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THE EXPERIENCE OF RISING ENERGY PRICES AND ECOLOGICAL ORIENTATIONS IN SELECTED EUROPEAN COUNTRIES

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ABSTRACT. This article examines the relationship between households' experiences of rising energy costs and their ecological orientations in selected European countries against the backdrop of the 2022/2023 energy crisis, exacerbated by the COVID-19 pandemic and the war in Ukraine. Using a survey methodology (computer-assisted web interviewing) in Poland, Germany, Denmark, Norway, the Netherlands and Switzerland, the research examines how the financial impact of the energy crisis was perceived by households and how this perception correlates with demographic characteristics, financial status, energy use and ecological orientation. The research aims to contribute to the discourse on energy vulnerability and energy poverty from the perspective of the lived experience of household energy bills. The results show that energy price increases are a universal experience among European households, but their intensity varies depending on factors such as age, education, income, location, gender and housing ownership status. Interestingly, the use of renewable energy sources has been found to reduce the perceived negative impact of rising energy costs. Another important finding of the research is that household vulnerability to energy prices is linked to an individual's ecological orientation. The findings pose a key challenge for sustainable development policies, pointing to the need to balance reducing the financial burden on citizens with the urgent need to protect the environment during energy crises.

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D14

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lived experience.

Introduction

In the winter of 2022/2023, European countries faced the problem of rising energy prices as a consequence of the COVID-19 pandemic (Khan et al., 2022; Zhang et al., 2021) and the war in Ukraine (Martínez-García et al., 2023; Zhang et al., 2024). This situation directly affected the functioning of households burdened with increased energy costs (Guan et al.,

2023). This article raises the issue of self-assessment of the financial situation of households in the context of increased energy bills. Firstly, the article aims to determine how individuals assessed the impact of the energy crisis on their financial situation (How economically affected do you feel by the energy crisis and rising prices?). Secondly, it aims to determine whether this assessment depends on demographic characteristics, financial status and the energy sources used. The issues discussed in the article are part of the discussion on the energy vulnerability of households and fuel poverty. These problems are presented from the perspective of subjective experiences related to home energy bills. Thirdly, the article aims to answer the question of whether and how the experience of the energy crisis affects ecological orientation. The implementation of this goal required the identification of variables that could be used to measure this complex and unobservable characteristic. This was achieved by using exploratory factor analysis (Goretzko et al., 2021), which made it possible to capture, without prior theoretical assumptions, the variables that were grouped to create a factor that is referred to as ecological orientation. The analysis has confirmed the correlation between the motivation to undertake ecological activities and the experience of rising energy prices.

The literature on the subject points to many factors that shape attitudes towards ecological issues and the natural environment, ranging from life transitions to the experience of disasters resulting from climate change. The literature review presented in the article shows a multitude of empirical conclusions in this area. In this context, it is worth asking the question of to what extent the experience of the energy crisis which takes the form of rising energy prices is a significant factor that shapes our perceptions of environmental protection. This is a very topical and important question from the point of view of shaping public policies because these findings may contribute to better planning of information campaigns and ecological education among groups particularly exposed to the effects of rising energy prices. It is also worth paying attention to the methodological aspect of the research. It was intentionally conducted when households received higher energy bills to capture the actual lived experience of residents. Moreover, as the project was implemented in five European countries, international comparisons have made it possible to go beyond the local context. To gain a deeper understanding of this phenomenon, it is essential to refer to previous research on both the economic consequences of energy crises and their impact on environmental attitudes. The following section provides a review of the relevant literature in this field.

1. Literature review

The issue of energy poverty, particularly in a crisis, is extremely important and is often discussed in empirical research and theoretical analyses. Most often, however, these studies concern objective criteria in the context of energy prices and economic recession (Halkos & Gkampoura, 2021), identification of groups at increased risk of energy poverty based on the structural vulnerability index (Oliveras et al., 2021), modelling of household energy consumption and translating the indicator to the macro level (Papada & Kaliampakos, 2018), ecological well-being in times of socio-ecological crisis (Carrosio & De Vidovich, 2023), the use of renewable energy (Simionescu et al., 2023), creating a development strategy (González-Eguino, 2015) and use of artificial intelligence (Lyeonov et. al, 2025). The topic of energy poverty is much less frequently analysed from the perspective of the lived experience of households, which should be an important dimension of research on energy vulnerability. Moreover, attempts to reconstruct the subjective experiences of individuals in the era of rising energy prices are mainly based on narrow qualitative research (Horta et al., 2019; Groves et al., 2020). This article describes these individual experiences based on large-scale quantitative research, taking into account the opinions of residents of five European countries.

The research question posed in this article is whether the direct experience of rising energy prices has an impact on the ecological orientation of residents of selected European countries. Social sciences make a significant contribution to the development of knowledge about factors influencing ecological attitudes, orientations and behaviours of individuals and households. However, in this context, it has rarely been considered how the experience of the crisis in the fuel market and the resulting increase in prices may translate into concern for the climate and change beliefs about the need for action, which can be described as the broader category of green thinking (Dean, 2001; Moser, 2015; Ali et al., 2020).

