

# Intention to Pay Higher Taxes Dedicated to Reduction of Coal Energy – A Case of Young Central Eastern Europeans

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## Abstract

In an era of increasing efforts to reduce global greenhouse gas (GHG) emissions, black coal creates many problems, primarily because it is a fuel used solely for burning that contaminates the environment. In countries in Central Eastern Europe, a safe and successful transition from energy produced from coal requires societal changes, as well as public and private financing. The aim of this study is to examine and better understand how different psychological factors influence young citizens' intention to engage in activities directed at coal energy reduction financially. In our pilot study, we enlisted respondents from the Czech Republic, Poland, Romania, and Slovakia because the analysis of the main sources of energy generation in these countries provided evidence that they are behind in embracing the European Commission's strategy and meeting the renewable energy sources target. Based on a questionnaire survey, we found that Central Eastern European citizens' intention to pay higher taxes to reduce energy use from coal was moderate. Using Ajzen's theory of planned behavior, we also found that only two variables, attitude, and subjective norms, are strong determinants of environmental intentions for young Central Eastern European citizens. In addition, our study is the first to include personal responsibility as a consideration in coal energy reduction. Our extension of the theory of planned behavior with personal responsibility indicates the enormous role of the postulated environmental protection policies and media campaigns in promoting environmental awareness among young citizens.

## Keywords

Coal energy, theory of planned behavior, intention to pay, taxes, Central Eastern Europe.



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## Introduction

Black coal is third among energy sources in the European Union (Manowska et al., 2017). For countries that draw coal energy from their own sources, it is an important (or the basic) solution to energy security and independence. The Czech Republic, Poland, Romania, and Slovakia are among such countries. In Europe, only Poland and the Czech Republic produce hard coal. Poland's consumption of hard coal accounts for 41%, and the Czech Republic accounts for 6% of total hard coal consumption in the European Union. Further, Romania, Slovakia, and Czechia's dependency on coal imports exceeds 90%, with Romania importing more than it consumes to build stock (Eurostat, 2022).

In an era focused on reducing global greenhouse gas (GHG) emissions, black coal creates many problems, as it is a fuel used solely for burning and contaminates the environment. Further, coal mines are threatened by the increasing cost of extraction, endangering the economic profitability of coal mines despite the incorporation of new management tools (Bijańska & Wodarski, 2020; Chmiela et al., 2022). Given the European Union's decarbonization ambitions (United Nations Climate Change, 2015; European Parliament resolutions, 2019, 2020), black coal regions are in transition and face unprecedented structural changes, which have been intensified by the military conflict in Ukraine.

A safe and successful transition from energy produced by coal requires not only the reinvention of local economies to create alternatives for workers whose jobs will be lost but also the revitalization of old mining industry areas and the development of new energy sources. These activities are challenging, as many industries in Central Eastern European economies are coal-reliant, and the hard coal sector – although it has been decreasing in size for many years – still provides jobs for thousands of workers in Central and Eastern Europe. These social and economic aspects are encompassed in the European Union's zero-emission strategy, which stresses the importance of creating a just transition fund of EUR 4,8 billion, marked especially for those regions most affected by decarbonization, such as coal-mining regions and areas that are dependent on carbon-intensive industries such as steel manufacturing (European Parliament resolutions, 2019, 2020). The fund would promote, inter alia, upskilling and reskilling to prepare workers and adapt them to new employment perspectives, requirements, and competencies and would also support the creation of high-quality and sustainable jobs.

EU resolutions strongly emphasize that just transition funding must be conditional on the progress of concrete and binding decarbonization plans in line with the Paris Agreement, especially the phase-out of coal and the transformation of carbon-intensive economic regions. In addition, it stresses that funds alone cannot ensure the transition and that a comprehensive EU strategy based on genuine dialogue and partnerships with the people and communities concerned, including trade unions, is necessary.

On the national level, European Union countries were obliged to prepare a long-term strategy outlining a vision of deep economic and societal transformation that engages all sectors of the economy and society in order to transition to a climate-neutral economy. Its aim is to ensure that transformation is socially fair and does not leave any Europeans or regions behind. Moreover, the European Commission provides incentives to the financial sector to contribute to the green transition, as well as the fundamentals necessary for societal change. Despite many decarbonization initiatives, the involvement of state countries in activities to reduce energy production from coal is diversified.

