# The emergence of mistrustful civic vigilance in Finnish, French, German and Spanish nuclear policies: Ideological trust and (de)politicization

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Abstract

*High levels of public trust in institutions and generalised interpersonal trust in "the unknown other" are generally seen to facilitate decision-making on nuclear energy and waste. However, earlier research has highlighted the potential virtues of mistrustful "civic vigilance" and politicisation as means of enhancing the robustness of policy decisions. Drawing on expert and stakeholder interviews as well as secondary material, this article examines the role of the largely neglected ideological dimension of trust in shaping the emergence of civic vigilance in the form of counter-expertise in four countries with distinct trust profiles: Finland as a "high-trust society", France and Spain as "societies of mistrust", and Germany as an intermediate case. The article concludes by stressing the co-evolution of civic vigilance with ideological and institutional trust, processes of (de)politicisation, and with the historically shaped and continuously evolving context. Strong ideological trust in the state has in Finland hindered the development of mistrustful counter-expertise, but has in France and Germany provided a foundation for its emergence, whereas the weakness of ideological trust in the state has in Spain undermined civic vigilance. The hypothesis that politicisation – opening up the debate and policymaking to broader publics – fosters the emergence of mistrustful civic vigilance holds for Finland, and largely for France and Germany, whereas in Spain, the particular form of politicisation – as "nuclearization of politics" – has hampered the development of counter-expertise.*

Keywords: nuclear power; radioactive waste management; trust; politicisation; history of nuclear power

## Introduction

Variation in levels of public trust in authorities and industry is frequently evoked as one factor explaining cross-country differences in nuclear policies. The in an international comparison unproblematic advancement of high-level radioactive waste (HLW) repository siting in "high-trust societies" such as Finland and Sweden has often been attributed to the high levels of trust that people have in public institutions and in their fellow citizens (e.g. OECD-NEA 2003; Lehtonen et al. 2020). Less attention has been paid to the role of the historically shaped "ideological trust", which relates to entities such as the state, the market, or planning, and their legitimate roles in society (Tait 2011, 158), and to the potentially constructive role of mistrust in enhancing the robustness and democratic quality of nuclear-sector policies, especially through mistrustful "civic vigilance" (Lehtonen et al., 2021).

This article examines the role of ideological trust in shaping and explaining the historical development of mistrustful civic vigilance in the nuclear sector in Finland, France, Germany, and Spain. We focus on one form of civic vigilance, namely the role of non-governmental counter-expertise organisations that independently monitor the health and environmental impacts of nuclear installations and critically examine the role of nuclear in energy policy.

The selected countries display great variation in their trust dynamics and nuclear policies. Finland stands out by its high levels of interpersonal generalised trust and citizens' trust in public institutions. Spain and France represent "societies of distrust", with generally low trust figures across the board, especially in government and politicians, while Germany's figures are close to European average (see table 1). Nuclear-sector surveys show similarly high levels of trust in key actors in Finland, significantly lower figures for Germany, and generally even lower – and declining – in France and Spain (IRSN 2020; Finnish Energy 2019; Eurobarometer 2010; Lehtonen et al. 2020; CSN 2015).

*Table 1: Evolution of trust in national institutions (2007-2016) (on a scale of 1 to 10, where 1 means not trust at all, and 10 means trust completely)*

| | Overall trust in national institutions[1] | | | Trust in political institutions (national parliament, national government) | | | Trust in non-political state institutions (legal system, police) | | | Trust in the media | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2011 | 2016 | 2007 | 2011 | 2016 | 2007 | 2011 | 2016 | 2007 | 2011 | 2016 |
| Finland | 6.9 | 6.5 | 7.0 | 6.5 | 5.9 | 6.4 | 7.8 | 7.6 | 7.8 | 5.8 | 5.4 | 6.6 |
| France | 5.2 | 4.7 | 4.8 | 5.0 | 4.3 | 4.2 | 5.7 | 5.3 | 5.6 | 4.6 | 4.5 | 4.4 |
| Germany | 5.3 | 5.6 | 5.9 | 4.8 | 5.1 | 5.4 | 6.3 | 6.4 | 6.6 | 4.6 | 5.0 | 5.3 |
| Spain | 5.6 | 4.6 | 4.5 | 5.5 | 3.9 | 3.7 | 5.9 | 5.3 | 5.2 | 5.1 | 4.5 | 4.6 |

Source: Own elaboration based on Eurofound (2018).

[1] The average of trust in national parliament and government, legal system, police and the news media.

The countries also differ in terms of their past and present nuclear policies. All were early adopters of nuclear energy. In France, nuclear power developed as a spin-off of nuclear weapons industry, whereas the three other countries were excluded from military uses of nuclear. Finland and France are currently building new reactors, and have advanced HLW repository projects. Germany plans to phase out nuclear by 2022, while Spain has had a de facto phase-out policy since 1984. HLW management in both Germany and Spain is still at an incipient phase, despite substantial efforts towards repository siting. Crucially, as we will show, mistrust of industry and authorities in France and Germany led to the development of organisations and practices of "counter-expertise" (e.g. Lehtonen 2019, 41-49; Jacquiot 2007), whereas in Finland and Spain such potentially constructive mistrustful civic vigilance has remained underdeveloped.

We start from two assumptions. First, underlining the importance of the forms and degrees of politicisation and depoliticization of nuclear policy, we postulate that civic vigilance generally evolves along with politicisation, that is, opening up of nuclear policy debate to a broad range of publics and perspectives. Second, we argue that ideological trust crucially conditions (de)politicisation and civic vigilance, with the perception, appropriation and mobilisation of the historical legacies as a key vehicle for building or undermining trust in the technology and its promoters. More specifically, we ask:

1. To what extent have debates and decisions concerning the nuclear sector been politicised or depoliticised, and what have been the implications for the development of mistrustful civic vigilance?
2. What role has ideological trust played in shaping the emergence of mistrustful civic vigilance in the form of nuclear-sector counter-expertise?

We do not seek to comprehensively explain the multiple reasons for the development of counter-expertise in the four countries. Instead, we focus on the role of (de)politicisation and the hitherto underestimated ideological dimension of trust in the emergence of counter-expertise.

