What can we learn from studying the History of Nuclear Energy and Society in 20 countries?

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Since its early days, nuclear power has been a highly contentious source of energy.

Nuclear accidents have highlighted the risks of this technology, but their impact on perceptions and policy has varied considerably between countries and has generally been more variable and uncertain than frequently assumed.

Across Europe and the USA, perceptions of the risks and benefits of nuclear energy primarily relate to environmental and health issues, safety, and costs.

However, perceptions of nuclear power and the strength of anti-nuclear movements vary greatly between countries. Historical experiences and past conflicts continue to influence current debates.

Throughout the history of nuclear power, involvement of the public – nationally and temporally – has been sporadic and varied.
Background

Nuclear energy is more contentious than most other sources of energy. The shadow of the bomb – the fact that nuclear technology had initially been developed for military purposes, and under conditions of official secrecy, has followed the development of civil nuclear energy ever since. Nuclear accidents have raised attention to risks involved. However, even if many citizens perceive nuclear energy as involving greater risks to human health and the environment than other sources of energy, commercial nuclear power provides almost 10% of global electricity with more than 400 active reactors in operation today.

Hence, why is it that some countries have adopted nuclear energy more eagerly than others?

Why have some countries never built nuclear plants or have decided to phase out existing plants, while others have embraced the technology and continue building new reactors?
The Problem

**History matters.** Present-day nuclear energy debates and decisions do not start from a clean slate. In fact, past experience of interaction is crucial for understanding how publics and policy makers perceive and treat nuclear energy. In current energy policy, such interaction is frequently described as “engagement”. How the nuclear sector “engaged” or related with society, how policy makers and industry interacted with citizens, and notably, whether they took citizens’ concerns seriously, is key to understanding public perceptions of nuclear energy and the nuclear energy sector.

However, societies have not been passive objects of top-down policy making. Citizens, journalists and civil society groups started “engaging” with nuclear energy of their own accord – by asking questions, by gathering scientific and policy expertise, and by demanding democratic participation, but also through protest. Actors from civil society thus also shaped the politics of nuclear power.
Coordinated by the University Pompeu Fabra in Barcelona, the international research project History of Nuclear Energy and Society, HoNESt, enquired into the complex history of the interaction between nuclear industry and civil society. An interdisciplinary team of historians and social scientists from 23 research institutions collaborated closely to explore the history of societal engagement with nuclear power over time.\(^1\) They undertook primary research, conducted more than 100 interviews, and compared historical experiences across 19 countries in Europe plus the United States. They used social science tools to analyse perceptions and engagement practice, and undertook stakeholder engagement research to devise a set of principles for public engagement.

The goal of this unprecedentedly large scale collaborative research enterprise was to improve our understanding of the varied and context-dependent experiences of nuclear-societal relations, in order to draw lessons and help improve energy policy decisions in the future. In a comprehensive programme of stakeholder engagement, through participation in stakeholders’ events, by organising stakeholder engagement workshops in Barcelona, London and Munich, webinars, podcasts and short videos, HoNESt has discussed its findings with stakeholders from industry, civil society, policy and the research community.
Key Findings

HoNESt’s comparative historical research demonstrated the diverse ways in which the nuclear energy sector and society engaged with each other. Obviously, experiences in democratic Western Europe and the USA differed from the situation in the dictatorships of Southern Europe (notably, Portugal and Spain until the mid-1970s) and Soviet-dominated Eastern Europe, where opposition and protest were not tolerated by governments, while state-controlled industries introduced nuclear power. Nevertheless, researchers found also striking similarities across systems.

When most nuclear power plants were built in the mid-1970s and 1980s, on both sides of the Iron Curtain, governments and public bodies were deeply involved in the promotion of nuclear power, through state sponsorship of nuclear research, via state ownership of utilities and various governments’ policies in favour of expanding the use of nuclear energy. Thus anti-nuclear critique frequently focused on politics and the state, more so than on nuclear industry. In both Eastern and Western Europe, centralised top-down decision-making was prevalent, based on apparently superior and rational technocratic expertise. Critique of nuclear power projects was often dismissed as ill-informed, ignorant or emotional.
Three phases of nuclear-societal relations can be distinguished.

In an early phase, from the late 1940s until the late 1960s, nuclear power was promoted in public relations campaigns in the wake of the Atoms for Peace programme kicked off by US President Eisenhower in 1953. Futuristic atom trains, travelling exhibitions and heavy investment in nuclear research were intended to stress the benefits of the “peaceful atom”.

Interestingly enough, such campaigns existed on both sides of the Iron Curtain in either a US-led or a Soviet-led version. During this period, very few reactors were actually built, and most of these were for research purposes. Incidents in nuclear installations e.g. in the Soviet Union or the United Kingdom were kept secret and did not receive attention in the public sphere.