The aim of this study is to examine and better understand how different psychological factors influence young Central Eastern European citizens' intention to engage in activities directed at coal energy reduction financially. To accomplish this, the next section describes the present clean energy transition activities of the four countries under investigation: the Czech Republic, Poland, Romania, and Slovakia. The following section of the article is devoted to past literature identifying Central Eastern European citizens' opinions about renewable energy policies and their socioeconomic consequences. Next, we present the theory of planned behavior used as a theoretical framework for this study. The current study section reveals the hypotheses, participants, materials, and procedures, as well as the results. This is followed by a discussion, including practical implications, and concludes with limitations and future research paths.

### Coal energy transition in selected Central Eastern Countries

#### *Czech Republic*

The Czech Republic's approach to climate change is twofold: a policy aimed at reducing greenhouse gas (GHG) emissions and a policy of adapting and strengthening resilience to the adverse impacts of climate change (Ministry of the Environment of the Czech Republic, 2017). More specifically, the decline in greenhouse gas emissions is expected to be significantly attributable to the decrease in coal as a source of energy production and its gradual replacement with nuclear and renewable energy sources. The new Czech government announced a clear target on January 7, 2022, stating that it would gradually eliminate coal by 2033 through a strategy to decarbonize the heating of buildings (David, 2022).

The assessment of the Czech government's national long-term strategy conducted by Ricardo Energy and Environment (2019), a global environmental consultancy, reveals some missing information regarding the estimated share of renewable energy to be generated by 2050, the GHG emission trajectories, and the expected GHG emission reductions by industrial sectors. The strategy mentions several scenarios to be explored and possibly implemented by 2050, such as importing biomass and electricity, expanding existing nuclear power plants, developing the potential for renewable energy sources, or a mix of green and nuclear scenarios.

The European Commission report (2020a) notes that in terms of the energy market, the Czech Republic plans to exit from using coal, while the long-term supply of coal will be a priority for the heating sector. This signals the need for a detailed analysis of just and fair transition issues, including a comprehensive assessment of the impact of planned national policies and measures on social, employment, and skills, especially in coal regions. Estimates indicate that the coal phase-out could result in the loss of 25,000 jobs. Investments in renewable sources, however, can restore the balance with up to 32,000 jobs (Zichová, 2021).

The main challenge in implementing the Czech government's national long-term strategy is highlighted by (Rečková et al., 2017), who found that replacing coal for heating purposes is a more difficult task when compared with electricity generation. The desired exit from coal use not only has employment consequences but also economical, as coal is a cheap source of energy.

### *Poland*

Climate change concerns in Poland are not as strong as in most European Union countries (Kundzewicz et al., 2019). Thus, coal energy opponents primarily discuss air pollution, as 36 out of the 50 most polluted cities in the European Union are in Poland (Maćkowiak-Pandera, 2018). Improving air quality in Poland requires comprehensive measures to modernize heating sources, i.e., heating network development, thermal modernization, and eliminating households' use of coal energy. As these require identifying new methods to diversify independent energy sources, have public health and other socioeconomic implications, and call for large amounts of financing, a discussion surrounding the financial sources of modernization, barriers, and drivers of coal consumption reduction is ongoing in Poland (Vasev, 2017; Manowska et al., 2017; Kuchler & Bridge, 2018; Brauers & Oei, 2020; Antosiewicz et al., 2020).

The discussion and suggested solutions are varied, as Poland's energy mix is primarily based on fossil fuels, and a political economy is associated with coal in Poland (Kuchler & Bridge, 2018; Brauers & Oei, 2020; Gas Infrastructure Europe, 2021). By analyzing the low-carbon energy transition in the Visegrad Group countries, it appears that Poland is in the most difficult situation, as it is most dependent on the production of electricity from coal and has the largest number of employees in the coal and coal-related sectors (Kochanek, 2021).

Moreover, Poland hasn't yet published its national long-term strategy (under the Paris Agreement, required by Regulation (EU) 2018/1999 of the European Parliament), although areas covered by this document encompass the expected socioeconomic effect of decarbonization, including inter alia, aspects related to macroeconomic and social development, health risks and benefits, and environmental protection. In addition, the cost of restructuring and modernizing the energy sector in Poland has been estimated at EUR 200 billion in the coming years (Czy wpływy z emisji CO<sub>2</sub>..., 2019). Overall, the social and economic aspects of coal mining in Poland suggest that a shift away from coal energy will not take place in the coming years (Jonek-Kowalska, 2015) and will be a very difficult challenge, intensified by the war in Ukraine (United Nations, 2022).

Despite the resistance to coal production and consumption, in 2020, it was announced that all of Poland's coal mines will be closed by 2049. The energy transition was primarily explained by difficult geological conditions, resulting in an increased cost for extracted coal. To reduce coal's share in electricity production from 80% to 32% by 2040, the building of six reactors and an offshore wind power plant in the Baltic Sea have been planned (Coal mines in Europe, 2021).