**Key concepts: trust, mistrust, (de)politicisation, and counter-expertise**

On a general level, trust[2] can be defined as a stance whereby an individual accepts 'believing without knowing', thereby placing herself voluntarily in a position of vulnerability towards another individual or an institution (Earle and Siegrist 2006). Conceptualising trust as a phenomenon operating on three mutually interacting dimensions – interpersonal, institutional, and ideological (see table 2, and the introduction to the SI), we address the mutual interdependence between the institutional and ideological dimensions of trust. The former denotes public trust in nuclear-sector institutions, such as the safety authorities, government,

[2] For the sake of simplicity, we use the term trust to encompass both its traditional meaning as a normative judgment concerning an individual or entity, and *confidence*, that is, a belief based on earlier experience that certain events will occur as predicted (Earle and Siegrist 2006; Kinsella 2016).

nuclear industry and operators, government regulation, and NGOs. It is based on perceptions concerning qualities such as the competence, sincerity, transparency, reliability, and ability to deal with mistrust and to avoid mismanagement or entanglement in political scandals (Laurian 2009; Introduction to the special issue). Institutional trust resembles that dimension of "political trust" which concerns citizens' satisfaction with the specific institutions of the polity (Zmerli 2014).

Ideological trust, in turn, relates to higher-level institutions, such as democracy, the state, market, and planning, and their legitimate roles in society (Tait 2011, 158; Lehtonen and De Carlo 2019). Understanding ideology as "ideas about means and ends" (Söderbaum 1999, 163), or the "subjective perceptions (models, theories) all people possess to explain the world around them" (North 1990, 23), we define ideological trust as being specifically directed at norms and values (Tait 2011, 160). Ideological trust concerns schemes of interpretation and means-ends relationships concerning "wider abstract systems and ideas" (Tait 2011, 160), such as technocracy, technological optimism, economic growth, the precautionary principle, centralized or decentralized solutions, or nuclear power as an electricity-generating option (Söderbaum 1999; Sadowski 2020). As compared with social (interpersonal) and institutional trust, ideological trust draws less on previous evidence or knowledge, and to a greater extent "on an individual's or institution's place within wider social discursive structures" (Tait 2011, 160). Ideological trust covers the "systems" element of political trust, that is, "citizens' orientations towards the nation-state, its agencies, and actors" (Norris 2017, 21-22; see also Zmerli 2014), yet it goes further, beyond citizens' satisfaction with a specific democratic system, and includes choices and preferences concerning alternative systems and conceptions of the public interest. Ideological trust entails high degrees of both emotionality and rationality (Lewis and Weigert 1985) – a typical situation in controversies over nuclear power and nuclear waste management. To our knowledge, no attempts have yet been made to directly measure ideological trust, a concept by nature even more difficult to quantify than institutional and interpersonal trust. In the following, a primarily qualitative approach is therefore adopted.

*Table 2. Types and sources of trust, mistrust and distrust.*

| **Type of trust, mistrust, distrust** | **Social** | **Institutional** | **Ideological** |
|---|---|---|---|
| **Description** | Generalised Particularised | Trust in specific nuclear-sector institutions | Legitimacy of and support to abstract meta-level institutions, such as the state, market, planning, precautionary principle |
| **Sources of trust** | Competence, sincerity, transparency, reliability, ability to deal with mistrust | | Worldviews, values, visions |

Excessive and unwarranted trust has its well-known downsides (Warren 1999; Lehtonen and De Carlo 2019), while mistrust has potential benefits, as "civic vigilance", a manifestation of responsibility and countervailing power that helps to hold political, economic and cultural elites to account (Warren 1999; Allard et al. 2016). Often operating in tandem with

trust, mistrust can manifest itself as an *attitude* stemming from doubt or fear, leading to a passive and prudent "wait-and-see" stance, or as a *strategy*, a skill, designed to help deal with a risky or uncertain reality (Allard et al. 2016, 10).[3] Our focus is on mistrustful civic vigilance exercised by non-governmental counter-expertise organisations that independently monitor the health and environmental impacts of nuclear installations and critically examine the role of nuclear in energy policy. Counter-expertise can be seen as an early attempt at breaking the 'monopolistic' view of expertise, hence paving the way to the more recent experiments of "co-construction" of knowledge, and dialogical, participatory, distributed and collective forms of expertise (Chateauraynaud and Debaz 2017).

Depoliticization, generally assumed to facilitate the emergence of counter-expertise, can be defined as "scientisation, technicisation, economisation and legalisation of issues", which are thus transferred from the public sphere to the "closed circles of experts and their organisations" (Ylönen et al. 2017). Through depoliticization, political actors express and seek to build trust in "technical, matter-of-fact arguments", and downplay non-technical claims that appeal for instance to values or particular interests (ibid.). A depoliticizing "technocratic ideology", with an uncompromised belief in human ingenuity and the ability of scientific and technological elites to drive progress and modernisation (McCulloch 1988; Sovacool et al. 2012), underpinned the development of nuclear power especially in the early years (e.g. Kaijser et al., forthcoming).

Politicisation, by contrast, is a strategy – often employed by the weaker party – designed to open up the issue at stake to a broad public debate. Politicisation can thus be expected to facilitate democratic, political deliberation on the various technical and non-technical issues relating to nuclear power (Ylönen et al. 2017). Mistrustful civic vigilance via counter-expertise can serve politicisation, through the "use of technical, matter-of-fact arguments to deconstruct" the claims made by the adversary (ibid.). Ideological trust, in turn, significantly conditions the (de)politicisation and emergence of civic vigilance.

Table 3 summarises the features of depoliticization and politicisation.

[3] We do not specifically address the related concept of **distrust**, which denotes the absence of trust, reflecting fundamental suspicion and cynicism (see the introduction to the special issue).

*Table 3. Politicisation and depoliticization.*

| | **Depoliticization** | **Politicisation** |
|---|---|---|
| **Definition** | Scientisation, technicisation, economisation and legalisation of debate | Opening up of the debate; focus on values and interests alongside facts |
| **Forms of legitimate expertise** | Narrow disciplinary expertise | Various types of expertise and disciplines |
| **Ideal form of decision-making** | Technocracy | Public deliberation |
| **Fostered by** | Trust in institutions | Mistrustful civic vigilance |

## Methods

We adopt a primarily qualitative approach, involving the triangulation and integration of data from a variety of sources: expert and stakeholder interviews, secondary material, and selected survey findings. By combining various data sources, such a mixed-methods process of triangulation provides "an alternative to validation which increases scope, depth and consistency in methodological proceedings" (Flick 2002, 227; see also Mertens and Hesse-Biber 2012).

