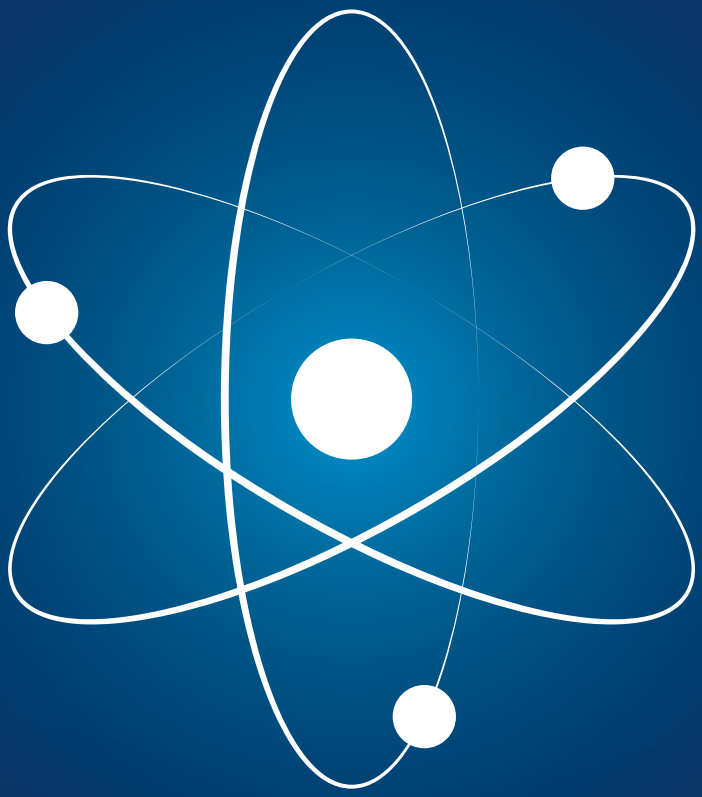
COAL-TO-NUCLEAR FOR POLAND
SOCIAL DIAGNOSIS

REPORT



URSZULA KUCZYŃSKA
ANNA PRZYBYSZEWSKA

COOPERATION: HANNA UHL

SOBIESKI INSTITUTE

DEsire

Instytut Sobieskiego
ul. Lipowa 1a lok. 20
00-316 Warszawa

mailto:sobieski@sobieski.org.pl
https://www.sobieski.org.pl/

COAL-TO-NUCLEAR FOR POLAND
SOCIAL DIAGNOSIS

URSZULA KUCZYŃSKA
ANNA PRZYBYSZEWSKA
COOPERATION: HANNA UHL

ISBN 978-83-68374-09-4

DESIGN AND PRODUCTION:
PIOTR PERZYNA
nowe media 24.pl

COAL-TO-NUCLEAR FOR POLAND **SOCIAL DIAGNOSIS**

REPORT

URSZULA KUCZYŃSKA
ANNA PRZYBYSZEWSKA

COOPERATION: HANNA UHL

"Everyone wants cheap electricity,
And no one wants to live next to a power plant".

statement by a study participant, male, group > 60 years of age,
Opole, 22.08.2024

SOBIESKI INSTITUTE

TABLE OF CONTENTS:

EXECUTIVE SUMMARY

PURPOSE OF THE REPORT

- The purpose of the report is to analyze the social aspects of the transition from coal to nuclear power (Coal-to-Nuclear, CtN), and thus the use of Generation III/III+ and IV nuclear reactors for the decarbonization and modernization of Poland's energy generation industry. The report outlines the global and Polish context for public attitudes towards nuclear power and presents the results of a qualitative social diagnosis conducted among Opole residents and a group of representatives of the Polish energy sector. The report offers a number of recommendations for actions that may be taken for the purpose of increasing the levels of acceptance for nuclear power plant builts, especially in local communities.

- The social diagnosis, carried out as part of the DEsire project, was conducted in the second half of 2024 in Opole. Opole was selected as a result of the Phase A of the DEsire project. Phase A identified the power plant in Opole as one of the most favorable locations for the implementation of the Coal-to-Nuclear pathway. Opole was also selected as a reference location for the Coal-to-Nuclear pathway study using Generation IV reactors. The study was qualitative in nature, allowing for a deeper insight into the motivations and emotions of its participants. However, it does not allow for drawing well-founded conclusions for the entire population of Poland.

- Workshop for the representatives of entities related to the Polish energy sector was held in the first half of 2024. Its participants included 15 representatives of companies and institutions working in the energy sector, but not technology suppliers or potential investors. The purpose of the workshop was to identify the key stakeholders in Coal-to-Nuclear (CtN) projects, their role and attitudes towards this path of modernization of the Polish power generation industry.

SUPPORT FOR NUCLEAR POWER

- In recent years there has been a significant shift in attitudes of the Western societies towards nuclear energy. Public support for its use has been steadily growing in both the United States and the European Union, even in traditionally anti-nuclear countries such as Austria and Germany. The identified key factor here was Russia's invasion of Ukraine. The energy crisis and soaring prices of fossil fuels made governments and citizens aware of the risks of dependence on imports.

- Support for nuclear power has also been growing in Poland. It reached a record-breaking high of almost 93% in 2024. Despite this, tensions are emerging at the local level, as exemplified by the divided community of Choczewo, where the construction of Poland's first nuclear power plant is underway. The main problem is the lack of effective communication between investors, local communities and authorities, a situation which fosters distrust and breeds conflicts. International experience shows that the key to success in nuclear projects is engaging with the local communities on an equal footing, as partners. Transparency, dialogue and appropriate mechanisms driving close cooperation can reduce the risk and foster acceptance of nuclear projects.

DIAGNOSIS

- Knowledge of nuclear power, as displayed by the participants of the study, was superficial and random, and was based on information obtained from the media or friends by accident. It is worth noting that the survey participants deeply held the false belief that nuclear power is dangerous, which they presented as fact rather than opinion. The source of this belief may be attributed to the Chernobyl disaster, its memories still vivid in the memory of the Polish people, all the more so that the Chernobyl disaster became part of mainstream culture, including movies and TV series.

- Nuclear power evokes numerous associations. The negative ones, although less numerous, are often much stronger and impact the imagination more profoundly – i.e. disaster, Chernobyl, contamination. This emotional layer of the image nuclear power industry has in the eyes of the study participants, exerts intense impact on the attitudes towards the construction of power plants in Poland, causing some people to be highly averse to such investments. It is worth noting that there exists a proven tendency to overestimate the likelihood of an event if any similar event is easy to recall from memory or to imagine. This tendency results from how personal memory operates and can be exacerbated by the media and cultural context. Thus, the perceived probability of a disaster occuring increases as the number of information and messages about other disasters of this kind function in an individual's environment. Therefore, it is important to actively shape the image of nuclear power by bringing forward positive experiences in operating power plants.

- It must also be noticed that the positive associations with nuclear power encompass the belief that its commissioning in Poland will lower energy prices. Study participants indicated that economies of scale would work here - if one facility produces a lot of energy, the energy will be cheaper. For some people, this is the main argument determining their positive attitude toward nuclear power. Since this belief may prove to be wrong, it is worth preparing for the need to give prominence to other positive aspects that introduction of nuclear power into the energy system brings.

- Study participants displayed three main attitudes: they were proponents, declared neutrality or they were opponents of the construction of a nuclear power plant. Proponents emphasized the opportunity for energy independence and environmental protection, although safety issues were not unimportant to them. Those declaring neutrality pointed at the self-declared deficit of knowledge about the technology but actively engaged in a discussion based on rational arguments. Opponents of nuclear power were firmly rooted in an emotional narrative, citing the Chernobyl disaster and fearing the dangers of radiation. In addition, they displayed reservations on NPP construction costs and the social impact of energy transition.

- A number of people, even those who have a positive attitude toward the construction of a nuclear power plant in Poland, would not want to see an NPP built in their vicinity. This is a well-known phenomenon, as it applies to many other large investment projects, especially energy projects. Failure to engage with the local community during planning for such investment is the prime reservation raised by study participants at this point. Mistrust that such decisions are made on the basis of technical and economic analyses carried out well in advance, etc. is also displayed. Some say outright that the power plant will be built where residents are least likely to protest, which means that public protest is seen as the most effective form of informing decision-makers on disapproval for their actions. Thus, the siting decision for an investment of strategic importance for the Polish energy system and, more broadly, the entire economy, is hostage to a struggle for dominance between the civil and the public side, which stems from deep distrust. It should be noted that it is in such a landscape favors disinformation and loss of control over the investment process.

KEY FINDINGS

- Study participants identified two clear requirements they believe will determine whether or not potential Coal-to-Nuclear investment may gain public support in their city:

  1. "Our voice matters" - residents want to be included in the investment planning process;

  2. "Talk the language of benefits and walk the talk" - residents want to find out what benefits they as city's residents and the city itself will draw from the construction of nuclear installations on their premises.

- Key to effective communication around the nuclear power plant investment lays in overcoming the deep distrust of the locals. Residents expect their concerns (about safety, about costs, about environmental impacts, about social consequences of the energy transition) to be adequately addressed. They would most like to hear arguments from nationally recognized experts and local government representatives. The latter have a crucial advantage over politicians operating on the national scene, because they are also residents of the region, so the investment will also affect them directly. In addition, local politicians know that they will pay for misleading their voters during the next elections. Making the debate about the nuclear power plant political is definitely regarded as wrong and counterproductive.

- The data collected in the report shows that the high support that Poles declare for the implementation of nuclear energy in the country does not translate into uncritical enthusiasm for the implementation of nuclear investments in specific local communities. Where there is no previous experience with nuclear power, doubts about the safety of applying such technology are prevalent. Experience from nuclear projects around the world and in Pomerania show, however, that even when education and communication campaigns succeed in dissipating these fears, new challenges arise. These are linked to the practical aspects of executing large infrastructural investment and the disruption the construction causes to the daily life of local residents. For the success of nuclear projects in Poland - including those on the Coal-to-Nuclear path, which brings nuclear investments closer to large concentrations of people - it is necessary to develop specific participation mechanisms for local communities. Providing residents with a sense of agency and control over their environment helps reduce resistance to investment. Empowering local communities and sharing with them the responsibilities associated with the investment, both at the construction and operation stages, can significantly reduce risks and burdens for all parties involved.

WORKSHOPS WITH REPRESENTATIVES OF THE ENERGY INDUSTRY

Participants of the workshop stressed the importance that clear communication has for the success of nuclear investments as well. They identified a variety of stakeholders in nuclear power plant investment projects with whom dialogue should be held. These include regulators, central and local administrations, trade unions, chambers of commerce, academia, local communities and special interest groups. Key findings point to the need for intensive, thoughtful communication and stakeholder engagement processes, avoidance of making the discussions on the investment political and active involvement of local communities in the decision-making process. It was also emphasized that public acceptance of the Coal-to-Nuclear concept depends on education, sticking to a consistent narrative around nuclear and building trust through transparency of operations. It was suggested that an independent expert platform be established that could reliably inform the public about nuclear energy. The need to coordinate communication and information policies at the national level was also pointed out, as was the need to support the development of local industry and education ecosystems.

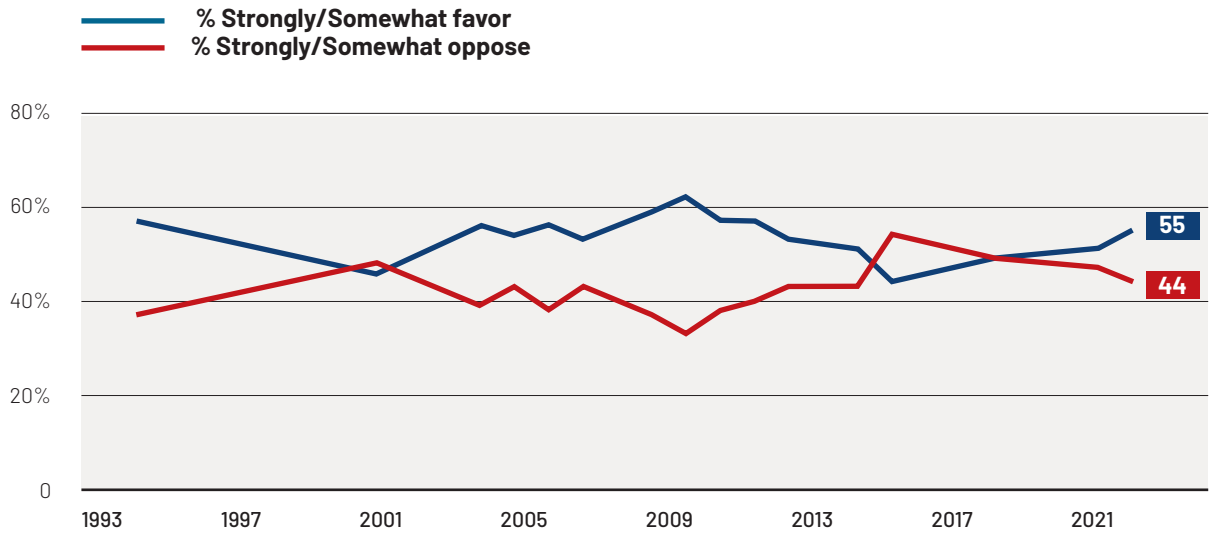
1. INTRODUCTION

1.1 GLOBAL CONTEXT

The workshop, held at its headquarters by the International Atomic Energy Agency in April 2023[1], focused on what was already quite obvious to analysts and observers of the public debate: around 2022 in Western societies a fundamental shift in attitudes towards nuclear energy occurred, and support for its use began to grow.

FIG. 1 **AMERICANS' OPINIONS OF NUCLEAR ENERGY, 1994–2023**

Overall, do you strongly favor, somewhat favor, somewhat oppose or strongly oppose the use of nuclear energy as one of the ways to provide electricity for the U.S.?



SOURCE: Gallup.

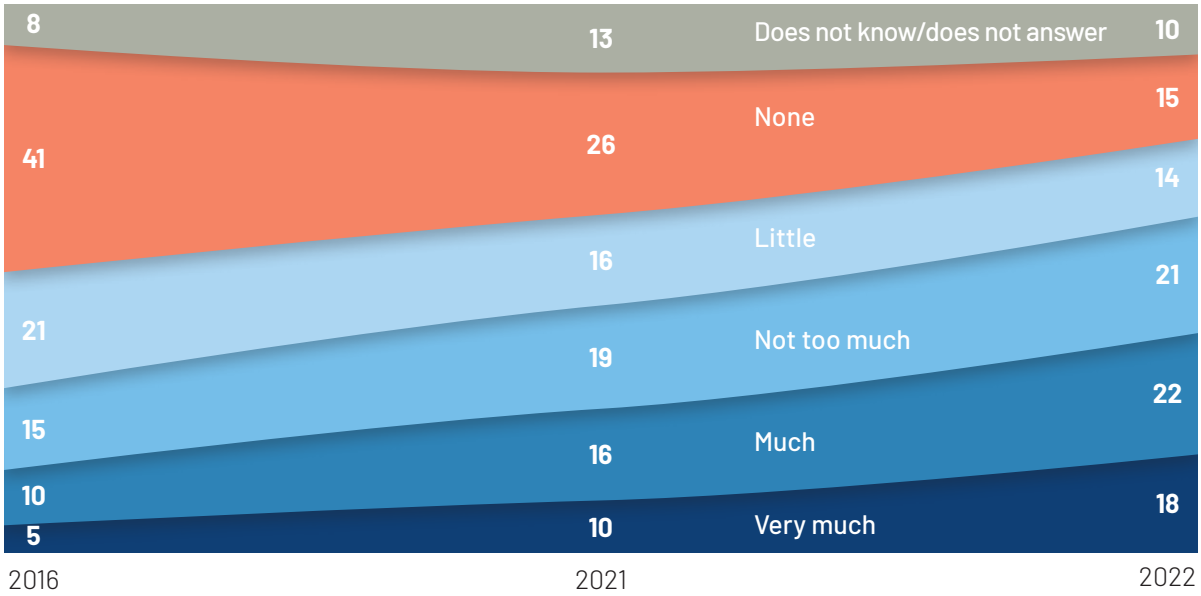
This was clearly demonstrated by a study conducted in the United States, where the downward trend that had been in place since 2012 was reversed. In 2023, for the first time in a decade, support for the use of

1 Workshop on Reimagining Nuclear Energy, 26–28.04.2023, https://www.iaea.org/events/evt2206873.

nuclear power reached 55%. Significantly, it crossed the party lines and increased among both Democratic and Republican Party voters. Admittedly, Republican voters (62%) were still more likely to be in favor of nuclear power than Democratic voters (46%), but the support levels indicated in the survey still showed a clear boost on both sides[2]. When one considers the actions by President Joe Biden's administration, which consistently supported the sector and took unprecedented decisions such as the restart of the Palisades nuclear power plant in Michigan[3] and efforts to keep the operating U.S. nuclear fleet online, the hope that this political consensus will last and translate into active American support for nuclear projects elsewhere in the world, including Poland, is not unfounded.

In the European Union, the situation appears to be similar.

FIG. 2 **WHAT SHARE OF YOUR COUNTRY'S ENERGY PRODUCTION SHOULD BE FROM NUCLEAR POWER?**



SOURCE: Szazadveg Foundation, Project Europe, 2022.

According to the Shazadveg Foundations' 2022 survey, the percentage of EU citizens supporting the use of nuclear energy has risen from 26 to 40 percent, while the share of staunch opponents has fallen from 26 to just 15%. Also the traditionally anti-nuclear countries such as Austria, Greece and Portugal have seen a drastic drop in the number of opponents.

2 M. Brenan, *Americans' support for nuclear energy highest in a decade*, 25.04.2023, https://news.gallup.com/poll/474650/americans-support-nuclear-energy-highest-decade.aspx.

3 *Palisades to receive $3B in federal, state funding to fuel plant restart*, 30.09.2024, https://www.ans.org/news/article-6428/palisades-to-receive-3bin-federal-state-funding-to-fuel-plant-restart/.

From this perspective, the case of Germany, where in 2022 *the Atomausstieg* was still underway and the last nuclear power plants were being phased out, seems interesting. The survey showed that in 2022 only 20% of Germans still believed that nuclear power should be consigned to oblivion, although six years earlier a majority of German citizens believed so[4].

This small social revolution in attitudes towards nuclear power is attributed to a confluence of many factors that contributed to the formation of a critical mass. A key role was played by the phenomenon of the ***social focal point***, a moment that highlights the need to revise prevailing attitudes. At the political level, such moments often become impeti for lawmakers to adjust policies and adopted strategies.

In the case of nuclear power, it was Russia's attack on Ukraine and its social and economic consequences that became such ***social focal point***. The introduction of economic sanctions on raw materials from Russia meant, among other things, that LNG supplies from other countries had to be contracted quickly and alternative suppliers of hard coal had to be found immediately. This, in turn, translated into a spike in prices on global commodity exchanges, with the price of a ton of coal hitting a historic high of 465.72 points in the Global Coal Price Index in December 2025[5]. For Poland it meant a period of anxiety about how the country would cope in the 2022/2023 heating season. These events made everyone - politicians, energy industry experts and ordinary people - acutely aware of the scale of the financial and political costs associated with dependence on imported energy sources.

Adding to this, the year 2022 saw another occurrence weighing on the public imagination: the symbolic, discursive victory of the narrative of the need to transition away from burning fossil fuels to produce energy in the face of accelerating climate change. This victory was by no means absolute, and it remains an open question whether it will stand the test of time. However, even climate skeptics realized that the trend towards decarbonization will stay with us for a long time to come as it became the question of a larger technological shift that already involves all continents and all countries - including major CO2 emitters like China and India - in many sectors of the economy, including energy production.

NUCLEAR POWER IS *COOL* AGAIN

The IAEA workshop mentioned before was entitled *"Reimagining nuclear, inspiring the youth"*[6]. It centered around a topic that is not often associated with the IAEA's expert and rather formal image: working with people and working with the public imagination. It was probably the historic first that saw the Agency's events, generally associated with the highest-level international bureaucracy, used as stage for a "nuclear opera" composed and sung by the founder of Generation Atomic[7], Eric Meyer of the US[8] and a cinema where you could watch a documentary about why the new generation of climate and environmental activists is committed

4 *Public support for nuclear energy in Europe is growing*, 3.01.2023, https://szazadveg.hu/en/cikkek/public-support-for-nuclear-energy-in-europe-is-growing/.

5 Monthly coal price index worldwide from November 2022 to November 2024, Statista Research Department, 10.12.2024, https://www.statista.com/statistics/1303005/monthly-coal-price-index-worldwide/.

6 J. Donovan, I. Chatzis, *Nuclear energy 'reimagined' at IAEA workshop on stakeholder engagement*, 5.05.2023, https://www.iaea.org/newscenter/news/nuclear-energy-reimagined-at-iaea-workshop-on-stakeholder-engagement.

7 *Safeguarding your energy and climate future by championing the cause for nuclear*, https://www.generationatomic.org/.

8 Eric G. Meyer, Biography, https://www.ericgmeyer.com/bio.

to promoting nuclear energy. You could also learn about what tools and methods the scientific community applies to bring the topic closer to a variety of audiences (including a glowing blue "atomic guitar" that one can play), watch a group of Argentinian children react with great curiosity to actors who during a theatre performance teach them about nuclear energy at their school and clap to the rhythm of a simple song taught in Nigeria to explain why nuclear energy should not be feared.

In the headquarters of one of the UN-affiliated organizations, normally dominated by big world politics, the representatives of nuclear watchdogs, regulators and industry, the engineers, industry specialists, technocrats, scientists and a whole colorful array of advocates for greater use of nuclear power met to discuss how to spread the positive nuclear message to everyone they meet - including anti-nuclear Germans - with the use of a range of unconventional and not-so-serious means.

It is indeed also due to such efforts that nuclear power returned to favor and became ***hip*** and ***cool*** again. Starting 2022 or so, in most countries of the global North, knowledge and support for nuclear power can not only be flaunted, but also shared with all concerned.