### *Romania*

Romania is continuing the downward trend of coal use in the energy market. Although 17 coal mining exploitations are still active, some of them have already entered the process of being closed by 2026. The Environment Ministry decided that only three coal exploitations will be maintained as strategic reserves until 2030. This strategy will allow Romania to restart, in a force majeure regime and temporarily, coal-fired power plants so that coal-fired energy will be produced only if needed and to achieve energy independence (David, 2022).

The Romanian government (2020) published its Integrated National Energy and Climate Plan 2021-2030 and committed, as a key priority of the strategy, to maintain the current level of diversity of internal sources of energy production (nuclear, fossil, and renewables). The aim is to stimulate oil, fossil gas extraction, and investments in renewable resources. The European Commission's (2020b) assessment of the viability of this strategy revealed that although Romania committed to increasing the share of energy from renewable sources in gross final energy consumption to 30.7% by 2030, this figure is still below the 34% target computed by the EC. With regard to the energy market, the aim is to cover a 50% share of national electricity consumption from renewable energy sources by 2030, which is considered an achievable and realistic target by the EC.

On June 30, 2022, the Romanian government adopted an emergency law on decarbonizing the energy sector (Romanian Ministry of Energy, 2022) to phase out coal by 2030. The law established the legal framework to phase out coal-based electricity production from the energy mix to ensure a sustainable transition toward the low-carbon production of electricity by replacing existing conventional power-generation capacities with low-carbon ones and promoting the use of renewable resources in energy production. The plan explicitly references developing more solar energy, wind energy, and hydropower capacities because these technologies do not produce GHG emissions. It is important to note that Romania's electricity mix is currently one of the most balanced in the EU, with coal, hydropower, fossil gas, nuclear energy, and wind power holding comparable shares of capacity and power generation (Turp-Balazs, 2022).

### *Slovakia*

The Slovak government has elaborated the Low-Carbon Development Strategy of the Slovak Republic (2019) until 2030 with a view to 2050, committing to identifying and implementing policies and measures to achieve climate neutrality in Slovakia by 2050. In addition, Slovakia has announced a target to phase out coal by 2030 (David, 2022). It is worth noting that nuclear power holds the largest share in electricity generation, followed by hydro and, to a lesser extent, the use of coal (Kochanek, 2021; EURACOAL, 2022).

The assessment of the Slovak national long-term strategy conducted by Ricardo Energy and Environment (2020) draws attention to the fact that the projected measures are insufficient to meet the climate neutrality target by 2050, with the implementation of additional measures of utmost importance. The strategy doesn't provide clear information and projections regarding GHG emission reductions, renewable energy sources, or energy efficiency beyond 2030. The draft strategy had already been analyzed by the European Commission (2020c), which formulated a series of recommendations. Consequently, Slovakia has increased its 2030 renewable energy contribution to 19.2%, which is still below the 24% target. The share of renewable energy consumption in terms of total consumption is projected to reach 27.3% by 2030, with the main sources identified as onshore wind and photovoltaics and, to a lesser extent, biomass, biomethane, and geothermal energy.

A scenario analysis (Gerbelová et al., 2021) meant to identify alternative technological options for replacing the existing coal power plant in Slovakia reported a net positive cost benefit for all developed scenarios. Although the installation of a new geothermal plant is estimated to be the most expensive option, compared to the use of biomass or the conversion to natural gas, it presents the highest CO<sub>2</sub> reduction in electricity generation.

To summarize, all four countries chosen for the investigation presented in this article struggle with the coal energy transition, each in its own way influenced by different social, economic, and political determinants. With this in mind, we find it worthy of scientific interest to examine to what degree young citizens of the Czech Republic, Poland, Romania, and Slovakia are eager to engage in efforts to reduce coal energy financially. Because young generations and their children are expected to benefit from actions taken today, and one can observe many activist movements fighting for the environment, we assume that young Central Eastern European citizens should feel responsible for energy production and its influence on future generations. Our motivation for the study is thus operationalized with psychological factors encompassed in Ajzens' theory of planned behaviour, which can serve as surrogates for environmental intentions and provide valuable insights (for regulators) about searching for new tools aimed not only at financing energy transition but also at activating young citizens in the environmental sphere.