Our key corpus of empirical data, and starting point for the analysis, consists of 27 semi-structured interviews with communication and public engagement specialists in key nuclear-sector organisations, carried out between October 2018 and January 2019 in our four case study countries. The interviewees were selected for their experience and knowledge concerning the nuclear-sector organisations' strategies and practices of communication, consultation and engagement with the civil society. A balanced set of industry, public authorities and regulators, civil society, and experts was sought (see table 4). The interviewees were asked to reflect on the following topics relating to communication, participation and engagement, in the past, present and future: 'challenges', 'conflicts', 'strategies and techniques', 'target audiences', 'key actors', 'alliances of actors', 'drivers for change and reasons for inertia', and 'evaluation measures'.

Table 4. The communication and participation specialists interviewed in 2018-2019.

| | Nuclear operators | Governmental authority | Safety regulator | NGO | Other | Total |
|---|---|---|---|---|---|---|
| **Finland** | **3** | | **1** | **1** | | **5** |
| **France** | **1** | **1** | **2** | **3** | **1** Affected communities | **8** |
| **Germany** | **2** | **1** | **1** | **1** | **1** Scientific Body | **6** |
| **Spain** | **1** | **1** | **2** | **2** | **2** University Affected communities | **8** |
| **Total** | **7** | **3** | **6** | **7** | **4** | **27** |

Through an iterative triangulation process (Flick 2002; Lewis 2016), we interrogated the interview material from the perspective of trust and mistrust, in light of earlier academic literature (see introduction to this special issue). Via iterative rounds of listening to interview recordings, refinement of interview notes, and exploration of trust/mistrust related literature, we narrowed the number of defining features in the interviewees' narratives concerning trust and mistrust down to three: i) perceptions concerning historical nuclear legacies, ii) emergence or absence of counter-expertise, and iii) ideological trust.

We then inquired these features in light of the existing literature. Especially for the early periods, we relied primarily on the relevant short country reports (SCRs) produced within the recent 3.5-year "History of Nuclear Energy and Society" (HoNESt) project,[4] which analysed the interaction between the nuclear sector and society in 1950-2018. Within this temporal scope, the analysis concentrated on those periods that were most significant for the emergence of counter-expertise in the country in question. The SCRs, freely and permanently available at the digital repository of the Public University of Navarra (UPNA), drew on diverse primary and secondary sources (archives, interviews, newspaper articles, statistics, organisation websites, historical works). We used the SCRs as such, or the sources indicated in them. Further literature in the fields of history and social sciences was used to fill gaps and verify the validity of interview and SCR data. Selected opinion surveys served to illustrate key findings and arguments. This exploration of literature led us to add the distinction between politicisation and depoliticization to the conceptual framework.

The next four sections present our findings, country by country. References to interviewees are presented in the following manner: nuclear operator (NOP), Governmental

[4] http://www.honest2020.eu/

Authority (GOV), safety authority (SAFA), non-governmental organisation (NGO), university (UNIV), affected community (COM), followed by a number given for each interviewee.

## Finland: fully-fledged depoliticization

### *Evolution of the nuclear sector in Finland*

Finland started developing nuclear power in the late 1950s. To safeguard neutrality in between East and West, two pressurised-water reactors were ordered from the USSR in the 1960s by the state-owned IVO (today, the 51% state-owned Fortum) for the city of Loviisa, and two boiling-water reactors from Sweden by the private-industry-owned TVO, to be built in Olkiluoto, municipality of Eurajoki (Michelsen and Harjula 2018). The four reactors currently supply about a third of Finland's electricity. Since 1987, licencing a nuclear installation in Finland has required a prior parliamentary ratification of a government decision-in-principle (DiP). In 1993, Parliament surprisingly rejected a DiP for a fifth plant to be built by TVO. The reasons included lack of consensus among key politicians, the media receptive to views from the anti-nuclear movement, sceptical public opinion, the pro-nuclear camp's failed campaigning strategy, and the still incipient role of climate change on the political agenda (Litmanen 2009, 201-206). In 2002, Parliament approved TVO's new application, and the Franco-German Areva-Siemens consortium launched the construction of a European Pressurised Reactor (EPR) in Eurajoki in 2005. The OL3 plant is expected to go on line in February 2022, over twelve years behind the schedule, and after a years-long dispute between TVO and Areva over compensations for delays. In 2010, the new "Fennovoima" consortium obtained a DiP to construct the country's sixth reactor. The project has faced setbacks, notably the withdrawal of its main shareholder, the German E.ON, replaced by the Russian Rosatom in 2013. In 2010, TVO obtained a DiP for a yet another reactor in Eurajoki, but decided, primarily because of the problems with OL3, not to apply for a construction licence within the five-year deadline, after the government had refused to extend the DiP.

Finland is a forerunner in HLW management, often praised for its democratic and consensual governance in the area (e.g. OECD-NEA 2003). A deep geological repository for spent nuclear fuel (SNF), constructed and financed by TVO's and Fortum's joint waste management company, Posiva, is to start operating in Eurajoki in the mid-2020s. Despite political pressure in favour of a "national solution", Posiva has refused to accept waste from the future reactor of Fennovoima, which has had to start searching for a site of its own (Vilhunen et al. 2019).

### *The futility of mistrustful vigilance?*

In a context of virtually full delegation (e.g. by the local municipality of Eurajoki) of surveillance of risk and safety to the nuclear safety authority – trusted by over 80% of the

