

The associative role of crisis perception in the formation of attitudes toward energy independence

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Abstract: This study examines the associative role of crisis perception in shaping societal attitudes toward energy independence in Hungary. Drawing on quantitative results from the Green Deal survey database, the study tests the hypothesis that support for energy independence is driven primarily not by institutional trust, but by individuals' perceived economic and social uncertainty. Statistical analysis reveals a significant relationship between crisis perception and support for energy independence (Kruskal–Wallis $\chi^2 = 10.44$; $p = 0.0012$), while no direct explanatory effect of institutional trust can be identified ($p = 0.3897$). According to the regression model, subjective cost pressure and crisis perception jointly serve as significant predictors of attitudes toward energy independence ($R^2 = 0.0745$). The findings suggest that energy autonomy emerges not merely as a technological or policy preference, but as a societal response to perceived uncertainty. The study contributes to the understanding of the social dimensions of the energy transition by examining energy policy attitudes within the interrelated framework of crisis perception, social vulnerability, and energy autonomy.

Keywords: *Crisis perception, Energy independence, Energy policy, Institutional trust, Social resilience, Sustainability attitudes.*

1. Introduction

The energy transition represents one of the most complex transformation processes within the European Union, requiring a high degree of societal embeddedness. The achievement of climate neutrality targets, the reduction of dependence on fossil energy sources, and the structural reconfiguration of the energy mix simultaneously pose technological, economic, and governance challenges [1–3]. In recent years, it has become increasingly evident that the energy transition cannot be understood solely as a policy or sectoral issue; its feasibility also depends on how society perceives its risks, burdens, and expected benefits [1, 4–7].

Following 2022, intensifying geopolitical conflicts, energy market volatility, inflationary pressures, and growing uncertainty regarding the security of supply have elevated the issue of energy independence to a central element of public policy discourse [4, 5, 8–10]. Rising energy prices, increasing household cost pressures, and the visible political consequences of external dependencies have contributed to the emergence of energy autonomy not only as a long-term strategic objective but also as an immediate societal demand for security. In this context, support for energy independence cannot be separated from the extent to which citizens perceive their own economic and social conditions as vulnerable [9, 11, 12].

The interpretation of this phenomenon is further complicated by the fact that simplified and conflict-oriented narratives circulating within the digital media environment often frame policy issues in terms of sovereignty, identity, or existential concerns [13–17]. In such a context, public attitudes do not respond exclusively to the substantive content of energy policy measures, but also to the extent to which societal

actors experience threat, uncertainty, or loss of control. Consequently, support for energy independence can also be interpreted as a societal response aimed at reducing perceived vulnerability [18, 19].

In the international literature, several interpretative frameworks are available to explain energy policy and environmental attitudes. Some approaches emphasize the role of institutional trust, governance legitimacy, and policy acceptance [20, 21], while others highlight the attitudinal significance of risk perception, social vulnerability, and subjective uncertainty [22, 23]. In the Hungarian context, however, it remains unclear whether support for energy independence is shaped primarily by institutional trust or rather by experienced crisis perception and economic pressure [24, 25].

The central question of this study is therefore whether support for energy independence is primarily determined by crisis perception or whether institutional trust and household cost pressure exert greater explanatory power. The aim of the research is to examine this relationship empirically and interpret it theoretically at the intersection of sustainability governance and security studies. Drawing on the quantitative dataset of the Green Deal survey, the study analyzes the structure of attitudes toward energy autonomy and investigates how subjective uncertainty is related to support for energy independence.

In terms of its structure, the second section reviews the literature on energy autonomy, crisis perception, and institutional trust, and derives the study's empirical focus from this framework. The third section presents the research design, including survey data collection, sample characteristics, the operationalization of variables, and the statistical methods applied. The fourth section reports the empirical findings, while the fifth interprets them in light of the relevant literature. The study concludes with a discussion of the conclusions, limitations, and directions for future research.