### **Central Eastern Europe citizens' opinions about renewable energy policies and their consequences**

In addition to the ongoing and expected economic and social changes that come with the coal energy transition, the psychosocial consequences of the transition toward a carbon-neutral economy are another important factor in the decarbonization process in Central Eastern European countries. The mining industry not only creates jobs but also influences many other aspects of human life. The mining industry's most visible consequences are negative environmental changes, including damage to overground and underground facilities, as well as other forms of material damage (Biały et al., 2020). Mining damage most frequently takes the form of surface deformations or damage to facilities and infrastructure in mining areas and their immediate vicinity (Midor et al., 2021). Some works deal with efficient mining and berm stability (Wiecek et al., 2019).

Further, coal power plants are responsible for significant air pollution, which reduces the quality of life of the inhabitants of a given area (Biały et al., 2021). Exposure to coal combustion residues containing both fine and coarse particulate matter, as well as benzo[a]pyren, can result in serious health problems, including cardiovascular disease, lung cancer, and other diseases that lead to premature death (European Environmental Agency, 2021). It can be assumed that as public awareness of the negative consequences of using energy from coal grows, society's readiness to undertake actions aimed at limiting the energy derived from coal should increase, even if it means liquidation of workplaces, the need for workforce reskilling, and the increment of large financial outlays by countries undergoing coal energy transition. The difficulty of the decarbonizing energy supply process is also expressed in the need to ensure a reliable, secure, and affordable energy supply for all households.

Indeed, Anderson et al. (2017), in a cross-country empirical analysis that combined data on the public's environmental attitudes and renewable energy policy outputs in a European context between 1974 and 2015, found that public opinion has shifted toward prioritizing the environment, expressed, *inter alia*, in support of the adoption of renewable energy policies in Europe. In a questionnaire study conducted in 23 European countries and Russia, the European Social Survey (2018) asked citizens about their concerns regarding climate change and their opinions on what energy policy measures in different countries should be adopted to mitigate climate change. Citizens were generally most concerned about the affordability of energy, dependency on fossil fuels, and imports. While most citizens of those European countries were worried about climate change, most of those citizens from the Former Eastern Bloc states were among the least worried.

Moreover, the survey analyzed the social perspective of possible actions that may reduce climate change – whether driven by societies or governments. Respondents in all countries believed that actions taken by governments had a greater chance of changing the climate situation than grassroots actions aimed at reducing energy use, even if taken by large groups of people. There was also public approval of subsidizing renewable energy with public money. At the same time, however, more people were against – rather than in favor of – putting a price on pollution by increasing taxes on fossil fuels. This shows that despite the awareness of the need to intensify changes in the area of energy sources, people in many countries hold negative views about the costs that this process may entail for individual households.

### **A reasoned-action perspective on pro-environmental intentions of Central Eastern European citizens**

Increasing severe environmental problems derived particularly from coal energy in many countries triggered research into the psychological factors that may cause people to engage in pro-ecological activities. As the European Social Survey (2018) demonstrated, although people are concerned about negative climate change, they are simultaneously restrained in expressing approval toward bearing the financial consequences of the decarbonization process. Therefore, it is important to understand the psychological factors that may increase social acceptance of the costs of this process.

Various conceptual frameworks have been introduced in research on pro-environmental decisions, such as the construal level theory (CLT) (Trope & Liberman, 2003), the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), and the social cognitive theory (SCT) (Bandura, 2008). Another theory that is extensively employed in the conceptual framework of environmental research is the theory of planned behavior (TPB) (Ajzen, 1991) because of its strong applicability and extensibility (Zhang et al., 2019). Armitage and Connor (2001), in a meta-analysis of 185 studies, found that TPB accounted for 27% and 39% of the variances in behavior and intention, respectively.

Ajzen's theory of planned behavior (1991) is prevalent in psychology and behavioral sciences. It assumes that individual behavior is driven by behavioral intentions as a function of three independent constructs: attitude toward behavior, subjective norms, and perceived behavioral control. TPB was applied to gain a better understanding of a broad range of human behaviors, including a growing body of studies on environmental changes and ecological consumer choices (De Groot & Steg, 2007; Nigbur et al., 2010; Greaves, Zibarras & Stride, 2013; Mancha et al., 2014). The results of those studies, which investigated behavioral intentions toward environmentally oriented behaviors at home, at the workplace, or in the neighborhood, revealed the role of the three components of Ajzen's theory.

In summary, the research demonstrated that the environmental theory of planned behavior (ETPB) may contribute to environmental changes, as intentions to improve or protect the environment are key elements to changing behavior. Stern (2000) noted that intention may not only independently contribute to behavior but may also be moderated or negated by peoples' beliefs about their choices and decisions. Therefore, a reasoned-action perspective on the pro-environmental intentions of citizens may be an important element in explaining behavior in the area of environmental activities.