population (e.g. Lehtonen et al. 2020) – mistrustful 'civic vigilance' has remained weak in the Finnish nuclear sector. Seeds of counter-expertise were brought from the USA, Sweden, and Germany, mainly via the Swedish-speaking minority community, in reaction to the ambitious nuclear new-build plans in communities near Helsinki (Tammilehto 1996; Michelsen and Harjula 2018, 51-57). Drawing on these imports, a small anti-nuclear NGO, "Alternative to nuclear power" (EVY), sought to develop counter-expertise in the late 1970s (Tammilehto 1996). The "fate relationship" with the neighbouring Soviet Union complicated matters, notably due to minority communists holding a strong position in the environmental movement, and advocating a reactor import from the USSR (Tammilehto 1996). At the time, criticising the West was acceptable – not critique against nuclear in the East (Michelsen and Harjula 2018, 52). In the early 1980s, EVY began to prioritise citizen activism over counter-expertise, and could not satisfy the media demand for counter-expertise in the wake of Chernobyl (Tammilehto 1996). In recent years, even industry representatives have longed for stronger critique from NGOs and academics, describing these as useful "sparring partners" that help lend credibility to the projects (Lehtonen et al. 2020). Also anti-nuclear activists have recognised the risk of their critique turning into indirect legitimisation of projects (NGO-1; Rosenberg 2007).[5] Counter-expertise has somewhat revived in recent years, e.g. via energy policy critique and alternative proposals from a grouping of a dozen of university professors (Halme et al. 2015; Haukkala 2018), and Greenpeace's investment in economic-engineering modelling (NGO-1). With no planned new reactors, and the current projects facing problems, the NGOs have largely abandoned anti-nuclear campaigning, focusing instead on promoting renewables and energy transition (NGO-1). Nuclear power remains a divisive issue within the emerging "green-transition coalition", and has somewhat dampened its policy impact (Haukkala 2018).

***Depoliticization as a means of building trust – and substituting for counter-expertise***

Counter-expertise has remained underdeveloped partly thanks to successful depoliticization of nuclear policy, underpinned by features of ideological trust: strong trust in the state bureaucracy, rule of law, technology, and education, as well as in honesty as a foundation of the Finnish mentality (Litmanen 2009). Four elements of depoliticization deserve mention.

First, through "naturalisation", the media and the promoters of nuclear energy have portrayed progress in the nuclear sector as a "natural" and rational process (Teräväinen et al. 2011). The Finnish media have tended to depoliticize debates on nuclear power (e.g. Vehkalahti 2015, 106; Ylönen et al. 2017) and nuclear waste (Kojo et al. 2020; Lehtonen et al. 2021). The media have turned increasingly pro-nuclear since the 1990s (Litmanen 2009), tending to marginalise critical views by attributing them to one single political party, the Greens (Ylönen et al. 2017, 267).

[5] Interview with two anti-Fennovoima activists, 13 June 2014.

Second, technical experts in industry and public authorities have built trust via openness, dialogue, and reliability, thus helping to keep nuclear debates outside of the political realm (Ylönen et al. 2017). Our interviewees (e.g. NOP-1; SAFA-1) highlighted the farsightedness of leading figures within industry and authorities, together with lessons from Chernobyl and Fukushima communication, as reasons for strategies of openness, which have helped the industry to gain acceptance for its nuclear projects (see also Michelsen and Harjula 2018).

Third, the interviewees repeatedly evoked notions such as a "nation of engineers", and a "country of rational engineer-environmentalists" (see also Karlberg 2010). The NGO interviewee (NGO-1) regretted a "blind belief in the honesty and high moral standards of the Finnish engineers" (see also Lammi 2009; Litmanen 2009). Industry, government and NGO interviewees alike stressed the fundamental importance of "reasoned" and "matter-of-fact" argumentation – which the female-led anti-Fennovoima movement adopted as its operating principle.[6] The Green party arguably owes its strong position partly to its efforts at nurturing a moderate, "neither left nor right-wing", and science-based image. The party has in recent years progressively softened its position on nuclear power. Interestingly, industry interviewees (NOP-1, NOP-2) stressed the importance of emotion, through storytelling, familiarity and interpersonal relations in conveying information, winning local citizens' trust, and combating opponents.

Fourth, the narrative of an "engineering nation" was further buttressed by a certain pride for "Finnish exceptionalism" (cf. Ylönen et al. 2017; Lehtonen et al. 2020), involving trust in local democracy, local-level trust in the operators, mistrust of Russian and French centralism and formalism (mentioned in relation to the OL3 and Fennovoima projects), the outstanding performance of Finnish NPPs, and Finland's leadership in nuclear waste management. Anti-Fennovoima interviewees evoked the reverse side of local democracy, arguing that their local municipal leaders were "candid fools", lured to supporting the project through promises of economic development and possibly personal benefits. In the spirit of depoliticization, both the industry and the NGO interviewees stressed that the foreign-policy controversy around the Fennovoima project[7] was beyond their remit.

## France: the long journey from depoliticization towards politicisation

### *Evolution of the nuclear sector in France*

[6] Expressions used by the interviewees (13 June 2014) included: "Emotions (…) in Finland, they don't carry much weight"; "We refuse to answer questions such as 'how do you feel now, after decision X by authority Y?'"; "you have to be emphatically matter-of-fact and calm"; and "we don't refer to Fukushima in our campaigning".

[7] In a local newspaper poll, 62% of the respondents viewed the participation of Russians in a Finnish NPP project as a security threat, given the current world political situation (Kaleva 2019).

The nuclear sector has since the 1950s enjoyed a special place within the French society, as a source of pride, export revenue, and a vector of post-War modernization (Hecht 2009). Initially created to support nuclear weapons production, the civilian nuclear sector took off properly in 1974, with the launching of a massive programme of American pressurised-water reactors (PWRs). Today, 56 reactors, operated by the 83% state-owned EDF, satisfy about 70% of the electricity demand. Despite the historically significant public scepticism towards nuclear energy (Brouard and Guineaudeau 2015), nuclear enjoyed cross-party support until the mid-1990s, when the uncompromisingly anti-nuclear Green party became a major player. France holds competence over the entire fuel cycle through three key organisations: EDF, the over 90% state-owned Orano (until late 2017, Areva), and the nuclear R&D agency, CEA. In 2012, the government declared that the share of nuclear electricity would be brought down to 50% by 2025, but postponed the target in 2018 to 2035. The construction of an EPR plant, launched in 2007 by EDF in Flamanville, Normandy, has faced delays, budget overruns, and technical problems, with the estimated entry in operation now 2023 (Poirier 2020). A repository for high- and medium-level long-lived waste is being planned for a sparsely populated area in the East of France, with expected operation start in 2035. The project, led by the national nuclear waste management agency, Andra, and financed via taxes levied on the waste producers, has a long and conflict-ridden history, and faces resistance from an active minority, despite the extensive participatory procedures especially at the national level (Lehtonen 2019). The independent safety authority, ASN, and its technical support organisation, IRSN, are responsible for safety regulation.