Analyses so far have focused primarily on searching for relationships between ecological orientations, experiences of extreme weather phenomena attributed to climate change, such as floods, hurricanes and fires caused by drought, and ecological orientations (Weinstein, 1989; Lujala et al., 2015; Howe, 2021, Zanocco et al., 2019). Victims of this type of disaster are more likely to change their orientation to a more ecological one. They change their political preferences by supporting politicians involved in climate protection (Rudman et al., 2013), are more aware of the risks caused by climate change (Bergquist et al., 2019; Nordlund & Garvill 2002), or change their behavioural intentions (Broomell, 2015; Demski et al., 2017; Howell & Allen, 2017). These studies confirm that place attachment is related to the represented worldview and environmental values (Devine-Wright, 2013).

It also turns out that although the coronavirus pandemic was primarily a health crisis, it contributed to increased awareness of global challenges, including climate change. The public health crisis highlighted the need for global action and cooperation in response to other global challenges, such as climate change (Reese et al., 2020). A pandemic may affect environmental attitudes and behaviours by increasing risk perception and awareness of vulnerability to global threats. Therefore, higher awareness of health risks may translate into greater understanding and concern about environmental risks (Geiger et al., 2019). Moreover, in the broadly understood health category, the use of advertising to increase pro-ecological awareness was also considered (Piwowarski, 2024).

It is worth noting that the opposite trend was observed during the global financial crisis. It turns out that it had an impact on how people perceived the importance of environmental problems and the extent to which they were willing to engage in ecological activities. It has been documented that during the recession in the United States, people focused more on family and friendship ties and, at the same time, showed little concern for their community and environment (Park et al., 2017). The social sciences are also interested in a life course transition as a factor significantly influencing ecological orientations. In this context, changes in everyday practices towards more sustainable consumption are emphasized, which are influenced by transitions in individual life cycles, such as motherhood or retirement (Burningham & Venn, 2020) or moving house (Verplanken et al., 2008). Researchers of social practices also note the impact of infrastructure on ecological orientations. For example, it has been found that clean home heating systems change the rhythm of everyday life and the organization of home space (Watson & Shove, 2023).

This literature review shows that modern science has well-established knowledge about the factors that influence ecological attitudes, ranging from macro-social issues to changes in an individual's life. Meanwhile, there are no empirical studies on the role of the energy crisis in shaping relations with the natural environment. Do changes in the fuel markets and the resulting impact on household bills significantly change the approach in this area? And if so, in what direction will these changes go? If we experience price increases, will our concern focus only on the economic security of our households, or will the anxiety caused by energy prices be a trigger for ecological attitudes? Previous studies have primarily focused on the macroeconomic effects of energy crises, often overlooking the subjective experiences of

households. This study adopts an approach that captures individual assessments of rising energy prices. The following section outlines the methodological framework applied in this research.

2. Methodological approach

The research project ‘Disrupted Routines’ was carried out in cooperation with researchers associated with the Sociology of Consumption of the European Sociological Association.¹ International surveys were carried out using the same survey questionnaire in six European countries: Poland, Germany, Denmark, Norway, the Netherlands and Switzerland. There were 1,000 respondents in each country, with the exception of Switzerland (500 respondents). The research was carried out using non-random quota sampling. Participants were recruited from various available online panels. The survey panel providers ensure that the sample was representative in terms of income and education levels attained by respondents from each country (according to the European Social Survey). The surveys were carried out in each country in March and April 2023 by the same research company.

The online survey questionnaire contained 44 items and its completion time (available on computers and mobile devices) was, on average, 15–20 minutes. The questionnaire consisted of closed-ended multiple-choice questions. The questionnaire distribution process was supported by an automated invitation-sending system and control of the responses obtained, including aspects such as response time, logical consistency and open-ended questions.

As for the restrictions of the research, it should first be pointed out that only selected countries took part in the surveys, so there is no overview of how all European countries function in these specific conditions. The second important issue to note, which is also a tip for future researchers, is that the survey questionnaire can be enriched with open-ended questions and/or additional qualitative research can be carried out to deepen the research issues.

The sample size from each country was not proportional to the population size. Therefore, simple averages cannot be seen as good estimators of the expected level of variables in all these countries together. However, this was not the purpose of the study. More weight was given to the analysis of correlations.

When writing about the limitations of the survey, it should also be noted that the level of income (wealth) is not the same across the six surveyed countries, which must be taken into account when attempting to infer the impact of income on vulnerability to energy crisis or ecological orientation. It should be noted, however, that the income figures of individual respondents were not made available by the panel providers. The income level was provided on a 5-point Likert scale – depending on the ratio of income to the median income in a given country." This approach is in line with the concept adopted in measuring poverty - in a country with a high level of GDP per capita, some citizens may feel poor (reach) if their earnings are much below (above) the median income.