Although TPB is considered a useful framework to explain human behaviors with regard to pro-environmental activities, some researchers claim that it does not fully explain particular behaviors. Some of TPB's weaknesses derive from the following facts: it is a static model (Sniehotta et al., 2014), the weight on rational predictors is based on self-interest motives (Bertoldo & Castro, 2016), and it excludes partially emotional and non-conscious influences on the intention-behavior gap (Webb & Sheeran, 2006). Moreover, the changing circumstances of the moment of intention formation and action may also play a role in lowering the predictability of this model. However, the constant popularity of the TPB in studies on psychological factors influencing pro-environmental behaviors caused it to be designated the principal approach in this study.

### **Current study**

According to the theory of planned behavior, the current study examines predictors of intention to pay higher taxes dedicated to reducing coal energy (Ajzen, 1991) among young Central Eastern European citizens. Keeping

in mind the limited predictability of TPB, we decided to extend the model adopted in the study by a personal responsibility factor to improve its predictive power. In light of the public opinion survey results cited above (European Social Survey, 2018), it can be said that the sense of personal responsibility for actions aimed at reducing the use of coal energy is crucial in shaping the desired pro-environmental behavior and, over the long term, in mitigating climate change. According to this survey, citizens view their own role in improving the environmental situation as much smaller than the role of the government. However, the importance of individual consumer behaviors in reducing overall energy consumption is undeniable. Households represented 27% of final energy consumption, or 19% of gross inland energy consumption, in the European Union in 2020 (Eurostat, 2020).

Further, past literature confirms that people are aware of coal mines' negative impact on the environment (Hąbek et al., 2019) and the need to limit GHG by decreasing the use of energy from coal (Kotchen et al., 2013; Reynolds et al., 2018), as well as the fact that the reduction of coal energy consumption is in line with the idea of corporate social responsibility (Bijańska et al., 2018; Kuzior et al., 2022). There is evidence that, for example, Americans are willing to pay 14% more on average in household energy bills to invest in clean energy and infrastructure and assist displaced workers from the coal sector (Kotchen et al., 2017). Additionally, residents of China are willing to pay at least 10% more than the market price for energy-efficient and environmentally friendly products that contribute to climate change mitigation (Li et al., 2016). Europeans also remain very concerned about climate change, as 96% of Europeans have taken at least one action to tackle climate change, and 90% of Europeans agree that GHG should be reduced to make the European Union climate-neutral by 2050 (European Commission, 2021).

Researchers have provided evidence that there is an association between education (Diederich & Goeschl, 2014), climate change concerns (climate beliefs), and individual intention to pay for mitigating such effects (Dienes, 2015; Reichl, 2021) and that private experience with climate change predicts intentions to fight global warming (Broomel et al., 2015). Researchers and institutions have investigated not only different forms of citizen engagement in climate change but also the financing challenges derived from ambitious environmental goals. The World Bank (2021) posits that the world will need to make significant investments in infrastructure totaling around US \$4 trillion per year by 2030. This indicates the enormous need for public and private financing for climate change mitigation and, among other activities, lowering the use of energy generated from coal.

Based on the socioeconomic challenges related to the coal energy transition surrounding the four analyzed Central Eastern European countries, and with the TPB as the theoretical framework for this study, we formulated four hypotheses:

**H1.** Attitude toward coal energy reduction is positively and significantly associated with the intention to pay higher taxes dedicated to reducing coal energy.

**H2.** Subjective norms regarding coal energy reduction are positively and significantly associated with the intention to pay higher taxes dedicated to reducing coal energy.

**H3.** Perceived behavioral control of the reduction of coal energy is positively and significantly associated with the intention to pay higher taxes dedicated to reducing coal energy.

**H4.** Personal responsibility for the reduction of coal energy is positively and significantly associated with the intention to pay higher taxes dedicated to reducing coal energy.

Consistent with the assumptions adopted in this study, and despite the differences in the actual level of coal as an energy source, all analyzed countries are currently taking measures to limit the use of this energy source and are experiencing challenges related to coal mines closures and limited financing sources. Therefore, in all four countries, it is equally important to explore the psychological factors explaining the propensity to take action to reduce the use of energy derived from coal. The adopted psychological framework of TPB has been used in many studies conducted on different groups of respondents, thereby demonstrating the universality of the theory developed by Ajzen (1991). The components of the process of behavioral intention formulation are constant, regardless of the category of planned behavior or respondents' characteristics. Consequently, setting aside the actual level of intention to pay higher taxes dedicated to reducing coal energy among the four groups of respondents, the psychological process leading to the formation of this intention would be analogous. Considering that the economic and industrial pasts of the surveyed countries of Central Eastern Europe are congruous, we assume that the propensity to take measures to reduce the use of energy from coal will be similar among respondents from these countries. Therefore, the analyses were carried out jointly for all four countries. Since young people take different actions to address climate change by joining existing environmental organizations, as well as by creating their own, sufficient attention was not accorded to youth climate mobilization (O'Brien et al., 2018; Cherisch et al., 2019; Bergmann & Ossewaarde, 2020). Rather, our study was conducted among students as representatives of a young generation. In this study, we combine psychology with economics and examine the intention to pay higher taxes dedicated to reducing energy from coal among Central Eastern Europeans.