1.2 POLISH CONTEXT

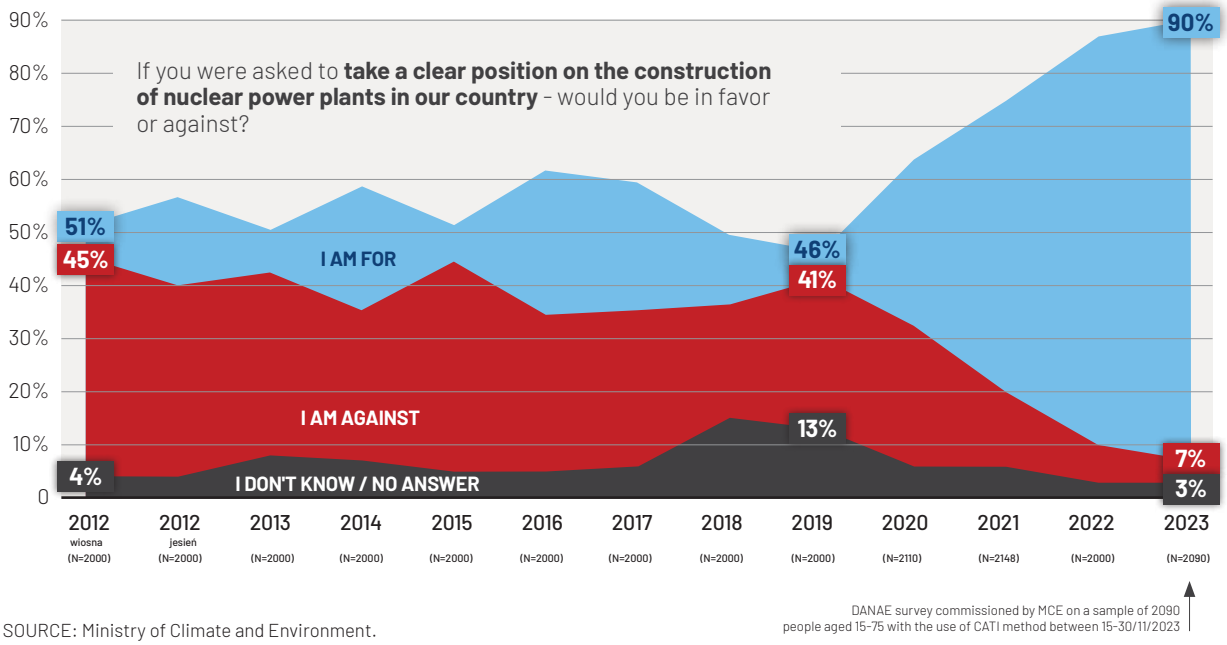
Regular surveys of public opinions's attitudes towards nuclear energy have been conducted in Poland since 2012. Over the past decade, it has become clear that **Poles are more positively disposed to nuclear energy than residents of other EU countries**. In 2023, another record was set: support for nuclear energy was declared by 89.9% of respondents, and the share of undecided respondents and of the declared opponents fell to historically low levels. More significantly, according to the results of the survey conducted for the Ministry of Climate and Environment, more than 76% of participants would approve of the construction of a nuclear power plant near their home[9].

The year 2024 saw slight correction in these attitudes. Again, the declared support went up: it exceeded 90% hitting record high of 92.5%, and the declarative support for the construction of a nuclear power plant near one's own home increased by 3.3 percentage points, to 79.6%[10].

9 Kolejny rekord – niemal 90% Polaków za budową elektrowni jądrowych w Polsce, 22.12.2023, https://www.gov.pl/web/klimat/kolejny-rekord-niemal-90-polakow-za-budowa-elektrowni-jadrowych-w-polsce.

10 Poparcie dla energii z atomu jest największe w historii badania opinii publicznej realizowanego w Polsce od 12 lat, 11.12.2024, https://www.gov.pl/web/przemysl/poparcie-dla-energii-z-atomu-jest-najwieksze-w-historii-badania-opinii-publicznej-realizowanego-w-polsce-od-12-lat.

FIG. 3 **ATTITUDES TOWARDS THE CONSTRUCTION OF NUCLEAR POWER PLANTS IN POLAND - RESULTS OF SURVEYS FROM 2013 TO 2024**



SOURCE: Ministry of Climate and Environment.

At the local level, however, where the construction of Poland's first nuclear power plant has been underway, things are getting a bit complicated. In the commune of Choczewo, local elections saw change in the seat of the head of the commune. Criticism against the former head of Choczewo commune had been mounting for some time, and to some extent was related to the way he worked with investors, including the investor in the nuclear project and its partners.

"Surveys still show that local support is high" - explains a Choczewo resident, hitherto extremely supportive of the investment, in a private conversation - *"but on the ground things have become complicated. The community has seen a clear split. Families have been arguing, neighbors have started fighting."*

This is worth bearing in mind when planning and implementing nuclear projects, every step of the way. **Polarization of opinions and attitudes as well as conflicts within small, local communities that are considered by its members an extension of family ties, pose real challenges. Results of the qualitative study conducted by the Sobieski Institute show not only that these concerns are legitimate, but also that they pose significant risk to the success of nuclear investments**. In a situation of conflict, once a critical mass has been reached, sheer numbers or the ratio of supporters to opponents can be of secondary importance. All it takes is a small but well-organized group acting in their common interest to cause serious strife. In the age of digital communications, such groups are formed with ease.

This "inflammatory potential" can also be observed elsewhere in Poland, with projects not falling under the Polish Nuclear Power Program - i.e. projects to build small nuclear reactors, SMRs. Between 2022 and 2023, many such projects were founded since large energy and industrial heat consumers saw them as an opportunity to secure their future energy needs.

In mid-2023, KGHM received a decision in principle from the Ministry of Climate and Environment - i.e. an official "green light" - to build SMR reactors at two locations: in the municipality of Wieleń and the commune of Lubasz in the Greater Poland voivoidship[11].

The latter commune saw the organisation of a group of people who quickly jumped at an opportunity to gather political capital by organising active opposition to the investor's plans[12]. Ironically, Lubasz is not a new point on the nuclear map of Poland. It is here that the village of Klempicz on the Warta river is located. In the 1980s it was in Klempicz that the site for the construction of the country's second nuclear power plant was prepared. The second NPP was to be built there upon completion of the Żarnowiec Nuclear Power Plant in Pomerania. Eventually, the Żarnowiec construction project was abandoned. Subsequently so was the investment in Klempicz[13]. Despite the local organizers' best efforts, a mass movement of opposition to KGHM's plans did not emerge in Lubasz, which may lead us to believe that proper management and cooperation processes could not only calm the situation, but even turn the moods in favor of the investment.

However, the swiftness with which protests are organized proves that every **subsequent nuclear project requires, from its outset, implementation of effective strategies to mitigate the risk of public resistance and potential conflicts**.

In December 2023, Polish Ministry of Climate and Environment issued six decisions in principle for OSGE, a company formed by Orlen and Synthos Green Energy, to build a fleet of small modular reactors using GE-Hitachi's BWRX-300 technology. While the Synthos group's intention to build a nuclear reactor at Stawy Monowskie had been known to the public - and therefore to local authorities and communities - as early as 2019[14], the communities in other potential sites (Dąbrowa Górnicza, Ostrołęka, Stalowa Wola, Włocławek, Kraków) mostly found out about the OSGE intentions from the press reports and other media, after OSGE received the Minitry's decisions in principle. Information about organized opposition in any of these places did not appear in any of the media. Only the statement issued in 2019 by the Oświęcim City Hall[15] allows us to guess that the news of the possible investment sparked local media's interest and surprised the town's residents at the time. Nearly five years had passed since then, and another five municipalities where OSGE is planning their nuclear investments, found themselves surprised by a a similar development. In November 2023, at a conference organized by the GZM Metropolis (Upper Silesian and Dąbrowa Basin Metropolitan Area, Górnośląsko-Zagłębiowska Metropolia in Polish) entitled "Atom for the Local Government. Nuclear power as an opportunity for the energy transition in Silesia and Zagłębie"[16], a representative of Dąbrowa Górnicza's City Hall pointed this out. He stressed that even when the local authorities favor the idea of going nuclear in itself and would gladly support the project, the great surprise the investor's media announcement was and the situation this has put them in, failing to provide an opportunity to at least prepare to answer questions that arise naturally under such circumstances, is not a good opening for either side.

11 *Przyszłość jest z miedzi*, Projekt budowy małej modułowej elektrowni jądrowej (SMR) w KGHM, 25.09.2023, https://kghm.com/sites/default/files/document-attachments/kghm_dla_inwestorow_smr.pdf.

12 *Mieszkańcy Klempicza protestują przeciwko budowie elektrowni jądrowej*, 16.01.2024, https://radiopoznan.fm/informacje/pozostale/mieszkancy-klempicza-protestuja-przeciwko-budowie-elektrowni-jadrowej.

13 J. Kujawa, *„Atomowa Wielkopolska" – plan budowy Elektrowni Jądrowej „Warta" w Klempiczu w schyłkowym okresie PRL*, „UR Journal of Humanities and Social Sciences" 2023, nr 3(28), https://repozytorium.ur.edu.pl/server/api/core/bitstreams/ea368a22-70d3-42a3-b367-a33913093f86/content.

14 P. Ciszak, *Sołowow chce zbudować elektrownię atomową. Oświęcim odpowiada: trudno komentować*, 22.10.2019, https://www.money.pl/gospodarka/solowow-chce-zbudowac-elektrownie-atomowa-oswiecim-odpowiada-trudno-komentowac-6437913562637953a.html.

15 *Ibidem.*

16 Zapraszamy do udziału w konferencji „Atom dla samorządu", 8.11.2023, https://metropoliagzm.pl/2023/11/08/zapraszamy-do-udzialu-w-konferencji-atom-dla-samorzadu/.

Adrian Foster[17], the mayor of Carlington, the city in Canada - where the first SMR reactor using BWRX-300 technology, which OSGE[18] plans to implement in Poland, is being built - spoke about the same issue at the technical meeting of the International Energy Agency in October 2024. As the chairman of the Canadian Association of Nuclear Host Communities[19], he addressed the assembled industry representatives: "Don't do this to us. To find out about such a big thing from the press is one of the worst things that can happen to a local government official in office.[20]"

The reaction of the Oświęcim authorities in 2019 and the events in Lubasz prove that Poland has not drawn conclusions from the events of 2012. At the time, the predecessor of Polskie Elektrownie Jądrowe, the investor in the first Polish nuclear power plant named PGE EJ1, announced their intention to conduct site investigations in three potential NPP locations on the Baltic coast: in Choczewo, Żarnowiec and Gąski in the West Pomeranian Voivodeship. At that time, the geosocial context was not favorable for nuclear investments: after the accident at the Fukushima- Daiichi plant in the aftermath of a record-breaking tsunami, Japan was shutting down its facilities[21], and Germany began execution of its *Atomausstieg* - the decision to close down its nuclear power plants taken after the disaster in Japan[22]. Despite this adverse context, central government bodies and investor representatives in Poland failed in 2012 to engage with local authorities and communities at potential sites to explain their decision. The opposition and resistance organized by local activists in Gąski[23] forced the investor to withdraw from the idea to conduct site investigation there. As a memento of these events, a shrine with an inscription "God, protect us from the nuclear" was erected by the protesters and stands in Gaski to this day[24].

Considering the behavior of the Polish investors more than a decade later, it seems the shrine is too weak of a memento. Perhaps the recommendations of the International Atomic Energy Agency will provide a more effective reminder that there exist a number of good and verified practices to support investors in managing the risks posed by the orchestrated opposition of angered people.

The IAEA is very clear on this matter: in the 21st century, **without at least the consent - and preferably cooperation - of the host communities**, **no nuclear investment**, whether in a waste repository, a uranium mine or a power plant, **has a chance of succeeding**.

In many places around the world, a whole range of ***nuclear stakeholder engagement*** methods and tools have already been developed and implemented, which, while helping to empower local communities, support investors in mitigating risks to their projects' budgets and schedules.

It is important to remember **that the societies at large and host communities in particular should be treated as parties in the project, stakeholders with a vested interest in its smooth progress**, and not as an obstacle to be overcome on the way to successful execution of the project.

17 Adrian Foster (politician), Wikipedia, https://en.wikipedia.org/wiki/Adrian_Foster_(politician).

18 Statement from mayor Foster on Darlington SMR progress and Ontario's nuclear agreements, 14.06.2024, https://www.clarington.net/en/news/statement-from-mayor-foster-on-darlington-smr-progress-and-ontario-s-nuclear-agreements.aspx.

19 Statement from mayor Foster on Darlington SMR progress and Ontario's nuclear agreements, 14.06.2024, https://www.clarington.net/en/news/statement-from-mayor-foster-on-darlington-smr-progress-and-ontario-s-nuclear-agreements.aspx.

20 own notes of the co-author present during the meeting

21 D. Batty, *Japan shuts down last working nuclear reactor*, 5.05.2012, https://www.theguardian.com/world/2012/may/05/japan-shuts-down-last-nuclear-reactor.

22 *Po Fukushimie: Angela Merkel ogłasza wycofywanie się z energetyki jądrowej*, 14.03.2011, https://www-swr-de.translate.goog/swrkultur/wissen/archivradio/nach-fukushima-merkel-laeutet-atomausstieg-ein-2011-100.html?_x_tr_sl=de&_x_tr_tl=pl&_x_tr_hl=pl&_x_tr_pto=sc.

23 J. Krężelewska, *Stop atom, czyli atomowa majówka w Mielnie*, 1.05.2012, https://gk24.pl/stop-atom-czyli-atomowa-majowka-w-mielnie-zdjecia/ar/4497135.

24 M. Gąsior, *Matka Boska ochroni przed elektrownią jądrową? W Gąskach odsłonięto antyatomową kapliczkę*, 14.05.2012, https://natemat.pl/14419,matka-boska-ochroni-przed-elektrownia-jadrowa-w-gaskach-odslonieto-antyatomowa-kapliczke.

Unfortunately, operating in line with this logic seems to be extremely difficult for the nuclear industry in general. To some extent, this may be an indirect result of the nuclear industry's inherent characteristics. **Nuclear facilities and associated infrastructure are, or can be, elements of critical infrastructure of strategic importance to the State, which entails strict control over access to information on their construction and operation**. Nuclear power facilities and associated infrastructure may be of high importance to the State's defense and security, including the security of the facilities themselves. This aspect has been accounted for in the legal requirements imposed on the operators of such facilities by the Atomic Law Act (Journal of Laws 2021, item 1941) and related to their public information obligations. The law outlines the necessary minimum, stipulating that "information relating to physical protection, nuclear material safeguards and information constituting trade secret under the provisions on combating unfair competition shall not be made available" (Article 35a, item 6).

For example, the Atomic Law Act in Article 55c, imposes the following information obligations on the operator of a radioactive waste repository in Poland:

- in response to inquiries: obligation to provide written information on the status of radiological protection of the radioactive waste repository, its impact on human health and the environment, and the volume and isotopic composition of releases of radioactive substances from the repository into the environment;

- obligation to annually publish, on the operator's website, information on the status of radiological protection of the waste repository, its impact on human health and the environment, and the volume and isotopic composition of releases of radioactive substances from the repository into the environment;

- the obligation to conduct information and education activities about the operation of the repository, and in particular, at least twice a year, publication of an information bulletin for the residents of the host commune;

- the obligation to keep the President of the Polish Nuclear Energy Agency and the general public informed about events posing radiation risks, if any occur and relate to the repository, via the website.

- the obligation to meet the requirements of the regulations on the provision of information about the environment and its protection, public participation in environmental protection and environmental impact assessments, in light of the Atomic Law act, rests with the President of the Agency, i.e., the President of the National Atomic Energy Agency, as the nuclear regulator supervising the operator of the repository (Atomic Law, Journal of Laws 2021, item 1941, Article 55c, paragraph 5).

Such a solution provides the head of the repository's operator a great deal of freedom in deciding on the scope and form of the information provided, each time weighing the issue of safety and security against the issue of access to information and transparency of the operator's actions to build relations and trust. For this reason, the Atomic Law Act, has provided for the establishment of the so-called "local information committees" (Atomic Law Act, Journal of Laws 2021, item 1941, Article 39n) whose members acquire special rights of access to nuclear power facilities and information about them. Their task is to ensure public control over the implementation of nuclear projects and operation of nuclear facilities, and - more widely - to inform the communities they represent about the results of their work and investigations. In Różan, where Poland's only National Radioactive Waste Repository operates, a Commission for Radiological Protection was established within the Town Council[25]. Composed of eight Town Council members, the Commission works directly with the operator of the repository, the Radioactive Waste Management Plant. The partnership honed and developed over the years, as well as the learning process that members of the

25 Rada Miejska w Różanie, Komisja Ochrony Radiologicznej, https://rozan.esesja.pl/grupa/6657/komisja-ochrony-radiologicznej.htm.

Commission go through in the course of their function, make the municipality of Różan an intelligent partner, understanding the importance and significance of information communicated to the residents and their representatives in reports submitted by the operator and during joint meetings.

In the realities of the 21st century, in a world based on unlimited access to information, meeting the legal minimum is not enough. This can be seen not only in the nuclear sector. Examples of good practice in building partnerships and cooperation with local communities are therefore worth looking for not only in other nuclear projects, but also in other industries. This aspect has proven to be key tool for risk management in wind power projects, especially onshore. It has also been extensively analysed and described, p.ex. by the Polish Wind Energy Association, which brings together wind farm investors. Its prominence is outlined in Chapter Three of the Code of Good Practices developed by the Polish Wind Energy Association: *Communication and Consultation - Key to Investment Success*[26], which proposes to go far beyond the identified legal framework, also expanding the catalog of the applied communication methods and channels, depending on the stage of the project's lifecycle.

Such approach is recommended by the IAEA in all documents pertaining to *nuclear stakeholder engagement* which are mentioned in this report (see: *Nuclear stakeholder engagement by the IAEA*). These documents contain tips on cooperation with local host communities for all types of nuclear facilities, providing for their life stages, as well as give a number of practical examples.

1.2.1 RECOMMENDATIONS FOR IN-HOUSE KNOWLEDGE AND RESOURCES

1. The Nuclear Energy Department of the Ministry of Industry, the National Atomic Energy Agency as the nuclear regulator, technical and environmental regulators such as the Polish Office for Technical Inspection and the General Directorate for Environmental Protection, as well as all potential investors in nuclear projects, nuclear technology suppliers, their contractors and subcontractors should carefully analyze the IAEA's recommendations in the area of communication and stakeholder engagement, and familiarize themselves with good practices in this area put in place in other countries and by other industries.

2. All potential investors in nuclear power facilities, suppliers of nuclear technology, their contractors and subcontractors in projects on the Coal-to-Nuclear path in Poland should secure organizational as well as financial resources in order to carry out activities in this field: hire and train people responsible for planning and implementation of activities, include them in budgets, and, above all, embed them as corporate processes in their own right within their organizational structures and management systems.

3. Potential investors in projects on the Coal-to-Nuclear path should develop and implement communication and stakeholder engagement strategies as early as possible at the planning stage of a nuclear project, at least in parallel with conducting activities aiming at obtaining a decision in principle, to establish cooperation and partnerships with local governments and community representatives.

4. Public communication and stakeholder engagement activities should follow the changes in the life cycle of a nuclear facility. They must be run consistently throughout the facility's life: from site selection and construction preparations to the decommissioning stage of any facility. All entities responsible for implementing energy transition activities, both at the central level (Ministry of Industry, the NAEA) and at the level of specific nuclear projects, including those on the Coal-to-Nuclear path, have an important role

26 *Energetyka wiatrowa – kodeks dobrych praktyk*, https://www.psew.pl/wp-content/uploads/2024/10/PSEW_Kodeks-Dobrych-Praktyk.pdf.

to play. The moments that require special attention, more work and effort, and closer cooperation are those related to making and executing decisions about the facility and affecting the local community.

5. The current legal status related to public information, communication and stakeholder engagement for the Polish nuclear energy sector should be analyzed with a view to fully implementing the recommendations of the International Atomic Energy Agency in Poland. It is also worth considering, for example, the introduction of a requirement to submit communication strategy and stakeholder engagement plans, including resources committed, along with other documentation required to apply for administrative decisions and licenses by potential investors.

1.3 THE DESIRE PROJECT CONTEXT

Polish public opinion polls gauging attitudes towards nuclear power - at least the ones whose results we know of - implicitly referred to the current state of the industry's technology, i.e. Generation III and Generation III+ reactors, which are now widely built. This generation also includes some SMR projects, while other SMR projects are Generation IV. Surveys of public attitudes towards the deployment of SMRs in Poland were conducted at the request of potential investors, and publicly available information does not allow to guess whether any of them addressed the concept of "reactor generation" or sought to know whether the respondents' attitude would differ depending on the technological advancement of the considered project.

This gap was to be filled by a qualitative study done under the DEsire project, which, while considering the Coal-to-Nuclear transition pathway, brings nuclear projects closer to large concentrations of people, like towns or even cities.

The qualitative study allowed for a series of in-depth interviews, workshops and surveys to be conducted with groups identified as groups of special interest to the project. The in-depth interviews served to provide for a more nuanced picture of attitudes and motives driving the interviewees' answers. Thus, the results of the study can provide a solid basis for extrapolation, identification of a starting point for strategic design and planning of activities driving at a specific outcome, which in this case, is to gain public acceptance for "replacing" the boilers of conventional power plants with nuclear reactors where it is economically and technically justified.

RESEARCH CONDUCTED AS PART OF THE DESIRE PROJECT INCLUDED:

1. Qualitative research on groups of Opole residents composed of, among others, representatives of special interest groups.

   The study was conducted in Opole since the Phase A of the DEsire project identified the Opole power plant as one of the most favorable sites to undertake modernization activities under the Coal-to-Nuclear path, including in particular with Generation IV reactors.

The qualitative study looked at attitudes towards nuclear power in general, at perceptions of new nuclear technologies and at the local context of a potential nuclear investment in Opole.

2. The diagnosis under the DEsire project also encompassed extensive surveys and workshops for representatives of the Polish energy sector, including above all representatives of expert entities related to the industry that will support nuclear energy projects, but which are neither potential investors nor operators.

In the context of Coal-to-Nuclear projects, technical criteria related to the terms "greenfield" and "brownfield" are accounted for when evaluating potential sites' suitability.

A "greenfield" investment is an investment at a site that has no energy-related infrastructure of any kind. This often involves the necessity to obtain environmental permits, connecting to the grid, as well as the requirement to undergo a set of approval processes and administrative decisions for the elements of future infrastructure. A "brownfield" investment, on the other hand, is a project that takes advantage of existing potential by upgrading, expanding or repurposing existing energy infrastructure. This distinction, which is important for technical and financial analyses, was not accounted for in the social diagnosis of the DEsire project for several reasons:

- "Greenfield" and "brownfield" are technical terms, rarely encountered in the public discourse. In the context of the survey and meetings, the introduction of these terms would risk diverting attention from the key aspect - gauging potential acceptance for the Coal-to-Nuclear path in general. (More on the types of investments in the report: Coal-to-Nuclear for Poland. National Potential)

- The purpose of the survey and the meetings was to identify initial attitudes and potential requirements driving the acceptance for energy transition on the Coal-to-Nuclear path in a community familiar with a major industrial facility, i.e. a large coal-fired power plant. Introduction of a "new" technology - nuclear power, which is still not part of Poland's energy mix - was crucial here, as was the attempt to probe whether potential acceptance depends on how advanced the planned nuclear technology is. Therefore, it was assumed that from the perspective of the community, each nuclear investment in Poland, until the first Polish nuclear power plant is commissioned, will be perceived as a novelty in any area, regardless of the type of investment. The relevance of using existing infrastructure was considered secondary.This aspect appeared in the survey results spontaneously, on the initiative of the participants, usually in favor of the investment under consideration.

2. SOCIAL DIAGNOSIS: “KNOWLEDGE AND OPINION ON NUCLEAR POWER PLANTS, INCLUDING GENERATION IV REACTORS”

In line with the outcome of Phase A, in which Opole received a very high rating as location for a potential nuclear reactor power plant upgrade, a qualitative study was conducted in the city in August and September 2024. Its execution was preceded by a publication in the digital edition of the local press[27], which contained information about the DEsire project, entities involved in its execution, and the ongoing call for volunteers to participate in an opinion poll conducted by the Sobieski Institute.