3. Conducting research and results

The analysis methods were strictly subordinated to the research objectives. The first objective concerned the self-assessment of the impact of the financial crisis and price increases on the financial situation (this variable is hereinafter briefly referred to as ‘the financial experience of the energy crisis’) and the identification of the determinants of this assessment.

¹ The principal investigator is Melanie Jaeger-Erben from the Brandenburg Technical University in Cottbus (Germany). The research team from Poland consists of employees of the Faculty of Sociology of the Adam Mickiewicz University in Poznań: Mariusz Baranowski, Rafał Drozdowski, Maciej Frąckowiak, Jan Jęcz, Małgorzata Kubacka, Ryszard Necel, Agnieszka Nymś-Górna and Przemysław Pluciński.

The scope for achieving the goal, including the selection of potential determinants, was limited by the scope of the survey questionnaire (available characteristics of respondents). It examined whether the financial experience of the energy crisis depended on the country of origin, gender, age, education, income, place of residence and housing ownership status. We also examined whether the financial experience of the energy crisis depended on which sources of energy were used in respondents' houses/flats. In particular, we asked how often a given energy source (gas, oil, pellets, wood, electric heat pump, district/remote heating, solar thermal energy, photovoltaic, wind and electric radiator, respectively) was used. Respondents could choose one of four answers: always, sometimes, rarely, never. Cases where the respondent did not know the answer were omitted from the analysis (on average, 6.18% of cases).

As the financial experience of the energy crisis is an ordinal qualitative variable, most of the studied characteristics are also qualitative (on a nominal or ordinal scale) and the quantitative variable (age) was not normally distributed, a non-parametric approach was used to infer the relationships. In particular:

- the independence chi-squared test was applied whenever both variables were qualitative– to assess the strength of the correlation, the V-Kramer (V_K) and adjusted C-Pearson (C_P) coefficient were calculated; if significant dependencies were detected, an equality test was performed for individual fractions to identify the most significant differences;
- the Kruskal-Wallis test was applied whenever the potential determinant was quantitative or ordinal;
- to infer whether a significant dependence was monotonic, the Spearman's correlation (r) test was performed whenever the potential determinant was quantitative (age) or qualitative but ordinal (income, education, frequency of using a given energy source); a test of equality of medians was also performed.

What is more, whenever concluding the variables' dependence required multiple testing in pairs, the Bonferroni correction was applied. In all these cases, dependence was considered significant when the p-value in a given test did not exceed the statistical significance level of 0.05. The p-value is reported in brackets.

Another research goal was to assess whether the financial experience of the energy crisis influences ecological orientation. To measure ecological orientation, a factor analysis was carried out with oblimin rotation based on 24 variables – answers to questions about the degree of compliance with various types of opinions (I am confident that I and my social environment will come through the energy crisis safely; Our country will also master this crisis; In the current energy crisis, policymakers must be tougher on business; To solve the energy crisis, companies need more freedom and fewer regulations; The energy crisis can only be solved if new technologies are developed; I am ready to give up comfort and prosperity if it means that I can save the environment; We should use this current crisis as an opportunity to transform our society; It is pointless to argue about social justice because conditions cannot be changed; The way things are today, you don't even know what is fair anymore; I believe energy consumption can be reduced without affecting my quality of life; The state should guarantee a minimum standard of living for all; It is right for entrepreneurs to make big profits because, in the end, everyone benefits; In times of crisis, wealthy people should give away more of their wealth; I would be willing to pay higher taxes so that poorer people can be supported paying their bills; There is always someone I can ask for help when I am in need; Despite the energy crisis, the state should continue to devote itself intensively to protecting the environment; The governmental support in the energy crisis is not sufficient at all; The governmental support in this crisis is fair and just; The environment and sustainability are more important than a quick solution to the energy crisis; I fear that many more crises will befall our society in the coming

years; There is no point in planning far into the future; I fear that the energy crisis will affect me negatively the coming years). The degree of agreement with each opinion was determined on a 5-point scale (from 1 – strongly disagree to 5 – strongly agree).

These variables met the necessary conditions to look for the main factors; that is respondents' characteristics that influenced their responses and determined connections between their answers to related questions. In particular, the Kaiser-Mayer-Olkin measure of sampling adequacy had a very high value of 0.849, indicating that grouping variables was reasonable. The result of the Barlett's test of sphericity (0.000) allowed us to reject the hypothesis of no relationship between individual questions.

To verify the relationship between the experience of the energy crisis and ecological orientation, the Kruskal-Wallis test and a supplementary test for the equality of medians were used, and the Spearman's correlation test was performed whenever the relationship seemed monotonic.

All tests were performed jointly based on all observations and separately for each country. IBM SPSS Statistics 9.0 was used for the analyses.

Following the survey implementation and statistical analysis, the findings reveal key factors influencing the experience of rising energy costs and their impact on ecological orientation. The next section presents the structure of the sample and detailed results of this analysis.