2. Theoretical Background and State of the Art

Societal support for energy independence can only be convincingly interpreted if the phenomenon is examined not solely from an energy policy perspective but also through social and perceptual dimensions. Accordingly, this section addresses three interrelated areas of inquiry. First, it reviews the evolution of the concept of energy autonomy within security policy and public policy frameworks. It then examines the literature on crisis perception and risk perception, with particular emphasis on how experienced uncertainty can shape public policy preferences. Finally, it considers approaches related to institutional trust and legitimacy to clarify that the study does not rely on a single theoretical model but rather compares multiple explanatory frameworks.

2.1. Energy Independence as a Security Construct

The concept of energy independence emerged primarily within a geopolitical and energy security context during the second half of the 20th century [4, 5, 8, 9]. Since the period of the oil crises, the stability of energy supply has become a key structural component of national security, as import dependency, the vulnerability of supply routes, and political control over energy resources have acquired strategic significance. Within this interpretative framework, energy autonomy has been associated with source diversification, the establishment of strategic reserves, and the protection of critical infrastructure. The climate policy shift of the 21st century has endowed the concept of energy independence with new meaning [1-3, 5, 6]. The European Green Deal is not merely an emissions reduction program, but a structural economic and regulatory transformation that also encompasses issues of energy security, competitiveness, and sovereignty [1, 9, 22]. Previous research has highlighted that Green Deal policies cannot be separated from questions of supply security and geopolitical maneuverability, particularly in unstable or partially integrated regions [5, 9, 22].

From a security studies perspective, energy independence can be interpreted as a complex construct encompassing the physical security of supply, economic stability, regulatory autonomy, and the subjective experience of vulnerability [3-5, 9, 18, 26, 27]. From this standpoint, energy autonomy is not merely a technical or economic issue but also a phenomenon closely linked to the perception of societal security.

Based on the literature, attitudes toward energy independence can be interpreted not only as normative political positions but also as adaptive societal responses to perceived threats [20-23].

Accordingly, it is justified to examine empirically the role that crisis perception plays in shaping support for energy autonomy. In this sense, the demand for autonomy also reflects a broader societal narrative of regaining control, particularly in contexts where external dependency, market exposure, and geopolitical instability jointly reinforce the experience of vulnerability [5, 18, 22-24].

Empirical studies also indicate that tensions between climate policy objectives, competitiveness, and energy security may generate societal ambivalence [8, 9, 22]. In many cases, declining support does not stem from rejection of sustainability goals, but rather from uncertainty arising from perceived trade-offs between climate targets, living costs, and security of supply [6-9, 18]. This perceptual dimension is closely linked to the phenomenon of crisis perception [28-30].

Overall, in the literature, energy autonomy is not conceptualized solely as a category of energy security or climate policy, but also as a socially embedded construct linked to issues of control, security, and vulnerability. It follows logically that the level of support is shaped not only by institutional and policy-related factors, but also by individuals' perceived threats and experienced uncertainty.

2.2. Crisis Perception and Risk Assessment

The concept of crisis perception in both the social sciences and security studies refers to the construction of subjective feelings of threat [20, 21]. Risk perception is not a mechanical reflection of objective macroeconomic or geopolitical indicators, but rather their individual interpretation, shaped by psychological, information-processing, and experiential factors. Consequently, two social groups in identical economic conditions may exhibit different levels of crisis perception, depending on the narrative environment and the cognitive frameworks through which they interpret the situation [18, 19, 28].

The theoretical starting point of this study is that one potential driver of attitudes toward energy independence is the level of experienced uncertainty. From this perspective, crisis perception is not treated as an isolated psychological phenomenon, but rather as a potential structuring social factor influencing attitudes toward energy independence. Accordingly, the study empirically examines the relationship between the subjective experience of uncertainty and threat and the level of support for energy autonomy [18, 24, 26].