***Evolution towards greater openness and counter-expertise through incidents and accidents***

The strong French tradition of nuclear-sector counter-expertise dates back to the 1970s, and the setting up of groups of scientists criticising the massive scale of the nuclear programme (Lehtonen 2019, 41-49), the first local information and surveillance committee (CLI) in Fessenheim (1977) composed of civil society, industry, and state representatives, and organisations (e.g. WISE-Paris) producing independent expertise on energy policy options. These organisations were not openly anti-nuclear, but focused on technical scrutiny and communication.

Counter-expertise was boosted by the "Chernobyl cloud affair", which shattered trust in the authorities, accused of concealing the true extent of the fallout in France (Lehtonen 2019, 63-75). Two still existing organisations, ACRO[8] and CRIIRAD,[9] were set up for independent analysis of radioactivity around nuclear installations. Chernobyl also spurred early experimentation with more open forms of expertise and civic vigilance, through CLIs and multistakeholder expert committees examining specific risks. A key precursor was the setting up of the "pluralist" expert group, Groupe de Radioécologie Nord Cotentin (GRNC), to

[8] Association pour le contrôle de la radioactivité dans l'Ouest.
[9] Commission de recherche et d'information indépendantes sur la radioactivité.

examine claims that child leukaemia had increased around the La Hague reprocessing and waste storage site.

Building on this experience, IRSN has led efforts at the co-construction of risk-related knowledge jointly by institutionalised and civil society actors. ASN has integrated civil society representatives in its expert advisory groups since 2014. Together with the growing prominence of ASN as a critic of the nuclear industry – and the economic critique from the National Court of Auditors (Cour des Comptes) – may have reduced the space available for counter-expertise (Lehtonen 2019, 48-49).

***From depoliticization towards gradual opening up and politicisation***

The interviewees described, almost invariably, a significant evolution towards openness and transparency, albeit only amongst government authorities, away from the earlier secretive and depoliticised decision-making by a narrow elite of experts.

Chernobyl fostered politicisation, but did not lead to fundamental questioning of nuclear energy. However, the misleading Chernobyl communication by the authorities constituted a watershed in public trust in government, making also the media increasingly wary of being perceived as a mouthpiece of the government (e.g. Lehtonen et al. 2021). Local opposition against Andra's test drillings led to a stalemate in the waste repository planning in 1990, and to a shift away from a technocratic approach to HLW management policy (Lehtonen 2019, 91-101). The rise of the Green party in the late 1980s turned nuclear into a party-political issue, facilitating the access of counter-expertise into government advisory circles (Brouard and Guineaudeau 2015). The recent experiments going beyond counter-expertise and towards co-construction remain controversial. Nuclear opponents fear neutralisation of radical critique (NGO-2), some nuclear-sector stakeholders see co-construction as "politicisation of expertise" (NOP-4) and a threat to representative democracy (NOP-5), while actors of co-construction fear the loss of citizen trust if the inputs from co-construction are overlooked in decision-making (COM-1).

Politicisation and mistrustful counter-expertise were spurred by the failure of the prevailing institutions to live up to the high expectations stemming from the strong ideological trust in the state as the only legitimate guardian of the public interest (Saurugger 2007; Lehtonen et al. 2020), and in nuclear as a symbol of national pride, economic well-being, and French technological prowess (Hecht 2009). However, this trust is highly ambiguous, with constant critique against a secretive, opaque and undemocratic "Nuclear State" (Lepage 2014), mistrusted as an adversary of grassroots and civil society action (Saurugger 2007).

Trust in engineering and expert institutions is ambiguous and fluctuating. Citizens express ideological trust in French engineering, sometimes describing the country's engineers as "the best in the world" (d'Iribarne 2005), and solid (84% and 82%, respectively) institutional trust in the **competence** of the nuclear safety authorities (ASN and IRSN). Trust in **sincerity**,

i.e. the trustworthiness of these authorities as sources of information on industry and nuclear energy, picked up considerably in 2019 as compared with the preceding years (IRSN 2020, 52). The ambiguity – e.g. between trust in "scientific rationalism", pluralist expertise, and co-construction – provides a more conducive environment for politicisation than the Finnish unquestioned trust in engineering and rationality. Unlike in Finland, the interviewees did not stress the importance of matter-of-fact argumentation. Like the Finnish operators, an industry interviewee (NOP-5) underlined the role of emotions and personal relations in communication and trust-building: *"we must 'touch' people… we need to discuss… You've got to create a relation with the people"*.

## Trust in Germany: politicised civic vigilance

### *Evolution of the nuclear sector in Germany*

Supported by a solid institutional and legislative framework established in the 1950s, giant West German corporations (e.g. Siemens, AEG and ThyssenKrupp) conceded to take the lead in developing nuclear research, technology, and infrastructure. The pro-nuclear political and public consensus (Kirchhof and Trischler 2018) was broken only by the outbreak of mass mobilisation against civilian nuclear installations in the 1970s. Protests at sites such as Wyhl, Brokdorf, Wackersdorf and Gorleben involved often violent confrontation with police, attracted increasing press coverage (Arlt and Wolling 2016, 844), were instrumental for the nascent green movement, and left permanent marks on the German society. In the socialist East Germany, nuclear research and technology were developed without public scrutiny (Helmbold 2018). In 1980, five Soviet-type nuclear reactors supplied 12% of the country's electricity (ibid.). Soon after the German reunification, all were shut down for safety reasons.

The nationwide peace movement against the deployment of nuclear missiles in West Germany in the 1980s, as well as the Three Mile Island (1979) and Chernobyl accidents further spurred anti-nuclear activism (Cotton and Rowe 2019, 43), including court cases against nuclear projects (Kirchhof and Trischler 2018, 20). They helped the Green party to reach 8.3% of the votes in the 1987 elections. The anti-nuclear sentiment culminated in the new red-green coalition government agreeing in 1998 on a nuclear phase-out within 20 years. Following years of hesitation and political disputes, the Fukushima accident in 2011 confirmed the phase-out plan, as Chancellor Merkel announced the shut-down by 2022 of all 17 NPPs, then supplying 25% of German electricity.

The only remaining truly controversial nuclear project is the HLW repository, planned since 1977 for the village of Gorleben (see Di Nucci et al, in this volume). Thanks to the phase-out decision, the site search could start from a clean slate, with new legislation and institutions set up to guide a process grounded on the principles of science, transparency, and

multistakeholder participation. A siting decision is scheduled for 2031. Decommissioning of reactors constitutes another major future challenge.