The research covered a total of 5,500 respondents. The structure of respondents' demographic and financial characteristics is presented in Table 1. As shown, the average age was 43.6. In each country, the age distribution was not normal and right-sided asymmetry was observed. The sample mean and median ages can be considered quite close to population ones - according to Eurostat, half of EU citizens were under 44.4 years old in 2022. At the same time, median age was higher in DE and the NL than in PL and NO (Eurostat, 2023). As for education, 2.59% of respondents had no education, 20.5% had primary education, 20.68% – secondary education, 31.64% – vocational education and 24.59% – higher education². Regarding the gender structure, it is worth noting that more than 50% of the respondents were women, which is correct. However, in the case of Germany, a slight overrepresentation of women can be found, while in the case of DK and NL a slight overrepresentation of men can be found. The sample income structure was almost uniform and identical in each country. This was the result of transforming income into an ordinal variable on a 5-degree Likert scale. Despite the survey companies ensure that the sample was representative in terms of income. it is debatable to assume equal classes - such a solution can be considered as a limitation of the study. Moreover, 25.4% of all respondents lived in rural areas, 20.9% in suburban areas, and 53.7% in cities. Such a structure can be viewed positively, as in most countries, the rural population is a minority. Finally, 45.04% of respondents rented residential premises, 51.05% were homeowners, and 3.9% indicated other status.

² Although the survey company ensured that the sample was representative by education level, comparing sample structure in Europe (Eurostat, 2025), it may seem that the percentage of people with tertiary education in the sample is too low - especially in DE, DK and NL (it should exceed 30%).

Table 1. Demographic and financial profile of the sample

Characteristics of respondents		Country of origin						Total
		DE	DK	NO	NL	CH	PL	
Age	Mean	46.18	45.109	39.79	49.43	42.82	38.12	43.64
	Median	46	44	38	51	42	36	42
	Standard deviation	15.49	15.92	14.67	17.456	14.39	13.44	15.86
	Skewness	0.057	0.236	0.658	-0.073	0.333	0.582	0.329
	Kurtosis	-1.003	-0.885	-0.254	-1.137	-0.507	-0.296	-0.837
	Normality test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Education	No school-leaving qualification (or still at school)	7.5%	1.1%	1.1%	1.0%	1.0%	3.0%	2.6%
	Elementary education	28.5%	24.1%	20.0%	20.0%	8.1%	16.0%	20.5%
	Secondary education	12.0%	11.2%	12.6%	38.0%	9.7%	35.0%	20.7%
	Vocational education	33.5%	51.5%	25.8%	25.0%	34.5%	21.0%	31.6%
	Higher education	18.5%	12.1%	40.5%	16.0%	46.7%	25.0%	24.6%
Gender	Male	39.7%	54.6%	48.8%	54.2%	45.8%	43.8%	48.0%
	Female	60.3%	44.9%	50.9%	45.0%	53.8%	56.0%	51.6%
	Other		0.3%	0.3%	0.4%	0.4%		0.2%
Place of residence	Urban area	51.8%	59.9%	46.0%	46.0%	55.8%	63.7%	53.7%
	Rural area	31.6%	14.8%	33.1%	23.8%	23.0%	24.9%	25.4%
	Suburban or peri-urban area	16.6%	25.3%	20.9%	30.2%	21.2%	11.4%	20.9%
Are you a tenant or an owner of a housing unit?	Tenant	61.1%	44.5%	29.8%	56.1%	66.0%	23.2%	45.0%
	Owner	38.2%	51.6%	65.6%	40.6%	32.6%	68.5%	51.1%
	Other	0.7%	3.9%	4.6%	3.3%	1.4%	8.3%	3.9%
What is your household's income?	Low	20.0%	20.0%	20.0%	20.0%	22.4%	20.0%	20.2%
	Low to medium	20.0%	20.0%	20.0%	20.0%	22.2%	20.0%	20.2%
	Medium	20.0%	20.0%	20.0%	20.0%	21.2%	20.0%	20.1%
	Medium to high	20.0%	20.0%	20.0%	20.0%	18.4%	20.0%	19.9%
	High	20.0%	20.0%	20.0%	20.0%	15.8%	20.0%	19.6%

Source: Authors' own compilation

In conclusion, although slight differences were noted between the structure of the sample and the population (especially gender) and applied by survey company transformation of income to even-numbered classes, the general diversity of the sample should be appreciated. Variety of trait variants is important to identify correlations.

3.1 Assessment of the experience of rising energy prices and the determinants

The starting point for the analyses was the question of to what extent the increase in energy prices observed last winter adversely affected the residents of selected European countries. Respondents were asked: 'How economically affected do you feel by the energy crisis and raising prices?' They could choose one of several proposed answers (see Table 2). The largest number of respondents (37%) said that they had not been worried about energy prices so far, but as they increased, they would become a problem for them. A similar percentage (36%) of respondents believed that energy prices were an issue for them, but their economic situation was good enough to cope with it. Among the surveyed residents of the selected European countries, 14.4% did not consider energy prices to be a reason for concern, but 12.6% had long had problems paying energy bills and their situation worsened due to the price increases. To sum up, the majority of surveyed Europeans agreed that rising energy prices were a cause for concern, with only a small percentage claiming the opposite. On the other hand, about one in ten Europeans felt that this was a persistent problem that worsened last winter.

