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Nuclear Power Investment Decisions in Poland and Legitimacy Theory: Empirical Research Results

Abstract

This article applies stakeholder theory to analyse the decision to invest in nuclear power, examining how such investments can contribute to government legitimacy through public support. The following research hypothesis was proposed: People in Poland have a positive attitude toward the application of nuclear energy for civilian purposes. The study employed a diagnostic survey method (CAWI). The research findings indicated that the respondents had a positive attitude toward the application of atomic energy for civilian purposes, which was not affected by their political preferences. However, public support for investments in nuclear energy has fluctuated over the years, so it may also change in the future and affect the legitimacy of government actions in this area. This paper deals with a matter of topical interest, i.e. decisions to investment in nuclear energy to meet the needs of the zero-emission energy sector. The originality of this study lies in its use of legitimacy theory as a conceptual framework.

Keywords: nuclear energy, low-emission energy sector, public support for nuclear energy, political preferences, legitimacy
JEL Classification: H54, Q42, Q48

Introduction

Decisions on investing in nuclear energy are strategic for the state, as their outcomes will materialise over the long term, whereas the heavy capital expenditure required for such investments must be incurred in advance, which can result in reduced current consumption for the future welfare of the society. According to legitimacy theory, a ruling party's ability to stay in power depends on maintaining the support of its electorate. Thus, it can be assumed that political parties might treat their voters as stakeholders whose needs should be addressed by the ruling party.

If public expectations are the same regardless of the political option they support, it can be expected that any subsequent government taking power will be willing to continue the investments to fulfil their voters' expectations, and will not seek to change the previous government's investment decisions. However, if the expectations of different groups of voters are inconsistent, the implementation of multiyear investments may depend on the stability of power; thus, the longer the period of implementation of the investment, the greater the risk of noncompletion. The present paper presents the results of a questionnaire survey aimed at determining whether people in Poland support the development of nuclear energy and whether this support depends on political preferences. The objective of the paper is to determine – on the basis of the legitimacy theory– whether the expectations of society will encourage decisions regarding the development of nuclear energy in Poland.

Literature review

Energy is sometimes considered the basic unit determining the level of development of civilisation [McElroy, 2010, p. VII]; specifically, the richer a society is, the more energy it consumes [Zweiffel, 2022], and the level of development is positively correlated with the amount of energy consumed [Acheampong et al., 2021; Chen et al., 2024]. Thus, energy security is vital to promote the economic development and social welfare of a country [Alam et al., 2022; Hai, Duong, 2024]. Energy security refers to the unimpeded satisfaction of the demand for affordable energy supplies [Winzer, 2012; Yakymchuk et al., 2022], and nuclear power enhances energy security [Radovanović et al., 2017].

Currently, social, economic and environmental goals need to be balanced, and sustainable development should be pursued [Parris, Kates, 2003]. Energy is also key to achieving sustainable development; the new concept of energy security is becoming more comprehensive and has a lot in common with the concept of sustainable development [Atstāja, 2025; Lee et al., 2016], with nuclear power a source of low-emission energy [Hjelmeland et al., 2025].

The basis of nuclear power is the energy accumulated in the nucleus of the atom. In 1942, the first successful experiment with a nuclear reactor was conducted in the United States by

the military [UChicago News]. Nuclear reactors created for power plants are designed in a completely different way, although the basic principle of their operation, that is maintaining the nuclear reactions occurring in the cores, remains the same. The generation of energy through nuclear reactions is a complicated but very effective process [Strupczewski, 2021], but it is crucial that the safety of the process of generating nuclear power be ensured, which has become even more important since the Chernobyl and Fukushima reactor failures [Lee et al., 2016; Matuszewski, 2016]. Relatedly, societal acceptance is essential for the strategic decision to develop nuclear energy [Elbargathi, Al-Assaf, 2024].

The first research on the possible applications of nuclear energy took place as early as in the 1930 s and concerned the military use of this technology [Bohr, 1932; Heisenberg, 1932]. The Americans were the first to build an atomic bomb, which they used in 1945 on Nagasaki and Hiroshima [Britannica]. The losses that these bombs inflicted were tremendous, and these attacks were later used for the purposes of propaganda in political actions in communist countries [Végsö, 2013, p. 75], including in Poland [Osęka, 2010, p. 129].