2.3. Selected Empirical Approaches in the Literature

The empirical literature related to this topic follows several partially divergent research directions. Szulecki et al. [5], Leonard et al. [8], Kochanek [10] and Panarello and Gatto [4] primarily demonstrate that the issues of energy transition, security of supply, and public perceptions of the Green Deal cannot be separated, particularly during periods of geopolitical tension. Oberthür and Dupont [17] further argue that questions of climate policy leadership and strategic maneuverability are closely interconnected. In contrast, Jordan et al. [20] and Bäckstrand and Kuyper [21] approach the issue from the perspectives of governance, legitimacy, and institutional acceptance. A partly overlapping line of research focuses more explicitly on public attitudes and acceptance: Perlaviciute and Steg [28], Batel, et al. [31] and Batel [32], Wüstenhagen, et al. [33], Upham, et al. [34], Huijts, et al. [35] show that energy-related support is shaped not only by policy content but also by trust, fairness, perceived risks, values, and contextual interpretations. Survey-based studies by Demski et al. [18], Knox-Hayes et al. [24], Gözl and Wedderhoff [25], Blumer et al. [29], and Aas et al. [36] likewise indicate that support for energy-related infrastructure and transitions is closely linked to perceived vulnerability, social beliefs, and institutional context.

Based on the brief empirical overview, it appears that two approaches with differing emphases stand in contrast when explaining energy-related attitudes. One emphasizes institutional trust, legitimacy, and governance acceptance, while the other focuses on risk perception, social vulnerability, and experienced uncertainty as underlying drivers of public policy preferences. From the perspective of the present study, the key question is not which of these interpretations exists, but rather which constitutes the stronger explanatory framework within the Hungarian sample [21, 25, 29].

The Hungarian, and more broadly, the Central and Eastern European context remains only partially explored in this regard. In particular, there are limited empirical studies that explicitly explain support for energy independence by comparing experienced socio-economic uncertainty, institutional trust, and household cost pressure [9, 11, 12, 25]. The present study addresses this gap: rather than introducing a new theoretical model, it examines which of the explanatory mechanisms identified in the international literature demonstrates a stronger association with support for energy autonomy within the Hungarian sample.

From this, three empirically testable hypotheses are derived. The first posits that higher levels of crisis perception are associated with greater support for energy independence. The second suggests that the direct explanatory power of institutional trust is weaker than that of subjective uncertainty. The third proposes that household cost pressure, when considered alongside crisis perception, is related to support for energy autonomy. The following section therefore outlines the dataset, variables, and analytical framework through which the study examines these relationships.

3. Research Design and Data Collection

The third section outlines the structure of the empirical component of the research. Its starting point is the conclusion from the literature that support for energy independence may be driven by multiple, competing explanatory mechanisms; accordingly, the analysis must account simultaneously for the roles of institutional trust and experienced uncertainty. In line with this, the section presents the data collection procedure, the logic of sample selection, the operationalization of the variables, and the statistical methods used to examine the hypothesized relationships.

3.1. Research Framework

The study is based on the Green Deal survey dataset; however, the analytical framework is determined not solely by the structure of the database but by the theoretical problem identified in the literature review. As outlined in the second section, at least two distinct explanatory logics can be applied to account for attitudes toward energy independence: one emphasizes the role of institutional trust and legitimacy, while the other highlights the importance of experienced uncertainty, crisis perception, and economic vulnerability [20–24]. The present study undertakes a comparison of these two explanatory approaches within the Hungarian sample.

Accordingly, the empirical analysis focuses on three types of variables: support for energy independence as the dependent variable, crisis perception as the primary explanatory variable, and institutional trust and household cost pressure as additional explanatory factors. The analytical approach first examines the main relationships using simpler statistical methods, followed by a multivariate model assessing whether crisis perception and cost pressure jointly exhibit a meaningful association with support for energy autonomy.

The study's conceptual framework is summarized in Figure 1.

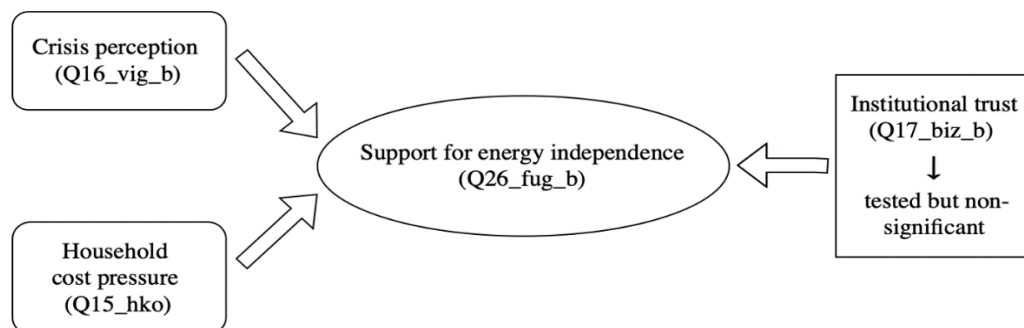


Figure 1.
Conceptual framework of the study.