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Table 2. Structure of responses to the question: ‘How economically affected do you feel by the energy crisis and raising prices?’

	Place of residence						Total
	DE	DK	NO	NL	CH	PL	
I am not concerned about energy prices.	9.5%	10.9%	13.7%	22.0%	14.6%	16.0%	14.4%
Energy prices are an issue for me but my economic situation is good enough to cope with it.	36.4%	35.7%	38.1%	35.0%	34.6%	35.3%	36.0%
I was not concerned about energy prices before but I am now as they are higher.	37.7%	36.7%	35.4%	36.3%	42.0%	36.5%	37.0%
I have long had problems paying energy bills and now the problem is even bigger.	16.4%	16.7%	12.8%	6.7%	8.8%	12.2%	12.6%

Source: Authors' own research results.

Based on the results of the chi-squared test, it can be concluded with at least 95% confidence that the financial experience of the energy crisis depends on the country of origin ($p < 0.001$, C_p : 0.172, V_k : 0.089), yet this relationship is not strong. However, it can be concluded that Germans and Danes were more likely than the Dutch ($p < 0.001$) and Swiss ($p = 0.001$) to claim that they had long had problems paying energy bills and then the problem was even bigger. The Dutch stand out the most compared to other countries, as they were less likely than Germans ($p < 0.001$), Norwegians ($p < 0.001$), Danes ($p < 0.001$) and Poles ($p < 0.001$) to agree that this had been a permanent problem that intensified over the last winter. It is worth considering whether the observed country-based differences may be influenced by differences between the sample and the population structure (e.g., in term of gender) - this is possible as long as the respondents' characteristics under consideration turn out to have a strong impact on vulnerability to crisis.

Based on the Kruskal-Wallis test, significant correlations have been identified between experiences related to increases in energy prices in the selected European countries and the age of respondents. It turns out that in Germany ($p = 0.003$), Denmark ($p < 0.001$) and Poland ($p = 0.004$), the younger the respondents, the less severely they felt the problem of rising energy prices. In Poland, the median age of people claiming to have felt the increase in energy prices was 38 years, in Germany – 46 years and in Denmark – 45 years. However, the monotonic relationship is not strong. Although statistically significant, the rank correlation coefficient was only 0.1.

Table 3. Median age of respondents expressing a given opinion

	Place of residence					
	DE	DK	NO	NL	CH	PL
A. I am not concerned about energy prices.	41	36	36	53	42	35
B. Energy prices are an issue for me but my economic situation is good enough to cope with it.	43,5	43	37	50	41	35
C. I was not concerned about energy prices before but I am now as they are higher.	48	46	40	51	43	38
D. I have long had problems paying energy bills and now the problem is even bigger.	48	45	39	45	41	40
Total in the country	46	44	38	51	42	36
Kruskal-Wallis test result (p-value)	0.003	0.000	0.139	0.219	0.584	0.004

Source: Authors' own research results

In light of the results of the chi-squared test conducted based on the combined samples, it has also turned out that education is a variable that significantly differentiates the experiences

of rising energy prices (p -value <0.001 ; C_P : 0.171; V_K : 0.088). The cross-table analysis shows that the higher the level of education, the less severely the problem of rising energy prices was felt. The correlation coefficient is also statistically significant (r : -0.09, $p<0.001$), which indicates a monotonic, although weak, relationship. This dependence is slightly different in individual countries. A monotonic correlation was found in Germany (r : -0.11, $p<0.001$), Norway (r : -0.13, $p<0.001$) and Switzerland (r : -0.133, $p=0.003$). A non-monotonic correlation was observed in Poland ($p<0.001$) and Denmark ($p=0.029$), meaning that it is impossible to determine the direction of dependence between the respondents' education and the extent to which they experienced the problem.

