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The Power Plant and the Bomb – Nuclear Energy's Siamese Twins

Numerous countries cherish or once cherished dreams of possessing nuclear weapons. The scientific fundamentals for civil and military use are identical. Moreover, the actual development of an explosive device design is rather straightforward. Two postdocs proved this as early as in the 1960s.

In November 1945, the Swiss government set up a "Study Commission on Atomic Energy" with the secret task of "striving to develop a Swiss bomb".[1] In January 1969, a core meltdown in the Lucens test reactor marked the temporary end of the Helvetian dream.

The Swiss and a covert nuclear weapons programme? It may seem inconceivable, but several countries that now use nuclear energy to generate electricity once had their own secret weapons programmes. The club included Argentina, Belgium, Brazil, Germany, India, Iran, Italy, Pakistan and Sweden. Under apartheid, South Africa operated nuclear power plants and possessed several nuclear warheads. The bombs were scrapped when democratic elections loomed on the horizon. North Korea began to build two nuclear power plants but left them unfinished and opted for the military variant. Israel was completely disinterested in nuclear power but manufactured an entire arsenal of nuclear weapons under the guise of civilian research instead.

And the story continues to this day. Saudi-Arabia's Prince Mohammed bin Salman (MBS) bluntly stated in 2019: "If Iran developed a nuclear bomb, we will follow suit as soon as

[1] Michael Fischer, "The Swiss atomic bomb", Swiss National Museum, 12 April 2019, see blog.nationalmuseum.ch/en/2019/04/plans-for-a-swiss-atomic-bomb/, accessed on 7 July 2021.

possible".[2] It has been that way since the discovery of nuclear fission: the bomb as an option.

Albert Einstein acknowledged "one great mistake" in his life: when he "signed the letter to President Roosevelt recommending that atom bombs be made". Civilian and military uses of nuclear energy have gone hand in hand ever since, 75 years ago, the "Manhattan Project" lead to the construction of the weapons which reduced Hiroshima and Nagasaki to ash and rubble. As early as 1950 – before U.S. President Eisenhower delivered his "Atoms for Peace" address in front of the United Nations in 1953, and before the world's first nuclear power plant was connected to the grid in Soviet Obninsk in 1954 – the then head of the U.S. Atomic Energy Commission described the two variants of nuclear development as "Siamese twins".

The nuclear science fundamentals are the same, whether for civilian or military use: nuclear fission, chain reaction, reactor technology, radiation protection, and fissile material. Fissile uranium can be enriched to serve as fuel in a reactor or as an explosive in a bomb. Every year, approximately 10 tonnes of plutonium are separated from spent fuel in the French reprocessing plant La Hague and processed into new fuel elements. A few kilograms – the volume of a grapefruit – suffice to build an explosive device.

Designing a Nuclear Explosive? No Unsurmountable Problem.

In December 1966, two postdocs submitted their report about an explosive experiment.[3]

The project had been commissioned by a nuclear-weapons laboratory of the U.S. government. Their results were immediately stamped "Secret" and partly declassified only in 2003. The two young physicists were tasked to find out if "a credible nuclear explosive can be designed, with a modest effort, by a few well-trained people without contact with classified information" that would "give a small nation a significant effect on their foreign relations". Leading weapons experts in the U.S. confirmed that the design developed by the young scientists – without the internet – would work. The duo had

[2] Aileen Murphy and M.V. Ramana, "The Trump administration is eager to sell nuclear reactors to Saudi Arabia. But why?", *Bulletin of the Atomic Scientists*, 16 April 2019, see thebulletin.org/2019/04/the-trumpadministration-is-eager-to-sell-nuclear-reactors-to-saudi-arabia-but-why, accessed on 10 November 2020.

[3] For details see Mycle Schneider, "The Permanent Nth Country Experiment", Paris, 24 March 2007.

developed a construction manual for a plutonium bomb, like the one that devastated Nagasaki. They considered the principle of a Hiroshima-type uranium explosive device, with a similarly devastating effect, to be “too simple” for that career jump they were hoping for.

Building a Nuclear Weapons Arsenal. Under Control?

Outside the official nuclear weapon states, certain logistics are needed to be able to draw up scientific-technical concepts, set up production facilities and prepare fissile material of sufficient quality and volume – and all this while maintaining strictest confidentiality.

The Vienna-based International Atomic Energy Agency (IAEA) is tasked with ensuring that fissile material and civilian nuclear facilities around the world are not misused for military purposes. At the same time, inspectors are expected “to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world”.[4] An awkward exercise: Controlling nuclear power while propagating it at the same time.

The exertions become even more excruciating with an increasing number of nuclear facilities and growing quantities of fissile material as the number of countries dedicating themselves to nuclear energy grows – whether with or without hidden military agendas.

At the same time, there is a lack of appropriate funding. The IAEA’s former Deputy Director General and Head of the Safeguards Department Pierre Goldschmidt once noted that the Vienna Police Department's budget was three times that available for global nuclear safeguards. He then went on to say: “The cost of the Gulf War of 1991, was equivalent, in 3 months time, to some 1,000 years of the Agency’s regular budget for [nuclear] Safeguards.”[5]

Last update: 2024

[4] IAEA, “Statute – as amended up to 28 December 1989”, see iaea.org/about/overview/statute, accessed on 24 May 2024.
[5] Pierre Goldschmidt, “Present Status and Future of International Safeguards”, JNC International Forum for Peaceful Utilization of Nuclear Energy, 12 February 2003.