2.1 INFORMATION MEETINGS

> *"You know, this is the first time someone came to me with this knowledge. And that's a shame".*
> *participant of an information meeting*

The survey in Opole was followed by information meetings organized by representatives of the Sobieski Institute. During the meetings, the current state of the nuclear power industry was briefly discussed, pointing to the direction of its development (SMR-type, Gen IV reactors). Sobieski Institute's experts provided participants with detailed information on the context of the qualitative study conducted in Opole, answered questions posed and referred to widely available sources of knowledge on the subject. Brochures with concise information on nuclear power generation were published by the Sobieski Institute for use during the DEsire project and were distributed to participants of information meetings in Opole[28].

In order to establish cooperation and build support for the investment, it is necessary to demonstrate that the investor is open to discussion and seeks to make sure that the local community knows and understands what and why is being done. Face-to-face meetings are crucial in this process.

27 *Atomowa przyszłość Polski*, 9.08.2024, https://nto.pl/atomowa-przyszlosc-polski/ar/c15p2-26621645.

28 *Energetyka jądrowa*, Instytut Sobieskiego, sierpień 2024, https://sobieski.org.pl/broszura-informacyjna-pt-energetyka-jadrowa-jak-to-dziala/.

Many participants clearly suggested that the form of the meeting was – in their eyes - of secondary importance, and beyond the informational content itself, the greatest value of such meetings laid with three important aspects:

1. participants did not have to make an effort to find information about such an event, they were personally invited,

2. they felt they were taken seriously during the meeting, as partners not learners or clients,

3. no one tried to convince them of anything.

2.2 RESULTS OF THE DIAGNOSIS

Results of the study have been grouped into several main parts:

1. **KNOWLEDGE**
   The first part focused on the participants' level of knowledge about nuclear power.

2. **OPINIONS AND ATTITUDES**
   The second part focused on their opinions on nuclear power.

3. **BENEFITS AND RISKS**
   The third part was devoted to discussing the benefits and risks that, according to the participants, are associated with the implementation of nuclear power in Poland and potential construction of an NPP in their immediate vicinity, i.e. in Opole.

4. **OUTREACH**
   The fourth part focused on the evaluation of past outreach activities and the expectations participants have towards what they would consider reliable and effective communication and information activities around nuclear power.

2.3 KNOWLEDGE

2.3.1 DIAGNOSING THE LEVEL OF KNOWLEDGE

Survey participants most often declared that they had no or very little knowledge on nuclear power. Also, those who were relatively well-informed, including those with technical degrees, described their level of knowledge in terms of lack of knowledge or basic knowledge.

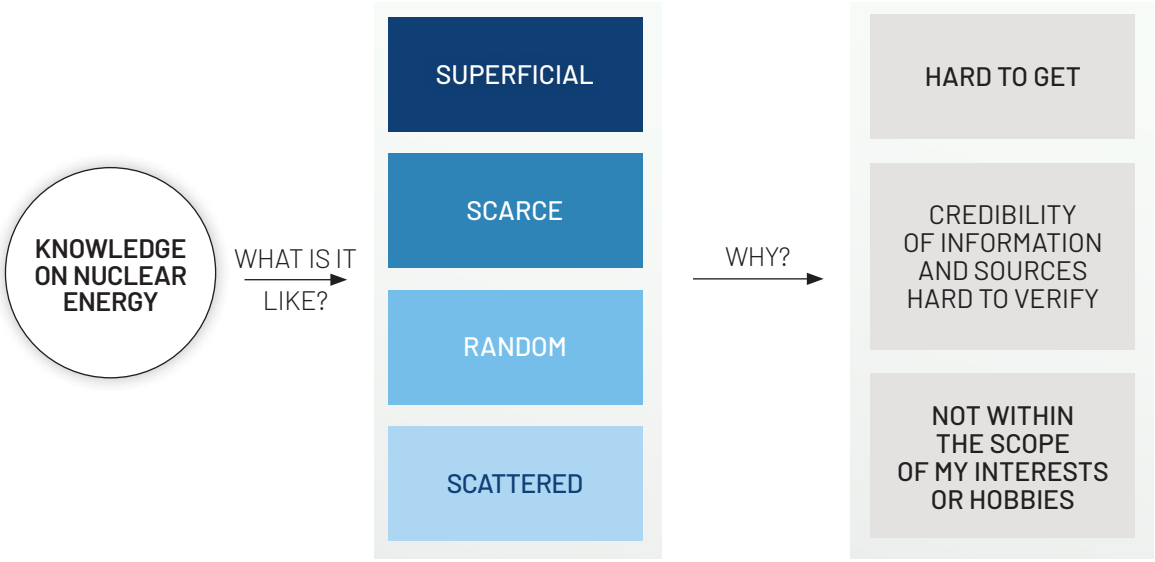
"Knowledge, I have zero".
survey participant, Opole, 2024

"We only find out about it when there is something happening somewhere in the world".
survey participant, Opole, 2024

"Me thinks most of us know relatively little" .
survey participant, Opole, 2024

Indeed, answers to simple questions testing the participants' knowledge showed that it was **superficial** and **random** since it had been acquired accidentally. Participants claimed to know about nuclear power only what they happened to come across in the media or on the Internet, or what they heard from friends. Most admit that **they do not actively seek information**, although they believe that nuclear power is a topic of great importance that will continue to grow.

FIG. 4 **KNOWLEDGE ABOUT NUCLEAR POWER**



SOURCE: Own work.

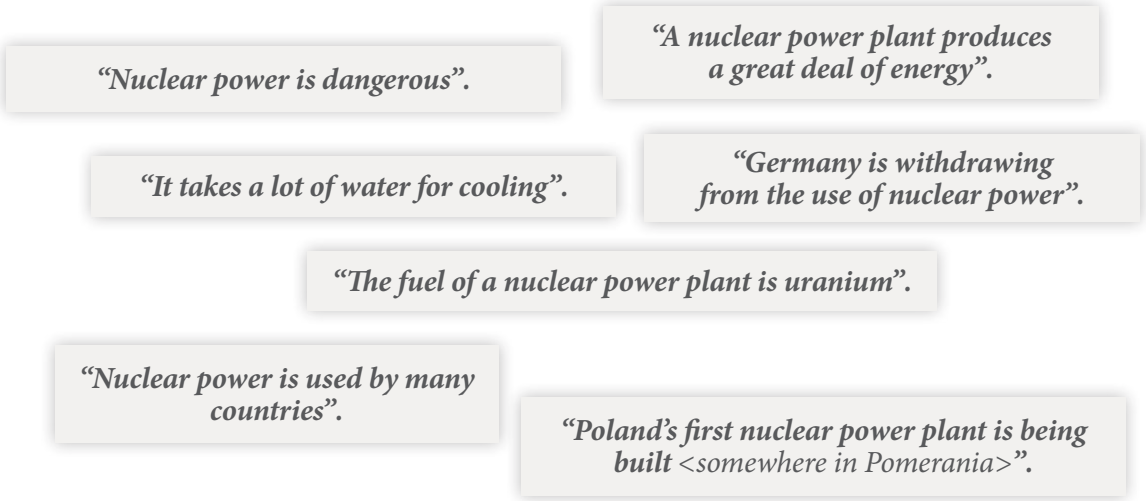
According to the study participants, nuclear knowledge is **difficult to access**, and is not readily available. This is further complicated by the fact that today **it is hard to say which of the available sources of knowledge and which expert opinion can actually be trusted**.

Although all unanimously point to the Internet as one of the readily available sources of knowledge and information, everybody complains that overload of contradictory information they come across on the internet makes it impossible to verify whether what they see or hear is correct, even when attempted. Participants assume you cannot believe anything without reservation.

Their knowledge of nuclear power can be boiled down to:

1. knowledge about the construction and location of the first Polish nuclear power plant "somewhere in Pomerania",
2. knowledge of the extensive use of nuclear power in other European countries and Germany's withdrawal from its use,
3. **a deeply-rooted and widespread belief that nuclear power is dangerous causes study participants to qualify it as "knowledge" they possess**,
4. knowledge of the use of large amounts of water to cool nuclear power plants;
5. knowledge that uranium as a radioactive element is the fuel in nuclear power plants;
6. knowledge that a nuclear power plant produces a lot of energy, more than any conventional power plant.

FIG. 5 **WHAT DO RESPONDENTS KNOW "FOR SURE"?**



SOURCE: own study.

At the same time, the survey participants were very active, asking lots of questions about technical issues related to the use of nuclear energy in power generation. They asked about waste management, the amount of water needed for cooling per unit of energy produced, location criteria for nuclear reactors. The questions focused on safety issues and sustainable use of resources.

School remains a recognized source of proven knowledge, especially for those of <30 years of age.

The groups of respondents under the age of 30 showed the least interest in the topic, the least curiosity, and the weakest desire to seek information about nuclear power. They were also the ones who most often pointed to school as a source of verified information and knowledge that can be trusted.

None of the respondents had heard of or ever thought about nuclear power in the context of Opole.

Age groups of > 60 and between 30 and 60 years of age questioned the idea as unreasonable.

There was only one voice noting that, after all, a nuclear power plant is operating quite close to Opole, namely in Czechia. The majority of participants unanimously agreed that the topic could not concern Opole directly, and despite declarations of scarce knowledge, they cited technical aspects as insurmountable obstacles: lack of water for cooling or tectonics.

A clear suggestion shone through: the participants are not hostile towards a nuclear power plant built in general but only as long as it happens somewhere far away, but not in their vicinity.

As time passed and the conversation progressed, the initial surprise by the idea receded, the process of rationalization began and all respondents were able to point out the benefits and risks associated with replacing coal-fired units with nuclear reactors at the Opole power plant.

SUMMARY

Survey participants declared low levels of knowledge on nuclear power. In the course of the interview, it became clear that part of the claimed knowledge is a deeply held false belief that nuclear power is dangerous.

This phenomenon may be attributed to the availability heuristics, one of the methods of simplified inference that **leads to cognitive errors**, as described by Amos Tversky, Daniel Kahnemann and Paul Slovic[29] [30]. The availability heuristic explains that people overestimate the likelihood of events that are easy for them to recall. This ease may be related to the fact that:

- similar events have occurred recently;
- similar event affected us directly;
- similar event triggered our emotions;
- similar events are commonly discussed in our environment or present in the culture.

This hypothesis seems legitimate in the light of research by Professor Joanna Sokolowska-Pohorille (2017, SWPS)[31], which confirms that accessibility heuristics can explain attitudes towards various energy technologies, including nuclear power. The overestimation of the risks associated with the use of nuclear energy may have been influenced by the events surrounding the Chernobyl disaster, still vivid in the memory of many Poles. Knowledge about the Chernobyl disaster is widely available and accessible under a variety of forms, including personal recollections or family stories. Chernobyl is a prominent part of modern culture and pop culture having been the topic of a number of feature films and documentaries, also very recently. Negative associations with nuclear power have been further exacerbated by the media coverage of events at the Fukushima-Daiichi nuclear power plant in 2012.

Research by Sylwia Mrozowska and Bartosz Duraj (2019, UG)[32], when examining the role of communication and stakeholder engagement in the process of gaining acceptance for the deployment of nuclear power in France, points to a simple solution: increasing the availability of positive and reliable information about nuclear power can provide an effective counterbalance to negative associations, mitigating the effect of disasters that dominate the public imagination.

29 A. Tversky, D. Kahneman, *Availability. A heuristic for judging frequency and probability*, „Cognitive Psychology" 1973, vol. 5, issue2, https://www.sciencedirect.com/science/article/abs/pii/0010028573900339?via%3Dihub.

30 D. Kahneman, P. Slovic, A. Tversky, *Judgment under uncertainty. Heuristics and biases*, Cambridge University Press, Cambridge1982, https://search.worldcat.org/title/7578020.

31 *Heurystyka afektu czy poszukiwanie alternatywy dominującej: Możliwe przyczyny rozbieżności ocen laików, polityków i ekspertów,* https://swps.pl/nauka-i-badania/granty/5820-heurystyka-afektu-czy-poszukiwanie-alternatywy-dominujacej-mozliwe-przyczyny-rozbieznosciocen-laikow-politykow-i-ekspertow.

32 S. Mrozowska, B. Duraj, *Rola komunikacji społecznej w pozyskiwaniu akceptacji dla energetyki jądrowej we Francji. Przypadek Lokalnych Komitetów Informacyjnych,* „Media, Biznes, Kultura" 2020, nr 1, https://czasopisma.bg.ug.edu.pl/index.php/MBK/article/view/.

Also, thanks to the well-known mechanisms of *primacy effect* and *anchoring effect* , *consistent efforts to raise the level of public knowledge* can be effectively prevent the spread of disinformation and misinformation.

2.3.2 RECOMMENDATIONS FOR EDUCATION

Recommendations in this area are based on the premise, confirmed by the research, that support for nuclear power grows as the level of knowledge on the topic increases[33].

1. Continuous and consistent educational efforts on a national scale are required. Education and information activities, coordinated at the central level, should be intensified in the regions of envisaged and planned locations of nuclear facilities, where the responsibility for conducting them can be shared with the investor and contractors of nuclear projects

    a. the ministry responsible for introducing nuclear power into Poland's energy mix, in coordination with the ministry responsible for the State Treasury companies from among which investors in nuclear projects, including those on the Coal-to-Nuclear path, will be recruited, should establish direct cooperation with the ministries responsible for education, higher education and science, as well as with supporting institutions (e.g., Ośrodek Rozwoju Edukacji, Education Development Center) to carry out educational campaigns that go beyond the basic school curricula on the topic of nuclear power and rely on the whole network of education-related institutions, including p.e. the subsidized SOWA network of science outreach centers, to reach as many pupils and students as possible with the support of NGOs. In potential and planned locations, science outreach and educational activities should be intensified and the responsibility for their implementation should be shared with the investor, technology supplier and nuclear project contractors;

    b. at the central level, direct cooperation with teachers' and academics' labor unions and self-governing organizations (e.g. Polish Teachers' Union, ZNP) should be established to train teachers and provide them with resources to be used in their further work and activities. At potential and planned sites, such activities should be intensified, and responsibility for their implementation shared with the investor, technology provider and nuclear contractors;

    c. all entities involved in outreach and education activities around nuclear must comprehensively address the questions of nuclear safety and radiological protection. Additionally, it is important to emphasize the role of nuclear power in raising the level of Poland's energy security, an aspect that is extremely important for understanding the context of the technological change being introduced.

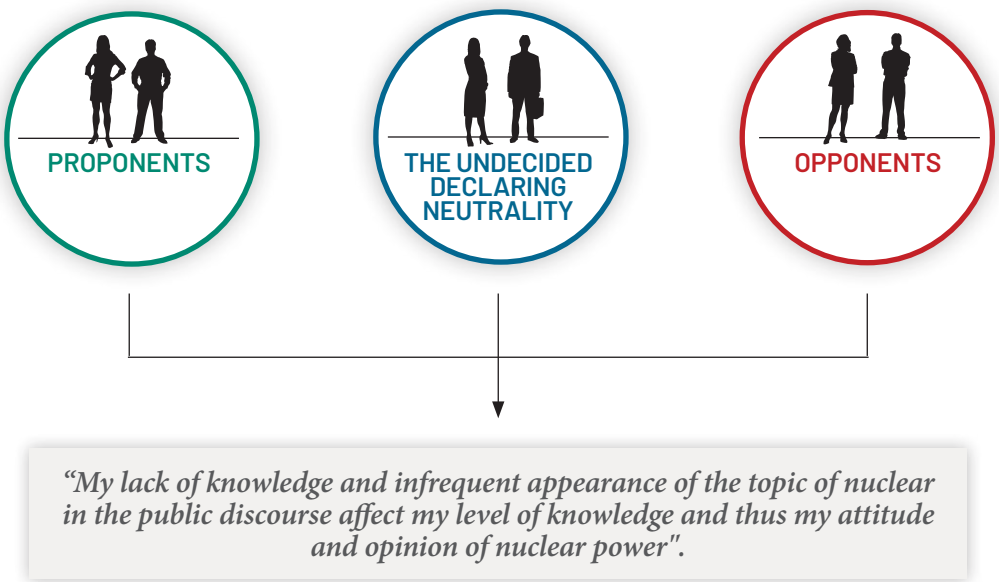
33 J.W. Stoutenborough, A. Vedlitz, S.G. Sturgess, *Knowledge, risk, and policy support: Public perceptions of nuclear power*, „Energy Policy" 2013, no. 62(11), s.176 – 184, https://www.researchgate.net/publication/262829597_Knowledge_Risk_and_Policy_Support_Public_Perceptions_of_Nuclear_Power.

2. At the central level, i.e. the Ministry of Industry, it is necessary to coordinate the creation and communication of a capacity building plan aiming at acquisition of competencies for application in the nuclear sector, including the creation of a central information platform grouping professional education initiatives and taking into account the transfer of competencies between conventional and nuclear power to account for the needs of projects on the Coal-to-Nuclear path.

2.4 OPINIONS AND ATTITUDES

The attitudes towards nuclear power, as displayed in the meetings can be organized into three groups: proponents, people declaring neutrality and skeptics. The group of supporters and the group of those with a neutral attitude, the unconvinced, were most numerous. Skeptics were by far the least numerous, as might be expected in the light of the results of a nationwide quantitative survey on the subject.

FIG. 6 **ATTITUDES TOWARD NUCLEAR POWER**



SOURCE: Own study.

The survey also included an analysis of participants' attitudes towards plans to build a nuclear power plant in Poland in general, then in Opole specifically, and towards the concept of converting a coal-fired power plant into a nuclear one through a so-called retrofit.

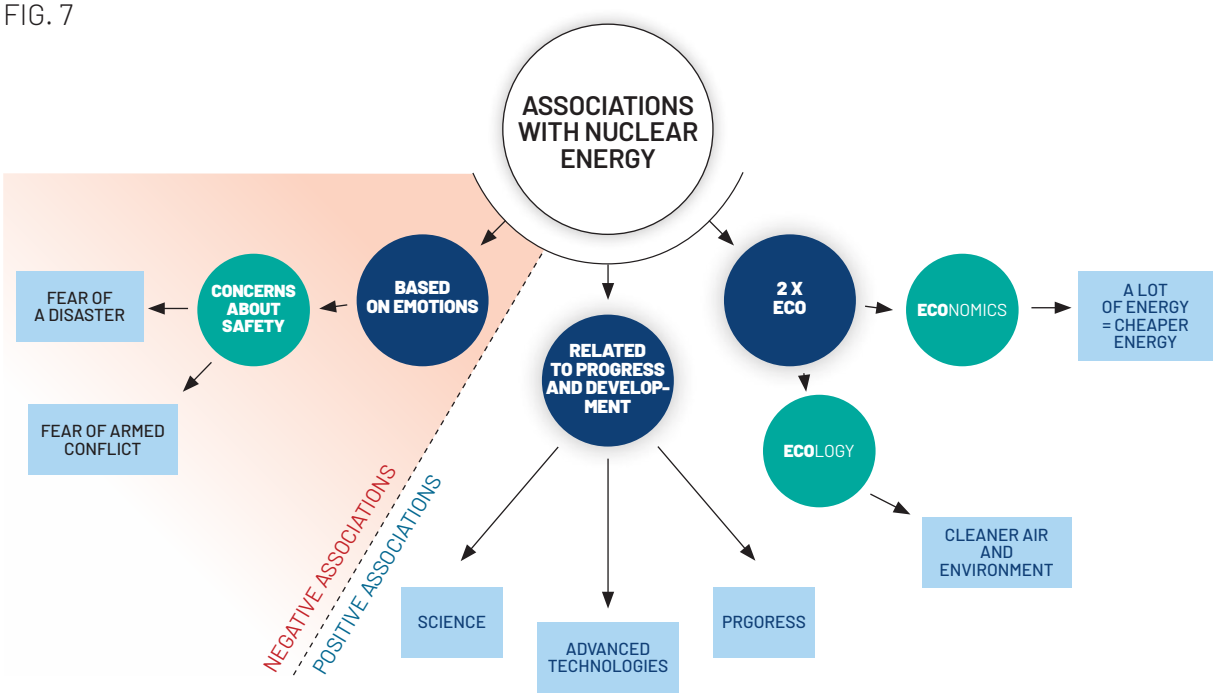
Significantly, during all of the meetings, their participants eventually reached the same conclusion: lack of comprehensive knowledge and reliable information, as well as scarce presence of the topic in the Polish public discourse, affect their attitudes and are a factor in the objections they raise.

2.4.1 DIAGNOSIS OF ATTITUDES

The diagnosis began with a discussion on the associations that participants have with the nuclear power plant. These can be divided into negative and positive. It is easy to note the disproportion between these categories.

There are more positive associations,
related to what respondents know about nuclear power.
Negative associations, on the other hand, are much stronger,
related to fear for the safety of oneself and others.

FIG. 7



SOURCE: own study.

"But, ladies and gentlemen, we talk so much about safety. Of course, it is probably, as they say , "number one", safety first and foremost. But there were these, these... Chernobyl, there was Japan... But what fraction of a percentage of all these power plants are these?"

*"That is, for a person,
the most important thing is safety".*

Chernobyl turned out to be the most frequent and strongest association. The name caused the greatest stir and the longest discussions among the survey participants. **Associating nuclear power plant with explosion and danger** are derivatives of the fear associated with Chernobyl.

At the same time, which is noteworthy, association with nuclear weapons was raised only once, in the oldest group of respondents. It provoked sharp reaction from other participants, who immediately protested the association of nuclear power with nuclear weapons. Interestingly, opponents of nuclear power also protested against this association.

Despite all scientific reports on the lack of far-reaching health effects of the 1986 events and the revival of nature in the Exclusion Zone, Chernobyl still evokes associations bordering on images of total annihilation, fear-inducing desolation and utter destruction.

WHAT CHERNOBYL REALLY DESTROYED?

One of the first people to learn about the contamination of the Polish territory in the aftermath of the Chernobyl accident in 1986 was the late Professor Zbigniew Jaworowski. Faced with

utter silence from the USSR so as to the causes of the spikes in the measurement results, he decided to take a radical step and commanded the roll-out of the largest medical preventative action in the history of the world: administration of Lugol's iodine to over 18.5 million people in just three days.

The action was a success. However, years later, Professor Jaworowski declared sternly: had he known at the time what he knew later, he would never have done it. From a medical point of view, the action was completely unnecessary, while on the social level its roll-out was proof of the horror of what had happened. In an interview with Onet in April 2011, just after the disastrous tsunami in Japan and the events at the Fukushima-Daiichi power plant, which he was asked to comment on, the professor said sadly:

"But we are still afraid of the nuclear, even though nuclear energy is by far the safest form of energy in the world. That's why I think Chernobyl did most damage not to our bodies, but to our mind".

Emotion-based associations center primarily on the discussion whether the use of nuclear power is safe and whether we are able to take responsibility for its long-term and safe use.

"That's why I wrote this 'responsibility,' meaning responsibility for this power plant, which can bring a lot of good and a lot of bad."

Safety and security were also raised in the context of the war in Ukraine and the fact that nuclear power plants as strategic facilities in Poland would be the first target and a tasty morsel for a potential aggressor.

- **ECONOMICS**

"Much more power generated".

"More electricity".

"Theoretically, there will be more electricity as a result, so it should be cheaper".