***Mistrustful civic vigilance through "politicised" counter-expertise***

The growing public mistrust towards the government and nuclear operators in the 1970s gave rise to influential counter-expertise organisations, such as the Öko-Institut and the Gruppe Ökologie Institut für ökologische Forschung und Bildung Hannover (GÖK). The Wyhl protests, including a six-month site occupation in 1975, and subsequent legal and political process, allowed the protesters to gain first-hand experience in preparing and communicating on scientific-technical knowledge (Radkau 2012). The opponents realised that the ability to produce independent technical and legal expertise was a prerequisite for equitable discussion with industry and government experts. The Wyhl process led to the creation, in November 1977, of the Öko-Institut. Its founding declaration stresses the importance of expertise: "In the long term, citizens' initiatives (...) will only succeed (…) if they themselves provide the necessary scientific justification" (Öko-Institut 1977, III).[10] All the while mindful of anchoring their activity in science (NGO-5; Augustine 2018), these organisations went beyond surveillance of health and environmental impacts of nuclear installations, engaging in debates on energy policy and suggesting alternatives (GOV-2; Jacquiot 2007).

On entering in power in 1998, the red-green government gave counter-expertise organisations direct access to policymaking and helped consolidate their status as recognised stakeholders. Vital in this institutionalisation was the appointment of counter-experts to high-level government advisory bodies (e.g. the Reactor Safety Commission and the Nuclear Waste Management Commission) as members or even as chairpersons. Following the announcement of the nuclear phase-out, counter-expertise has refocused its activities on opposing nuclear installations in the neighbouring France, Belgium, and the Czech Republic (NGO-5).

***Politicisation: from transparency towards openness***

The long process of politicisation – evolution from a "nuclear nation" through the mass protests and counter-expertise in the 70s and 80s to a relative consensus on a nuclear phase-out – has been described as a success of German democracy (Milder 2017; Kirchhof and Trischler 2018). Our industry interviewees highlighted substantial progress towards transparency and proactiveness (NOP-6), but regretted the industry's failure to convey positive messages about nuclear energy to opinion leaders (NOP-5). Chernobyl consolidated the ongoing politicisation. In the words of an industry interviewee, after Chernobyl, many people "would choose whom to vote for on the basis of their nuclear opinions" (NOP-5).

Politicisation has been founded on diverse partly contradictory features of ideological trust. The early nuclear era was characterised by trust in "state engineering" (Hecht 2009;

[10] Translated from German by the authors.

Cotton and Rowe 2019, 49), national pride for technological achievements, and high status of engineers in society. Although strongly against authoritarianism, technocracy, and large-scale technologies (Kirchhof and Trischler 2018, 14), the opponents in the 1970s were solidly "pro-science" (Augustine 2018, 86, 119) – a precondition for the credibility of especially the numerous female-led post-Chernobyl citizen movements, such as Mothers against nuclear (NGO-5). To an extent, these features persist today (e.g. Cotton and Rowe 2019, 49-51), reflected also in above-European-average levels of institutional trust in scientists, government, and the safety regulator (Eurobarometer 2010; Eurofound 2018). However, Fukushima seems to have "shaken the confidence in expert judgements on the 'safety' of nuclear power plants" (Ethics Commission 2011, 10), whereas the energy transition (Energiewende) policy evokes relatively high trust in the federal but especially in the local governments (Steentjes et al. 2017). Yet, like in Finland and France, the pro-nuclear interviewees emphasised "emotionalising" as a prerequisite for trust-building, regretting the failure of the industry to "get on the emotional track" in addressing the "scared" mothers that could not be convinced "with rational arguments" (NOP-5).

Like in France, mistrust of specific nuclear-sector institutions in the 1970s was fuelled by their seeming inability to respect the ideals of democracy, notably transparency and honesty (Cotton and Rowe 2019, 48; Kirchhof and Trischler 2018). Protests were founded on solid ideological trust in representative democracy – a "quiet, unified, celebratory, worthy," democracy "that hardly accepted conflict" (Milder 2017, 2) – and a simultaneous deep mistrust of the authoritarian technocracy that nuclear energy seemed to embody. In the shadow of the country's national-socialist past, revolt against the untrustworthy state and nuclear energy appeared as a generational duty, especially to the youth (Kirchhof and Trischler 2018). The perceived opacity of the nuclear industry and authorities turned even the conservative citizenry in the rural host communities into mistrustful protesters, who at times even endorsed violent protest, while at the same time developing counter-expertise through "citizen initiatives" (Jacquiot 2007; Milder 2017).

## Trust in Spain: nuclearization of politics

### *Evolution of the nuclear sector in Spain*

In the mid-1950s, Spain became the first and only dictatorship in the West to pioneer nuclear technology development. However, since the 1960s, it imported the requisite technology and funding, mainly from the US. An ambitious nuclear programme, set up in the 1960s and 1970s with full support of the government and the oligopolistic electricity utilities, foresaw the construction of almost 40 reactors (Costa Morata 2001, 18-19; Rubio-Varas et al. 2018). The early projects barely faced opposition, as the regime did not tolerate protest. From the mid-1970s, rather unorganised local protest movements emerged, mainly to defend local livelihoods such as tourism and agriculture. The nuclear programme was scaled down in 1979, mainly due

to the economic downturn triggered by the oil crises, the transition to democracy (1977-1982), and public opposition. The socialist government declared a moratorium on nuclear construction in 1984, which meant, in essence, the abandonment of the programme. In the late 1980s, ten reactors supplied up to 35% of electricity consumption, while in 2019, seven were still operating, covering 21% of total consumption.

The transition to democracy also brought about a clearer institutional separation of duties. The governmental nuclear authority, Junta de Energía Nuclear, was abolished and its duties transferred to three public bodies: an independent safety regulator (CSN) in 1980, an energy R&D organisation (CIEMAT) in 1986, and a nuclear waste management agency, ENRESA, in 1984. The moratorium generated some local and national-level debate, yet waste management and the reactor lifetime extensions remain the only truly contentious issues. ENRESA has pioneered public engagement, in developing and managing the low-and intermediate-level waste site in El Cabril (since 1992), and since 2006, in efforts to site a centralised temporary HLW storage facility (ATC). A process founded on the principles of voluntarism, transparency and openness was to prepare for the government decision (Rubio-Varas et al. 2018, 60-61). In 2011, the government designated Villar de Cañas, a tiny rural municipality about 200 km south-east of Madrid, as the host for the ATC. After long-drawn tacking back-and-forth between the national and regional governments, following multiple swings in political power constellations, the project is currently on hold, and ENRESA is looking into alternatives.