There are several generations of nuclear reactors. Generation I reactors were designed for military operations [Zakrzycki, 2012]. Generation II reactors were built on a large scale and served both military and civilian purposes, notably in nuclear power plants, but they lacked safety features [Zheludev, Konstantinov, 1980]. Generation III nuclear reactors introduced enhanced safety, greater efficiency, and sustainable operation; however, their limited military applicability meant they were mainly used for civilian purposes [Goldberg, Rosner, 2011]. Generation IV nuclear reactors, currently under development, have an advanced design and offer an even higher level of safety than the previous generations, as well as the possibility of using different types of nuclear fuel, including spent fuel, as energy sources [Reaktory jądrowe IV generacji, p. 10].

In Poland, nuclear energy is neither used for civilian nor military purposes, and there may be concerns about possible reluctant social acceptance of the use of nuclear energy resulting from the communist propaganda to which Poles were subjected after World War II. The use of nuclear energy for civilian purposes may also face opposition from society due to safety concerns, which may be fuelled by the relatively recent nuclear power plant disasters in Chernobyl and Fukushima [Lee et al., 2016]. On the other hand, the ecological awareness of the Polish society has been fostered for a long time, and European plans related to reducing CO^2 emissions may also shape a positive attitude toward nuclear energy [Lee et al., 2016].

The decisions and activities related to investments in nuclear power plants and nuclear military potential are of strategic importance for the state. Since these decisions are made by the government, the theory of legitimacy and the theory of stakeholders have been adopted as the theoretical framework of this paper. The legitimacy theory is derived from a broader theory of political economy [Deegan, Blomquist, 2006; Deegan, 2014] and assumes the existence of a social contract. If an organisation adheres to a social contract, that is meets the expectations of society, its decisions are legitimised, with society allowing it to continue to operate [Burlea-Schiopoiu, Popa, 2013; Deegan, Blomquist, 2006], but if the social contract

is not respected and the expectations of society are not met, then the organisation is severely punished by society [O'Donovan, 2002]. The government is formed by the specific parties that win the elections. The programme of a political party is a type of social contract between the voters – i.e. the stakeholders – and the party, with the government subject to legitimisation, the decisions taken by the government, including meeting the expectations of the voters, subject to legitimisation, and the supporters of the party acting as stakeholders who grant legitimacy [Suddaby et al., 2017; Szadziewska et al., 2024]. Through the acceptance of party supporters as stakeholders, which is positive legitimacy, the entity subject to legitimisation, i.e. the government, is granted legitimacy, or its legitimacy is reinforced [Kreczmańska-Gigol, Gigol, 2024; Szadziewska et al., 2024]. To remain in power, the government must fulfil the voters' expectations so that the party it represents can gain legitimacy and maintain voters' support [Kreczmańska-Gigol, Gigol, 2024; Tost, 2011] in order to avoid losing power. Social acceptance is essential for the development of zero-emission nuclear energy. Moreover, given the long duration of nuclear investments, it is important to establish whether public support for such investments is high and consistent among the supporters of all parties, as if the ruling party changes, investments may be at risk if the supporters of the new ruling option do not back it as strongly. Thus, it was decided to determine the attitudes of the Polish people toward the development of nuclear energy and the use of nuclear energy for civilian purposes, depending on the political party they support.

Despite the negative impact of communist propaganda and concerns about the safety of nuclear power plants, positive factors, such as the European Green Deal, the pro-environmental attitudes arising from it, as well as the concern for energy security in connection with the ongoing war in Ukraine, seem to prevail. Thus, the following thesis was proposed: Polish society has a positive attitude toward the application of nuclear energy for civilian purposes. An additional research question was also raised: Does the degree of public acceptance of nuclear energy depend on the respondents' political preferences?

The use of nuclear energy in Poland has been discussed for many years, but investments have not yet started. Notably, they require considerable capital expenditure, with a long time required for them to produce effects [Strupczewski, 2021]. The period needed for the investment to be completed makes its success dependent on public acceptance, which is independent of their political preferences. If social acceptance of the investment was linked to political preferences, a change in the ruling political option would threaten its completion, because the ruling party, whose supporters were not in favour of the development of such investments, would most likely want to stop the investment to please its supporters and stay in power for longer. Knowledge of the level of social acceptance for this type of investment can be helpful for making the right strategic decisions concerning the directions of energy technology development, which could increase energy security and reduce emissions in accordance with the goals of sustainable development.