### *Participants*

The study was conducted on a sample of 239 respondents recruited from four Central Eastern European countries: The Czech Republic (N = 41), Poland (N = 68), Romania (N = 65), and Slovakia (N = 65). Thus, it is a pilot study. Overall, in this study, conducted from May to July 2022, 110 women and 129 men participated in the mean age range of 23.22 (SD = 6.23). Most of the respondents were students of economy and management (55.2%) or engineering (34.7%). Some of them studied at facilities related to environmental protection (8.4%) and others (1.7%). Only 38.5% of students confirmed that they lived within 50 km of an active coal mine.

### *Materials and procedures*

The survey was conducted using the paper-pencil method on university campuses in four Central Eastern European countries. Participation in the study was voluntary, with no remuneration for respondents. Using a designed questionnaire, students were asked to answer questions on their intention to pay higher taxes dedicated to reducing coal energy, attitudes, subjective norms, and perceived behavioral control of coal energy reduction as components of the theory of planned behavior (Ajzen, 1991), as well as personal responsibility for coal energy reduction.

With regard to the intention to pay higher taxes dedicated to reducing coal energy, at the beginning of the questionnaire, respondents answered questions indicating how much they would be willing to pay in higher taxes (for the price of energy) to accelerate the shift away from energy produced from coal using a 7-point Likert scale (1 = definitely not; 7 = definitely yes).

In order to measure attitudes toward coal energy reduction in accordance with Ajzen's theory of planned behavior (1991), we asked respondents to evaluate their postures toward activities aimed at reducing the use of coal energy (for instance, My commitment to reducing the use of coal energy would be...) on three scales with a 7-point semantic differential (bad or good; irresponsible or responsible; undesirable or desirable). The Cronbach's alpha coefficient here was .90.

Concerning subjective norms regarding coal energy reduction, we asked participants three questions about personal and social norms pertaining to limiting energy production from coal (for instance, Most of my friends believe that limiting the use of coal energy is important). The answers were given on a 7-point Likert scale (1 = definitely not; 7 = definitely yes). The scale's Cronbach's alpha coefficient was .80.

Respondents were then asked about the perceived behavioral control of reducing coal energy. They answered three questions regarding the perceived behavioral control of reducing coal energy (for instance, I am convinced that I can influence the reduction of the use of energy produced from coal), again using a 7-point Likert scale (1 = definitely not; 7 = definitely yes). Cronbach's alpha coefficient was calculated to be .74.

In order to measure personal responsibility for limiting energy production from coal, we asked six questions (for instance, I feel ashamed of how little I do to improve air quality). As in the previous questions, the answers were recorded using a 7-point Likert scale (1 = definitely not; 7 = definitely yes). Cronbach's alpha coefficient was calculated to be .83.

In an additional component of the questionnaire, we included questions about gender, age, and faculty of the study, as well as living near (up to 50 km) an active coal mine. At the end of the study, we thanked respondents for completing the questionnaire.

## **Results**

As the first step of the analysis, we examined whether the intention to pay higher taxes dedicated to reducing coal energy is similar among respondents from four analyzed countries, as assumed. The univariate variance analysis turned out to be insignificant ( $F = 1.05$ ,  $p < .372$ ), indicating no differences in this respect. Therefore, taking into account the result of the statistical analysis and the above considerations, we are able to present the results of further analyses for the entire group of Central Eastern European respondents.

Table 1 presents the descriptive statistics and correlations for the studied variables. As predicted, an intention to pay higher taxes was positively correlated with all three dimensions of the theory of planned behavior: attitude toward coal energy reduction ( $r = .48$ ,  $p < .001$ ), subjective norms regarding coal energy reduction ( $r = .47$ ,  $p < .001$ ), and perceived behavioral control of coal energy reduction ( $r = .23$ ,  $p < .001$ ), in addition to personal responsibility for coal energy reduction ( $r = .44$ ,  $p < .001$ ). These findings provided preliminary support for the hypotheses.