***Mistrustful civic vigilance***

Spain has developed nuclear counter-expertise only to a modest degree. Interaction between the various local opposition movements in the early 1970s was minimal, and little effort was made to systematise the production of critical expertise. The relaxation and the subsequent abandonment of the dictatorship opened the doors to critical views and knowledge from countries such as Germany and the US (e.g. Costa Morata 2001; Rubio-Varas et al. 2018, 16). Despite isolated victories, the Spanish anti-nuclear movement has failed to form a stable and politically influential national network. An association of nuclear municipalities, AMAC, was established in 1988, to produce technical counter-expertise but also to see to that appropriate emergency plans were in place. Ensuring fair distribution of benefits and compensations was a high priority for the host municipalities, mistrustful of the state's and industry's willingness to heed local demands (COM-2). In the 1990s, safety measures suggested by Spanish university experts were brought to the debate by AMAC, and subsequently implemented. Amongst the multistakeholder bodies, the Local Information Committees, established in 2000, and the Local Information Commissions, created by AMAC in 2005, primarily provide information, rather than seeking to (co)-produce expertise. The CSN permanent advisory committee on transparency, access to information and public participation (2010) has hardly influenced policy (GOV-3; UNIV-1). Similar to France, civil society actors have regretted the disconnect between the participatory processes and decision-making on the ATC (COM-2).

### *The peculiar Spanish nuclearization of politics*

Especially in the early years following the transition to democracy (1977-1982), the public to a certain extent continued to associate nuclear energy with Franco's dictatorship, its military ambitions, and its close connections with both "American imperialism" and the private electricity industry (Rubio-Varas et al. 2018, 27; Costa Morata 2001; Palazuelos 2019). Democratic Spain emerged as one of the societies most opposed to nuclear power in Europe (Rubio-Varas et al. 2018, 4), yet the Green party has never played more than a highly marginal role. Still in the early years of democracy, anti-nuclear action represented a form of resistance against the heritage of Francoism, in particular the utilities that were compensated for the revenue lost due to the 1984 moratorium, and were blamed by anti-nuclear activists for abusing their privileged position (e.g. Camacho Palencia 2018). The earlier predominantly critical press reporting on nuclear (De la Torre and Rubio-Varas 2017) has given way to a more balanced tone in regions hosting NPPs (Cobos and Recoder 2019). Public mistrust persists, fed by the perceived absence of a culture of transparency and openness, and a belief in an enduring collusion between nuclear advocates and regulators (NGO-6). Trust seems stronger in the small, rural nuclear communities, where the industry has established strong social ties with local citizens, who see nuclear installations as purveyors of jobs and progress (NOP-7), yet remain uncertain about the safety of nuclear (Rubio-Varas et al. 2018, 69; Oltra et al. 2019, 5). Ambivalence marks attitudes towards ENRESA's commitment to public engagement, for example on the El Cabril low- and intermediate-level waste site planning, with university experts supportive (UNIV-1) and environmental groups sceptical (NGO-7).

The Three Mile Island and Chernobyl accidents spurred public mistrust, but the impact was considerably dampened by two factors that hampered the development of counter-expertise: the 1984 moratorium had "pacified" the nuclear debate, and the anti-nuclear movement focused its attention on the April 1986 referendum on Spain's NATO membership. Moreover, although accidents and incidents in Spanish reactors (esp. Vandellós I, 1989) generated local concern, our interviewees described the national-level situation as one of absence of debate. The industry continues to see debates as risky, whereas citizens often lack interest, in the absence new-build plans.[11] Due to the paucity of debate, the safety authority, CSN, remains notoriously unknown to the citizenry, which often associates it with the nuclear promoters and industry (CSN 2015).

This combination of public mistrust and disinterest has evolved against the background of a particular form of politicisation, "nuclearization of politics". The transition to democracy created an enduring political tension between the central government and the newly established autonomous communities, the latter exploiting the nuclear issue for self-legitimisation (Rubio-Varas et al. 2018). Nuclear power has thus become yet another instrument in existing political disputes. Mutual mistrust between the national and regional governments has become institutionalised, and is founded on a mix of interest-, ideology- and regional identity-based

[11] Citizen attendance is low even in the statutory meetings of the local information committees (NOP-7).

motivations, including clashes between different (rural/urban) development models (Espluga, Medina, and Konrad 2018). A safety authority interviewee remarked: "As with many other policy areas, the government party tends to support the regulatory body, while the one in the opposition tends to question it" (GOV-3). Positions on nuclear energy and waste have continued to fluctuate according to shifts in power relations between the central and regional governments. The ATC siting process – unprecedentedly participatory, but victim of a battle involving multiple political parties, tiers of government, and arguments marginal to the project itself – constitutes a recent example of such nuclearization of politics.

## Discussion

Table 5 summarises trust, mistrust, civic vigilance and (de)politicisation in the nuclear sector in our four case study countries.

PLACE TABLE 5 APPROXIMATELY HERE

### *Civic vigilance based on ideological trust and mistrust*

Our analysis departs from the commonplace view that posits trust as automatically desirable and mistrust as something to be minimised in management of high-risk industries. In particular, the article illustrates the ways in which positive manifestations of mistrust as civic vigilance co-evolves with country-specific ideological trust. From this perspective, Finland and Spain stand out by the weakness of their civic vigilance traditions, as compared with France and Germany. The roots of this weakness in Finland lie in the solid ideological trust in state bureaucracy and the state-industry alliance as the backbone of the country's socioeconomic wellbeing, in Finnish high-quality engineering, and in honesty, reliability and rational, pragmatic reasoning as defining features of the "engineering nation". The absence of significant nuclear incidents, relatively weak trust in the competence of NGOs especially in the area of energy policy, the steadily advancing spent fuel repository project, and the exceptionally strong trust in the nuclear safety authority have further reduced the demand for counter-expertise.

In Spain, the weakness of counter-expertise reflects a combination of deep institutional mistrust of state institutions and instrumentalization of nuclear issues for political purposes, which limits the space for fact-based argumentation based on expertise.[12] Mistrust of institutions has been spurred by the view that the state has granted undue privileges to the

[12] The frequent references by our Finnish, French and German interviewees to rational, fact-based argumentation were indeed virtually absent from the discourse of the Spanish interviewees.

private utilities and by the instrumental use of nuclear issues in battles between the central and regional governments, with politicians shifting their positions on nuclear according to political constellations. Ideological mistrust manifests itself in clashes between contrasting territorial development models, and, especially in the early years of democracy, perceptions of nuclear energy as a product of Franco's dictatorship.