The statistical analyses performed (chi-squared test and Spearman's correlation test) indicate a significant correlation between the impact of rising energy prices and income. This time, the relationship is statistically significant in each of the analysed countries. In all cases, a statistically significant negative correlation has been found: the higher the respondent's declared income, the less severe the experience of rising energy prices. The Spearman's correlation values in the analysed countries were as follows: Germany: -0.301 (0.000); Denmark: -0.257 (0.000); Norway: -0.211 (0.000); Netherlands: -0.210(0.000); Switzerland: -0.381 (0.000); and Poland: -0.154 (0.000). At the same time, the relationship between the experience of the energy crisis and income was the strongest of all identified correlations. It is therefore worth reconsidering the results summarised in Table 2 in the context of income structure differences. The survey company divided the respondents into even-numbered groups. As a result, the number of high-income respondents is the same in each country. According to Eurostat databases the share of the people whose income is high (i.e. 160% of the median or more) in 2022 was the highest in Switzerland (16,8%) and Germany (16.6%), while it was 14.1% in Poland, 12.5% in Denmark, 11.6% in Norway and 11.5% in Netherlands (Eurostat, 2025b). It is therefore conceivable that if the sample size of the income classes reflected the population Germany and other countries (in terms of feeling the financial impact of the energy crisis) could decrease. A significant relationship (chi-squared test) between the place of residence and the experience of rising energy prices was observed in Denmark ($p=0.010$, C_P : 0.153; V_K : 0.092) and Norway ($p=0.027$, C_P : 0.141; V_K : 0.084). It turns out that the more urbanized the place of residence, the less severe the increase in energy prices and (as verified) it was not related to income differences. In Norway, there was a significantly higher percentage of people in rural areas who felt price increases more severely than in cities ($p = 0.017$). In turn, in Denmark, differences appeared between suburban areas and cities: in cities, the price increases were also less noticeable ($p=0.025$) than in suburban areas, where respondents declared that this had become a problem for them ($p=0.022$). Although statistically significant, the detected relationships were not strong. No correlations have been identified in the other countries.

Gender was also an important factor differentiating the self-assessment of the impact of energy price increases on the financial situation. This relationship can be observed in every country except Switzerland. According to the analyses (chi-squared test), women declared greater concerns about the increase in energy prices than men. The p -values were 0.015 in Germany and below 0.001 in the remaining countries. Measures of the strength of the V_K correlation ranged from 0.16 in Denmark to 0.10 in Germany, and the adjusted C_P contingency coefficient was 0.2 up to 0.13. Perhaps the overrepresentation of men in the Dutch sample can be seen as a reason why the Dutch were least likely to feel the economic impact of the energy crisis compared to other countries (see Table 2).

It also turns out that the experience of rising energy prices depended on the housing ownership status of the respondents. This relationship was statistically significant in all countries included in the study (chi-squared test). While in Germany, Denmark, Switzerland,

the Netherlands and Poland, the p-value was below 0.001, in Norway it was 0.02. This translated into the strength of the correlation: the adjusted C_P coefficient reached the highest level in Switzerland – 0.299, which indicates a moderate strength of the correlation, and the lowest in Norway – only 0.145. The results indicate that in all countries except the Netherlands, renters were more likely than owners to agree with the statement ‘I have long had problems paying energy bills and now the problem is even bigger’.

The relationship between the experience of rising energy prices and the frequency of using various energy sources was also examined. Based on the distribution of responses (chi-squared test) and significant values of the correlation coefficient ($p < 0.001$), it can be concluded that the more frequently renewable energy sources, such as solar thermal energy ($r = -0.161$), photovoltaic ($r = -0.175$) and wind energy ($r = -0.165$), are used, the lower the problem of rising energy prices. This relationship was confirmed in all countries covered by the study. This correlation was not observed for more traditional energy sources.

3.2. Measuring ecological orientation

During the exploratory factor analysis, six eigenvalues of the correlation matrix exceeding the value 1 and the associated main factors were identified. To interpret the main factors, attention was paid to the variables that were characterized by the highest (and, at the same time, exceeding 0.4) values of factor loadings, measuring the strength of the correlation of a given variable with a given factor. It turned out that the first factor, associated with the highest eigenvalue of the correlation matrix (4.125) and explaining 17.2% of the total variance, correlated most strongly with answers to six questions, which can be considered substantively related to ecological orientation. Therefore, it was decided to establish a measure of ecological orientation as a weighted arithmetic mean of these six identified variables:

$$ECOLOGICAL_ORIENT = \sum_{i=1}^6 w_i \cdot x_i$$

The weights were determined in direct proportion to the factor loadings. The factor loadings of the model matrix and the weights of these variables (w_i) are summarized in Table 4. The determined weighted arithmetic mean was very strongly correlated with the value of the first factor identified during factor analysis ($r = 0.943$).

Table 4. Components of ecological orientation

Statements	Factor loadings	Weights
X1 – We should use this current crisis as an opportunity to transform our society. Below you will find different statements about how the energy crisis affects you.	0.699	21.10%
X2 – I am ready to give up comfort and prosperity if it means that I can save the environment. Below you will find different statements about how the energy crisis affects you.	0.621	18.79%
X3 – q33r8: Despite the energy crisis, the state should continue to devote itself intensively to protecting the environment. Do you experience support in the current crisis?	0.578	17.44%
X4 – q31r8: The energy crisis can only be solved if new technologies are developed. Below you will find different statements about how the energy crisis affects you.	0.539	16.28%
X5 – q33 r8: The environment and sustainability are more important than a quick solution to the energy crisis.	0.470	14.20%
X6 – q31r5: In the current energy crisis, policymakers must be tougher on business. Below you will find different statements about how the energy crisis affects you.	0.405	12.24%

Source: Authors' own research results

The statistical analyses performed (Kruskal-Wallis test and Tukey's range test) have shown statistically significant differences in the development of ecological orientation in some countries ($p\text{-value} < 0.001$).

