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Keeping the Lid on Pandora's Box

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Pandora's Promise

Directed by Robert Stone

Impact Partners, CNN, and Vulcan Films

The documentary *Pandora's Promise* by director Robert Stone claims to present an environmental case for nuclear power. It starts from a premise most informed people would support: profligate release of greenhouse gases is causing climate change, but our material comfort depends critically on energy, so a radical shift to cleaner energy supply technologies is imperative. The film correctly notes that most environmentalists are hostile to nuclear energy and then dismisses this as an irrational prejudice, buttressing this claim by parading a succession of present and former environmentalists who are now prepared to say nuclear is worth considering to help slow climate change. Rather than an irrational prejudice, however, such hostility to nuclear power, I would argue, is an informed view that recognizes the unsolved problems of reactor safety, waste management, and weapons proliferation. By dismissing these cautions and concerns as uninformed, the film fails to provide a thorough exploration of the issue.

The film further claims that nuclear energy is cheaper than renewable energy supply technologies, an assertion that is impossible to reconcile with the hard facts of recent construction. More fundamentally, its talking heads assert that nuclear is the only real alternative to coal-fired electricity if we want to continue living comfortably. Since the nuclear power industry has an extremely bleak future unless that assertion is accepted, the film has been greeted with enthusiasm by industry advocates, as well as pro-nuclear conservative and

environmental circles, and it is still being shown throughout the US.

The whole argument of the film, while distinctly underwhelming, is eerily familiar. In 2007, I noted that the nuclear industry was attempting to resurrect its failing prospects by rebranding nuclear energy as the low-carbon solution to climate change.¹ This was an act of desperation, requiring the industry to embrace environmental arguments it had been deriding for decades, but it was obvious that a new strategy was needed to save nuclear power. The peak level of installed capacity occurred back in the 1980s. Since then, deferments and cancellations have swamped new orders, and the industry has appeared to be in terminal decline. Careful briefing of journalists with limited technical backgrounds enabled the industry to start spreading the argument that nuclear power might be the lesser of two evils, its risks worth considering given the alternative risk of runaway climate change. This film is just the latest multi-media form of that tired argument.

The Australian Prime Minister back then, John Howard, attempted to arouse interest in the nuclear option when he realized his inaction on climate change was an electoral liability. He appointed a strongly pro-nuclear group, chaired by the head of the Australian nuclear agency, to travel the world and report on prospects for nuclear energy. The committee did its best to be positive about nuclear power, but you can only bend the facts so far.² It conceded that building just one nuclear reactor in Australia would take at least a decade and probably longer, far too slow a response given the urgent problem of climate change. It conceded government subsidies would be needed to overcome the poor economics of nuclear energy, but went on to claim nuclear power might be economic if Australia became a “late adopter” of proposed new-generation reactors. Even if we could believe assurances from an industry that has been consistently wrong about new designs, delaying to await the promised wonder-reactors would be even less credible as a timely response to climate change. Finally, it dismissed concerns about reactor safety and radioactive waste as uninformed and urged the government to engage in a program of “community education.” So it gave me a sense of déjà vu to watch this film and see those concerns again airily waved away as ignorant prejudice while being urged to trust the assurances of the nuclear industry.

It is clear, however, which way the tide is running. It is not environmental activists that have been making the decisions not to build nuclear power stations, but hard-nosed technocrats and bony-fingered accountants. Even with large direct and hidden subsidies, nuclear power is still more expensive than other forms of generating electricity. As systems are improved to try to ensure that accidents like Chernobyl and Fukushima do not happen again, the cost of nuclear power keeps increasing. At the same time, the costs of the renewable energy technologies like wind and solar are lower and keep falling. Trying to make an economic case for nuclear involves great leaps of faith. As a specific example, one group recently conceded that the capital cost of a new nuclear power reactor in the US would be about \$5,000 per kilowatt with a construction time of ten years. Since Westinghouse claims that its new design might only cost \$1,000 per kilowatt and take three years to build, the enthusiasts said nuclear power would become cheaper than fossil-fuel electricity.³ That is like saying that new cars costing \$40,000 and using 12 liters of fuel per 100 kilometers are expensive to drive, but one would only have to get the cost down to \$8,000 and the fuel economy up to 4 liters per 100 kilometers to provide cheap transport. There is nothing wrong with the arithmetic, but the claims are scarcely credible.

The economic argument is not the critical one, however. The likely costs we will incur as a result of global climate change are huge. If nuclear electricity were the only way of averting those problems and its other shortcomings could be remedied, we might be prepared to pay whatever it costs. However, nuclear power is not the only viable low-carbon means of generating our electricity, and it looks very improbable that the other problems of nuclear electricity could be solved. Waste management is, at least in principle, a technical problem that could be solved if enough resources were committed. Weapons proliferation, on the other hand, is a social and political problem with no solution in sight. It requires extraordinary optimism to believe the problem could be managed if there were a massive expansion of nuclear power.