All participants agreed on the fact that nuclear power provides large amounts of energy that can help reduce energy prices. The discussion on this aspect continued in later, when participants were asked to list the benefits and risks of building a nuclear reactor in Opole.

- **ECOLOGY**

It was often pointed out that **the use of nuclear power is economical, also from environmental perspective.** Pollution reduction was most often quoted in this context:

"There is nothing, no dirt, no dust, no pollution from the nuclear power plant. Of course, there is waste that must be properly stored for years to come".

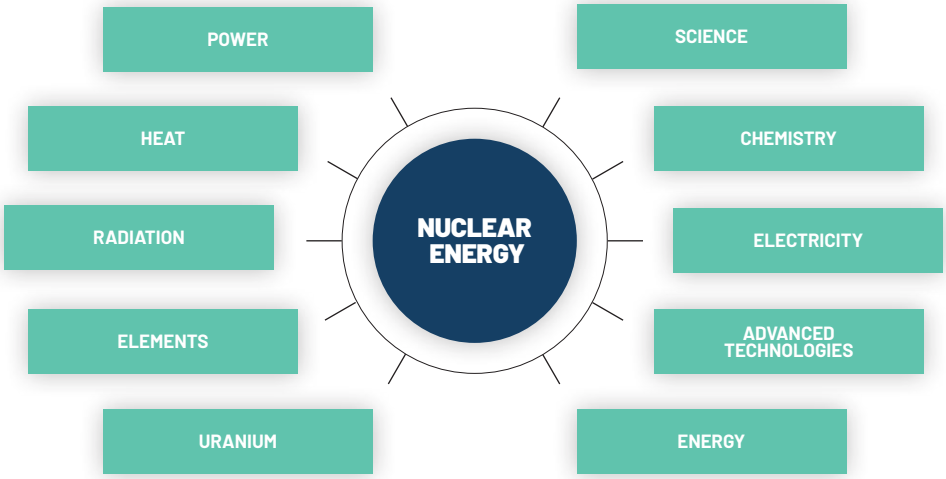
"Ecology, that is, it's certainly less pollution in the air, because you're no longer producing all those ... what is it ... sulfates, like you do when using coal".

During an in-depth conversation about benefits and risks, participants were more cautious in assessing the environmental effects of building a nuclear power plant in Opole. Some were concerned about water use, while others pointed to the destruction of the beauty of the landscape in the Opole region.

Doubts pertaining to these questions become a default line of defense as nuclear investment "approaches" the proverbial fence of the respondents' yards.

Interestingly, similar objections are often raised during execution of all major infrastructure investments. In the case of nuclear power, reference to the "invisible danger" of ionizing radiation complicates matters further, and this despite the fact that most respondents are fully aware that under normal operating conditions the radiation stays contained within the nuclear site and is subject to strict control.

FIG. 8 **ASSOCIATIONS WITH SCIENCE, TECHNOLOGY AND PROGRESS**



SOURCE: Own study.

Most participants' thinking is organized by key words and key notions: uranium/atom/energy/power plant.

Although none of the participants would be able to explain either nuclear fission or the workings of a nuclear reactor, most understand the difference between a conventional power plant, which relies on the chemical energy of fossil fuels, and a nuclear power plant, where the energy is released by splitting the atomic nuclei. Most participants are convinced the processes occurring in a nuclear reactor are extremely complex, and the degree of complexity translates into greater risks associated with mastering and controlling them.

"And chemistry... it's just, when I think about it, I'm reminded of all of these reactions from chemistry lessons, these protons, here knocking out, some various things like that".

"In simple terms, because when burning coal, after all, I can see that you put coal in, it burns, energy of some kind is emitted, heat. And when it comes to the nuclear ones, you can actually think that it's kind of complicated".

TECHNICAL PROGRESS IN NUCLEAR POWER

"The new nuclear technology is not any new technology, but an upgraded technology. The drive to improve continues, as it does everywhere".

"It's not 'new technology,' these new generations [added by UK.], *because nuclear technology as such has already been around since the 1960s".*

"Technological progress happens all the time. Safety and security systems are changing all the time. It is natural that technology is permanently evolving".

In this section, respondents were asked about progress: whether they associate nuclear power with it and whether they see nuclear industry as an industry that is growing and evolving. This question is of utmost significance in the context of plans to incorporate Gen. IV nuclear reactors and SMRs into Poland's energy mix as they are only now moving beyond the phase of prototyping. What was of interest here was whether terms such as "new nuclear technologies," "new generation of reactors," evoke more doubt and caution among respondents than simply "nuclear power." Participants were also asked whether their attitudes would vary depending on the type of project they were faced with.

Most of the participants, after initial hesitation and discussing the issue in groups, came to the conclusion that there is no such thing as "new nuclear technology." There is only one fission reaction, they concluded, and so all nuclear power plants are based on the same premise. "New nuclear technology" is, according to them, simply a newer, modernized and improved version of the same technology. After all, progress is being made everywhere.

"A bit of a revolution. In the Polish conditions".

"Revolution in thinking".

The youngest respondents had most trouble taking a clear stance on this issue, citing they have too little knowledge on the matter. Others tended to agree that:

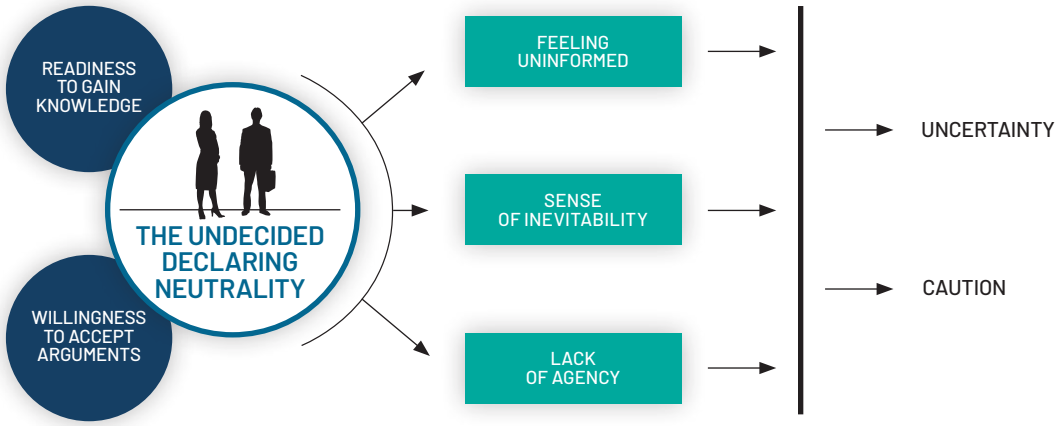
In the context of the world and Europe, which already use nuclear technologies, the implementation of any nuclear technology, including new ones, is a simple evolution following natural technological progress.

In the context of Poland, the implementation of any nuclear technology bears the hallmarks of a revolutionary change in both technological and social terms.

It may therefore be assumed that in Poland the distinction between Gen. III/III+ or IV reactors to be built will be a secondary issue as long as the public opinion stays assured they technically have not much in common with the "old" type of facilities like the infamous Chernobyl-like RBMK nuclear reactor. Introduction of nuclear power into the Poland's energy mix is itself a revolutionary change, and the complications, as further discussions during the meetings suggested, may have more to do with the location itself (whether it will be in my back yard or at a safe distance from my home) than with the generation of the reactor.

2.4.2 THE UNDECIDED DECLARING NEUTRALITY

FIG. 9



SOURCE: OWN STUDY.

The neutral group was in most part open to listening to presented arguments. They visibly relaxed and allowed themselves to be drawn into a lively discussion in the presence of people who declared themselves supporters of nuclear power and had knowledge-based arguments.

The emotion that most often shone through in their interventions was a **sense of being uninformed, of having no agency and influence over something that would be decided over their heads anyway**. This feeling created uncertainty in them, and this translated into far-reaching caution and exaggeration of risk, justified by their belief in anecdotal evidence that nuclear power could pose a threat.

When they felt empowered and taken seriously by other participants of the conversation, these individuals more than once changed their position from a cautious "rather not" to "maybe," "all in all, ok."

"I always keep in mind that when I was in Kyiv, there was an opportunity to visit Chernobyl. I didn't dare to do it because of the potential radiation that could get through".

"I am also neutral, because I trust scientists, I know that progress takes place, that we draw conclusions from mistakes. [...] But on the other hand, I have this Chernobyl always somewhere in my mind, it happened close to us, we experienced it and we know, what it all looked like."

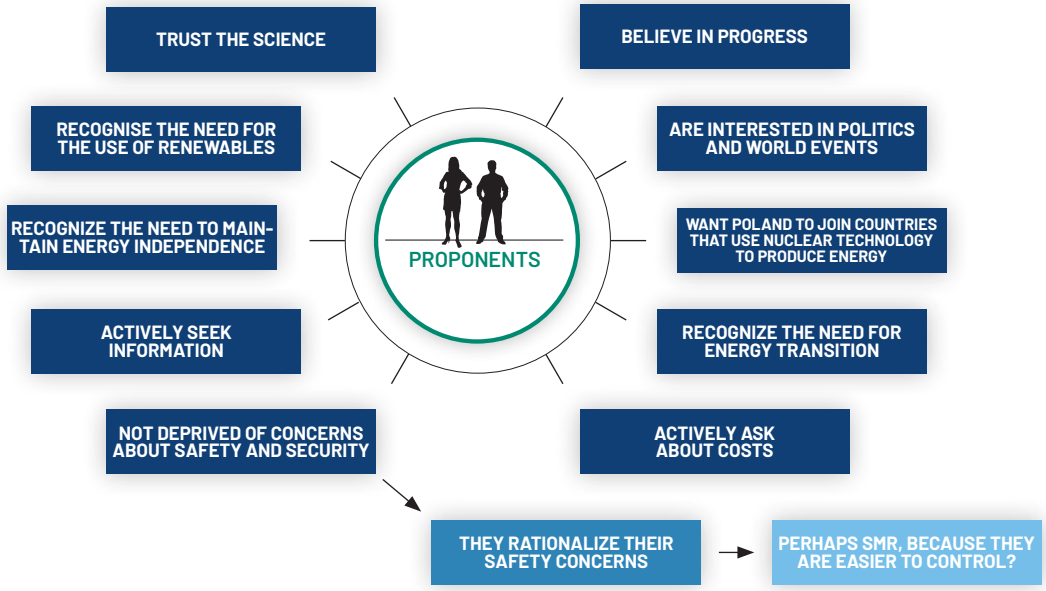
"I am somewhere in the middle. I don't yet have, so to speak, a formed opinion. On one hand, I think it will happen anyway, whether I have an opinion or not. That is the order of things. Well, unfortunately, we will not be able to avoid having this power plant in our country. But on the other hand, this kind of rational thinking kicks in in me, which means not now, not at this moment".

Aside from addressing their fears about safety, **the arguments** that appealed most strongly to this group were:

- striving for energy independence;
- striving to catch up with other Western countries;
- need for an energy transition mixed with concern about the social impact of the decision to stop coal-mining and burning coal in the region and in Poland.

2.4.3 PROPONENTS

FIG. 10



SOURCE: OWN STUDY.

They are believers in technological progress and would like Poland to eventually catch up with Western European countries in this regard. They recognize the need for energy transition and consider nuclear energy an opportunity to protect the environment, primarily to reduce greenhouse gas emissions and air pollution. They are interested in world events and believe that the current geopolitical situation forces Poland to maintain its energy independence. They are also supporters of the use of RES technologies, but understand that this is not enough.

Proponents of the use of nuclear power, **however, are not free of safety concerns. What sets them apart is that they have the arguments and knowledge to work through these concerns rationally.**

One manifestation of their fears are the unprovoked mentions of SMRs as an opportunity for a safer and less costly form of domestic energy transition than full-scale nuclear power.

"We are afraid of this one power plant, but around us we have a dozen of them in the Czech Republic. Because they are far away, so we are not aware and we are not afraid."

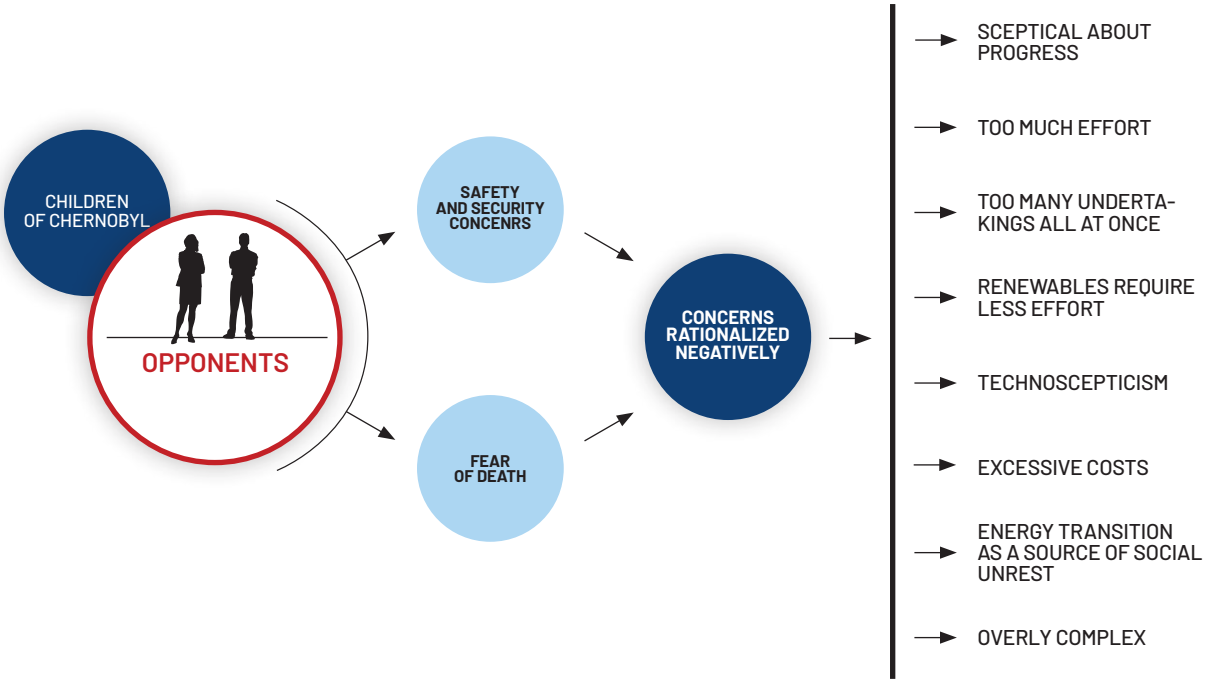
"And the question of whether I'm a proponent, well, yes, because we have to replace coal with something".

"This is some form of securing our domestic energy needs".

"There's a hell of a lot of it abroad. And there are very many of these power plants in every country".

2.4.4 OPPONENTS

FIG. 11



SOURCE: OWN STUDY.

This is the least represented group in the study, consisting mainly of people between 30 and 60 years of age. They often described themselves as the **"children of Chernobyl"** and cited the Chernobyl disaster as a generational and formative experience.

What transpired from their interventions was that they are no longer young, enthusiastic technooptimists, but are even sometimes clearly skeptical about technology and progress.

Unlike the older group, made up of people over 60 years of age who often made references to the state of the world that they want their children and grandchildren to inherit, they are not yet thinking about securing the future. At the same time, they most often and most clearly articulate **concerns about safety and security**.

Their low level of knowledge, unlike in the group declaring neutrality, **does not translate into their openness to arguments**, but rather into a proliferation of obstacles, even after being assured of the safety of one aspect of nuclear or another. **Thus, they rationalize their fears negatively**.

They quote the threat that sheer operation of a nuclear power plant poses, the experience of Chernobyl and radioactive waste all the while admitting they have no knowledge of how it is handled or stored. They also worry about miners losing their jobs and the social unrest that may come with it. They list high costs and financial efforts as an obstacle to deploy nuclear in Poland.

They are overwhelmed when they think about the complexity of all the tasks to be undertaken to adapt current power installations to the new energy source. In their eyes weather-dependent energy sources appear to be safer, require less labor and resources, less effort and have lesser impact on the environment.

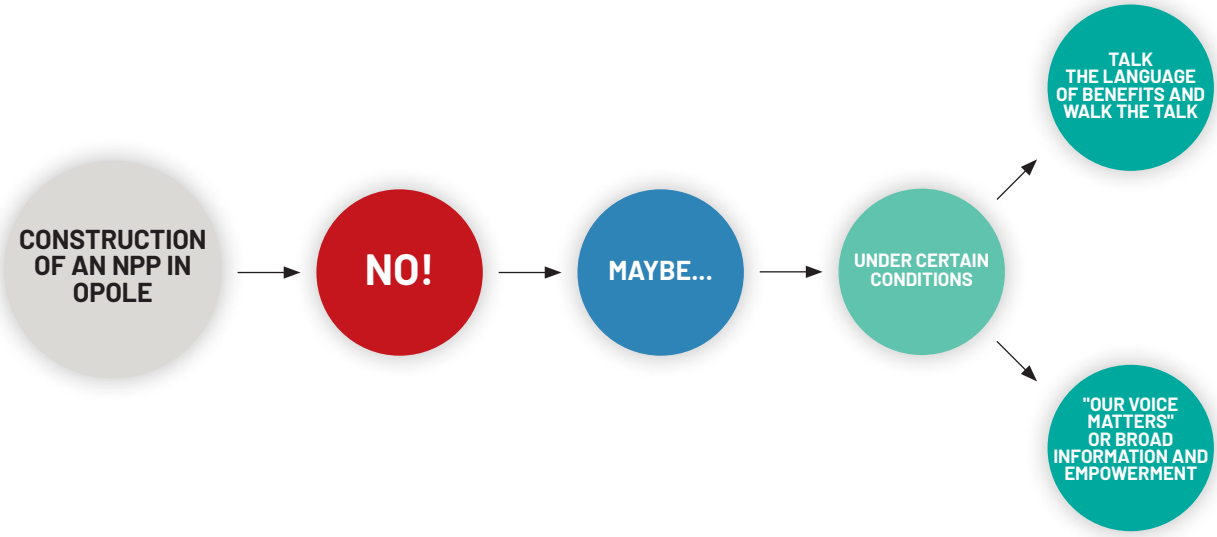
Their interventions bear testimony to their **fear of change and a lack of belief that such enormous, collective effort as the one required to implement nuclear in Poland makes any sense or is even possible to accomplish.**

> *"[...] too much danger is involved and at the same time there is the possibility of using another type of energy that is safe [...]".*

> *"Hence, out of fear, precisely for the environment, too, well, because it will have an impact after all. I would actually have to get to know exactly what impact this power plant has on the environment, on those residents who will live close by, because so sometimes you hear that even such simple windmills that they build, they are also harmful, as it turns out".*

2.5 CONSTRUCTION OF AN NPP IN OPOLE - NO, MAYBE, UNDER CERTAIN CONDITIONS

FIG. 12



SOURCE: OWN STUDY.

"We, the people of Opole, will certainly say that this is the worst place. At the seaside - great, because it's far away".

"In our city, everyone would look at potential benefits."

The majority of participants of the meetings were in **favor of continuing the nuclear power plant project in Poland**. The level of knowledge they possessed did not significantly affect their position.

They unanimously stressed they lack comprehensive knowledge and find it difficult to access reliable and straightforward information on nuclear power. They also underlined that nuclear power is not frequently and widely talked about, which affects both their own attitudes and the opinions of those around them. **The feeling of being uninformed breeds the sense of being excluded from the decision-making process. Many participants feel that they are unable to give their informed consent to a nuclear project**. Under these circumstances, a declared neutral attitude can easily turn into opposition.

"I'm neutral in this regard because as is known, the further, the better. And if it's to be in our place, I'm not going to protest either, I'm not going to chain myself to anything, but somehow I also think that maybe it would be better to find more favorable places for this plant, in terms of location, and not choose a location simply because people here are not protesting, so, let's put that power plant there".

The oldest group, aged over 60, was visibly frustrated and felt left out of social life and decision-making processes.

However, inadequate engagement with local communities has proven to be an obstacle for all the groups, even if they generally agreed with the change being implemented.

Possible construction of a nuclear reactor in Opole was met with significantly less approval among study participants than the construction of a nuclear power plant in Poland, which clearly points to **the NIMBY phenomenon** and presence of all the risks associated with it.

Those between 30 and 60 years of age turned out to be least open to the idea of replacing the coal-fired units at the Opole power plant with a nuclear reactor. It must be kept in mind this is the most numerous and most represented group in their region and in the country, actively shaping its economic and sociocultural life.

Regardless of the adopted attitude (pro, anti- or neutral stance) towards nuclear power, study participants believed that **transitioning away from coal as the main energy source is inevitable in their region.** Some of them consider this change positive and equate it with modernity and progress, and most consider it the right strategic direction.

However, they raise a number of reservations with regards to this inevitable change:

1. It should be part of a coordinated and consistently implemented broader energy transition plan, not an ad hoc, "accidental" investment.

   This is especially important in the context of phasing out the current energy sources: survey participants find that technological shift away from coal cannot happen without providing for the social fabric that has formed around conventional power plants over the decades of their operation.

   In other words, they would like to see a plan for redirecting the people working in coal-fired power plants to the newly created nuclear industry.

2. Poland as a country must ensure that it has properly trained personnel to manage and operate the nuclear power plant.

> *"We never have enough to adequately train people, build human capital, gain competencies. We don't have cadres".*

> *"I am not afraid of the shift. I am afraid that those who will be making decisions about this shift will not do a good job, perform well [...] If they do a good job, if it can be said they did everything to the highest standard, as they should, then I am not afraid of any such plant".*

   This reservation about the necessity to plan for specific activities and to build the required capacity is directly linked to the loudly voiced concerns about nuclear being done "the Polish way," in line with the "Polish mentality," i.e. sloppily and with little attention to important details.

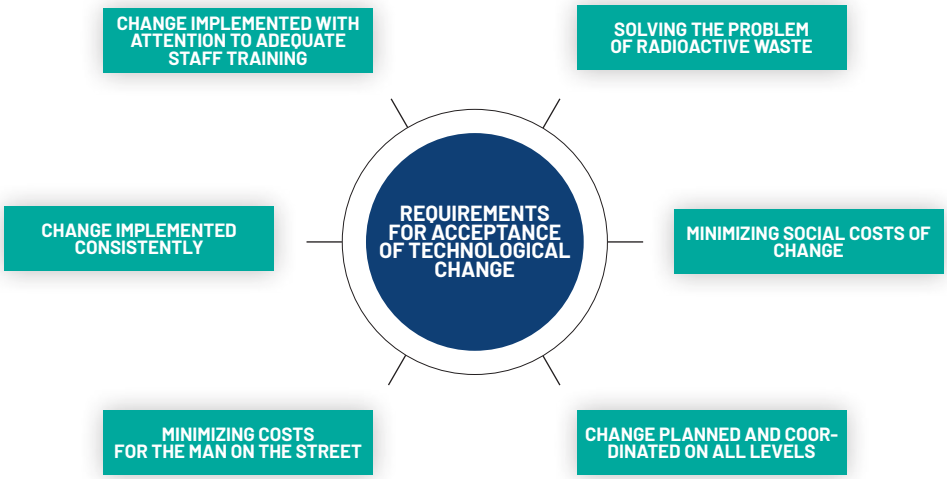
3. The construction of a nuclear power plant is a large investment and entails high costs.