It turns out that Norway and Switzerland are countries where the values of the measure were different than in all the other countries under study. In Norway, both the mean value and the quartiles (Q1: 2.728, mean: 3.147, median: 3.145 and Q3: 3.668) were slightly lower than in all the other countries. In turn, in Switzerland, they were the highest (Q1: 3.091, mean: 3.4817, median: 3.509 and Q3: 3.873). No significant differences were observed between the remaining countries (Netherlands, Denmark, Germany and Poland). The values of these descriptive statistics in Poland were as follows: Q1: 2.966, mean: 3.3296, median: 3.334 and Q3: 3.739.

Table 5. Descriptive statistics of ecological orientation

	Country of origin						
	DE	DK	NO	NL	CH	PL	Total
Mean	3.3000	3.3500	3.1473	3.2567	3.4817	3.3296	3.2954
Q3	3.8580	3.7936	3.6680	3.6822	3.8730	3.7393	3.7414
Median	3.3271	3.3330	3.1447	3.2560	3.5093	3.3340	3.3056
Q1	2.8366	2.9871	2.7277	2.9139	3.0909	2.9660	2.9042
SD	0.7950	0.6520	0.7460	0.6990	0.6080	0.6860	0.7135
Skewness	-0.3500	-0.1200	-0.2890	-0.1780	-0.3630	-0.1950	-0.283
Normality test (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Source: Authors' own research results

The differences in ecological orientation between the countries may have arisen due to the fact that the sample structure in terms of size of income classes and gender did not perfectly match the population structure in the compared countries. Therefore, an additional test was conducted to examine whether the level of ecological orientation was related to any other factors. However, no significant or strong relationship was identified in any of the studied countries. The only notable finding was a positive correlation between ecological orientation and the respondent's age, but this correlation was weak – the highest Spearman correlation coefficient was observed in Poland at 0.16. Thus, it seems that adjusting the sample structure would not have significantly affected the results."

3.3. The experience of rising energy prices and ecological orientation

The Kruskal-Wallis test indicates a significant relationship between ecological orientation and opinions about the experience of price increases ($p < 0.001$). Both the results of pairwise comparisons and the test of the equality of medians indicate that a significant difference was observed between the medians in the group most strongly affected by the problem of price increases (lower orientation measure) and in the group that coped with the problem thanks to their good financial situation. There were no clear differences between the remaining groups. Consequently, the Spearman's rank correlation coefficient, although statistically significant ($p < 0.001$) and negative, indicated that the relationship was not strong. However, the negative value of this coefficient confirms the general regularity: a strong experience of the problem of price increases is accompanied by a decline in ecological orientation. After conducting the research in individual countries, it turned out that a negative correlation could be identified in three of the countries under examination: Germany ($r = -0.096$, $p\text{-value} < 0.01$), Norway ($r = -0.147$, $p\text{-value} < 0.01$) and the Netherlands ($r = -0.072$, $p\text{-value} < 0.05$).

The correlation was not strong as a significant decrease in ecological orientation was only observed in the case of a strong experience of price increases (see Figure 1.).