The analytical strategy followed a stepwise approach. In the first step, we examined whether a statistically significant relationship could be identified between crisis perception and attitudes toward energy independence. In the second step, the role of institutional trust was tested separately to clearly distinguish between the two potential explanatory mechanisms. In the third step, a multivariate model was employed to assess whether crisis perception and household cost pressure jointly exhibited a relationship with the dependent variable. This sequence follows directly from the theoretical dilemma identified in the literature review.

3.2. Survey Design

The Green Deal survey was conducted online during the second half of 2023 and consisted of a total of 27 questions. Its primary aim was to explore sustainability- and energy-policy-related attitudes within Hungarian society, with particular attention to support for energy independence, the intensity of crisis perception, the level of institutional trust, and the subjective experience of economic uncertainty. Respondents completed the questionnaire voluntarily and anonymously; therefore, the data collection cannot be considered representative. Nevertheless, the survey included multiple interrelated attitudinal and perceptual variables, making it suitable for exploratory analysis of key societal patterns of interpretation.

A total of 293 valid responses were obtained during data collection. The questionnaire included demographic items, attitudinal questions related to sustainability and the energy transition, as well as items measuring crisis perception, institutional trust, and household cost burden. As all questions required mandatory responses, no missing data were observed for any key variables.

The inferential statistical analyses were ultimately conducted on a subsample of respondents with higher education qualifications. This choice was not based on the assumption that this group is exclusively relevant for examining energy policy attitudes, but rather on the consideration that, given the conceptual and policy-related complexity of the questionnaire, this subgroup was most likely to provide meaningful, non-random responses. The final analytical subsample thus consisted of 193 respondents out of the total sample of 293. Consequently, the findings of the study cannot be generalized to the entire Hungarian population; instead, they reveal associative patterns within a narrower group of respondents with higher levels of educational attainment.

Data processing and statistical analyses were conducted in the R environment. The analysis began with a descriptive statistical overview of the sample and the structure of the key variables. This was followed by non-parametric methods to examine the main relationships, after which a linear probability model was applied to analyze the joint association of crisis perception and household cost pressure with attitudes toward energy independence.

3.3. Sample, Variables, and Descriptive Statistical Overview

The descriptive statistical overview of the study serves two main purposes. First, it is necessary to present the demographic composition of the sample on which the analysis is based. Second, it is important to clarify the measurement logic underlying the variables included in the inferential analysis. Accordingly, this subsection first outlines the main characteristics of the sample and then briefly introduces the variables used in the analysis and their operationalization.

Table 1.

Summary of the main demographic characteristics of the sample, including age distribution, gender, and education level.

Variable	Category	N	%
Gender	Male	152	51.9
	Female	141	48.1
Age group	16–23	44	15.0
	24–35	99	33.8
	36–45	55	18.8
	46–55	55	18.8
	56–65	19	6.5
	65+	21	7.2
Education level	Secondary or lower	88	30.0
	Higher education	205	70.0
Total sample		293	100

The study is based on a non-representative online sample; therefore, the results cannot be statistically generalized to the entire Hungarian population. Online data collection is likely to overrepresent respondents with higher levels of digital literacy, greater engagement in public affairs, and, to some extent, younger age groups. Moreover, the statistical analyses were conducted on a subsample of respondents with higher educational qualifications ($Q4_vgz \geq 3$; $N = 193$ out of the total $N = 293$), meaning that the analysis pertains to a narrower segment characterized by distinct social and information-processing patterns. This not only limits generalizability but also suggests that the observed relationships may partly reflect the specific attitudinal structure of this subgroup. Accordingly, the findings should be interpreted as exploratory and associative in nature, rather than as estimates applicable to the entire population.

The main demographic characteristics of the sample are summarized in Table 1. Following the presentation of these demographic features, it is also necessary to briefly outline the measurement logic underlying the key variables included in the inferential analysis.