The second phase, between the early 1970s and the late 1980s, was the heyday both of nuclear energy expansion and anti-nuclear protest. Commercial nuclear power plants became available in the late 1960s, and were introduced across Europe, in order to respond to growing energy demand, and as a substitute for oil in the wake of the oil crises of 1973/74 and 1979. In Western Europe and the United States, experts’ assessments critical of nuclear power, social mobilisation in the wake of 1968, but also a growing demand for democratic participation as well as local grievances and centre-periphery conflicts within nation states fuelled the growth of anti-nuclear movements in the mid-1970s. These movements were transnationally connected, and they shared scientific expertise and protest tactics, such as the occupation of building sites.
Citizens demanded explanations and democratic participation. This phase was also the heyday of new instruments of public engagement: public hearings, societal discussions and information campaigns (such as in the Netherlands, Denmark and West Germany) and referendums, held in Austria, Sweden, and Italy. In some countries, such as Denmark and Portugal, societal debates contributed to the decision not to introduce nuclear power, or, after the referendums in Austria and Italy, to stop the nuclear energy programmes. Green parties emerged in a number of countries with a clear anti-nuclear message. The nuclear accidents of Three Mile Island in 1979 and of Chernobyl in 1986 resonated with an ongoing debate and fuelled further conflict. Chernobyl also strengthened incipient environmental and anti-nuclear opposition in Eastern Europe. By highlighting the problems of nuclear power, critics equally targeted the crumbling Soviet system.

A third phase – since the early 1990s – was characterised by continued conflict – such as about whether or not to accelerate phase-out, e.g. in Sweden, or about whether or not to phase out – such as in unified Germany. Where to place nuclear waste disposal sites continued to be highly controversial, even in countries where local communities were invited to compete for such sites. In Central and Eastern Europe, nuclear power plants were either closed down or brought up to Western technological standards in the run-up to EU membership. International organisations played a crucial role in these processes. After 1990, the closure and the renovation of nuclear power plants took place in the context of newly open public spheres, without necessarily always receiving a lot of public attention. In the context of the economic and social hardships of transition societies, concerns about energy security and energy prices often outweighed environmental concerns.
In some countries, against the backdrop of climate change debates, nuclear power was increasingly represented and viewed as a low-carbon energy source, such as in the UK, France, Finland, Ukraine and Russia, where new nuclear power plants were being built, as part of a so-called nuclear renaissance. These projects were not stopped in the aftermath of the Fukushima accident in 2011. However, the accident in Japan induced German chancellor Angela Merkel to a U-turn towards an accelerated nuclear phase-out by 2022.

In 2010, the Merkel government had just extended the lifetime of nuclear power in Germany. Already before Fukushima, and even more so thereafter, this had rekindled the anti-nuclear movement, with large-scale demonstrations and a vast surge in the polls of the anti-nuclear German Green party. These divergent responses to Fukushima among European countries demonstrate the continued diversity of how nuclear energy is discussed and perceived, and how the legacy of the past informs present-day energy decisions.
Perceptions of Nuclear Power

Despite these great national differences between societal debates about nuclear energy, the types of risks and benefits citizens associated with nuclear power were very similar across countries. Citizens’ concerns related to issues of land use, health, safety, the environment and the cost of nuclear energy. Over time, perceptions also changed in a similar manner across countries.

Until about the 1970s, when only a very limited number of nuclear plants actually existed, few citizens worried about risks, but these were increasingly highlighted in the 1970s and 1980s. Since the 1990s, concerns about nuclear risks somewhat decreased again. Well until the 1980s, many citizens perceived nuclear power as economically beneficial. This perception has only eroded in more recent years. Despite these similarities between countries, the level of controversy on nuclear energy differs strongly between countries.

Explaining different perceptions and policies

How can history help explain differences in perceptions and policies? A number of explanatory factors can be singled out from our historical comparison. National pride – and the link to national defence and national technological prowess – usually translated into support for nuclear energy.

This in particular holds for countries with nuclear weapons, namely France, the UK and the USA, and the Soviet Union, where the promotion of pride in technological achievements was part of the narrative of Soviet superiority. However, recent memories of dictatorship – such as in Spain or West Germany – contributed to a more critical view of nuclear power. In Spain, nuclear power was strongly associated with the pro-nuclear policies of the Franco dictatorship, which made nuclear power a no-go to most of the non-communist left of the political spectrum.
Across a number of countries in Europe, Robert Jungk’s “The Nuclear State” (1977) – which claimed that nuclear energy required dictatorial state competences to ensure security and safety – was very influential. In West Germany in particular, a younger generation of protesters justified their conscientious critique by the failures of their parents’ generation to have withstood the Nazis. The size of the respective country’s economy mattered. Larger countries were more likely to adopt nuclear power early, given the substantial start-up cost, and the need for sufficient electricity demand. Thus, utilities in countries with smaller electricity markets sought to make up for this by transnational cooperation. Sweden, for instance, cooperated for electricity sales across the border to Denmark, when they built the nuclear power plant Barsebäck near Copenhagen. Bulgaria exported power to Greece. For projects in weaker and smaller economies, such as Portugal, it proved more difficult to muster the necessary credit to finance a nuclear power plant.

