational and versatile technology whose risks are measurable and manageable. By weaving cultural history with technical evidence, the book reframes nuclear science as a domain of practical engagement and innovation. It challenges alarmist discourse, destabilizes entrenched narratives of fear, and positions nuclear power as indispensable to sustainable futures. In doing so, Gregory contributes not only to the technical literature on nuclear energy but also to the broader historiography of science and technology, offering a corrective to cultural misperceptions and a foundation for policy grounded in empirical evidence rather than symbolism.

Every chapter opens with an engaging narrative, followed by a simple, balanced scientific background of the concept, and concludes with contemporary challenges and their convincing answers. The clarity, his greatest strength, ensures a balanced take without overwhelming readers with the scientific details. The profound passion of the author eases the complex concepts of reactor engineering, advanced physics, radiobiology, and aerospace technology lucidly. Through his scientific rigor, persuasive

style, intelligent wit, and apt examples, he tackles highly controversial topics, as radiophobia, by presenting facts and figures. Another scholarly strength of the book is the use of deeply researched, well-referenced sources, including peer-reviewed studies, authentic data, and historical records that establish his authority on the topic.

However, some areas could have been expanded on to bring clarity. Among them, the nuclear economics comes first as it is the most widely used argument in the nuclear energy critique. More emphasis by the writer on the cost of the nuclear technology, such as maintenance and decommissioning costs, could have better assessed the viability of this option. Furthermore, global nuclear technology equity is another underexplored area by the writer. Similarly, the regulatory and licensing challenges received his partial attention, which are critical to the discussion of nuclear feasibility. Additionally, the techno-optimism, especially in the radioactive deterrents in wildlife, nuclear fuel supply, and uranium mining, could have been better balanced with a sufficient appraisal of the logistical and ethical concerns. The geopolitical sensitivities, socioeconomic dynamics, and environmental justice are key players in nuclear adoption trajectories. Such an omission risks sustaining the persistent gaps between the nuclear energy utopia and real-world constraints.

Overall, the central argument of the book is that the atoms are a viable pathway for solving the most pressing challenges humankind faces today. The author juxtaposes the significance of nuclear science by logically explaining the limitations of renewable energy sources. From energy security to food security, climate security, and health security, nuclear science has proven to be a sustainable course. Through his deep expertise, Gregory developed the account of nuclear science, turning it from abstract radiophobia into a manageable and immense source of energy.

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