Research methodology

The diagnostic survey method was used to conduct a quantitative study, to which end the author of the paper created a questionnaire as a research tool. The electronic survey was made available to various research groups via the internet, specifically through Google Forms, with computer-assisted web interviewing was used for this study. This method involves holding online surveys using computers or other devices with internet access. This form of online survey has many advantages – it is efficient, saves time, allows for automation and ease of data analysis, and is convenient for both researchers and respondents [Zijlstra et al., 2017]. Unfortunately, the use of CAWI excludes the participation of people who do not have access to the internet. A Likert scale (1–5) with 1 meaning "I completely disagree" and 5 meaning "I completely agree" was used in the survey. A network of social connections and the snowball effect were used to reach respondents [Goodman, 1961; Sęk, 2015], of which 288 responded to the survey.

The Model Multinomial Logit (MNL), which was programmed in Stata, was adopted for conducting this study [Bąk, Bartłomowicz, 2014; Hausman, McFadden, 1984]. This regression model, which is used in econometrics to analyse multiclass classification or selection where the dependent variable has more than two categories, serves to analyse the characteristics of consumers and the impact they have on the choice of specific options [Bąk, Bartłomowicz, 2014].

Research sample

In total, 288 people representing various social groups responded to the survey. The research sample comprised 41% women, 58.7% men, and 0.3% respondents who chose not to provide their gender. The majority of the respondents were aged between 18 and 25 years old (49.3%), and the smallest group comprised those under 18 years (1.1%). The second largest group consisted of those aged between 26 and 35 (22.9%), with the remaining two groups including people aged 36–50 years old (16.3%) and those over 50 years old (10.4%). The structure of the respondents resulted from the imperfection of the snowball effect used in sample selection, as well as the CAWI method adopted, which caused people inactive on the internet to be excluded and should be considered a limitation of the study.

Most of the respondents were people from towns with populations of fewer than 50 thousand inhabitants (35.5%), with the second largest group composed of people from cities with over 500 thousand inhabitants (24.7%), followed by people from cities with populations ranging from over 50 thousand to 100 thousand (11.5%). The other groups included people from cities with populations ranging between 100 thousand and 150 thousand inhabitants (10.8%) and people from cities with over 150 thousand to 250 thousand inhabitants (12.2%), while the smallest group comprised people from cities with over 250 thousand to 500 thousand

inhabitants (5.3%). The division of the sample by the population of the respondent's hometown corresponded roughly to the data concerning the entire population of Poland [Ile osób, 2019; GUS, 30 April 2019].

Table 1 shows the breakdown of the respondents by the political party they support. The majority of the respondents supported the Civic Coalition and the Left, with far fewer supporters of Law and Justice and The Third Way (6.6% each) in the sample, and the smallest group of the respondents supporting Confederation (6.2%).

Table 1. Research group divided by the supported political party

In the next parliamentary elections, I am going to vote for:	Proportion in the research sample in %
I do not know yet	28.6
Civic Coalition (Koalicja Obywatelska)	26.8
The Left (Lewica)	26.1
Law and Justice (Prawo i Sprawiedliwość)	6.6
The Third Way (Trzecia Droga: PSL and Poland 2050)	6.6
Confederation (Konfederacja)	6.2

Source: own elaboration.

Research results

The respondents were asked to answer whether they agreed with the four statements provided. The answers are presented in Table 2.

Table 2. Summary of responses

Statement	1	2	3	4	5
	I completely disagree	I rather disagree	Hard to say	I rather agree	I completely agree
I am in favour of the construction of nuclear reactors in Poland.	0.0208	0.0139	0.0938	0.1840	0.6875
I am in favour of the construction of nuclear reactors in my neighbourhood.	0.0625	0.0556	0.1389	0.2361	0.5069
Nuclear energy is safe.	0.0069	0.0382	0.1424	0.4097	0.4028
Nuclear energy is environmentally friendly.	0.0139	0.0278	0.1944	0.3715	0.3924

Source: own elaboration.

The vast majority of the respondents fully agreed with the statement expressing support for the construction of nuclear reactors in Poland (68.8%), selecting "5". The second largest group of respondents indicated "4," which also showed their generous support for the idea (18.4%). In total, 87.15% of the respondents supported or strongly supported the idea of building nuclear reactors in Poland. Only 6 respondents (2.08%) disagreed completely with

the statement expressing support for the construction of reactors, and 4 people selected "2," which indicated that they were rather not in favour of the construction of reactors (1.39%). The proportion of both of these groups in the sample was therefore minimal, together accounting for 3.47% of the respondents. Those undecided, who selected "3," comprised only 9.38% of the respondents. With regard to acceptance of the construction of nuclear reactors, there were no statistically significant differences between the groups of respondents (divided by age, hometown, gender and political preferences).