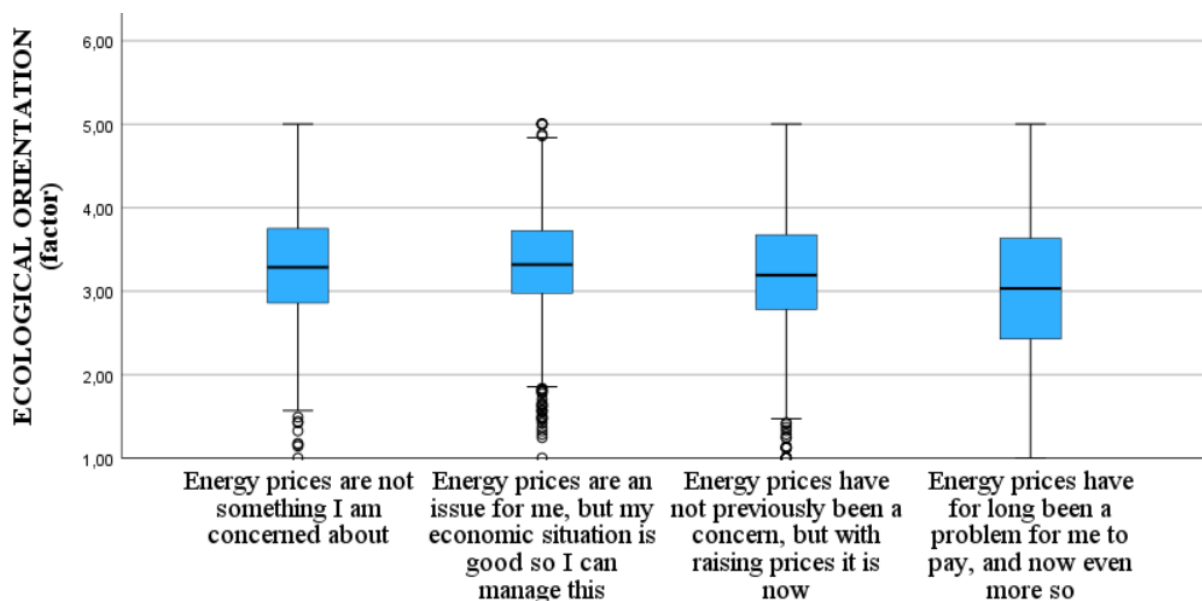


Figure 1. Distribution of ecological orientation on the scale of experience of energy price increases

The statistical analysis highlights a clear relationship between the experience of rising energy prices and ecological orientation, though this relationship varies across countries. These findings have important implications for energy and environmental policy.

Conclusion

The article presents an analysis of the experience of rising energy prices among residents of selected European countries, examining the impact on the ecological orientation of respondents. The research results indicate that the majority of households directly experienced increases in energy prices. It was therefore a universal experience, but its intensity varied depending on factors such as age, education, income, place of residence, gender and housing ownership status. The research findings highlight the importance of understanding energy poverty from the perspective of people's everyday difficulties (Middlemiss & Gillard, 2015). It turns out that among the variables that reduce the perception of the negative impact of price increases is the use of renewable energy sources. This result corresponds with previous observations on the perception of renewable energy sources as a solution to bypassing the energy crisis (Gârdan et al., 2023) or as a factor in reducing negative environmental perceptions (Dagiliūtė, 2024).

To capture the correlation between the experience of rising energy prices and attitudes towards the natural environment, a factor analysis was conducted, which allowed us to establish a measure of ecological orientation based on the answers to selected statements in the questionnaire. Among the analysed countries, the lowest ecological orientation was recorded among the residents of Norway and the highest among respondents in Switzerland. The article proves that ecological orientations differ depending on the subjective household vulnerability to increases in energy prices. When analysing this relationship, significant differences were observed depending on the respondent's country of origin, which indicates the complexity of the problem and the need to adapt political and economic strategies to the national context. A

new finding is that household vulnerability to energy prices is linked to individual attitudes towards ecological issues. It is also important to indicate the direction of this dependence because the increase in energy prices has a significant impact on the decline in ecological orientation, which was observed in Germany, Norway and the Netherlands. Previous research has emphasized the importance of extreme weather phenomena (Bergquist et al., 2019; Howe, 2021) and man-made disasters (Mi et al., 2023; Matiiuk & Liobikienė, 2023) in shaping attitudes towards the natural environment. This research has expanded the set of factors previously identified by researchers to determine human orientation towards ecological issues to include households' vulnerability to rising energy prices.

The research results constitute a significant challenge for sustainable development policies. This is an alarm signal for decision-makers to balance actions aimed at reducing the financial burden on residents with the visible need to protect the environment during the energy crisis. The need to promote sustainable and ecological energy solutions as part of the energy crisis management strategy should be emphasized because concern about rising energy prices was much less expressed where renewable sources were used.

The research therefore confirms the complexity of the relationship between economics and ecological issues and also shows how energy crises affect social and individual attitudes towards sustainable development. The European Union is a world leader in introducing environmental legislation (Tutak & Brodny, 2022). It is important that the experience of rising energy prices, which has a direct impact on reducing ecological orientations, does not create bottom-up social pressure on political decision-makers forcing them to stop or limit environmental reforms. In the geopolitical context, it is worth emphasizing that it is important to adapt national and international solutions that take into account local specificities and the need for global cooperation in the field of sustainable development and energy crisis management.

The results of this study underline the urgent need for policy makers to integrate social and environmental considerations into energy policies. As the experience of rising energy prices is associated with a decline in environmentalism in certain countries, policies should aim to alleviate economic hardship without compromising sustainability goals. Governments could implement targeted financial support mechanisms, such as energy subsidies or tax incentives for the uptake of renewable energy, to reduce the financial burden on vulnerable households. In addition, raising public awareness of the long-term benefits of investing in green energy can help counteract the short-term economic concerns that lead to lower environmental commitment.

While this study provides valuable insights into the interplay between energy price experience and ecological orientation, further research is needed to explore the long-term effects of energy crises on sustainability attitudes. Longitudinal studies could examine whether changes in environmental attitudes persist beyond the immediate economic pressures. In addition, future research could expand on the role of policy interventions and investigate which measures are most effective in sustaining pro-environmental behaviour in times of financial stress. It would also be beneficial to explore qualitative perspectives to gain a deeper understanding of household decision-making processes regarding energy consumption and environmental behaviour. Finally, comparative analyses involving a wider range of European and non-European countries could provide a more comprehensive picture of the relationship between energy price volatility and sustainability commitments on a global scale.

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