   Survey participants worry that even if the deployment of nuclear power translates into lower energy prices in the long run, it may prove to be a burden for finances of the State and household budgets, especially in the phase of construction, in the short run.

4. Survey participants would like to know how the "waste problem" will be solved.

Most of the objections voiced in this part of the discussion were not what could be called *dealbreakers* - they would not, when considered one by one, be reason good enough to reject nuclear. All of them were rather openings for conversation.

FIG. 13



SOURCE: OWN STUDY.

Study participants identified two conditions they believe will determine whether or not a potential Coal-to-Nuclear investment may gain public support in their city:
Requirement 1: "Our Voice Matters";
Requirement 2: "Talk the language of benefits and walk the talk".

2.5.1 REQUIREMENT ONE: "OUR VOICE MATTERS"

Possible future construction of a nuclear power plant in Opole is an extremely important topic, and even those who believe that the decision will be made somewhere over their heads agree that extensive public consultations - in which they would gladly participate - should take place.

Study participants want to be aware of the decisions being made, especially since these decisions will affect their immediate environment. Participants would like to take part in the consultation process, and get reliable and credible information in its course.

This is an extremely important part of the diagnosis: the participants in the meetings understood the "safety" of nuclear power as their own sense of security and feeling well informed on the matter. They pointed not so much to specific technical aspects as to gaining credible, reliable information about nuclear power and its operations as a condition for recognizing that nuclear power plants are safe. They want to be able to trust the information they obtain, i.e. to get it from someone they trust and who will guarantee credibility of information by putting their own face and name on it. They prefer that to seeking information themselves.

"As we live in Opole we want to know, from every angle, what is happening here, how things are going... Because we live here, so we want to know what's happening here, why it's happening here, what we're going to get out of it".

"I am an informed and aware resident and I want to voice my concerns".

Acquired knowledge and being kept in the loop on what is happening were listed as factors decisive for both individual and the community's empowerment in the decision-making process, providing for a sense of security, alleviating anxiety about potential change and the use of nuclear technology.

"If we had in some way... in the sense that it really was to be built and we could contribute in some way to whether it would be built or not, well I would like to know, whether I want it to be actually built or not. So then I would like to have those consultations, of any kind, which is what it's all about. Because I don't really know how it works, how this operates. Well, I would like to get such information".

"It seems to me that most of us, the residents of Poland, or Poles, have scant knowledge of what nuclear power is, how a power plant works in general and why we need a nuclear power plant exactly. Before launching such an investment, it would be necessary to run such a broad program or such an information campaign that would tell us why this is so... It looks like some new team comes in and resurrects some idea that was once there and says <we are now bettingon nuclear power>. But why? Please explain it to us."

One group of the youngest participants **suggested that the informational function of such public consultations alone might not be enough, and that an additional motivating factor would be to involve residents in the decision-making process**.

Looking at the identified social trends in other countries, it is only natural for expectations in this regard - and consequently the response of decision-making bodies as well as investors and other nuclear industry representatives - will and should evolve in the direction of ***nuclear stakeholder engagement***, as it is called by the International Atomic Energy Agency.

NUCLEAR STAKEHOLDER ENGAGEMENT BY IAEA

This term does not yet have an established equivalent in Polish. It appeared first in the IAEA documents as "stakeholder involvement" in a report by the International Nuclear Safety Advisory Group (INSAG)mtasked with ensuring international community's access to clear and reliable information on nuclear safety. Published in 2006, the report by INSAG, *Stakeholder Involvement in Nuclear Issues*[34], takes note of the evolving social, political and technical realities that are forcing change in the way various projects are undertaken and decisions made, also because of the revolution in the ways of communication that technological advances and access to digital tools have brought.

"INSAG has concluded that the expectations of stakeholders of a right to participate in energy decisions are something that the nuclear community must address" - reads the forward by the INSAG Chairman. Since 2006, the importance to work with local communities, societies and all stakeholders in nuclear projects has only become more evident. Later IAEA documents in this area (*An Overview of Stakeholder Involvement in Decommissioning*, 2009[35]; *Stakeholder Involvement Throughout the Life Cycle of Nuclear Facilities*, 2011[36]; *Communication and Stakeholder Involvement in Environ- mental Remediation Projects*, 2014[37]; *Communication and Consultation with Interested Parties by the Regulatory Body*, 2017[38]; *Stakeholder Engagement in Nuclear Programmes*, 2021[39]; *Communication and Stakeholder Involvement in Radioactive Waste Disposal*, 2022[40]) point to the evolution of the term itself as well as to change of the approach: English *involvement*, which presupposes the activity of only one of the parties, has been replaced with *engagement*, clearly indicating the bilateral nature of the exchange and equal status of the parties involved.

34 *Stakeholder involvement in nuclear issues*, INSAG Series No. 20, Vienna 2006, https://www.iaea.org/publications/7604/stakeholder-involvement-in-nuclear-issues.

35 *An overview of stakeholder involvement in decommissioning*, IAEA Nuclear Energy Series No. NW-T-2.5, Vienna 2009, https://www.iaea.org/publications/7970/an-overview-of-stakeholder-involvement-in-decommissioning.

36 *Stakeholder involvement throughout the life cycle of nuclear facilities*, IAEA Nuclear Energy Series No. NG-T-1.4, Vienna 2011, https://www.iaea.org/publications/8694/stakeholder-involvement-throughout-the-life-cycle-of-nuclear-facilities.

37 *Communication and stakeholder involvement in environmental remediation projects*, IAEA Nuclear Energy Series No. NW-T-3.5, Vienna 2014, https://www.iaea.org/publications/10494/communication-and-stakeholder-involvement-in-environmental-remediation-projects.

38 *Communication and consultation with interested parties by the regulatory body*, IAEA Safety Standards Series No. GSG-6, Vienna 2017, https://www.iaea.org/publications/11029/communication-and-consultation-with-interested-parties-by-the-regulatory-body.

39 *Stakeholder engagement in nuclear programmes*, IAEA Nuclear Energy Series No. NG-G-5.1, Vienna 2021, https://www.iaea.org/publications/14885/stakeholder-engagement-in-nuclear-programmes.

40 *Communication and stakeholder involvement in radioactive waste disposal*, IAEA Nuclear Energy Series No. NW-T-1.16, Vienna 2022, https://www.iaea.org/publications/13590/communication-and-stakeholder-involvement-in-radioactive-waste-disposal.

In different social and political realities this empowerment may translate to varying degrees of participation in the decision-making by external project stakeholders. **However, it always implies building partnerships that take into account the needs of each party, broad and open communication, transparency, and conducting intensive outreach, communication and educational activities in response to the needs raised by stakeholders**. The idea is that at key moments in the project, the stakeholders should be prepared to share responsibility and make decisions with nuclear investors and/or operators in a way that will support each party's goals.

Since the publication of the INSAG report, the political and social landscape has changed, and these changes only highlighted the need to give *nuclear stakeholder engagement an* even higher priority. Stakeholder engagement is one of the 19 infrastructure areas that in line with the IAEA's *milestone approach*[41] must be developed and properly executed by any country that plans to implement or is implementing a nuclear power program. Stakeholder engagement and communication are currently embedded into 3 infrastructure milestones defined in the IAEA's *milestone approach*.

These milestones are:

1. readiness to make a knowledgeable commitment to a nuclear power program,

2. readiness to invite bids/negotiate a contract for the first nuclear power plant,

3. readiness to commission and operate the first nuclear power plant.

The description of each of these three milestones involves stakeholder engagement and communication goals that should, in a concerted effort, be pursued by all those involved in the country's nuclear program.

IAEA completed its INIR-2 mission in Poland in April 2024. A team of IAEA experts conducted an Integrated Nuclear Infrastructure Review for Phase 2 of nuclear program implementation, making five recommendations and seven suggestions to support Poland's transition to Phase 3.

41 *Milestones in the development of a national infrastructure for nuclear power*, IAEA Nuclear Energy Series No. NG-G-3.1 (Rev. 1), Vienna 2015, https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1704_web.pdf.

The emphasis on communication issues and stakeholder engagement in nuclear projects must translate into corporate culture settings where these areas are sanctioned as proper processes requiring adequate resources to be run efficiently. All nuclear project developers must be aware of this. Effective and highly interesting stakeholder engagement projects are now also being carried out by countries associated with an authoritarian styles of governance and management (e.g., China or Russia), as well as by emerging countries such as Nigeria or Brazil, not just developed democracies.

According to IAEA documents, activities in these areas should be **carried out throughout the whole lifecycle of a nuclear project, including when interest in a facility's operation in local communities and beyond - quite naturally expires**.

As history has shown, nuclear projects have failed also when fairly advanced precisely because of public resistance, including resistance from local communities. Examples include:

1. Poland's half-built and abandoned Żarnowiec Nuclear Power Plant[42]

2. Austria's Zwentendorf Nuclear Power Plant[43] - built in full, but never put into operation due to a negative result of a nation-wide referendum;

3. delays in execution of plans to build a geological radioactive waste repository in Bure, France[44];

4. premature shutdown of the Enrico Fermi Nuclear Power Plant in Italy[45] and the San Onofre Nuclear Generation Station in California in the US[46] or even the premature shutdown and destruction of fully operational nuclear power plants in Germany as part of *the Atomausstieg*, which was neither economically nor ecologically justified.

Recently, however, there are also examples of quite the opposite, namely of how stakeholder groups were able to defend a nuclear facility from premature closure, as communities around the Diablo Canyon Nuclear Power Plant[47] have done, led by women organized around the Mothers for Nuclear group[48].

42 Elektrownia Jądrowa Żarnowiec, https://nuclear.pl/polska,ejz,elektrownia-jadrowa-zarnowiec,0,0.html.

43 *Krótka historia Elektrowni Jądrowej Zwentendorf*, 9.06.2023, https://nuclear.pl/wiadomosci,news,23060903,0,0.html.

44 *Déchets nucléaires à Bure: la mise en oeuvre du projet Cigéo jugée conforme à la Constitution*, 27.10.2023, https://www.lemonde.fr/planete/article/2023/10/27/dechets-nucleaires-la-mise-en-uvre-du-projet-cigeo-a-bure-jugee-conforme-a-la-constitution_6196794_3244.html.

45 *Nuclear Power in Italy*, 18.09.2024, https://world-nuclear.org/information-library/country-profiles/countries-g-n/italy.

46 A. Stein, J. McBride, *Closure of San Onofre Nuclear Power Plant increased emissions in California by 37 million metric tons of CO2e*, 3.12.2021, https://thebreakthrough.org/blog/the-closure-of-san-onofre-nuclear-power-plant-increased-emissions-in-california-by-37-million-metric-tonsof-co2e.

47 J.B. Meigs, *Diablo lives!*, 19.08.2022, https://www.city-journal.org/article/diablo-lives.

48 *Mothers for Nuclear*, https://www.mothersfornuclear.org/.

CASE STUDIES: EXAMPLE AND ANTI-EXAMPLE

Sellafield is a huge area in Cumbria in the United Kingdom. Sellafield is where the world's first commercial nuclear power plant, Calder Hall, as well as plutonium production facilities and the Windscale nuclear reactor, which saw a massive 16 hours - long fire in 1957, were located.

All facilities in Sellafield have been decommissioned, and the question of what to do with the waste that resulted from the decommissioning and cleanup arose. For now, they are all still located right there, in Sellefield.

The decision was made for them to be deposited in an underground repository , but finding the right place proved difficult. In 2018, all municipalities in England and Wales were invited to submit their applications to participate in the selection process. First - the readiness of the local community, then - geological and environmental studies. Thanks to an interesting incentive package on offer, there was no shortage of applicants. Preliminary studies ruled out one municipality, another - after protests from local residents - decided to withdraw. Three remained, including Sellafield's direct neighbor, the small seaside town of Seascale.

"We've known Sellafield forever, it's the largest employer in the area."- David Moore, Mayor of Seascale, explained to the BBC. "Here, the conversation is different. This waste has been here since as long as we remember and is still here with us. Now it's just a matter of creating a safer place for it"[49]. Seascale is affiliated with the NuLeaf[50], and the mayor David Moore, is also its chairman.

NuLeaf is an association of municipalities that host nuclear facilities in the United Kingdom. Its members advise each other and represent their shared interests as a group both before institutions and the nuclear industry. The number of such organizations is growing: Canada has CANHC (Canadian Association of Nuclear Host Communities[51]), the United States has ECA (Energy Communities Alliance[52]), in Europe there operates an increasingly vibrant GMF or Group of European Municipalities with Nuclear Facilities[53]). With the help of the IAEA, who supports the networking and cooperation among nuclear municipalities and communes, the *Global Partnership* is being developed to bring together regional associations such as GMF, ECA and CANHC. Global Partnership has recently been joined by organizations from Argentina and South Korea.

49 V. Gill, K. Stephens, *Which rural area will take the UK's nuclear waste?*, 9.09.2024, https://www.bbc.com/news/articles/czx6e2x0kdyo.
50 Nuclear Legacy Advisory Forum, https://www.nuleaf.org.uk/.
51 Canadian Association of Nurses in Hemophilia Care, https://canhc.org/.
52 Energy Communities Alliance (ECA), https://www.energyca.org/home.
53 Group of European Municipalities with Nuclear Facilities, https://gmfeurope.org/.

"There was some discontent in our place recently," a representative of Drigg, a village neighboring Seascale, was recounting during a technical meeting in Vienna. - "Sellafield had heavy transport go through through our village but failed to inform us in advance. People got upset. Not only because of the noise, but also it's that little children walk those streets daily on their way to school and back. So do our cats.. During the meetings we hold regularly with Sellafield operator, we were able to agree on a schedule for heavy transport. It's announced in advance. They stick to the schedule, people have calmed down."

In Poland, no one seems to have talked to the British about it. Recent news from Pomerania sound disturbingly familiar:

"Recently there was an argument about heavy transport being directed through the village of Lubiatowo. The investor failed to inform the residents about it beforehand. They only put up the notices on the boards a day after ... " - a resident of Choczewo, the neighboring village, recalls.

The results of this failure are, unfortunately, as easy to predict as it was easy to prevent them:

"As for the residents and their attitudes towards the construction of the power plant, the community has indeed become divided. It's clear that also some of the people who used to support the investment are now very skeptical about it, are tired, and above all, they are unhappy with the investor's and the contractors' disregard for them and their needs. They only keep up some appearances that they listen and that the residents' opinion matters. [...] Community's support for the investment is obviously falling because people are fed up with being disrespected."

Aiming to raise the standards of stakeholder engagement and public communication throughout the industry, the IAEA launched a pilot edition of the Nuclear Stakeholder Engagement School[54] [55]in 2024. This was a five-day professional training course organized in cooperation with the International Center for Theoretical Physics (ICTP) in Trieste that focused exclusively on questions of communication and stakeholder engagement. One of the overarching goals of the training, as identified by the IAEA, was to make its participants (decision-makers, representatives of national nuclear regulators and administrations, as well as representatives of the nuclear industry) aware of a very simple and yet very difficult thing: public communication and stakeholder engagement are advanced schedule and budget risk management tools for nuclear projects. For them to work, however, the stakeholders, especially local communities, must be treated respectfully and as partners in the project.

54 M. Fisher, *IAEA and ICTP hosting first ever stakeholder engagement school this week*, 28.11.2024, https://www.iaea.org/newscenter/news/iaea-and-ictp-hosting-first-ever-stakeholder-engagement-school-this-week.

55 Joint ICTP– IAEA Nuclear Stakeholder Engagement School, 25–29.11.2024, https://www.iaea.org/events/evt2400946.

2.5.2 REQUIREMENT TWO: TALKING THE LANGUAGE OF BENEFITS AND WALKING THE TALK

"The topic of power plants in Opole, as for everyone, is important for me too, because obviously, everyone wants to fare better then they do now. Because it comes with better standard of living".

"It depends how you look at it. Because from a materialistic perspective, de facto it means for us ... possible reduction in electricity prices".

"Why did Opole fight to have the power plant within the city limits? After all, is stands in Dobrzyn. They fought to incorporate Dobrzyn into Opole, because it is nine million in tax revenue annually and if it becomes nuclear [power plant] it will be more. Opole as a city has developed thanks to this".

In the discussions held by all groups of survey participants, a clear suggestion was made: in order for nuclear reactor built to be seriously considered in Opole at all, the participants need **a clear message on how they as the inhabitants of the city and the city itself will benefit from this investment.** They need this clear message also for the sake of envisaged discussions with their families and friends.

The participants, during the meetings, were **able to identify in detail the benefits** that the operation of a nuclear power plant in Opole could bring both to them, the city and the entire region:

- additional source of revenue to the city budget,
- new jobs,
- education, including higher and professional education,
- development of the service industry, including specialized services for such a facility,
- development of transportation and energy infrastructure,
- reducing emissions and improving air quality,
- raising the city's prestige - Opole as a place of importance on the map of Poland.

Comments about the benefits in terms of raising the city's attractiveness were also made, sometimes countered by comments on its loss.

This shows that the public debate often revolves around the imagined and not the real, around the image that community members have of themselves and the place they live in, as well as beliefs.

"Well, and the place will become associated with it, a nuclear power plant in Opole, and Opole. It will be like with the summer festival in Opole [...]. They will be coming to see".

"In Poland, the Opole region is presented as such a green agricultural region, where there is little pollution. We are in a safe area. And then, all of a sudden, a power plant appears among those green fields of rapeseed".

Participants **were able to put the local benefits into a national context**, referring to the concepts of energy independence, low energy costs, better use of natural resources, environmental protection, technological progress and social development associated with the emergence of a new industry and a whole branch of science.

At the same time, while the conversation about benefits focused on quantifiable and tangible gains, **the discussion of risks** again centered on emotions, with fear being the dominant one, veiled in a number of reservations:

"On the other hand, the risk is one, the fear of an accident [...]. This is so obvious and so strong that there is nothing more to be said here. Because it entails everything else."

*"What about the waste? Because these ashes, not ashes, something can be done with them.
And here, it's not like it can be disposed of in some factory".*

- fear of accident,
- fear of radiation as another facet of the fear of accident, as well as recurring questions about the radioactive waste,
- fear of armed conflict,
- fear associated with environmental losses: changes in water relations, forest clearing,
- fear of disproportionately high costs of building, operating and adapting energy infrastructure,
- **fear of conflict and tensions within the community.**

"Well, this conflict between these opponents and people who want to build it and so on. I think it's also a problem, that people are arguing and so fiercely as around this issue".

"An attack on important facilities during the war. It is evident, because, for example, next to military installations,these houses are bombed. So that's pretty significant".

"And then the strikes, well, because there can be some strikes organized, people can do things like that when they don't want any such power plant here".

It became clear in the course of the discussions that talking the language of benefits and sticking to the category of facts can, in the opinion of study participants, be an effective tool for rationalizing and dispelling fears.

NUCLEAR ZEALAND - CASE STUDY

Positive engagement of local communities has been achieved in the Dutch municipality of Borsele.

Borsele has hosted a number of nuclear facilities for decades, ranging a nuclear power plant to COVRA, a nuclear waste repository. Recently, Borsele was identified by the central government of the Netherlands as a potential location for new nuclear investments. Residents took the news calmly, and adopted a proactive approach. Under the leadership of Gerben Dijksterhuis, the mayor of Borsele, an innovative public consultation process was implemented, as a result of which the Borsele community defined its own vision of development and came up with a list of conditions that investors must meet in order for the residents to support the implementation of nuclear projects in their municipality. The conditions cover a range of economic and environmental criteria, but also cultural and landscape criteria, important for preserving the qualities characteristic to this corner of Zealand. This is an excellent opening for both sides: for the community, which knows what it needs from the planned investment, and for the future investor, who has an organized, cooperative and informed community in front of them[56].

56 Borsele Conditions Group, 2023, https://www.borsele.nl/sites/borsele/files/2024-05/Borsele%20Conditions%20Group%20Looking%20back%20on%20a%20unique%20citizen%20participation%20process%20in%202023.pdf.

2.5.3 RECOMMENDATIONS FOR COOPERATION, PARTNERSHIPS AND RELATIONSHIPS

Investors in a nuclear project and its developers must design and implement mechanisms for direct communication and cooperation with communities of potential sites in order to:

a. jointly determine the expected benefits of nuclear investment for the host commune and its region, as well as to reduce the risks of conflicts inside the communities to manage risks to the communities themselves, investors and operators;

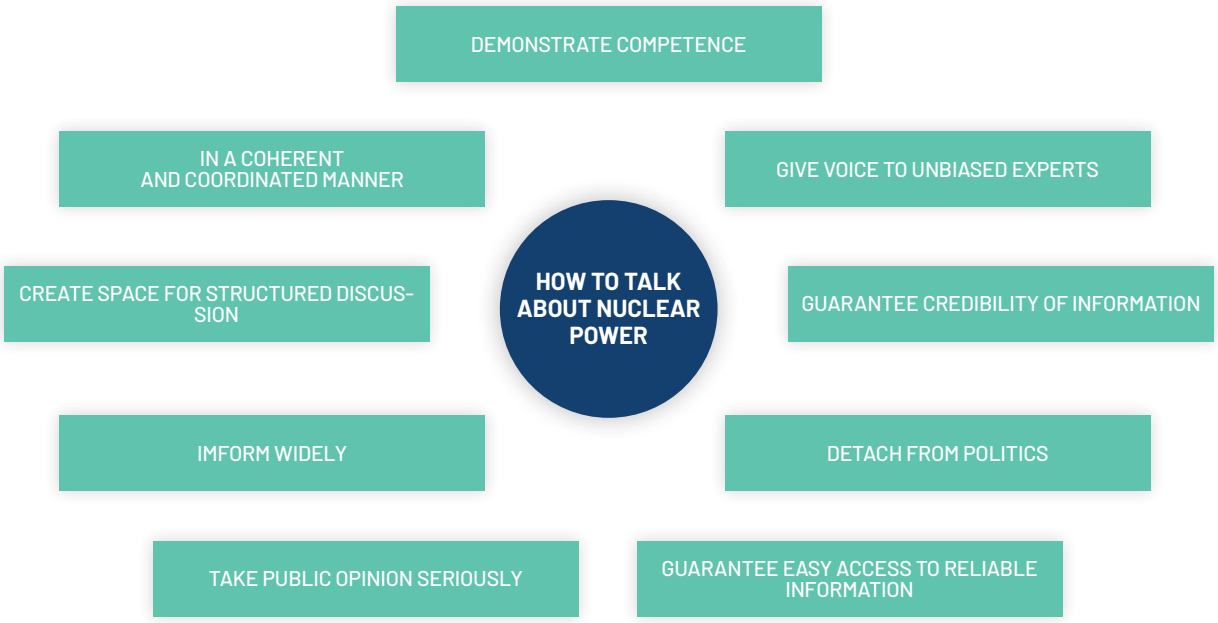
b. jointly define how to measure the degree of materialization of these benefits for a given location and its region;

c. correct the direction of the actions taken, if such a need is raised by either party.