Interestingly, the respondents not only supported the construction of nuclear reactors in Poland but also supported the construction of reactors in their neighbourhood, with the latter support only slightly lower than the former. More than half of the respondents selected "5" (50.69%), and 23.61% of the respondents indicated "4." In total, almost ¾ of the respondents (74.30%) supported or fully supported the construction of nuclear reactors in their neighbourhood, with only 6.25% of the respondents not supporting the construction of reactors in their neighbourhood at all, and 5.56% of the respondents not in favour of it. The undecided group accounted for 13.89% of the respondents. It may therefore be inferred that the support for the construction of nuclear reactors among the respondents was very enthusiastic, and even the prospect of having a reactor built in the immediate vicinity of the respondent did not cause a significant drop in support.

Table 3 shows the relationships among the responses given to this question with reference to each group of respondents (divided by gender and political preferences). There were statistically significant differences with respect to the respondents' gender, with women, on average and ceteris paribus, 31% less likely than men to support the construction of a nuclear reactor in their neighbourhood. There were also statistically significant differences among the groups with respect to political preferences, with undecided voters, on average and ceteris paribus, 12.9% less likely than the supporters of the Civic Coalition to be in favour of the construction of a nuclear reactor in their neighbourhood.

Table 3. Impact of demographic variables on the respondent's support for the construction of nuclear reactors in their neighbourhood (regarding the following statement: I support the construction of nuclear reactors in my neighbourhood

Research sample	1 I completely disagree	2 I rather disagree	3 Hard to say	4 I rather agree	5 I completely agree
In the next elections, I am going to vote for the following party:					
Civic Coalition (Koalicja Obywatelska)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Confederation (Konfederacja)	−0.359 (1.597)	−16.958 (2452.616)		−1.423 (1.205)	−1.614 (1.002)
The Left (Lewica)	0.004 (1.179)	−1.981* (1.102)		−0.327 (0.746)	−0.846 (0.693)

cont. Table 3

Research sample	1	2	3	4	5
	I completely disagree	I rather disagree	Hard to say	I rather agree	I completely agree
Law and Justice; the United Right (Prawo i Sprawiedliwość; Zjednoczona Prawica)	0.934 (1.348)	−0.571 (1.340)		−0.013 (1.072)	−0.977 (1.017)
The Third Way (Trzecia Droga: PSL and Poland 2050)	−14.645 (1989.018)	−16.607 (2162.838)		−0.230 (1.069)	−0.540 (0.980)
I do not know yet	−0.250 (1.025)	−2.227** (0.965)		−0.974 (0.688)	−2.041*** (0.643)
Gender:					
Male	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)	0.000 (.)
Female	0.419 (0.710)	1.114 (0.809)		−0.205 (0.470)	−1.155*** (0.441)
Constant	−49.019 (8287.555)	0.524 (7634.954)		14.852 (3681.331)	17.193 (3681.331)
Standard errors are provided in parentheses. Pseudo R^2: 0.11 Observations: 279					

Source: own elaboration.

The overwhelming majority of the respondents believe that nuclear energy is safe (81.25%, including 40.28% fully agreeing and 40.97% rather agreeing) and environmentally-friendly (76.39%, including 39.24% fully agreeing and 37.15% rather agreeing). The demographic groups of the respondents did not differ significantly.

Discussion of the results

The answers obtained from the respondents to questions concerning support for the construction of nuclear reactors in Poland and the construction of reactors in the respondents' neighbourhood allowed for confirmation of the thesis that Polish society has a positive attitude toward the application of nuclear energy for civilian purposes. Support for the construction of nuclear reactors in both cases was very enthusiastic (see Table 2) – the construction of nuclear reactors in Poland was supported by 87.15% of respondents, including 68.75% who fully supported the idea and 18.40% who rather supported it. Only 3.47% of the respondents were strongly or rather against it. Support for the construction of reactors in one's neighbourhood was expressed by a slightly smaller number of the respondents, although it was still very enthusiastic – 74.30% of the participants were in favour (including 50.69% fully supporting it and 23.61% rather supporting it). Only 11.81% of respondents were opposed to the idea (including 6.25% fully against it and 5.56% rather against it), while 13.89% of the respondents were undecided. Thus, the main research thesis was confirmed.