All survey items required mandatory responses; therefore, no missing data were present for the key variables. The Likert-scale items were designed within a standardized measurement framework, enabling consistent and comparable treatment of the variables. Scale-level validation indicated that the variables measuring crisis perception demonstrated adequate internal consistency. The operationalization of variables followed established practices in international research on attitudes and perceptions [37].

The operationalization of variables in this study followed standard practices in social science attitude measurement [37]. Measurement was based on Likert-type scales, allowing for the quantification of subjective perceptions and attitudes. For the purposes of the analysis, the variables were grouped into three functional categories: the dependent variable, the primary explanatory variable, and additional explanatory variables.

The dependent variable measured support for energy independence ($Q26_fug_b$), capturing the extent to which respondents supported strengthening Hungary's energy autonomy. The variable was originally measured on a five-point Likert scale and was subsequently recoded into a binary form for the purposes of the analysis. The primary explanatory variable was crisis perception ($Q16_vig_b$), which captured the subjective experience of economic and social threat. In addition, two further explanatory variables were included in the model: institutional trust, measuring the level of trust in public institutions ($Q17_biz_b$), and household cost pressure ($Q15_hko$), indicating the perceived burden of living costs. The inclusion of these variables was not an arbitrary data-handling decision but was grounded in the two main explanatory logics identified in the literature review.

3.4. Analytical Strategy and Model Specification

The analytical strategy followed a stepwise logic. In the first step, the relationships between the main variables were examined using simpler, non-parametric methods to identify the basic associations between crisis perception, institutional trust, and attitudes toward energy independence. In the second step, we

tested which variables exhibited statistically meaningful relationships with the dependent variable. In the third step, a multivariate model was applied to assess whether crisis perception and household cost pressure jointly showed an association with support for energy autonomy [22].

This sequence followed directly from the theoretical dilemma identified in the literature review. The aim of the study was not to establish a comprehensive causal model, but rather to identify which potential explanatory mechanisms exhibited stronger associative relationships with support for energy independence within the examined sample. Methodological decisions were guided by the measurement levels and distributional characteristics of the variables. All statistical analyses were conducted using version 4.5.2 of the R statistical software.

3.4.1. Analysis of Relationships

In the first step, the relationship between crisis perception and attitudes toward energy independence was examined using a rank-based, non-parametric procedure. The application of the Kruskal–Wallis test was justified by the ordinal level of measurement; in the case of two groups, this procedure yields results equivalent to those of the Mann–Whitney U test. The empirical results indicate a statistically significant relationship between crisis perception and attitudes toward energy independence ($H(1) = 10.4400$; $p = 0.0012$), leading to rejection of the null hypothesis.

The direct relationship between institutional trust and the dependent variable was tested separately using a non-parametric procedure. The results show no statistically significant association in this case ($H(1) = 0.7398$; $p = 0.3897$). Within the present sample and model specification, this suggests that the direct explanatory role of institutional trust appears to be weaker than that of crisis perception.

3.4.2. Multivariate Model

The joint effects of crisis perception and household cost pressure were examined using multiple linear regression [37]. The dependent variable was support for energy independence (Q26_fug_b), while the main predictors were crisis perception (Q16_vig_b) and household cost pressure (Q15_hko). Model parameters were estimated using ordinary least squares (OLS). The model's explanatory power was evaluated using the R^2 and adjusted R^2 indicators.

The explanatory power of the model remained limited ($R^2 = 0.07458$), indicating that the included variables account for a relatively small proportion of the variance in the dependent variable. Given that the dependent variable is coded as binary (0/1), the OLS estimation can be interpreted as a linear probability model. In this study, the model was employed because of the direct interpretability of its coefficients; however, in light of the limitations of this specification, the results are interpreted with appropriate caution.

The significance of the regression coefficients was assessed using standard t-tests. Both crisis perception and household cost pressure showed statistically significant positive associations with the dependent variable ($p < 0.05$). Based on the global F-test, the model as a whole was also statistically significant ($F(2,190) = 7.6560$; $p = 0.0006$); however, its explanatory power remained limited. The direct relationship between institutional trust and the dependent variable was examined separately using a non-parametric test, which revealed no significant association ($H(1) = 0.7398$; $p = 0.3897$). The main estimates of the regression model are summarized in Table 3.

