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The German Experience: Reprocessing-exit and Energy Shift

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Part 1: THE NUCLEAR PHASE-OUT IN GERMANY.

In the 1970s, an internationally networked, strong civil society movement emerged, especially in West Germany, which consistently opposed the use of this risky technology. In East Germany, open protest was even more consistently suppressed. Nevertheless, only two of 20 planned NPPs were completed in Eastern Germany, and they were already shut down in 1990 for safety reasons.

German reprocessing plants: Karlsruhe, Jühlich, Wackersdorf

Several reprocessing plants were planned in West Germany. However, nuclear reprocessing was never operated on a large scale in Germany. First, a pilot plant for nuclear reprocessing was created in Karlsruhe, which operated from 1971 to 1990 and reprocessed a total of 200 tons of nuclear fuel. A second pilot plant was completed by after thirteen years of construction in 1983 at Jühlich, but never went into "hot" operation due to a design flaw. Plans for another reprocessing plant in Hesse - first at Volkmarsen and later at Frankenberg-Wangershausen - were halted after protests and new state parliamentary elections in 1982. In 1985, the Bavarian government began construction of a large reprocessing plant in Wackersdorf. However, construction was finally halted in 1989 after massive protests and the nuclear meltdown in Chernobyl in 1986. The era of nuclear reprocessing in Germany also ended at the same time as German reunification 1990.

The decision for a nuclear phase-out in 2000, lifetime extension in 2010 and reverting back to a phase-out again in 2011

Ten years later, in June 2000, the first Social Democratic-Green federal government under chancelor Gerhard Schröder decided to phase out nuclear energy. This was anchored by an agreement with energy utilities and an amendment to the Atomic Energy Act. After the change of government in 2009, however, a new conservative-liberal German government under Angela Merkel decided in 2010 to extend the operating lives of nuclear power plants by eight to 14 years.

Fukushima was a turning point - also in German nuclear history. A few days after the reactor accident in Fukushima on March 11, 2011, the German government reacted with a nuclear moratorium for eight nuclear power plants: the seven oldest nuclear power plants were shut down directly; another nuclear power plant (Krümmel nuclear power plant), which had been shut down for technical reasons at that time, was not to be restarted. In a U-turn initiated by the Fukushima disaster, the German government in June 2011 again decided to phase out nuclear power by 2022. However, nuclear power plant operators saw this as an expropriation-like intervention and a violation of investment protection and filed lawsuits before international arbitration

tribunals as well as constitutional complaints. In 2016, the Federal Constitutional Court granted them the right to compensation. In March 2021, the German government finally reached an agreement with the nuclear operators on compensation of €2.4 billion to end all legal disputes related to the nuclear phase-out. The nuclear phase-out itself was judged by the Federal Constitutional Court to be a constitutionally compliant legislative measure. However, the design of the second phase-out (following an interim extension of operating lives) resulted in the legal sentence to compensation payments.

End of service life in 2022, unresolved final disposal of nuclear waste and current discussions

The last German nuclear power plant is scheduled to be taken off the grid in 2022. Even after the nuclear phase-out, the problem of a missing final disposal site for nuclear waste remains.

According to a 2017 amendment to the Site Selection Act, a suitable site for an underground repository for highly radioactive nuclear waste is to be found in Germany by 2031. The process started with an open-ended so-called "white map" and an investigation of the geological conditions throughout Germany. In a first step, almost half of Germany's territory was excluded from further investigations as unsuitable. The next steps will involve closer examination according to further criteria of the remaining area for further delimitation.

According to the Site Selection Act, the nuclear waste generated in the 60 years of nuclear energy use must be stored safely for one million years. This will be a burden for future 30,000 generations, long after the use of nuclear energy has ended.

A state fund was set up to finance the final disposal, which was endowed with approximately 24 billion euros by the nuclear power plant operators. With this payment, they were legally released from their obligation to provide aftercare from the time of interim and final storage. One company each were tasked with interim storage and final disposal.

In the German Bundestag, only the extreme-right wing AfD party advocates a resurrection of nuclear energy. This is rejected by all other parties and parliamentary groups as well as by the broad majority of the population. However, rejection has recently declined according to polls, as a representative survey by the Allensbach Institute shows: While in 2012, 73 of the population still called the nuclear phase-out the right thing to do, in 2021 the figure was only 56 percent.