The results of this study are consistent with the findings of other studies concerning support for the construction of nuclear reactors in Poland, which have been carried out in recent

years. In a study conducted by IMAS International in August 2020, 57% of the respondents expressed support for the construction of a nuclear power plant in Poland, 20% were against it, and 23% had no opinion on the topic [Poparcie społeczne, 10 November 2020]. In turn, in a study by Danae carried out in November 2020, over 62% of the respondents were in favour of the construction of reactors in Poland, while almost 32% opposed it, and 6% had no opinion regarding the matter, and more than 46% of the participants in the study had nothing against the construction of nuclear reactors near their place of residence [PAP, 2020].

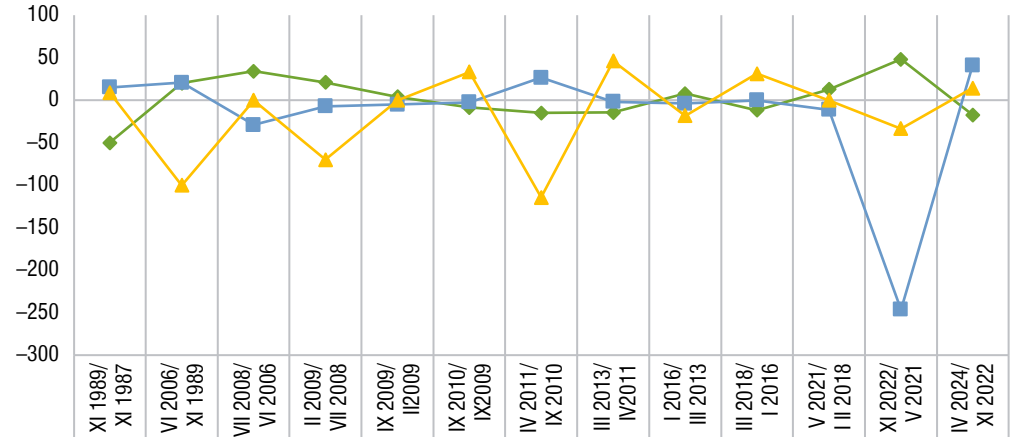
Gender influenced participants' support for the construction of a nuclear power plant in their neighbourhood, with fewer women than men in favour of the idea. The results of the study were consistent with those of the relevant literature [Feliksiak, Roguska, 2024, p. 12], which has demonstrated that one's support for nuclear energy decreases as doubts concerning its safety emerge [Matuszewski, 2016]. A substantial majority of the respondents believed that nuclear energy was safe, which was also confirmed by the results obtained regarding support for the construction of nuclear power plants in the respondents' neighbourhood. Thus, fears expressed in the relevant literature, which are related, among others, to the disasters in Chernobyl and Fukushima [Peycheva et al., 2014], were not confirmed, and the negative impact of communist propaganda from the past was not observed. The overwhelming majority of respondents also believed that nuclear energy was environmentally-friendly, which confirms that environmental awareness in Polish society is growing [Peycheva et al., 2014; Strupczewski, 2021].

According to stakeholder theory, since society chooses the ruling party by casting votes in general elections – that is, through the agency of the voters – society is thus an important stakeholder for the party as well as for members of the government from the ruling party. Thus, the government should strive to satisfy the needs of society, particularly its voters, to obtain – according to legitimacy theory – support for the government's actions and preserve power owing to this legitimisation. Within the framework of activities that are part of the energy development strategy, the government needs to consider the opinions and requests of various social groups [Iwińska, Witkowska, 2016]. Governments are forced to reduce emissions not only because of pressure arising from international environmental protocols, but also because of public expectations [Lee et al., 2016]. In recent years, support for the idea expressed above has been surprisingly high, considering that in studies from the previous decade – as noted by Wątor [2020, p. 490] – it rarely exceeded 40%.