3.4.3. Methodological Limitations and Interpretative Considerations

The statistical procedures applied were not intended to establish causal relationships, but rather to explore how crisis perception, institutional trust, and economic cost pressure are associated with attitudes toward energy independence. Accordingly, the findings are associative in nature and refer to structural relationships among the variables measured in the Green Deal dataset. During data preprocessing, no extreme outliers were identified, and no missing data remained for the key variables. The directionality of the measurement scales was standardized to ensure that higher values consistently indicate stronger perceptions or greater levels of support. The regression model was estimated in linear form, with attitudes

toward energy independence as the dependent variable and crisis perception and cost pressure as explanatory variables:

$$\text{Energy independence} = \beta_0 + \beta_1 (\text{crisis perception}) + \beta_2 (\text{cost pressure}) + \varepsilon.$$

The model's explanatory power is low ($R^2 = 0.07458$), indicating that the included variables account for only a relatively small proportion of the variance in the dependent variable. This suggests that attitudes toward energy independence are influenced by several additional factors not captured by the model.

The present specification does not include several theoretically relevant control variables, particularly age, income level, political orientation, type of residence, and household structure. Therefore, the estimated effect of crisis perception may partially reflect the influence of uncontrolled background factors. The low R^2 value further indicates that the determinants of attitudes toward energy independence are multifactorial.

Measurement was based on five-point Likert scales. Although this allowed for the capture of gradations in attitudes, the presence of a midpoint may have increased the proportion of neutral responses and reduced the scale's discriminatory power. Thus, the scale design itself constitutes a measurement limitation. In future data collection, using four- or six-point scales without a neutral midpoint may be more appropriate.

4. Statistical Analysis and Results

The analysis was conducted in three steps: first, the relationship between crisis perception and energy autonomy was examined using nonparametric methods; this was followed by an analysis of the role of institutional trust; finally, a multivariate regression model was employed to test the joint effects of the explanatory factors.

4.1. Descriptive Statistics

Before the inferential analysis, a descriptive statistical overview of the key variables was conducted. The distribution of responses indicates that support for energy independence is relatively high within the sample, while perceptions of crisis exhibit moderate variance.

The binary recoding of the dependent variable resulted in a moderately imbalanced distribution, with a higher proportion of respondents supporting energy independence. Although this imbalance does not affect the regression analysis, it should be taken into account when interpreting the results.

4.2. The Relationship Between Crisis Perception and Energy Independence

To examine the relationship between crisis perception and attitudes toward energy independence, a Kruskal–Wallis test was applied because the variables were coded in binary form (0/1). The use of this rank-based procedure was justified by the ordinal nature of the original measurements and the assumption of non-normality. In the case of two groups, the Kruskal–Wallis test is equivalent to the Mann–Whitney U test. The results indicate a statistically significant difference in support for energy independence across different levels of crisis perception ($H(1) = 10.44$; $p = 0.0012$). This suggests that the intensity of perceived crisis is significantly associated with support for energy autonomy, with respondents exhibiting higher levels of crisis perception being more likely to support energy independence.

In addition to statistical significance, effect size was also assessed (e.g., ε^2), and the direction of the relationship was examined based on group medians and mean ranks to ensure that the interpretation was not based solely on p-values. The estimated effect size ($\varepsilon^2 \approx 0.054$) indicates a small but meaningful effect. This suggests that crisis perception constitutes an important, though not exclusive, structuring factor in the formation of attitudes. The analysis was conducted on the subsample of respondents with higher education qualifications ($Q4_vgz \geq 3$), resulting in a reduced sample size compared with the full dataset ($193/293 = 72.3\%$).

4.3. Institutional Trust

No statistically significant direct relationship can be identified between institutional trust and support for energy independence in the present sample ($H(1) = 0.7398$; $p = 0.3897$). Based on the current dataset and model specification, this indicates that the direct predictive role of institutional trust is not supported.