At the central level, associations of nuclear facility host communities operating in Europe and elsewhere should be identified, with the ministry serving as a point of contact for Polish local communities interested in becoming involved in their work and in acquisition of their *know-how* on to secure their own interests. Nuclear investors should encourage their potential and host communities to join these organizations, or at least inform them of such a possibility, and provide an opportunity for contact.

2.6 HOW TO TALK ABOUT NUCLEAR POWER

FIG. 14



SOURCE: Own study.

Study participants generally admitted that it was their fear talking the dangers and risks. They often link this fear to their ignorance oN the topic of nuclear.

The opponents resorted to categorical statements and wishful thinking:
"There is no such thing as saying that a nuclear power plant is safe".
"Ay, in a peaceful world with everything and no external disasters as if, yes ...".
However, many participants, especially those in the group declaring neutrality, offered possible solutions and **pointed to actions that could make them feel confident about the safety of the nuclear power plant**:

1. interestingly they most often **pointed to** their **own knowledge and awareness, that is, the need for extensive education and information of the public**, including themselves;

> *"If I had heard from the experts that actually such situations may happen, but we are prepared for them, it would probably reassure me somehow".*

> *"First of all, education, then awareness will be raised. Even the elderly should somehow get educated".*

2. **execution of the project and nuclear plant operation by a set of adequately trained, highly competent and experienced personnel;**

> *"A well-trained staff to take care of it. [...] We go to France, we go to the States, learning about the technology".*

Study participants want to be sure that the nuclear project is run by competent people, which translates **into a demand to learn about nuclear power from people whom they trust to be experts, directly involved and experienced in the matter**. Scientists, especially those known to the public, were the people whom the study participants would trust if they talked about nuclear power.

At the same time, the participants were unable to identify any such scientist by name. Thus, tentatively, they resorted to mentioning science communicators with degrees in science, who became household names in Poland, i.e. Tomasz Rozek, for example. The name of Professor Andrzej Dragan also came up, with professor being quoted as a real authority in the field of science. Study participants placed science communicators on par with specialists and experts-practitioners related to the nuclear power industry itself. So, while the participants seem to appreciate expert and scientific knowledge, they also care about making the message simple and accessible to as wide of a group as possible.

"Ideally, it should just be some experts; people who are experts in a particular field".

Trust in the person whom study participants receive information from is a major factor in their decision to take their opinion seriously.

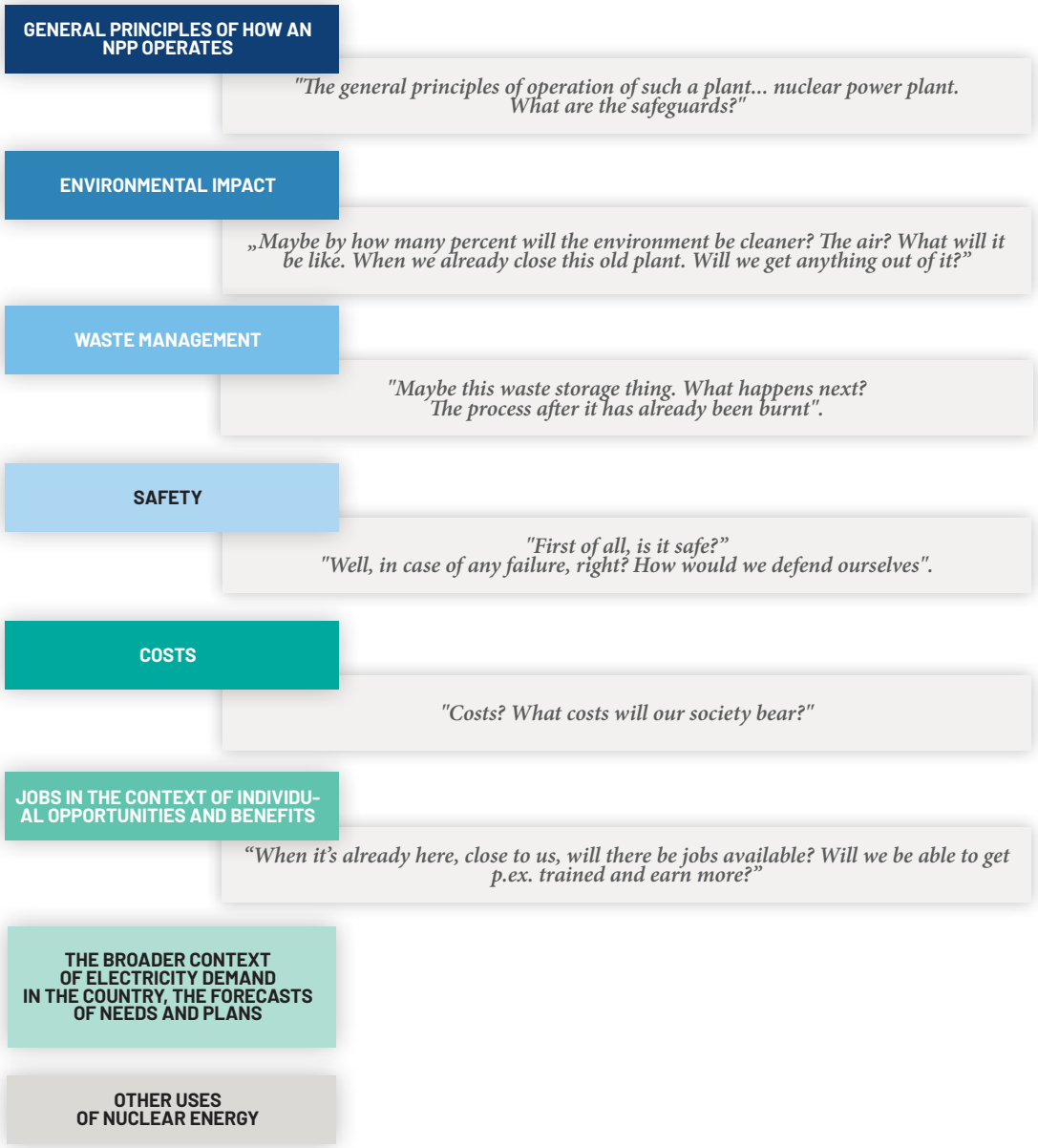
"And other people (...) I'm not a specialist, then I like to ask someone who I think knows a little more than I do. Not necessarily some professor out there, but just a person, who is interested in the topic. Reads more. And it's easier for me because I don't have to struggle through".

Study participants feel dramatically uninformed about nuclear power. However, under the conditions of information overload, finding information and verifying its credibility on their own requires an effort they are not always willing to make. They criticize past communication efforts around nuclear power as inconsistent, giving the impression of lack of coordination, lack of plan and haphazardness.

"Apparently 2030, then 2040, it's hard to get specific dates because there is no specific information".

2.6.1 INFORMATION STUDY PARTICIPANTS WOULD LIKE TO OBTAIN

FIG. 15 **WHAT INFORMATION SHOULD BE PROVIDED?**



SOURCE: OWN STUDY.

The list of information that study participants would like to receive encompasses questions previously identified as sources of anxiety and reservations:

1. general principles of how a nuclear power plant operates;
2. environmental impact;
3. waste management;
4. safety;
5. costs;
6. jobs in the context of individual opportunities and benefits;
7. broader context of the electricity demand in Poland, forecasts and plans, and other applications of nuclear energy.

> *"Or, let's suppose how much, for example, I don't know, of this uranium is needed to, I don't know, provide power to the whole of Poland for, let's say, a year".*

> *"Does it actually create new opportunities in terms of jobs, or is it temporary?"*

> *"Costs. Yeah, that too, because it's... I overheard, I generally overheard that is far as this first nuclear power plant to be built goes, the cost may reach, according to various sources, about 140 billion zlotys".*

2.6.2 WHO SHOULD SPEAK?

When asked who should inform and communicate on nuclear power, there was also an unequivocally negative answer: **it should not be the politicians.** They were considered the least credible and trustworthy, and it was pointed out that as such, they should not participate in information and education campaigns at all.

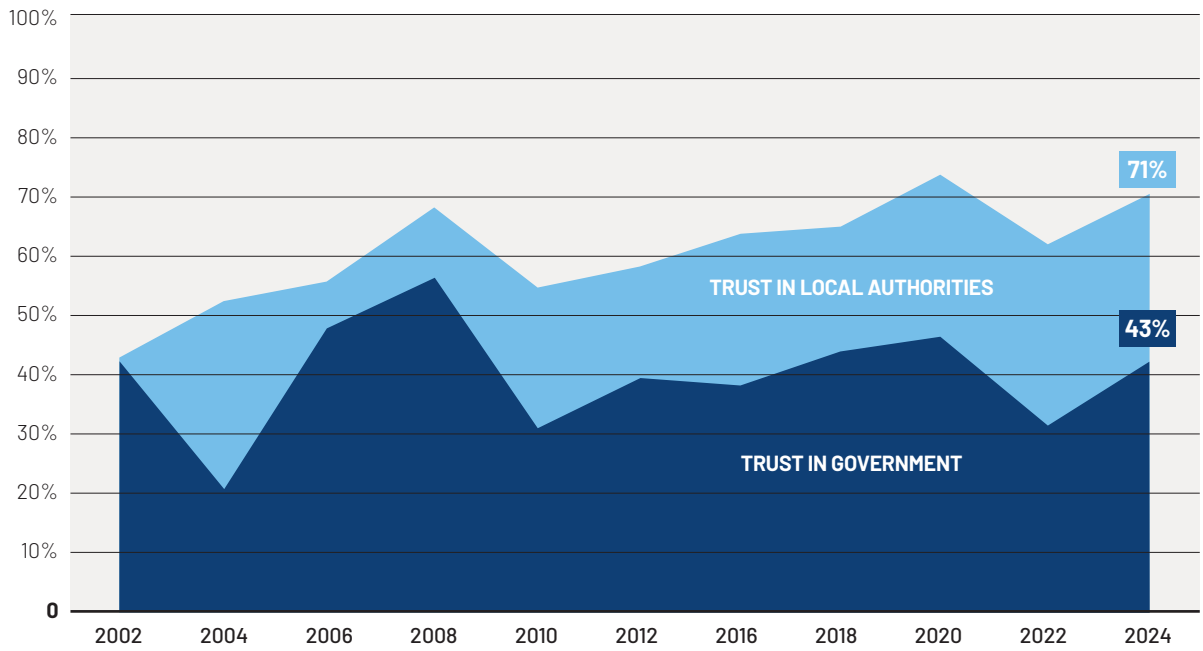
> *"Moreover, it seems to me, for example, it would have to be some kind of specialist, unrelated to politics, because the politics will later produce opponents who will reject the project only because it is associated with this specific political party. That is, they must be unbiased".*

This phenomenon can be explained by the low level of trust in this particular social group. In a CBOS survey of 2024 *Public Trust*, only 43% of people thought the government could be trusted, while 50% thought it could not. Trust in the Sejm and Senate (the lower and the upper chamber of the Polish Parliament) is declared by 41% of Poles, why 40% of them trust the president. Over the years, the level of trust in the representatives of the central executive branch has proven to always be relatively low, not exceeding 46% since 2010.

It is worth noting, however, that at the same time trust in local authorities reached one of the highest levels from among the various institutions surveyed. A total of 71% of respondents felt that local government representatives could be trusted, with only 20% holding the opposite view. During the DEsire qualitative study, respondents repeatedly referred favorably to the role of local authorities in the implementation of nuclear projects. Study participants expressed a wish for public consultations and discussions about the

construction of a nuclear power plant in their city be undertaken by its head, the mayor, accompanied by experts and scientists. This local aspect seems to be crucial here: **the requirement to include local government officials in the discussions clearly stems from their responsibility for the people who elected them and their accountability to the people who elected them**.

FIG. 16 **LEVEL OF TRUST IN GOVERNMENT AND LOCAL AUTHORITIES FROM 2002 TO 2024**



SOURCE: Based on the CBOS survey "Social Trust" (2024); Response to the question: "Do you, in general, trust the institutions listed?"; Percentages indicate a combination of "I definitely trust" and "I rather trust" responses.

The question of not making the discussion about nuclear power and possible plans to build a nuclear power plant in a specific location political, in this case in Opole, took up a lot of space at the meetings. It came up first when concerns about nuclear plans for Opole would bring conflict and tensions within the community were raised. A broad information and education campaign as part of the public consultations process was generally seen by study participants as a tool for conflict prevention and mitigation.

Overall, the tone of the conversation hinted at high levels of frustration and, perhaps most importantly, fatigue with the information noise in the media and polarization of the debate both in the media and on the Internet, especially in the social media and on discussion forums. Historically, making the conversation on nuclear political has never done it any good.

Study participants would like to see **a space created where they are taken seriously, where information provided can be relied on and where genuine discussions take place, with room for presentation of all sorts of arguments. An image of a city-wide - or even broader than that - Oxford debate transpired from their interventions**.

THE EFFECTS OF MAKING THE DEBATE ON NUCLEAR GO POLITICAL

In Poland, the result of a flawed local referendum on the construction of a nuclear power plant in Żarnowiec served as a good excuse to abandon the half-finished project. In the municipality of Różan, where the National Radioactive Waste Repository in Poland has been in continuous operation since 1961, a referendum was held more than a decade ago, the validity of which was not recognized by either the provincial or central authorities. Nevertheless, the local community clearly spoke out against extending the operation of the NRWR in their commune. Although relationship between the operator of the facility with the residents of Różan and their representation, i.e. the municipal authorities, are currently very good, the topic of extending operations of the facility has not been discussed again in the open.

As a result of the referendum following the Chernobyl accident, Italy - at a massive cost - shut down its nuclear power plants and dismantled its nuclear development program[57]. Today they are seriously reconsidering this decision[58]. In Austria, the result of the referendum put halt to the launch of a freshly built Zwentendorf nuclear power plant[59]. In Switzerland, after the accidents at the Fukushima power plant, it was decided to impose a moratorium on any new builts and later to abandon plans for nuclear development entirely. Recently, however, the discussion was relaunched and a number of voices calling for the return to nuclear are being heard[60]. Going political in the debate around nuclear power in Lithuania has led to a paradoxical situation: in a referendum held together with the 2008 elections, more than 90% of Lithuanians voted in favor of extending operations of the post-Soviet Ignalina Nuclear Power Plant. The referendum, however, was not binding and in accordance with Vilnius' pre-accession agreements with Brussels, the last reactor in Ignalina was shut down[61]. Interestingly, just four years later, the Lithuanian government decided to ask the Lithuanians about their support for the project to build a new power plant, Visaginas. The project was to be executed in partnership with other Baltic states and Poland. However, the result of the referendum held together with 2012 elections and strongly associated with the political party in power at the time, was negative[62]. It buried the idea of implementing a nuclear project in Lithuania for years. In 2024, faced with the quickly approaching end of operations of the Krsko nuclear power plant, which still remembers former Yugoslavia, the Slovenian authorities decided to ask the public about construction of a second facility. The discussion got so heated and the political divide turned out to be so deep that the parliament in Ljubljana cancelled the referendum[63], recognizing that under such conditions rational debate and rational decision-making by voters would simply be impossible.

57 Country Nuclear Power Profiles – ITALY, 2022, https://www-pub.iaea.org/MTCD/publications/PDF/cnpp2022/countryprofiles/Italy/Italy.htm.

58 H. Roberts, *Energy price hike prompts Italian nuclear rethink*, 5.01.2022, https://www.politico.eu/article/energy-price-hike-prompt-italy-nuclear-rethink/.

59 Zwentendorf NPP, https://www.nuclear-heritage.net/index.php/Zwentendorf_NPP.

60 *Switzerland to scrap ban on building nuclear power stations*, 28.08.2024, https://www.reuters.com/world/europe/switzerland-scrap-ban-building-nuclear-power-stations-2024-08-28/.

61 L. Mažylis, A. Jurgelionytė, *The Lithuanian referendum on extending the working of the Ignalina Nuclear Power Station. The rationality of actors within(un-)changing structures*, „Baltic Journal of Law & Politics" 2012, vol. 5, no. 1, https://intapi.sciendo.com/pdf/10.2478/v10076-012-0006-y.

62 C. Pfafferott, *Lithuanians opt anti nuclear energy in non-binding referendum*, 5.10.2012, https://www.democracy-international.org/lithuanians-opt-anti-nuclear-energy-non-binding-referendum.

63 V. Spasić, Slovenia cancels referendum on Krško 2 nuclear power plant, 25.10.2024, https://balkangreenenergynews.com/slovenia-cancels-referendum-on-krsko-2-nuclear-power-plant/.

> Public pressure on being treated seriously, provided with credible information, on transparency of operations in a digital democracy will only grow. **It is in the public interest to create the space for a calm and structured conversation, exchange of information and opinions on nuclear power.** This should not be too difficult give that all parties represented in the Polish Parliament today unanimously consider implementation of the nuclear project a national interest and a raison d'Etat. The issue, however, gets more complicated on the local and regional levels, where high support for nuclear power nationally will not necessarily translate into an enthusiastic welcome for the plans to have a nuclear reactor built in one's own backyard.

2.6.3 "SOMEWHERE SOMEONE SOMETHING AND THAT'S IT" OR SOURCES OF KNOWLEDGE AND INFORMATION

Study participants in the meetings were unforgiving in their assessment of the information policy as well as education and communication activities conducted to date around nuclear power in Poland. This harsh assessment probably somehow mitigates in their own eyes the embarrassment they felt when admitting to the low level of knowledge they have on the topic. They also cited scarce media coverage of the topic.

They judged poorly not so much the quality of available sources of knowledge and information on nuclear power - although they doubted the accuracy of most of the information available on the Internet - but its low quantities and inadequate diversity of communication channels. Experience taught them to cross check the information in a number sources.

> *"Well, it seems to me that this topic ... it's a bit non existent. There was some information at the beginning, when they were going to build it, and it was under the previous Civic Platform government, and there was ... a little action, and now it has died down altogether. I don't hear anything. In the sense... nothing of the sort appears on my screen".*

Only one person mentioned they came across "Rodzina Atomickich", the nation-wide information and education campaign around nuclear presenting a family of four dealing with the topic.

The sources of information, both those that study participants have used and those where they would like to come across information about nuclear power, vary by age group. They do, however, have a common denominator: **all age groups watch documentary films and TV series, which they often treat as sources of knowledge and credible information.**

Groups between 30 and 60 years of age, as well as groups of >60 years of age, were more likely to use and rely on traditional TV, while the youngest group relies on streaming platforms and YouTube. Although the >30 groups also use them, what sets them apart from the youngest group is that they mention TV channels at all.

"Science communication programs appeal more to people. It's where people who are not necessarily specialists as such but who do possess genuine knowledge pass it on to the public. It is something different altogether to interpret something when you have no knowledge on the topic and to interpret it and pass on when you do have some knowledge and understanding... and you simply pass it on for further circulation".

All age groups use the Internet as a source of information, but function and behave on the Internet quite differently.

Information on the government websites and stand-alone, reliably run websites are considered most trustworthy. According to study participants a well-run information campaign would include a website where the presented information and more knowledge on nuclear energy would be provided, linking to even more detailed information as well as to information sources.

The group most critical and wary of information they obtain is the youngest group, of people under 30 years of age. When asked directly about the sources of information they trust, its members unanimously identified only one - school.

A clear hint, which was also offered by all groups, was the suggestion that information provided **should be somehow layered, with priority being given to short (e.g., visual, video, film) teasers about where to look for answers to their questions, rather than to information itself, in both the media and on the Internet**.

"It seems to me that it is enough to advertise the places from which you can learn what you need. That it doesn't have to be full information. It is not necessary to talk on the radio for an hour about something, it can just be enough to advertise some site or channel".

2.7 EDUCATION

All survey participants pointed out that although education about nuclear energy is part of the school curriculum, it does not do much. The topic is covered in a very limited a way.

For most of those surveyed, especially the younger ones, school is one of the few sources of knowledge and information that can really be trusted.

This is probably due to the fact that those under the age of 30 still have vivid memories of their time spent in school and see the knowledge they acquired then as the basis for their view of the world. In contrast, generations between 30 and 60 years of age, due to family commitments such as growing children, are often up to date with what is taught in schools today and agree with that message.

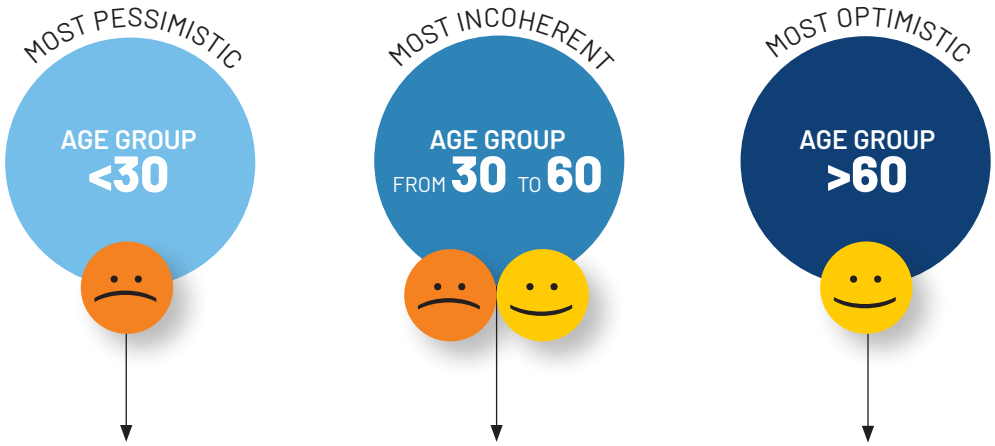
"It is very scarce. I mean, very little. There is this one lesson where it is simply stated there is such a thing as a power plant, it works so and so (...). That's how atoms split. Nobody understood it really. And we move on".

"Education on the subject is non-existent".

2.8 THE FUTURE OF NUCLEAR POWER IN POLAND

Study participants were offered to run a thought experiment: they were asked to draw the front page of a newspaper from 2034. The date was symbolic: it was exactly 10 years from the time of the discussions and simultaneously, the planned date for the commissioning of Poland's first nuclear power plant.

FIG. 17 **NUCLEAR POWER IN POLAND 10 YEARS FROM NOW**



THE TOPIC WILL ONLY GROW IN IMPORTANCE WITH TIME.

GREATER PRESENCE OF THE SUBJECT IN THE DEBATE MEANS A HIGHER LEVEL OF KNOWLEDGE AND AWARENESS

SOURCE: own study.

The vast majority of study participants designed covers that referred directly to the topics discussed in the meetings, but the ideas expressed in the drawings varied between the age groups:

1. THE GROUP OF THE OLDEST PARTICIPANTS WAS MOST OPTIMISTIC

In their works, the first nuclear power plant has just begun operating, and more NPPs were under construction and in the pipeline. They accounted for advances in nuclear technology and the next generation of reactors. Technooptimism of this age group seems to be directly related to what they mentioned in the meetings: **over the** course **of their lifetime**, **they have witnessed a remarkable technological and digital revolution**. Things they had never even thought possible when young adults are now the norm and are advancing further.

To some extent, this is probably also wishful thinking: during the meetings, they often mentioned their legacy and the world they want to leave to their children and grandchildren. Evidently, they associate nuclear power with progress and a better future: cleaner air and cheaper energy.

"We got it! The country's first nuclear power plant is up and running".

"We finally have our nuclear power plant in Poland".