The support of the Polish society for the use of nuclear energy has been measured multiple times, and the results have fluctuated significantly over time (see Figure 1). The first study was conducted in 1987, with the last study one conducted in 2024, and as Figure 1 clearly indicates, support for nuclear power in Poland increased in 2022 after the Russian invasion of Ukraine. However, in a survey from 2024, the proportion of supporters fell (by –17%), and the proportions of opponents and undecided individuals increased (by 41% and 14%, respectively). In the context of stakeholder theory and the theory of legitimacy, such fluctuations may pose a problem for members of the government regarding strategic decisions about investments in nuclear power. Investments in nuclear energy require extensive capital expenditure

and produce effects only after a long period. The relevant literature suggests that there is an ongoing debate about the acceptance of nuclear energy, although limited research has been devoted to measuring the impact of nuclear power on energy security or sustainability [Lee et al., 2016]. This could be the reason behind the lack of well-established public opinion on investments in nuclear energy, as well as its high volatility, and the lack of clear data regarding support for investments in nuclear power may hamper its development.

Figure 1. The dynamics of change in support for the construction of a nuclear power plant in one's immediate vicinity



	XI 1989/ XI 1987	VI 2006/ XI 1989	VII 2008/ VI 2006	II 2009/ VII 2008	IX 2009/ II2009	IX 2010/ IX2009	IV 2011/ IX 2010	III 2013/ IV2011	I 2016/ III 2013	III 2018/ I 2016	V 2021/ I II 2018	XI 2022/ V 2021	IV 2024/ XI 2022
Supporters	–50	20	34	21	4	–9	–15	–14	8	–12	13	48	–17
Opponents	15	21	–29	–7	–5	–3	26	–2	–4	0	–11	–246	41
Undecided	9	–100	0	–70	0	33	–114	46	–18	31	0	–33	14

Source: own elaboration, based on Opinia publiczna o polityce energetycznej. CBOS. Komunikat z badań [M. Feliksiak, B. Roguska, 2024].

In November 2022, 75% of the respondents supported the construction of a nuclear power plant in their immediate vicinity, while only 13% opposed the idea and 12% were undecided. According to the Public Opinion Research Centre (CBOS) [Feliksiak, Roguska, 2024, p. 11], in April 2024, 64% of people supported the idea and 22% opposed it, with 14% undecided. The study presented in this paper was conducted in the spring of 2023, which means that at that time, more than a year had passed since the Russian invasion of Ukraine, which helps explain why the results of the study indicated that the proportion of people supporting building a nuclear power plant in their immediate vicinity was larger than that in April 2024 and smaller than that in November 2022. The energy transition of Poland and Europe cannot take place without nuclear power [Deja et al.; Zweiffel, 2022; Strupczewski, 2021], and the representatives of almost all political groups support the development of nuclear energy [Jakóbik, 2023]. In 2018, the Green Party (Partia Zielonych) opposed the construction of nuclear power plants, while before the 2015 elections, the United Left (Zjednoczona Lewica) and Together

(Razem) were the opposing parties [Tomaszewski, 2023]. Public acceptance is a prerequisite for the development of nuclear energy, because if the government's actions are not granted legitimacy by the voters of the party it represents, it can cause this party to lose in the next elections and be stripped of power.

Summary

The nuclear energy industry aids a country's energy transition in accordance with the principles of sustainable development. Although the relevant literature offers publications indicating some flaws of this type of energy source, including hazards related to the risk of failure and problems with the disposal and storage of radioactive waste, it is still considered environmentally-friendly and safe, which has been confirmed by the results of this study. There is considerable public support for the construction of nuclear power plants in Poland, as well as enthusiastic support for placing nuclear power plants in the immediate vicinity of respondents, although women support this idea less than men, which has also been confirmed by the results of this study. Research shows that support for nuclear energy does not depend on political preferences. However, previous studies demonstrated that the Green Party (Partia Zielonych) did not support the construction of nuclear power plants in China in 2018, and in 2015, this idea was not supported by the United Left (Zjednoczona Lewica) or Together (Razem).

The research that has been conducted indicates high support for nuclear energy among the respondents, which is consistent with the results of previous studies. On the basis of stakeholder theory, it can be assumed that the main stakeholders for a political party are voters. According to legitimacy theory, voters' expectations should prompt political parties – and the government they form – to make decisions consistent with those expectations to obtain legitimacy for their actions. If the voters expect the government to invest in nuclear power, the government should do so to gain their support and retain power. Since there are no differences between the supporters of individual parties in terms of being in favour of nuclear investments, such investments should continue even after government changes. However, some risk stems from the fact that public support for these investments fluctuates considerably, which could cause the government's determination to falter out of fear of changes in voters' support for nuclear energy in the future, as we have already witnessed.

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