Radioactive waste management remains a significant problem after nearly sixty years of nuclear power. Most of the waste is still stockpiled near reactors. We have been assured for decades that the waste could be safely immobilized in underground repositories, but the public remains so wary of these claims that identifying storage sites has proven extremely difficult. The US recently

abandoned Yucca Mountain as a waste repository after decades of planning. While storing waste safely is mainly a technical problem, it is also a serious social issue because of the immense time period involved. The waste needs to be immobilized for thousands of years—longer than any human civilization has ever endured.

The second fundamental problem is weapons proliferation. This issue is deeply embedded within the nuclear industry, which began with weapons and only later added production of useful energy. The first commercial nuclear electricity, from the Calder Hall reactor in the UK, was a smokescreen to distract attention from the reactor's real purpose: to produce plutonium for the British bomb. The Nuclear Non-Proliferation Treaty, developed forty years ago, aims to encourage peaceful use of nuclear energy while restraining weapons development. The problem is that the nations which then had nuclear weapons have not fulfilled their commitment to disarm. Some are still developing new weapons or expanding their capacity to deliver nuclear warheads. As a result, other nations have joined the nuclear weapons club: India, Pakistan, Israel, and probably North Korea. As Dr. Mohammed El Baradei said on stepping down from heading the International Atomic Energy Agency, "as long as some countries place strategic reliance on nuclear weapons as a deterrent, other countries will emulate them." This is an inescapable conclusion.

The Oxford Research Group, which specializes in security issues, recently analyzed whether nuclear power could make a major contribution to slowing climate change.⁴ It concluded that nuclear would have to supply at least a third of the world's energy by 2075 to make a real impact. This would involve building four nuclear power reactors a month from now. If that were to be achieved, ORG concluded, it would have a disastrous effect on the world's ability to control weapons material. Such a massive expansion would only be possible if we used breeder reactors, which produce plutonium for the next generation of reactors as well as supplying energy. The film is unashamedly enthusiastic about these reactors, ignoring the technical problems which have caused many nuclear engineers to question their feasibility. Assuming those technical problems could be solved, the expansion would require processing about 4000 tonnes of plutonium each year: an annual production equivalent to about twenty times the entire current military stockpile. So the world would be processing more plutonium than the current global

military inventory every three weeks if it were to generate enough nuclear power to have an impact on climate change. It is a dangerous fantasy to assume this could happen without fissile material being misused, either by rogue regimes or terrorist organizations.

As a final issue that is often overlooked, proposing massive expansion of nuclear power assumes perpetual peace. Just as power capacity was targeted in World War II, we could expect it to be attacked in any future conflict. Bombing nuclear reactors would have appalling consequences.

Fortunately, we do not have to choose between freezing in the dark and glowing in the dark. We can provide for our material comfort while slowing climate change by combining a mix of renewable energy technologies with storage and dramatic improvements in the efficiency of using energy. Many studies in different countries have concluded we could live at the same level of material comfort as we do now with less than half the energy we now use, by cost-effective improvements in the efficiency of turning energy into the services it provides: cooking, heating, motive power, lighting, transport, and so on. A 2011 UNEP study on resource efficiency called for a “new industrial revolution” to enable us to meet our needs with a quarter of the energy we now use.⁵ Rapid improvements in both energy storage and generating technologies using renewable energy flows now provide the prospect of meeting our needs from a mix of these sources. They already offer cheaper power than nuclear reactors, and the costs are continually coming down. Some technocrats have worried about energy security if we rely on the intermittent flows of sunlight and wind, but advances in storage are dealing with those concerns.

Opening Pandora’s box unleashed a range of dark forces, so it is an appropriate metaphor for the nuclear industry. If we succeed in achieving a Great Transition, history will record nuclear energy as a sad misadventure which wasted enormous resources and made the world more dangerous. Pandora’s box did also contain Hope, but there is no rational basis for hope for the nuclear industry. This facile film claims to promote a panacea, but offers only a false promise.

Endnotes

1. Ian Lowe, *Reaction Time: Climate Change and the Nuclear Option* (Melbourne: Quarterly Essay, 2007).
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About the Author



Ian Lowe is Emeritus Professor of Science, Technology and Society at Griffith University in Brisbane, Australia. He directed Australia's Commission for the Future in 1988 and chaired the advisory council that produced the first national report on the state of the environment in 1996. He has filled a wide range of advisory roles in Australia, including serving as a member of the Radiation Health and Safety Advisory Council since 2002. He is the author of 12 books and over 100 other publications and a Fellow of the Australian Academy of Technological Sciences and Engineering. He has been a reviewer for the IPCC, the International Geosphere-Biosphere Programme, and the UNEP study of Resource Efficiency and Economic Outlook for the Asia-Pacific. In 2009, the International Academy of Sciences, Health and Ecology awarded him the Konrad Lorenz Gold Medal for research aimed at a sustainable future.

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