2. THE GROUP OF RESPONDENTS BETWEEN 30 AND 60 YEARS OF AGE WAS THE LEAST CONSISTENT

In their works, the first **nuclear power plant was either already operating or ... a delay in** its commissioning **was announced once again.** A few bitterly reported that construction was still underway, a few that the project had regressed: the safety of the planned facility was still being debated, or studies were being conducted to find a suitable location. It may be incurred from their interventions during the meetings that their attitude results from extending their diagnosis of the present pervasive impossibilism surrounding nuclear power in Poland into the future.

3. THE YOUNGEST AGE GROUP WAS MOST PESSIMISTIC

"Unbelievable that everyone was so afraid 10 years ago! Meanwhile, a great success was achieved: lower energy bills, cleaner air, plenty of new jobs created..."

"Barbara J. went missing under unexplained circumstances. And here we have the whole front page of the newspaper about this event and here, in the corner, there is a tiny mention of the nuclear power plant".

The dominant opinion in this group was that... **nothing will have changed by 2034**. The covers they designed focused on the ongoing public consultations for the nuclear project, debates on whether the NPP built is indeed necessary, advantages and disadvantages, safety. Only a few of the members of this group thought that a nuclear power plant would be in operation in Poland 10 years from now.

What transpires from their works is a blurred picture: it is not clear whether this group never feels adequately prepared to take action, or whether their attitude is to be understood as a bitter diagnosis of the executive and decision-making paralysis they observe.

"Referendum on the built was negative. Electricity prices went up, investors are fleeing the country".

"The topic of the nuclear power plant hits the news. Chernobyl's big comeback. Is it worth it for us".

All three age groups seem to come together at another point in the survey: they believe that in 2034 the topic of nuclear energy will be much more prominent and widespread than it is today in the media and elsewhere, which will translate into an increase in knowledge and awareness of the public.

"More awareness for sure. So I think already more people will be in favor of it."

Each group - including the most skeptical groups of people under 30 - mentioned the generational change that is taking place. They claimed people younger than them will not be afraid of the nuclear technology, and that the Chernobyl disaster will in the near future become nothing but an anecdote, a story known from pop culture and history books.

A major constraint and a problem that will remain relevant 10 years from now, according to study participants, will be the length of public consultations, arrangements and decision-making processes, which do have a discouraging and demoralizing effect on the public opinion.

3. WORKSHOPS WITH REPRESENTATIVES OF COMPANIES OPERATING IN THE POLISH ENERGY SECTOR

In the light of the results of the qualitative research conducted in Opole, the conclusions from the workshop that was organized under the DEsire project with another specific group of Coal-to-Nuclear stakeholders, namely Polish industry representatives on April 11-12, 2024[64] are interesting. Participants in the workshops included representatives of Polish companies and institutions working in the Polish energy sector, but who were not technology providers or potential investors. The meetings, centered on the topic of "Identification of stakeholders in the Coal-to-Nuclear projects as well as areas of cooperation among them," had the form of a moderated discussion. The group, moderated by one of the Sobieski Institute experts, consisted of 15 people. The purpose of the discussion was to explore three main areas:

I. companies and institutions involved in the Coal-to-Nuclear investment process and their respective roles;

II. attitudes towards the Coal-to-Nuclear pathway, level of knowledge about the technology itself and about its role in Poland's energy transition;

III. willingness to support other stakeholders in Coal-to-Nuclear investments and openness to multi-level cooperation.

3.1 PARTIES TO THE COAL-TO-NUCLEAR DEBATE AT THE NATIONAL AND LOCAL LEVELS

Participants in the discussion were asked the following questions:

- Who are the socio-economic stakeholders in the debate around Coal-to-Nuclear at the national and local level?
- Who should participate in this debate?
- Who is particularly important in this debate?

In response to the above questions, workshop participants created an extensive, though not exhaustive, list of stakeholders in a potential nuclear power plant built or repowering project with the use of a nuclear reactor, without accounting for at this stage the specifics of a location for such an investment.

This list included regulators (the National Atomic Energy Agency, grid operator), the central administration which designs the legal framework and defines strategic directions for energy projects implementation in Poland, chambers of commerce, as well as the academics (a pool of experts) from among whom "ambassadors" for such projects can be recruited.

64 Seminarium DEsire 11 – 12 kwietnia 2024, https://projektdesire.pl/seminarium_desire_kwiecien_2024/.

As representatives of the Polish energy sector, the participants paid a lot of attention to **trade unions and labor representation active in the energy industry**, **as well as to special interest groups** such as farmers and miners, represented at all levels of decision-making processes, including at the European level.

When descending to the local level, participants emphasized the significance of such actors as members of the local government administration, including the often overlooked and underestimated lower-level administration officials whose cooperation is crucial to the success of the project. Local authorities, as well as Members of the Parliament and other politicians of the national level active and interested in the developments in their region, were also listed.

Residents and representatives of local communities, including representatives of local civil society, were considered an important group of stakeholders - the largest part of the discussion centered on them and their perception of the project. According to workshop participants, it is necessary to create a direct channel of communication with them, since the acceptance of the investment by this group determines the possibility of implementing the project at all.

Identified stakeholders:

- regulatory and supervisory authorities (the National Atomic Energy Agency, grid operator, General Directorate for Environmental Protection et al.);
- central government bodies;
- chambers of commerce, including local and regional chambers;
- the academic and scientific community;
- trade unions and labor representation;
- organized special interest groups, such as farmers;
- local government bodies, including lower-level officials;
- active and locally oriented Members of the Parliament;
- civil society representatives at all levels: local, regional, national, including opinion leaders.

Workshop participants proved to be keen observers of investment processes executed in Poland, including of the nuclear project in Pomerania, which translated into their heightened awareness of the importance of the public sentiment, especially local sentiment, to the success of these projects.

They recognized the risks associated with what they described as "inadequate and disorderly communication," without making no distinction between "communication" as a corporate process and "stakeholder engagement," which are not identical terms. Participants in the discussion have taken note of **the current trend** in which local communities and indirect **stakeholders** (*according to the IAEA's definition, a stakeholder in a nuclear project is any person or group that, according to their own perceptions and beliefs**,** is or could be affected by the implemented investment and so have an interest in it) **are seeking empowerment as parties to the investment processes, gaining agency and impact on decisions made whenever possible**. Observations by industry practitioners show that in situations **where such partnerships fail to form**, the stakeholders feel disregarded and disrespected, these negative emotions leading to organization or complacence with active to activation - to the detriment of the investment - of its opponents (the example of Gąski).

They also observed that making the debate on nuclear political has never done any good to nuclear investments, this politicization being understood in two ways:

1. making nuclear part of an election campaign and playing on the current moods of the local community (the example of Pomerania, where the governor of the voivoidship suggested the possibility of cancelling the administrative decision and "moving" the nuclear investment out of Choczewo to Zarnowiec),

2. choosing controversial political "ambassadors" for nuclear in the area (the example of Antoni Macierewicz, who promoted the construction of a nuclear power plant in Belchatow). Their intuitions are thus consistent with the opinion expressed by the residents of Opole during the quantitative study.

3.2 SOCIAL ACCEPTANCE OF THE COAL-TO-NUCLEAR PATHWAY

Next part of the workshop focused on gaining public acceptance for the Coal-to-Nuclear pathway. Participants were asked the following questions:

- What was decisive to the success of public acceptance for large nuclear power in Poland?
- Can this success be replicated in the Coal-to-Nuclear regions, including for Coal-to-Nuclear using SMR reactors?
- What will it take to repeat it?
- What will be the similarities and differences?
- Can Coal-to-Nuclear be part of a just transition?

Participants in the meetings proved cautiously optimistic in this regard, identifying the following conditions for the success of the venture:

1. implementation of a whole series of well-thought-out and coordinated education, outreach, information, communication and stakeholder engagement activities that as of now are clear to be necessary in the light of lessons learnt from the nuclear project underway in Pomerania;

2. effective learning and implementation of lessons learned from past experience from nuclear investment processes.

Above all, however, they pointed to the need for an early, intensive, coherent and consistent public information and communication policy, which, again, they equated with clear communication and cooperation with project stakeholders. They believed that this is the only way to effectively prevent tensions and resolve conflicts: by building lasting partnerships that allow for open communication on an equal footing and for the concerns, objections and reported issues are taken seriously and given due consideration, and the investor responds appropriately by changing and adjusting its actions. By creating a safe space for stakeholders to express their opinions, a sense of empowerment and agency is built in them, which translates into increased mutual trust.

Representatives of the nuclear regulator and other regulatory bodies should take an active part in the discussion on the safety of nuclear power. Their task is to build public awareness of their role as safety watchdogs overseeing investment processes and applying the strictest national and international requirements.

Workshop participants also clearly saw the crisis of authority, which adds to the complexity of conducting information, education and communication activities: experts do not reach the public with their arguments, because they are not able to get through to them with their message. And when they do get through, they are sometimes treated with suspicion, as people who may have an interest in lobbying for a particular solution. Meanwhile, people with only some superficial knowledge of the subject become authorities for various groups only because they knew how to gain notoriety. Workshop participants noted that the public often confuses facts with opinions, because the latter, using accessible language and emotional appeal, are easier to remember and faster to assimilate. This in turn translates into how various technologies, including nuclear power, are perceived and to opinions such as "nuclear power always leads to disasters" being treated as facts, which perpetuates myths and hinders real, fact-centered debate. In this regard, participants noted the need to teach and encourage the public in general to think critically and distinguish between objective information and subjective assessments.

According to participants, public debate must clearly separate scientific data from opinions, and use accessible language that can be understood by a wide audience. One of the solutions that may be put to work would be, as they suggest, creation of an expert platform that can and will evaluate the investments and inform about them in an accessible and neutral way, and without seeking to gain anything from doing so.

3.3 RECOMMENDATIONS ON COMMUNICATION AND INFORMATION POLICY

1. Communication and information projects implemented so far at the central level need to be significantly expanded on, deepened, and - optimally - run on a permanent basis. It is worth considering, for example, a follow-up campaign to "Rodzina Atomickich" ("The Atomckis Family") by the Ministry of Industry, or a continuation, expansion and greater promotion of this campaign, including through the use of a wider range of tools and media channels (including, for example, outdoor campaigns or documentaries, popular science books, etc., created in cooperation with partners to use their promotional and distribution channels). Potential investors in nuclear projects, including those on the Coal-to-Nuclear path, should not only join activities conducted at the central level, but also duplicate them at the local and regional levels, in potential locations, involving local partners.

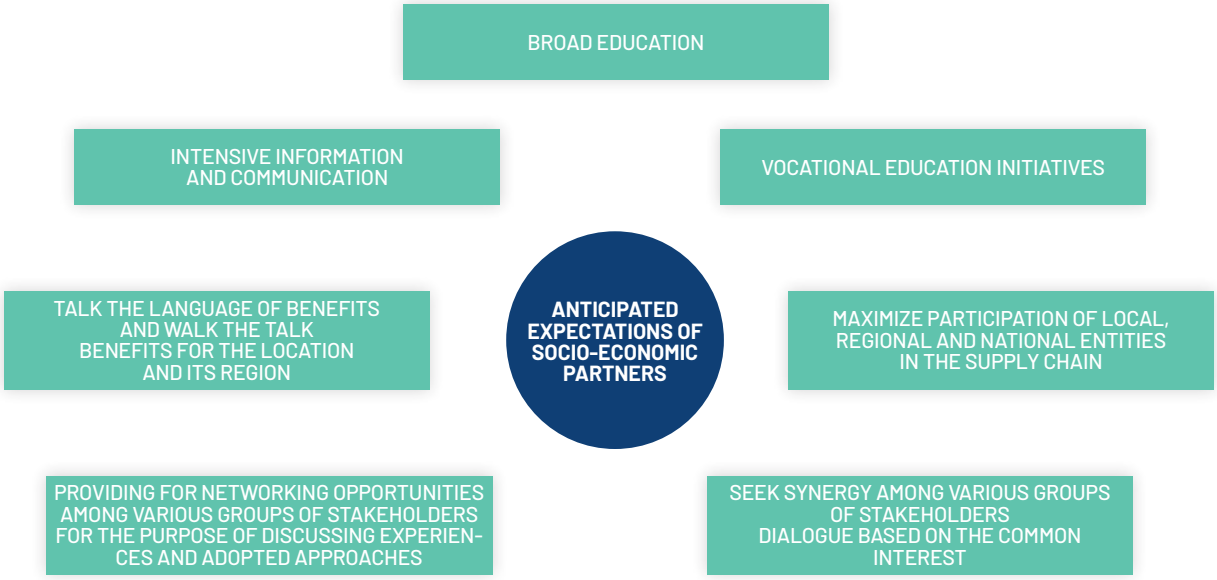
2. Comprehensive coverage of nuclear safety and radiological protection issues must be part of ongoing information and communication activities. In addition to nuclear safety and radiological protection, it is important to emphasize the role of nuclear power in raising the level of Poland's energy security, which is a key aspect for understanding the context of the technological change underway and an important argument for most audience groups.

3. It is necessary to highlight the role of the National Atomic Energy Agency, or the nuclear regulator, as an independent watchdog of safety and as an expert body. It is thus necessary to expand and rethink communication and information policy implemented by the nuclear watchdog as an expert body.

4. It will be beneficial to create an expert platform that will be seen as independent from the industry itself and will serve as a neutral, advisory, evaluative and informative voice, and that is neither the regulator nor the watchdog as the National Atomic Energy Agency is. Such an expert body convened *ad hoc* has already once supported the community of Różan to vet information provided by the operator of the radioactive waste repository. The National Center for Nuclear Research, the Institute of Chemistry and Nuclear Technology, any of the technical universities running education programs in nuclear power, as well as associations such as the Association of Ecologists for Nuclear Energy SEREN will do well in the role of coordinator of such a platform due to their reputation as unbiased, science-based entities.

5. Communication and information policy implemented by all entities involved in the execution of nuclear projects, including nuclear projects on the Coal-to-Nuclear path, should be coordinated for consistency of message at the central level. Key in this regard will be cooperation between the ministry responsible for nuclear power in Poland, i.e. the Ministry of Industry, and the ministry controlling the entities from among which investors will be recruited, i.e. companies controlled by the Treasury of State.

FIG. 18



SOURCE: OWN STUDY.

3.4 EXPECTATIONS OF THE SOCIO-ECONOMIC PARTNERS TOWARDS A COAL-TO-NUCLEAR INVESTMENT

Workshop participants, as employees of entities operating in the energy sector, voiced a number of expectations towards the Coal-to-Nuclear project investor and technology provider. These expectations, however, were neither exorbitant nor particularly different from the expectations we face in the case of "large" nuclear power. This means that most of them are, so to speak, "implicit," that is, an inherent part of running a nuclear program in a country developing this sector.

These include the following:

- consistent, proactive communication focused on providing high-quality information, pointing out the economic benefits of the investment, open communication on project progress and achievement of subsequent project goals; consistency of the nuclear power narrative in communication efforts by representatives of both large nuclear projects and SMR projects (e.g., stressing that both full-scale and small modular reactors are safe);

- educating on nuclear energy a variety of age and social groups: from child to adult;

- creating initiatives to support professional development and acquisition of skills needed in the nuclear power sector following the British model; it can be concluded that this expectation refers to initiatives such as the one run by the French association of nuclear industry players GIFEN (Groupement des Industriels Français de l'Energie Nucléaire[65]) or by the British Destination Nuclear[66];

- striving to maximize participation of Polish companies in the nuclear supply chain, including promoting them and promoting the idea of boosting the local content i.e. delivery of supplies and services for the nuclear project by the Polish, including local, companies in as large of a share as possible, as well as presenting their experience and openness to cooperation in a positive light;

- explaining the importance of the project for the region in the context of the necessary energy transition;

- creating opportunities for networking among various stakeholder groups through conferences, open meetings, workshops, study tours to existing nuclear facilities, etc.;

- seeking synergies and identifying shared interests among different stakeholder groups, e.g. outlining how in the case of an economic crisis, the local government and the investor will have a common interest.

The discussion of expectations took place organically and went in the direction of critical assessment of the **mistakes made so far** and of what, in the eyes of workshop participants, should not be repeated so as not to jeopardize project implementation. Remarkably, **this part of the discussion focused precisely on the social aspects related to communication and stakeholder engagement, again put together**.

65 Groupement des Industriels Français de l' Energie Nucléaire, https://www.gifen.fr/travailler-industrie-nucleaire.
66 Destination Nuclear, https://www.destinationnuclear.com/.

Such identified errors were:

- insufficient openness and transparency of information policy;
- insufficient engagement with the local community and treating then as an obstacle rather than a partner in the project;
- failure to provide safe space for expressing negative emotions, concerns and opposition for the local community and more broadly;
- inadequate response to safety and security concerns at the national and local levels. This may lead to a situation where simple information on the implementation of standard safety and security procedures, or development of contingency and emergency plans, are treated as confirmation of fears and contribute to increased levels of anxiety;
- insufficient communication about the benefits of nuclear investment;
- **marginalizing/dismissing the topic of nuclear power plant accidents.** According to workshop participants, presenting the nuclear power plant project as completely safe and without negative consequences can lead to a drop in public confidence, especially taking into account the need for active community participation in the process of developing and implementing emergency plans, including evacuation plans. Failure to service this topic adequately translates into fears of other aspects of nuclear energy application, such as exaggerating the threat from radioactive waste.

All workshop participants agreed that communication and social aspects are crucial to nuclear projects and can either make them or break them.

Industry representatives turned out to be well informed and have an in-depth understanding of the public sentiment towards nuclear, and their observations were largely confirmed by the residents of Opole taking part in the qualitative study, especially where they discussed their expectations on the information and communication policy regarding nuclear projects in Poland.

3.5 RECOMMENDATIONS ON MANAGING INDUSTRY EXPECTATIONS TOWARDS INITIATIVES ON THE COAL-TO-NUCLEAR PATHWAY

1. Communication around Coal-to-Nuclear investments, carried out by all entities involved in their implementation, must be similar to communication around full-scale nuclear power, and therefore guarantee access to reliable, verifiable and easily accessible information. It must also take into account the key message that is that development of the new industry that nuclear power sector will be in Poland, is a crucial part of building the resilience of the Polish, but also of the European economy.
2. Polish government should strive to promote the participation of Polish companies in the supply chain for nuclear investments, including, in particular, projects on the Coal-to-Nuclear path. Their activities should

involve promoting the Polish industry and seeking to boost local content, i.e. share of supplies and services provided by the Polish, also local, companies, and portraying Polish suppliers in a positive light.

3. Extensive efforts are needed to find synergies between the conventional and nuclear energy sectors, and competencies and skills transferable between these two industrial branches must be identified.

3.6 SWOT ANALYSIS FOR COAL-TO-NUCLEAR

The workshop included development of SWOT analysis for Coal-to-Nuclear investment from a business perspective in the context of the challenges of energy transition. The questions identified were qualified as belonging to one of four key areas of the SWOT analysis.

SWOT analysis developed by the workshop participants for the Coal-to-Nuclear pathway shows that they consider its execution potentially beneficial.

This is indicated by the number of opportunities they identified - that is, benefits that, with the right approach and management, could materialize if it is implemented. Workshop participants see there is an opportunity to build nuclear facilities, for example, in Silesia, and avoid the ritual cries over destruction of the landscape and public reluctance to the appearance of an industrial facility in their neighborhood. Silesia was cited as an example of a highly urbanized and industrialized region that could potentially benefit from embarking on the Coal-to-Nuclear path.

S for STRENGTHS

- Zero carbon emissions,
- Existing infrastructure left by coal-mining and coal-fired power plants,
- Grid ready to evacuate power,
- Stable energy source for an energy-intensive region,
- Existing human capital,
- "Push" for investment - the need to build a stable and emission-free source of energy,
- Constant high energy demand that justifies the supply;

W for WEAKNESSES

- Land not prepared for investment, e.g., the cost of preparing "brownfield" areas for the Coal-to-Nuclear investments can be significantly higher than preparing "greenfield" areas.
- Lack of currently commercially available "ready to build" solutions means potential problems associated with demonstration and First-of-a-Kind projects,
- Staff shortages - the nuclear sector in Poland is not yet developed, for Coal-to-Nuclear pathway even more so,
- Lack of Polish technology means that the cash margin feeds foreign pockets,
- The need to create a large buffer for CAPEX and OPEX;

O for OPPORTUNITIES

- Financial benefits for the region,
- Development of the city and its region, preventing labor migration to other parts of the country and abroad,
- Market development due to demand for local manufacturers and suppliers,
- In heavily industrialized regions, such as Silesia, residents are used to industrial facilities, so it may be easier to get their approval for the construction of another one,
- Gaining experience as pioneers of a certain technology/solution at the European level,
- Full-scale nuclear power paves the way for SMRs and other nuclear technologies,
- "Trendsetting" generating political and social demand ("everyone goes nuclear"/"SMRs are in"),
- The need for energy transition in the region,
- Continuous dialogue with the regulator allows for improvements and the required changes in the legal framework,
- DEsire-type knowledge platform - bringing together research and advisory services for all those interested in the Coal-to-Nuclear solutions, i.e. early networking of entities potentially forming a special interest group.

T for THREATS

- Lack of social acceptance for the technology due to insufficient knowledge on the topic and fear,
- Lack of investment opportunities in geologically active regions,
- Demographic decline means high risk of labor shortages, exacerbated further by lack of initiatives aimed at redirecting employees of the fossil-fueled energy sector to nuclear power,
- Pilot solutions are prone to problems,
- The need to adapt regulations to specific conditions of Coal-to-Nuclear investments and current very restrictive legal framework for SMRs,
- High demand for nuclear investment can lead to a "bottleneck" in investment and manufacturing i.e. queues to component manufacturers etc.

At the same time, Coal-to-Nuclear's inadequate handling from a social and communications perspective is considered the biggest threat.

Although, according to the SWOT analysis methodology, threats are external factors over which we have no unquestionable control, workshop participants in the previous part of the discussion made it clear that this is not quite the case: such tools and ways exist and are known to them. These include a consistent, coherent and intensive information and communication policy, education and stakeholder engagement. This should be understood as early cooperation with stakeholders on an equal footing and active response to their needs to build a sense of working towards a common goal. This goal, after all, goes beyond the construction of a nuclear facility within the defined budget and schedule, but encompasses as well - according to the INSAG report - the maximization of safety, which is the main and greatest point of concern among those who remain skeptical about the use of nuclear power in Poland.

3.6.1 RECOMMENDATIONS FROM THE SWOT ANALYSIS FOR THE COAL-TO-NUCLEAR PATHWAY

1. Coal-to-Nuclear pathway creates an opportunity for highly industrialized regions, where resources as the following are already available:

    a. infrastructure that can be repurposed,

    b. human capital worth investing in, and

    c, ready potential markets for the energy produced at nuclear power plants and nuclear cogeneration plants.

2. Conducting outreach, education, communication and stakeholder engagement activities with the same intensity and diligence as in less industrialized regions is essential for public acceptance. The initial assumption that residents of industrialized regions may be more willing to accept nuclear investment still entails a genuine need for appropriate outreach, information and communication activities, since communities in industrialized regions have a high awareness of the benefits they can obtain. It is necessary to take into account the needs and concerns of specific special interest groups, which have proven record of mobilization and impact on investment decisions.