Tab. 1. Descriptive statistics and Pearson's correlations for the adopted variables ( $N = 239$ ,  $*p < .001$ )

Construct	1	2	3	4	5
Intension to pay higher taxes (1)	3.54 (1.55)				
Attitude towards coal energy reduction (2)	.48*	14.68 (3.92)			
Subjective norms regarding coal energy reduction (3)	.47*	.58*	14.60 (3.66)		
Perceived behavioral control of reduction of coal energy (4)	.23*	.24*	.30*	12.47 (3.95)	
Personal responsibility for coal energy reduction (5)	.44*	.33*	.36*	.40*	21.75 (7.33)

Next, the multiple linear regression analysis was conducted. Since the data for the independent and dependent variables were obtained from the same group of respondents and the regression quotation has four independent variables, a multicollinearity test was carried out using the variance inflation factor (VIF) before performing multiple linear regression analysis. The results of the self-informant bias examination are presented in Table 2.

Tab. 2. Full-Collinearity Test

Construct	VIF
Attitude toward coal energy reduction	1.54
Subjective norms regarding coal energy reduction	1.61
Perceived behavioral control of reduction of coal energy	1.24
Personal responsibility for coal energy reduction	1.32

All VIFs presented in Table 2 are below 2.00, and according to Kock (2015), the VIF threshold should be less than 3.3, enabling us to conclude that the regression model has no lateral collinearity problem (Hair et al., 2017).

The results of the multiple linear regression analysis are presented in Table 3. According to hypotheses **H1-H4**, the predictors were as follows: three dimensions of the theory of planned behavior (attitude toward coal energy reduction, subjective norms regarding coal energy reduction, perceived behavioral control of coal energy reduction), as well as personal responsibility for coal energy reduction. The dependent variable was the intention to pay higher taxes dedicated to coal energy reduction.

Tab. 3. Results of the multiple linear regression analysis

Hypotheses	Relationship	Standard Beta	Standard Error	T-value	p-value
H1	Att → ItP	.263	.026	4.01	<.001
H2	Nrm → ItP	.215	.028	3.22	.001
H3	Ctr → ItP	-.013	.023	-.22	.825
H4	Res → ItP	.282	.013	4.65	<.001

Att – Attitude toward coal energy reduction; Nrm – Subjective norms regarding coal energy reduction; Ctr – perceived behavioral control of coal energy reduction; Res – personal responsibility for coal energy reduction; ItP – Intension to pay higher taxes dedicated to coal energy reduction

The coefficients of the independent variables in **H1**, **H2**, and **H4** were all positive, supporting the formulated hypotheses. Intention to pay higher taxes dedicated to coal energy reduction was explained by attitude toward coal energy reduction ( $Beta = .263$ ,  $p < .001$ ), subjective norms regarding coal energy reduction ( $Beta = .215$ ,  $p < .001$ ), and personal responsibility for coal energy reduction ( $Beta = .282$ ,  $p < .001$ ). The analysis did not support the perceived behavioral control of the reduction of coal energy as a predictor of the intention to pay higher taxes in order to reduce energy from coal. Accordingly, the three H1, H2, and H4 predictors explained 34.7% of the variance in intention to pay higher taxes dedicated to coal energy reduction ( $F = 41.71$ ,  $p < .001$ ).

## Discussion and practical implications

Young Central Eastern European respondents' intention to pay higher taxes to reduce energy use from coal was moderate. This finding corresponds with the European Social Survey (2018) characterizing the Former Eastern Bloc states as restrainedly concerned about climate change and coal energy transition. Since all analyzed countries rely heavily on coal energy and therefore experience negative environmental consequences associated with the fight surrounding pollution and social changes resulting from coal mine closures, this result is surprising. As previously described, citizens in many European countries, as well as in America and China, are inclined to incur financial expenses in the form of taxes to reduce the consumption of coal energy and accelerate the decarbonization



process. The link between coal energy and environmental, societal, and medical costs is unambiguous and prompts people to participate in discussions surrounding the cost of energy transformation. We contribute to the existing literature on coal energy reduction, as well as broader topics on activities related to climate change and greenhouse gas emissions, from the perspective of the following Central Eastern European countries: the Czech Republic, Poland, Romania, and Slovakia.

Employing the theory of planned behavior, we demonstrate that attitudes toward coal energy reduction and subjective norms regarding coal energy reduction are positively associated with an intention to pay higher taxes dedicated to a coal energy decline. These findings suggest that young Central Eastern European citizens' intention to engage in coal energy reduction financially is likely influenced by their attitudes and subjective norms regarding the payment of higher taxes dedicated to environmental actions in the form of reducing coal energy. On the one hand, our results confirm prior literature, which provides evidence that only two variables (attitude and subjective norm) are strong determinants of different environmental intentions (Glandon, 2003), as we found a significant relationship between the intention and its two antecedent variables: attitude toward coal energy reduction, and subjective norms regarding coal energy reduction.