However, this does not imply that institutional trust is entirely irrelevant. The present analysis does not examine whether this variable may influence energy-related attitudes through indirect, moderating, or interaction mechanisms. Accordingly, the non-significant result should be interpreted narrowly as the absence of a detectable direct relationship, rather than as evidence that the role of institutional trust can be dismissed. Detailed results of the Kruskal–Wallis test are presented in Table 2.

Table 2.

Kruskal–Wallis Test Results for the Main Variables Included in the Analysis.

Variable	χ^2	df	p
Q11_jav_b	8.2223	1	0.0041
Q12_edm_b	7.9477	1	0.0048
Q15_hko	8.9285	2	0.0115
Q16_vig_b	10.44	1	0.0012
Q17_biz_b	0.7397	1	0.3897

4.4. Regression Model

The joint effect of crisis perception and household cost pressure was examined using multiple linear regression [37]. The aim of the model was to assess the extent to which uncertainty and economic burden explain the variance in attitudes toward energy independence. The estimated coefficients represent changes in the probability of supporting energy independence. A one-unit increase in crisis perception is associated with a 0.1818 increase in the estimated probability of support among respondents with higher education qualifications. The main estimates of the regression model are presented in Table 3.

The coefficient of determination for the model is $R^2 = 0.0745$, indicating that crisis perception and household cost pressure jointly explain only a small proportion of the variance in the dependent variable. This reflects limited explanatory power; therefore, the results should be interpreted with caution. Both crisis perception and household cost pressure show positive associations with attitudes toward energy independence; however, the model does not include several relevant control variables. In particular, the potential effects of age, income level, political orientation, type of residence, and household structure cannot be disentangled. Accordingly, the estimated coefficients should be interpreted not as pure causal effects, but as associations derived from a model with limited specification [17–19].

Table 3.

Multiple Linear Regression Model Explaining Support for Energy Independence (OLS Model).

Dependent variable: Q26_fug_b				
N = 193 (df = 190 → N = df + k + 1 = 190 + 2 + 1)				
Variable	β	SE	t	p
Konstans	0.1284	0.0693	1.853	0.0654
Q15_hko (cost pressure)	0.1037	0.0509	2.037	0.0431 *
Q16_vig_b (crisis perception)	0.1818	0.0752	2.416	0.0166 *

Model indicators:

- $R^2 = 0.0745$
- Adj. $R^2 = 0.0648$
- $F(2, 190) = 7.656$
- $p(F) = 0.0006$
- Residual SE = 0.4661

Note: N = sample size; df = degrees of freedom; SE = standard error; t = t-statistic; p = significance level; R^2 = coefficient of determination; Adj. R^2 = adjusted coefficient of determination; F = F-statistic; OLS = ordinary least squares. Statistical significance is indicated at the $p < 0.05$ level.

Based on the global F-test, the regression model as a whole is statistically significant ($F(2,190) = 7.6560$, $p = 0.0006$), indicating that the included explanatory variables jointly exhibit a non-random association with the dependent variable. The intercept is not statistically significant at the 5% level ($p = 0.0654$); therefore, its independent explanatory relevance cannot be confirmed. The results pertain to the subsample of respondents with higher education qualifications from the Green Deal dataset and indicate that, within this model, crisis perception is the strongest direct predictor of attitudes toward energy independence, with its effect further reinforced by subjective economic cost pressure.

5. Discussion

The central question of the study was to identify the structural factors shaping attitudes toward energy independence. The following section discusses the findings within the frameworks of security studies, social psychology, and the information environment.

5.1. Energy Autonomy as a Security Response

The results confirm that support for energy independence is primarily a response to experienced uncertainty [4, 5, 17–19, 24, 38]. The significant association between crisis perception and support for energy autonomy suggests that this attitude cannot be interpreted solely as an energy or environmental policy preference; it also emerges as a means of coping with perceived threat [38].

From a security studies perspective, energy autonomy embodies a broader narrative of regaining control [4, 5, 9, 22]. When individuals perceive economic instability, risks to security of supply, or geopolitical uncertainty, demand for autonomous solutions increases. In this sense, energy independence represents both a symbolic and practical means of reducing vulnerability [18, 26, 27]. The findings suggest that societal support for the energy transition is not grounded solely in technological rationality or climate policy convictions but is also closely linked to individuals' sense of security [1, 6–9]. The green transition becomes a legitimate process when it can reduce the subjective experience of uncertainty and loss of control. The results are associative in nature: crisis perception shows significant covariation with attitudes toward energy independence, but the cross-sectional, self-reported measurement does not allow causal inference [39].