The center of the current discussion about new nuclear energy initiatives is at the European level. Some EU member states, such as France, and the EU Commission under President Ursula von der Leyen (CDU) proposed including nuclear energy in the EU taxonomy and declaring it a "clean" energy source. Countries such as Germany, Luxembourg, Portugal, Denmark and Austria are opposed to this in a joint statement.

In this context, I think it is significant to point out the respective share of nuclear power in the countries concerned (in France it is over 70%) and the resulting dependencies. Moreover, most of the states that support nuclear energy are also military nuclear powers or at least supplier states.

While for decades it was claimed that Germany, as an industrialized country, could not ensure its security of supply without nuclear power, Germany is still a net exporter of electricity and continues to have a strong industrial base. Moreover, Germany experiences fewer power outages (10 minutes) than our neighbor France (49 minutes), which still relies on nuclear power for 70% of its power. Smaller-scale systems are proving to be more resilient. Holding on to nuclear energy makes the systemic shift to a full supply of renewable energies more difficult.

Lessons learned from the German nuclear phase-out

Three basic statements can be made from the development of nuclear energy use in Germany:

(1) Nuclear power was never an economically viable, but always a political project. The military origins of nuclear power early on concealed the extensive costs and subsidy requirements of nuclear power generation, which have grown even more over the past decades, also as a result of nuclear accidents and increased safety requirements. The statutory insurance ceilings alone prevent a real pricing of nuclear power - in addition to many other hidden subsidies. Electricity generation costs from nuclear power will continue to rise in the future, while they will continue to fall for renewable energy generation. Nuclear power is uneconomical and thus a phase-out model.

(2) The German experience shows: Transparency and publicity allows the arguments against nuclear energy to become a democratic majority and to obtain directional decisions.

(3) A phase-out of nuclear energy can be implemented without jeopardizing security of supply and must be implemented in a politically and legally consistent manner. A zigzag course, as with the German lifetime extension and the phase-out, reduces the security of business to plan ahead, leads to compensation payments, increases the incomprehension of the population towards the political decisions and slows down the energy transition to renewable energies.

Part 2: THE ENERGY TRANSITION TO RENEWABLE ENERGIES.

The core of the German "Energiewende" - energy transition - lies not in turning away from nuclear power or the planned phase-out of coal, but in the creation of efficient, environmentally friendly and affordable alternatives: renewable energies. Solar energy and wind energy have emerged as pillars of the energy turnaround - combined with the other renewable energy generation options.

The introduction of the Renewable Energy Sources Act (EEG) 2000

Introduced in 2000, the Renewable Energy Sources Act (EEG) guarantees a feed-in tariff for electricity generated from renewable energy sources (RES). It thus created for the first time a legal framework and a support mechanism for the market ramp-up of RE. This enabled numerous - mainly decentralized - investments and ushered in a democratization of the energy system.

Market ramp-up of renewables and the development of a legal framework for renewables

In 2000, a target of 12% renewable energy capacity was set for 2010, which was far exceeded with 17%. Under Chancellor Merkel, a target of 30% by 2020 was announced in 2010; 43% was already reached in 2019. The EEG model of feed-in tariffs for RE has been adopted in over 100 countries worldwide - including Japan in 2012.