Timing mattered. Countries trying to introduce nuclear energy in the mid-1970s at the heyday of the global anti-nuclear movement faced a much greater challenge than those that already had an established nuclear sector. Again, Denmark is a case in point, where concrete plans for nuclear power plants were only tabled as a response to the oil crisis, and immediately attacked by a nascent and quickly-growing anti-nuclear movement. In France, West Germany, and Sweden, where nuclear projects had been started much earlier, plants continued to be realised – even in the face of large-scale protest. Events – notably nuclear accidents – mattered, but they did matter not as much as commonly assumed. The impact was mainly short term and often coincidental, such as in Italy, where referendums held shortly after Chernobyl and Fukushima led to a ban on nuclear power in both cases. However, a Swedish national referendum after Three Mile Island led to a defeat and the disillusionment of the anti-nuclear movement. Nevertheless, no additional nuclear plants were ordered.
A few years later, Sweden was heavily exposed to the Chernobyl fallout. As a response, the government planned to accelerate the phase-out. A few years later, these plans were revoked, and the phase-out was postponed again. In West Germany, even after Chernobyl, nuclear power plants were put online. Nevertheless, Three Mile Island and Chernobyl limited the political appetite for new nuclear projects - both in the US and most European countries. Economic reasons also reduced investment in increasingly expensive nuclear power plants, due to a much slower growth of electricity demand since the oil crises, and ever-more costly safety requirements.

### 10 Principles for effective engagement

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Lessons for engagement practice

HoNESt organised one-day stakeholder engagement workshops with participants from industry, science, policy makers and civil society from across Europe in Barcelona, London and Munich to discuss the implications of nuclear history for the future of engagement with nuclear energy and society, and to devise principles and policy recommendations for future engagement practice in energy decisions as siting decisions often have a disproportionate impact on local populations.

Effective engagement is of course context specific, but it inevitably involves broad and diverse participation. Historical experience demonstrates that public inquiries and national referenda enable open-ended dialogues on nuclear energy and its future. However, if results are ignored by policy makers, this may also lead to major disappointment, as evidence from the Netherlands in the 1980s illustrates. By contrast, public consultations, standard industry practice, are less open to citizens’ concerns and viewpoints making it much harder to earn trust in society, and thus improve relations between nuclear energy and society – and demonstrating that the nature of engagement processes matters.

Nuclear issues will stay on the agenda – our research has shown that eye-level participation is key for energy policy in the future. More detailed recommendations can be obtained from HoNESt Policy brief II: Engagement futures for nuclear energy in Europe.
Key actions and policy priorities: Three Lessons for policy makers

1. History matters. A comprehensive knowledge of different societal actors’ views of nuclear power and experience of societal conflict in the course of time is key to understanding present perceptions.

2. Prevalent perceptions are deeply embedded in politics and societal discourses and therefore hard to change.

3. However, only an honest commitment to eye-level public engagement, fair procedures, new cultures of communication and slow processes of trust building will enable a fresh start, and help to improve the way democratic decisions on sustainable future energy provision will be taken.
Footnotes

1 (Butler 2018, 40-43)

2 More specific findings for each of the 20 countries covered can be found in the Short Country Reports, which were produced to provide context and collect comparative empirical evidence for subsequent more specific historical and social science research. Academic publications emerging from the project can be found here: http://www.honest2020.eu/publications

3 (Rubio-Varas and De la Torre 2017, De la Torre and Rubio-Varas 2015)

4 (Trischler and Bud 2019)

5 (Rubio-Varas, Carvalho, and Torre 2018, Kaijser and Meyer 2018)

6 (Kaijser and Meyer 2018)

7 (Kirchhof 2018)

8 (Tchalakov and Mitev 2019)

9 (Kasperski 2017)

10 For details see (Espluga et al. 2018, Konrad et al. 2018)

11 (Melnikova et al. 2018)

12 (Espluga Trenc et al. 2017, Rubio-Varas, Carvalho, and Torre 2018, Kirchhof and Trischler 2018)

13 (Jungk 1984 [1977])

14 (Schüring 2012)

15 (Kaijser and Meyer 2018, Rubio-Varas, Carvalho, and Torre 2018, Arapostathis and Fotopoulos 2019)

16 (Meyer 2018)

17 (Charnley-Parry et al. 2018), p. 40-43.
References


References