5.2. The Indirect Role of Institutional Trust

The absence of a direct effect of institutional trust in the present analysis should not be interpreted as evidence of its irrelevance, but rather as an indication that its direct association cannot be confirmed within this sample and model specification. In this sense, attitudes toward energy independence appear to be more strongly linked to subjective experiences of uncertainty than to institutional trust. At the same time, the current dataset does not allow for an examination of whether institutional trust may exert influence through indirect, moderating, or interaction effects.

These findings are largely consistent with the literature on risk perception and environmental behaviour [25, 28, 35]. Previous studies have demonstrated that perceived economic and social vulnerability significantly shape public attitudes towards environmental and energy policies [9, 11, 12, 20–25]. The present analysis confirms that this mechanism also operates in the context of energy independence attitudes in Hungary. Its contribution lies not in identifying a fundamentally new mechanism, but in demonstrating that perception-based explanations established in the international literature are also applicable to Hungarian energy independence attitudes. Building on the approach of Gifford and Nilsson [22], the study shows that subjective experiences of uncertainty are more directly associated with attitudes than institutional trust. In contrast to the legitimacy-centred frameworks of Jordan et al. [20] and Bäckstrand and Kuypers [21], the present findings emphasize that, in this case, perceptions of vulnerability and cost pressure play a more prominent role than institutional acceptance [25, 29].

6. Conclusion

The aim of this study was to empirically examine the factors shaping attitudes toward energy independence in Hungarian society. The results indicate that, within the present sample, support for energy autonomy is significantly associated with crisis perception, while no direct relationship with institutional trust can be identified. Crisis perception and household cost pressure jointly form a statistically significant but limited explanatory model; accordingly, the findings should be interpreted as exploratory and associative in nature. The observed pattern suggests that, in the Hungarian sample, attitudes toward energy independence are more closely linked to the subjective experience of uncertainty and vulnerability than to institutional trust.

From a theoretical perspective, the primary contribution of this study lies in testing perception-based explanations of attitudes, which are well established in the international literature, within a Hungarian sample. The paper does not introduce a fundamentally new theoretical mechanism; rather, it demonstrates that subjective uncertainty and cost pressure also play observable roles in shaping attitudes toward energy independence in the Hungarian context.

From a policy perspective, the findings point to several important implications. Maintaining societal support for the energy transition requires more than emphasizing technological or economic rationality alone [1, 4, 6–9, 28, 31–35]. Policy communication must also address the emotional dimensions of uncertainty and perceived threat, as a substantial share of public attitudes is shaped by these perceptions [18, 25, 28, 39, 40]. Economic stability and predictable energy policy can play a key role in mitigating crisis perception; accordingly, reducing household cost pressure may indirectly contribute to stabilizing energy-related attitudes [9, 11, 12]. In addition, strengthening information resilience, particularly through the development of media literacy and critical thinking, may, in the longer term, reduce the impact of disinformation in amplifying crisis perception [9, 41–47]. Energy policy decision-making should therefore take into account that the demand for energy autonomy does not appear solely as a political preference but can also be interpreted as an indicator of societal security perception [18, 24, 26, 36, 38, 48–50].

The study has several important limitations. The analysis is based on a non-representative online sample, and, more specifically, on a narrower subsample of respondents with higher education qualifications; therefore, the generalizability of the findings is substantially limited. Measurement was conducted using five-point Likert scales, which, due to the presence of a midpoint, may reduce the discriminatory power of responses. Furthermore, the regression model does not include several theoretically relevant control variables, particularly age, income, political orientation, type of residence, and household structure; therefore, the estimated effect of crisis perception may be partially inflated due to omitted variable bias. Due to the cross-sectional nature of the data, the observed relationships should be interpreted as associative patterns rather than causal effects. Future research should employ extended control models and incorporate robustness checks using logistic regression.

The effectiveness of energy policy communication and decision-making may depend on reducing perceived uncertainty [48, 49].

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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