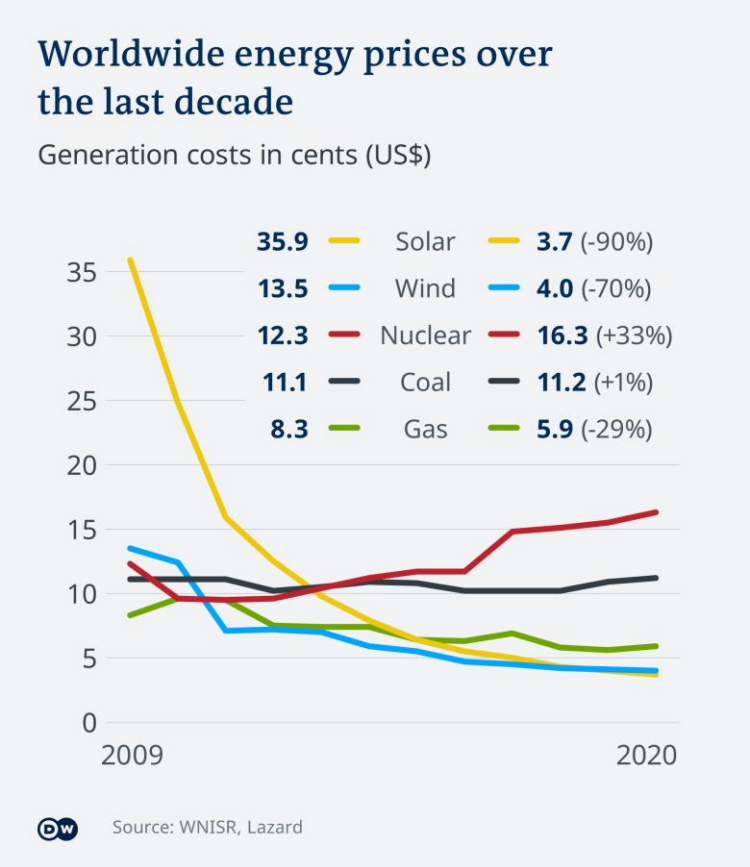
The introduction of tenders in 2014 and 2017

The EEG was adapted in amendments in 2004, 2009 and 2012. With the success of renewable energies, which had not been thought possible, the fear of displacement from the electricity system grew among players in the conventional energy industry, especially since the growing share of renewable energies due to the fluctuation of wind and solar energy necessitates a restructuring of the systemic prerequisites - with the integration of storage facilities and other flexibility instruments, including sector coupling.

The call for "predictability" led to the introduction of quantity control instruments, which had a slowing effect on the expansion of renewable energies. These include annual volumes and control instruments such as the introduction of tenders in 2014.

Instead of creating an incentive to outperform the originally set targets, as in the original EEG Act, this created de facto caps on the expansion of RE. This made it particularly difficult for smaller players to participate in the energy transition. However, these made the largest contribution to the expansion of renewable energies.

In addition, there were complex framework conditions and - national as well as European - legal hurdles for the expansion of renewable energies. This concerns both planning law issues and, for example, species protection (mostly concerning birds). As a result, the number of approved onshore wind turbines in Germany fell by 40 percent from 2015 to 2020.



Source: https://www.dw.com/en/eu-states-split-on-classifying-nuclear-energy-as-green/a-59792406

Current developments and outlook for the traffic light coalition

A new Bundestag was elected in September this year. In the coalition agreement, the coalition parties made a clear commitment to accelerate the expansion of renewable energies and give them priority. The challenges lie both in the dismantling of administrative barriers and in the future design of the market. In addition to a commitment to the EEG Act at least until the end of coal-fired power generation, further instruments are to be

developed. The instruments must be suitable for meeting the requirements of accelerated expansion of renewable energies and cross-sectoral use (i.e., from the electricity sector into the heat and transport sectors).

The removal of obstacles, such as excessively long approval periods for wind turbines, is already in the pipeline. A central and necessary energy policy project is the creation of a funding instrument that provides an incentive to outperform the set targets in order to compensate for the lost speed in the expansion of renewables in recent years.

Lessons Learned from the German Energy Transition

In conclusion, there are three lessons to be learned from the German Energy Transition:

(1) A future-proof energy supply in the 21st century requires a consistent shift away from conventional energy sources - both nuclear and fossil. The energy transition can only succeed if the expansion of renewable energies becomes the "first choice" of an investment decision in accordance with a strong and supportive legal framework.

(2) The shift to renewables is not only an ecological imperative, but also an economic imperative. Especially for a country like Japan, which as an island with a strong industry and has had painful experience of nuclear disaster as well as dependence on conventional energy imports, a change to 100% renewables offers an opportunity for an autonomous, low-cost and sustainable energy supply with future-oriented markets and jobs.

(3) In order to achieve this massive expansion of renewable energies, support mechanisms are needed in which targets do not serve as upper limits for expansion, but rather offer incentives for exceeding the set expansion targets and also bring about systemic change and a transformation of the energy system. In this context, special attention must be paid to the design of the transitions of large industrial sectors so that no selective mass unemployment occurs.

The design of the global energy turnaround requires exemplary action at the local level. In this way, incentives are created for imitation in other places around the world.

The development of such a path is the shared challenge of energy policy in Germany, in Japan and worldwide.

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