4. SUMMARY

Poland as a country entered the "atomic age" at its very beginning. In 1958, in a special center created near Warsaw, the first nuclear research reactor EWA of a Soviet design went into operation. It worked for thousands of hours without failure and helped to raise and educate entire generations of specialists. Shut down 1995, EWA was replaced by the Maria reactor, which was put into operation in 1974. It continues to operate today, and is operated by the National Center for Nuclear Research. It is where scientific research is conducted and radioactive isotopes widely used in medical diagnostics and for cancer therapies are produced daily.

Few people know that there is a nuclear reactor operating just 25 kilometers from the heart of Warsaw. Few know the history of the Polish nuclear research and sciences or realize that Poles were among the first in the world to implement processes of safe radioactive waste management, including storage and disposal at the National Radioactive Waste Repository in Różan, launched in 1961.

Nuclear power in Poland is still absent from the energy mix. Over the past decade, a number of entities and institutions have made a major communication and education effort in this regard. Unfortunately, in light of the material gathered during the research under the DEsire project, it has become clear that this is still too little, by far.

The high declarative support for nuclear power in the country seems to be largely a question of circumstances, the support for it or opposition thereto tied to the image the respondents have of themselves and of Poland. This is clearly indicated by the arguments they list as most convincing:

- The need to close the technology gap with other countries;
- The need to maintain energy independence;
- the need to move away from fossil fuels for climate reasons;
- and - on the other hand - it's too complex of a task that we are not competent enough to handle.

What emerges from these arguments is a picture of people convinced of the need to implement nuclear power rather than of its advantages. Therefore, **even though Poland has never been among the starkly anti-nuclear countries, this fact is rather proof of a certain independence of thought among Poles cautious about fashions and trends in the Western Europe than proof of a stable endorsement for nuclear power**.

The **declaratively high level of support does not translate into a desire to be an immediate neighbor of a nuclear power plant, even if it were to replace a conventional plant standing right over the fence**.

Technical issues seem to be of secondary importance here. A full-scale nuclear power plant, SMR or Generation IV reactor is, and will be for a long time to come, a social revolution in Poland, not an evolutionary response to the modern environment.

Fears related to implementation of a new nuclear technology (SMRs or Generation IV reactors) will be a proxy reaction, stemming from not having sufficiently rationalized and diffused fears about the safety of those reactors that our Czech, Slovak or other European neighbors have been operating for years without issues. This can always be seen when, having answered all questions about human and environmental safety, the study participants, still unconvinced, start multiply causes for concern, this time usually about radioactive waste and spent nuclear fuel management.

The construction of Poland's first nuclear power plant in Pomerania began more than a decade after the announcement of the intention to conduct site investigations in Choczewo and at a time of a general increase in support for nuclear assigned to turmoil on the global fuel supply market and sharp increase in electricity prices. Nevertheless, the initial approval of the locals for Choczewo investment seems to have somewhat faded with the passage of time.

4.1 SUMMARY OF FINDINGS

KNOWLEDGE OF OPOLE RESIDENTS

Knowledge about nuclear energy, the Polish nuclear power program or the context of the decision to implement nuclear in the country is very low. Survey participants attribute responsibility for this state of affairs to the insufficient coverage of nuclear energy by the media and its scarce presence in the public debate, to poor access to reliable sources of information, and inadequate education, both at school and later.

Part of what they claim to be their knowledge on nuclear is a deeply held but false belief that nuclear energy is dangerous. This may be the effect of a cognitive bias that leads people to consider phenomena that are easier to imagine (because they have happened before or are often mentioned in the media) as more likely to happen. The availability heuristics in question strongly impacts perceptions of nuclear power, mainly due to the Chernobyl disaster and the media's tendency to cover extensively nuclear disasters and accidents. Increasing the availability of positive and reliable information about nuclear power could effectively counteract the dominance of negative associations in the public consciousness.

At the same time, it is important to note the human tendency to attach great importance to the information heard first and relate all information acquired afterwards to it. The mechanisms of the *primacy effect* and *anchoring effect* make it more difficult for factual information to be considered credible if false information has spread first. Therefore, **systematic work on raising the level of knowledge can be an effective means of preventing the spread of mis- and disinformation**.

OPINIONS AND ATTITUDES OF OPOLE RESIDENTS

As the diagnosis shows, emotion-based associations with nuclear power, mainly fear, are still the strongest. The most common and the strongest association is the Chernobyl disaster. Much work is still required to redirect public attention to the positive aspects of nuclear power plant operation.

Certainly, safety should be at the center of all educational campaigns.

Other negative associations with nuclear power include spread of the ionizing radiation outside of the NPP site, risk of attack, water consumption and destruction of the landscape.

Nonetheless, nuclear power evokes a lot of positive associations as well - clean air and environment, lots of energy and lower energy prices, technological progress, catching up with the developed economies.

Three main attitudes towards nuclear power were defined in the survey:

- **People declaring neutrality:** people who feel highly uninformed and express a need for more knowledge. Potentially, they will be the willing addressees and recipients of an educational campaign, and their attitude may shift into positive and supportive. At the same time, these people can easily become opponents of nuclear power if they feel their need for information is not adequately addressed by the investor and public administration.

- **Supporters:** these people recognize the inevitability of the energy transition and are convinced that nuclear technology should be part of it. They actively seek information about nuclear power, trust the science and believe in technological advances (also the increasing safety of nuclear technology). However, they are not without concerns about the safety of a nuclear power plant, so they would be attentive recipients of an educational campaign.

- **Opponents:** this attitude was most clearly present in the group of respondents between the ages of 30 and 60. These were the people holding vivid memories of the Chernobyl disaster and very anxious about their future. They are skeptical of progress and have little trust in all the assurances about the safety of new nuclear solutions. They are particularly worried about the large investment costs associated with nuclear power plant and about the enormous organizational effort required for the success of the project. They doubt in Poland's and the Polish people's ability to plan and effectively implement nuclear power plans in Poland. They will be the main target group of the educational campaign.

CONSTRUCTION OF NUCLEAR POWER PLANT IN OPOLE IN THE EYES OF THE RESIDENTS

Possible construction of a nuclear reactor in Opole was met with noticeably less enthusiasm than the construction of a nuclear power plant elsewhere in Poland, which clearly indicates the existence of the NIMBY (*not in my backyard*) phenomenon that accompanies all large investments, specially energy investments. Study participants list a number of concerns related to such construction project:

1. Will the technological shift from coal to nuclear be carried out in a coordinated manner so that the workers are not left without support?

2. Has care been taken to properly train the staff to manage and operate the nuclear power plant so as to ensure the safety of the nuclear project?

3. Won't the large investment required to run a nuclear project impact the State's budget and household budgets negatively in the short term?

4. Is the plan for nuclear waste management known?

Survey participants identified two clear conditions that will be key to public acceptance of the Coal-to-Nuclear project in their city:

1. "OUR VOICE MATTERS"

Study participants want to be aware of the decisions being made, especially since these decisions will affect their immediate environment. Participants would like to take part in the consultation process, and get reliable and credible information in its course. This will increase their sense of safety and security.

Emphasizing stakeholder engagement and communication in nuclear projects must translate into organizational arrangements and sanctioning them in the corporate integrated management systems as legitimate processes requiring adequate resources. All nuclear project developers must be aware of this. According to IAEA documents, activities in the areas of outreach, education, information, communication and stakeholder engagement should be carried out throughout the lifecycle of a nuclear project, including when interest in a facility's operation in local communities and beyond fades away.

2. TALKING THE LANGUAGE OF BENEFITS AND WALKING THE TALK

All the groups make a clear suggestion: the plan for a possible nuclear built in Opole will be seriously considered only when city's residents get a clear receive clear message on how they and the city itself will benefit from its execution. Flaunting the benefits and sticking to the facts can, in the opinion of survey participants, be an effective tool for rationalizing and dispelling fears, including those about safety.

HOW TO TALK ABOUT NUCLEAR POWER

Both qualitative research participants and workshop participants discussed at great length what they called communication and its importance for nuclear projects. As defined in the *2014* document *Communication and Stakeholder Involvement in Environmental Remediation Projects*[67], communication, education, information, identifying stakeholder needs, consulting with stakeholders, negotiating, involving them in decision-making processes, building relationships, partnerships and consensus are all *nuclear stakeholder engagement* activities, the depth, intensity and nature of which change depending on the stage of the project and, unsurprisingly, the needs of both the project and its stakeholders.

In order for these processes to fulfill their purpose and support all parties in achieving a common goal, they must be properly accounted for in legal regulations and requirements or recommendations issued by the nuclear regulators. Above all, they must be embedded into organizational structures of nuclear project implementers. This is clearly not yet the case in Poland and it's time for all parties involved in the implementation of the Polish nuclear program - those operating now and those who will be active in the future - to rise to the challenge.

Although the participants in the studies and workshops did not mention this explicitly, it is quite clear from their interventions they knew full well that approval that transforms into active cooperation on the part of the local communities often were "the make it or break it" for the nuclear projects. In order for their decisions to be more often "for" and not "against" a nuclear project, both the societies at large and local communities must not feel that they are a nuisance, an obstacle to a beautiful nuclear future but that they are this future's co-hosts.

67 *Communication and stakeholder involvement in environmental remediation projects*, IAEA Nuclear Energy Series No. NW-T-3.5, Vienna 2014, https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1629_web.pdf.

Given the low level of trust in central-level politicians, they should not be prominently featured in educational campaigns for nuclear power. Study participants expressed a wish for public consultations and discussions on the construction of a nuclear power plant be undertaken by the head of the city, the mayor, accompanied by experts and scientists.

4.2 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The data collected in the report shows that the high support that Poles declare for the implementation of nuclear energy in the country does not translate into uncritical enthusiasm for the implementation of nuclear investments in specific local communities.

Reservations in communities without experience with nuclear power, such as Opole, are most often about the safety of applying the new technology. In contrast, experience from nuclear projects around the world and the experience from Pomerania show that even when these fears are overcome through education and communication activities, the practical aspects associated with the implementation of a large infrastructure investment and the upheaval it brings to the daily routines of local residents can become problematic.

For the success of nuclear projects in Poland - including those on the Coal-to-Nuclear path, which brings nuclear investments closer to large concentrations of people like towns and cities - it is necessary to develop and implement specific participatory mechanisms for local communities. Such mechanisms allow residents to retain a sense of agency and control over their environment.

Building the sense of agency and empowerment among local communities and sharing responsibility for the investment and then operation of the facility at the local level are a way to reduce risks and burdens for everyone involved.

Accordingly, the resulting recommendations from the report are divided into several categories:

1. In-house know-how and resources;
2. Education;
3. Communication and information policy;
4. Stakeholder engagement, cooperation, partnerships;
5. Regarding industry expectations for the Coal-to-Nuclear path.

Activities in each of these categories should be carried out on two levels:

- national and central - by the public administration bodies responsible for the introduction of nuclear energy into the Polish energy mix and the ministry responsible for overseeing the State-owned companies from among whom investors in nuclear projects, including projects on the Coal-to-Nuclear path, will be recruited;

- regional and local - by potential investors and their partners with the support of entities, institutions and organizations at all levels, including the central one.

In principle, the recommendations for communication and stakeholder engagement activities are addressed at all entities involved in the Polish nuclear program and other nuclear projects, including those on the Coal-to-Nuclear path. From the perspective of specific entities, the difference will lay with the geographic scope or depth of involvement, which is consistent with the logic of the IAEA recommendations in this area.

Communication and stakeholder engagement as processes must be carried out throughout the life of a nuclear facility. All entities involved in the implementation of the Polish nuclear program and other nuclear projects, including those on the Coal-to-Nuclear path, have an important role to play in them, and there is a need to seek synergies and coordinate activities, especially communication. Thus, far-reaching cooperation and sharing of information is required.

Recommendations in full can be found in the relevant sections of this report, and a summary is provided below.

SUMMARY OF RECOMMENDATIONS FOR IN-HOUSE KNOW-HOW AND RESOURCES

1. Careful analysis of IAEA recommendations on communication and stakeholder engagement, as well as of best practices applied in other countries and industries must be performed;
2. Outreach, education, information, communiction and stakeholder engagement processes must be embedded in the structures of organizations responsible for the implementation of nuclear projects. Adequate resources must be allocated for their use, including their management by a competent and well-trained staff;
3. The earliest possible launch of outreach, education, information, communication and stakeholder engagement activities for any new nuclear investment is recommended;
4. These processes must be carried out consistently, throughout the life of a nuclear facility, sollowing the stages of the project (siting, construction, commissioning, operations, decommissioning);
5. It should be considered to introduce a regulatory requirement to start and conduct these activities already at the stage of applying for decision in principle, after a thorough analysis of the discrepancies between Polish law and IAEA recommendations.

SUMMARY OF RECOMMENDATIONS FOR EDUCATION

Recommendations in this area are based on the premise, confirmed by the research, that support for nuclear power grows as the level of knowledge on the topic increases[68].

1. Therefore, continuous and consistent educational efforts on a national scale are required and must be conducted:
   a. educational institutions of all levels (primary, secondary, higher education) and subsidized institutions (e.g. SOWA networks and others);
   b. include material and information falling outside of the scope of school curricula and taught in cooperation with NGOs, to be intensified in potential locations;
   c. in direct cooperation with teachers' and academics' self-governing organizations (e.g., Teachers' Labor Union, ZNP) to train teachers and provide them with resources for independent work.

2. Nuclear safety and radiological protection issues must be addressed comprehensively and the importance of energy security must be stressed;

68 J.W. Stoutenborough, A. Vedlitz, S.G. Sturgess, *Knowledge, risk, and policy support. Public perceptions of nuclear power*, „Energy Policy" 2013, no. 62(11), s.176–184, https://www.researchgate.net/publication/262829597_Knowledge_Risk_and_Policy_Support_Public_Perceptions_of_Nuclear_Power.

3. Capacity building plan for human capital and competencies for the Polish nuclear power industry, accounting for professional transitions from conventional energy sector to nuclear power sector, i.e. the Coal-to-Nuclear path, should be developed and communicated widely.

SUMMARY OF RECOMMENDATIONS ON COMMUNICATION AND INFORMATION POLICY

1. Conduct information campaigns on a permanent basis, including, for example, the continuation and expansion of the "Poznaj Atomickich" campaign with the use of new means and channels of communication;

2. Comprehensively cover nuclear safety and radiological protection issues and underline the importance of energy security.;

3. Expand and rethink communication and information policy implemented by the nuclear regulator as an expert body;

4. Create an expert platform as an independent fact-checking institution.

SUMMARY OF RECOMMENDATIONS FOR COOPERATION, PARTNERSHIPS, RELATIONSHIPS

1. Develop and implement mechanisms for direct communication and cooperation with communities of potential locations in order to:
   a. jointly determine the expected benefits and reduce the risks associated with conflicts within the community for the communities themselves, investors and operators;
   b. jointly define how to measure the degree of materialization of these benefits for a given location and its region;
   c. come up with mechanisms to correct the direction of the actions taken, if such a need is raised by either party.

2. Map organizations of nuclear host communities in Europe and encourage communities in potential locations to get in touch.

RECOMMENDATIONS ON MANAGING INDUSTRY EXPECTATIONS TOWARDS INITIATIVES ON THE COAL-TO-NUCLEAR PATH

1. Maintain consistency between communications on Coal-to-Nuclear investments and full-scale nuclear power. Key message: introducing nuclear power to the energy mix is essential part of building the resilience of the Polish and European economies;

2. Provide intensive support for the participation of Polish companies in the supply chain for nuclear investments, including, in particular, those on the Coal-to-Nuclear path;

3. Map competencies and skills directly transferable between conventional and nuclear power.

ABOUT THE AUTHORS AND PUBLISHER

Anna Przybyszewska
anna.przybyszewska@sobieski.org.pl

Project manager and specialist experienced in working in the international R&D, nuclear and RES projects. Graduate degree in nuclear power from the Faculty of Energy and Fuels at the AGH University in Krakow. While working for the National Centre for Nuclear Research, she participated in projects related to nuclear cogeneration and other non-electrical nuclear power applications, Generation IV reactors, and development of requirements for next-generation nuclear reactors. Co-author of reports developed under the ALLEGRO, NC2-IR and HTR-PL reactor initiatives.

Participant of international courses:

Training for foreign young researchers and engineers of Orai Resarch and Develop Center (2015) and Intercontinental Nuclear Institute (2016).

Manager in the DEsire project at the Sobieski Institute.

Urszula Kuczyńska
urszula.kuczynska@sobieski.org.pl

Linguist and economist, she works on the social aspects of energy transition and climate policy.

Associated with the nuclear power industry since 2011, she participated in the development and implementation of a number of communication and education initiatives, including the pioneering Joint ICTP - IAEA School of Nuclear Stakeholder Engagement at the University of Trieste. She also international experience in China. Author of press publications, analyses and reports, as well as the book "Atom for the Climate" (2021, published by Części Proste).

Graduate of applied linguistics at Warsaw University (French and English), foreign trade at the Warsaw School of Economics, and studies in the Chinese language and culture at Zhejiang University of Technology in Hangzhou. Fond of cats, Polish greyhounds and gymnastics as a sport.

COOPERATION

Hanna Uhl
An expert on energy transition and investment financing, with many years of experience in public administration and the private sector. She specializes in raising funds for energy and R&D projects, as well as in issues related to climate policy, energy efficiency and clean air and sustainable transportation.

The Sobieski Institute is a Polish private think-tank whose mission is to "Create Ideas for Poland."

It was registered in 2005 as a foundation, although it began its activities in 2003. Between 2003 and 2010, the Institute published the quarterly "International Political Review". From 2011 to 2015, it organized the annual congress "Poland - The Great Project." In 2017, it organized the edition of the National League of Innovation.

Since 2017, the Institute has placed great emphasis on publication of studies and recommendations aimed at showing how the Polish economy should explore the opportunities associated with the fourth industrial revolution, innovation and new technologies.

The Sobieski Institute also conducts educational activities through the "Academy of Young Experts" project, which supports young people in developing leadership and soft skills. Each edition of the program focuses on a different key issue, responding to the current needs of the younger generation. Now in its 6th edition, the project focuses on the European Union, imparting knowledge and preparing participants for European Personnel Selection Office (EPSO) recruitment processes. The program opens the door to an international career in EU institutions.

It is a unique opportunity to gain practical skills and for professional development at the highest level.

One of the Sobieski Institute's latest projects is the "Sobieski Channel," which we invite you to subscribe to on YouTube. The channel was created for the purpose of leading inspiring conversations on issues important for Poland. It is where interesting people meet in a space dedicated to a meaningful debate.

In its activities, the Sobieski Institute has cooperated with many entities. To date, these include:

- NGOs: Polish Automation and Robotics Forum, Mutual Insurance Support Foundation, Republican Foundation, Jagiellonian Institute, New Confederation, Ambitna Polska, Youth for Poland, Students for the Republic, Konrad Adenauer Foundation, Central European Energy Partners, Sławomir Skrzypek Foundation, Wacław Felczak Foundation, Institute for Foreign Affairs and Trade (Külügyi és Külgazdasági Intézet), Institute for Politics and Society (Institut pro politiku a společnost), The F. A. Hayek Foundation Bratislava;

- corporations: Aiut, Assay Group, Rohde&Schwarz, WB Electronics, Asseco, Samsung, Lotos, Google, Procter and Gable, PWC, Cisco, EY, Phoenix Systems, Uber, USP Health, Fortum, Orange, Energa, Zysk i Ska, Collegium Wratislaviense, 4CF;

- public/international institutions: the Ministry of Foreign Affairs, the European Commission Representation in Poland, the Ministry of Climate and Environment, the Future Industry Platform Foundation, the Agency for Development and Industry, the Stock Exchange, the Bank of the National Economy, the Chancellery of the Prime Minister, the Ministry of Digitization, the Law and Justice Party, the Hungarian Embassy, the Polish Senate, the European Conservatives and Reformists Party, the European Parliament Office in Poland.

For a full list of reports and publications, as well as information about the Institute's activities, please visit www.sobieski.org.pl.

We also invite you to subscribe to the Sobieski Channel on **youtube.com/kanalSobieski**.

Join us - it's worth it!

Decarbonization of the energy sector is one of the most important challenges of Poland's modern energy policy. The Sobieski Institute already analyzed this topic in its 2019-2020 publications SMR for Poland and Nuclear Power for Poland. These activities continue with the involvement in the project "DEsire - Plan for decarbonization of the national utility power industry through modernization with nuclear reactors" and work on the Coal-to-Nuclear (CtN) concept.

The result is a series of coherent analyses devoted to the energy transition in Poland using the

Coal-to-Nuclear pathway, presenting practical solutions to support this process, the implementation of which would contribute to the achievement of decarbonization goals, increase in energy efficiency and security.

Here we present the third report in the series, entitled *Coal-to-Nuclear for Poland. Social Diagnosis*, which focuses on social aspects of the energy transition in Poland and around the world.

The report indicates that since Russia's invasion of Ukraine, support for nuclear energy has increased in both the United States and the European Union. In Poland, as many as 93% of respondents expressed support for this technology. Nevertheless, at the local level,

fears and tensions are observed, mainly due to the lack of effective communication between investors, local authorities and the public. Failure to engage local residents in the decision-making process leads to a sense of marginalization, which fosters distrust and resistance to new investments.In communities with no previous experience with nuclear power, such as Opole, concerns most often focus on the safety issues. Meanwhile, nuclear projects in other countries and the experience of Pomerania show that even after these fears are overcome through education and effective communication, other challenges emerge and are related to the execution of a major infrastructural investment and its impact on the daily life of local residents.

The success of nuclear projects in Poland, including initiatives on the Coal-to-Nuclear path, requires effective participatory mechanisms for local communities be designed and put in place.

They provide residents with a sense of agency and empowerment, allowing to retain control over their surroundings. Creating the sense of agency and empowerment in the local community, as well as sharing responsibility for the implementation and the subsequent operation of the facility, are key to minimizing risks and reducing burdens for all parties involved.

We invite you to read more!

The "Coal-to-Nuclear for Poland" series of reports includes the following publications:

1. National Potential. Coal-to-Nuclear for Poland.

2. Support Mechanisms. Coal-to-Nuclear for Poland.

3. Social Diagnosis. Coal-to-Nuclear for Poland.

WE CREATE IDEAS FOR POLAND

SOBIESKI INSTITUTE

SOBIESKI INSTITUTE
Lipowa 1a/20
00-316 Warszawa
tel.: 22 826 67 47

sobieski@sobieski.org.pl
www.sobieski.org.pl

ISBN 978-83-68374-09-4

@InstSobieskiego
Instytut Sobieskiego
Instytut Sobieskiego
Kanał Sobieski
Kanał Sobieski

KANAŁ SOBIESKI

Material prepared for the research task "Social diagnosis and preparation of analytical materials to support the implementation of the plan to modernize power plants and power units by using nuclear reactors of the III/III+ and IV generation", within the framework of the DEsire Project "Plan for decarbonization of the national energy generation sector through modernization with the use of nuclear reactors", financed by the National Center for Research and Development under the Strategic Scientific Research and Development Work Program "Social and economic development of Poland under the conditions of globalizing markets" GOSPOSTRATEG-VI/0032/2021-00.