France and Germany resemble Finland in the strong ideological trust in state bureaucracy (especially in France) and representative democracy (esp. in Germany), yet counter-expertise prospered precisely because the institutions failed to live up to the citizens' high expectations. In France, the ideological trust in the state as the sole legitimate guardian of the public interest meant that when the nuclear sector – as an incarnation of "state engineering" underpinning the country's post-War reconstruction – after Chernobyl notoriously failed to live up to the high standards, mistrustful counter-expertise quickly consolidated its position. In Germany, institutional mistrust was further buttressed by the strong ideological trust in open, representative democracy and ideological mistrust of state authoritarianism and technocracy. For the German citizens, the nuclear policy lacked democratic transparency, and the violent police repression of protests symbolised the dreaded authoritarianism. The French and German cases therefore differ from that of Spain, where expectations towards state institutions are low, citizens harbour little trust in either the regional or central governments, and resignment and frustration have seldom translated into concrete manifestations of civic vigilance.

***(De)politicization***

Our analysis highlights the diversity of forms taken by (de)politicisation, and nuances the assumption that politicisation would always foster civic vigilance. The high degree of politicisation of nuclear debate in Spain and Germany contrasts with the depoliticization in Finland, and the gradual politicisation in France. Depoliticization has been strongest in Finland, with political parties internally divided on the nuclear issue, and decision-making and vigilance delegated to the trusted state institutions. Ideological trust in Finland as a rational and pragmatic "engineering nation" has further bolstered depoliticization. In the three other countries, the trust in engineering-led technocracy has eroded since the 1970s. In France and Germany, politicisation was boosted by the collapse of trust in "state engineering" and risk communication in the aftermath of Chernobyl, and by the rise of the anti-nuclear Green parties in the mid-1990s. In France, post-Chernobyl politicisation remained incomplete, with the counter-expertise organisations shying away from energy policy debates, and primarily seeking to ensure that the authorities respected legal and ethical norms.

Politicization took opposite directions in Germany and Spain. In Germany, political debates and decisions were characterised by highly principled – and according to nuclear opponents rational and fact-based – standpoints related to nuclear. In Spain, convictions, principles, and strategic manoeuvring concerning political and regional identities governed the shifting positions on nuclear. The Spanish "nuclearization of politics" leaves limited room for

mistrustful counter-expertise, as nuclear-related arguments are employed opportunistically to serve broader political aims.

**Conclusions**

Our country case studies illustrate the multiple ways in which ideological trust and mistrust shape the trajectories of mistrustful civic vigilance and types of (de)politicisation of nuclear debates and policies. Ideological and institutional trust and mistrust interact with each other, and with the historically shaped and continuously evolving context. The strong ideological trust in the state has in Finland hindered the development of mistrustful counter-expertise, but has in France and Germany provided a foundation for its emergence. In Spain, the weakness of ideological trust in the state has undermined civic vigilance.

The hypothesis that mistrustful civic vigilance is spurred by politicisation but undermined by depoliticization holds for Finland. To a large extent it holds also for France and Germany, where depoliticization and high ideological trust during the early decades of nuclear laid the bases for politicisation and active mistrustful civic vigilance once the institutions proved untrustworthy. In Spain, by contrast, the particular form of politicisation – "nuclearization of politics" – has weakened the demand for counter-expertise: in a political culture and institutional setting characterised by complex relations of power and authority between not only political parties but also competing central and regional governments, fact-based argumentation and expertise tend to lose relevance. In conditions of high ideological trust, depoliticization is a potentially powerful but risky strategy, whose success crucially depends on the ability of specific institutions to live up to the high expectations.

We suggest further research on two themes that could not be incorporated in this article. First, to help better understand the relative weight of politicisation, depoliticization, and ideological trust in shaping the emergence of civic vigilance and new forms of expertise, analysis could address topics such as the relationships between the scientific community and the anti-nuclear movements, media attention given to anti-nuclear movements and local NGOs, and the role of political parties in shaping the development of expertise. Second, despite the obvious difficulties involved, efforts should be made to develop indicators in support of comparative analysis of ideological trust across varying contexts.

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Table 5. Summary of trust, mistrust, civic vigilance and (de)politicisation in the four countries.

| | Finland | France | Germany | Spain |
|---|---|---|---|---|
| **Portrayal of nuclear history** | • Problem-free: advancement according to plans, in the spirit of openness | • Problematic legacy, but "we've come a long way" | • Opposition against nuclear and process towards phase-out an example of democracy | • Civilian nuclear associated with Francoism, military, and privatisation of the industry and benefits |
| **Institutional trust** | • High trust, especially in the safety authority | • Complex web of largely mistrustful relations<br>• Operators and safety authorities trusted for competence, mistrusted of lacking sincerity | • From the mistrust in the 70s towards the re-establishment of trust in state institutions | • Extremely low trust in government competence – and very low trust in govt sincerity |
| **Ideological trust** | • Finnish engineering nation<br>• Rational, moderate, and matter-of-fact argumentation<br>• Local democracy and autonomy<br>• Finnish pride; mistrust of the foreign (France, Russia) | • Ambiguous trust-mistrust relations towards the state<br>• From "state-engineering" towards mistrust (post-Chernobyl)<br>• Ambiguity of (and debate on) the relations between direct and representative democracy | • Representative democracy<br>• Mistrust of authoritarian technocracy, large-scale technologies (in the 70s)<br>• From "state-engineering" towards mistrust (post-Chernobyl)<br>• Rational, science-based argumentation | • Anti-Francoism as a basis for anti-nuclear action |
| **Mistrustful civic vigilance** | • Weakly developed | • From technical counter-expertise (1970s) towards co-construction of expertise | • From science-based (1970s) towards energy-policy counter-expertise (since Chernobyl) | • Weakly developed, mainly oriented towards information and communication |
| **(De)politicisation** | • Consistent and successful depoliticization as a foundation of trust | • Depoliticization until the mid-1990s; since then, partial politicisation | • High degree of politicisation since Chernobyl | • Nuclearization of politics, instead of politicisation of nuclear |