Moreover, our findings confirm Ajzen's (1991) theory that attitude tends to be a stronger determinant of intention than other factors. On the other hand, the significant relationship between the intention and its two antecedent variables (attitude and subjective norm) confirmed by this study contrasts with other studies, providing evidence for a significant relationship between all three variables (attitude, subjective norms, and behavioral control). It is important to note that most studies implementing TPB with regard to environmental intentions were conducted among business managers and other primary decision-makers (for instance, Cordano & Frieze, 2000; Weidman et al., 2010; Mancha et al., 2014; Thoradeniya et al., 2015) or dealt with green purchases by customers (Kim et al., 2013; Wu et al., 2017; Sreen et al., 2018). Thus, our findings can only be compared with previous studies to a certain extent.

Because this study's focus was on the intention to pay higher taxes dedicated to coal energy reduction, a surprising finding was that perceived behavioral control or reduction of energy from coal is an insignificant factor. This suggests that Central Eastern Europeans do not feel they have control over the reduction of coal energy. It also confirms the findings of the European Social Survey (2018) that citizens see their own role in improving the environmental situation as much smaller than the role of governments. The findings call on Central Eastern European policymakers to intensify activities aimed at increasing perceived behavioral control among young citizens. Such activities are particularly important in light of the results of previous studies on pro-ecological behavioral intention, indicating the unrelatedness of perceived behavioral control and purchase intention on some green products (Arvola et al., 2008). In this research, perceived behavioral control was reflected in different aspects, such as perceived inconvenience, cost of time, and resources (Zhang et al., 2019). Because those factors may also play a role in shaping the intention to pay higher taxes dedicated to coal energy reduction, actions aimed at minimizing the negative effects of the decarbonization process should also be considered. In particular, policymakers could develop plans for the gradual decommissioning of coal-based energy for various groups of energy consumers and provide guidance for pro-environmental organizations seeking private financing.

The results of our study are consistent with other studies identifying the importance of psychological factors in many pro-ecological activities, including the process of coal energy reduction. Promoting and adopting sustainable development is crucial in a world struggling with increasing resource constraints, environmental pollution, and ecological degradation as a consequence of human industrial activity. These authors are concerned with the automated purification of certain rocks (Elbakian et al., 2018). (Likewise, Zhang et al., 2019), research suggests the extension of TPB with personal responsibility, creating a new, promising research perspective on behavioral intention regarding coal energy reduction. As a practical implication, this finding again indicates the enormous role of the postulated environmental protection policies and media campaigns in order to promote environmental awareness among citizens.

Further, this research, grounded in the theory of planned behavior, is the first to include personal responsibility for coal energy reduction as a factor influencing the intention to pay higher taxes on reducing coal energy. The factor's significance as a predictor of environmental action confirms that psychological factors should be the subject of further in-depth research examining the role that perceived personal responsibility and other personal indicators play in environmental decision-making.

### Limitations and future research

TPB does not explicitly consider contextual variables. Thus, our study should be interpreted with caution. First, it is possible that other variables could influence willingness to pay taxes dedicated to reducing coal energy. Second, this study took an imaginary form, which could impact the results obtained.

In addition, an insignificant relationship between perceived behavioral control and the intention to act in favor of coal reduction suggests that it is worthwhile to explore whether it is possible to change young Europeans' perceived behavioral control over coal energy reduction.

Future researchers investigating pro-environmental decision-making may wish to explicitly include personal responsibility as a factor shaping analyzed behavioral intention. Future studies might also indicate that personal responsibility better predicts decisional intentions than general attitudes and subjective norms regarding coal energy reduction. The authors express an opinion that future researchers should clarify the role of personal responsibility of the professions whose members may influence private financing of coal energy reduction and other environmental actions.

To conclude, this study introduces a new research perspective on the psychological factors shaping the intention to pay higher taxes dedicated to reducing coal energy, identifying the roles of personal attitudes, subjective norms, and personal responsibility in paying higher taxes dedicated to environmental actions. As other studies showed a relatively low level of citizens' environmental awareness, future studies should focus on methods of increasing citizens' involvement in environmental activities and examining other psychological factors that could be important in shaping the intention to undertake pro-ecological decisions regarding energy consumption.

## References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Anderson, B., Böhmelt, T. & Ward, H. (2017). Public opinion and environmental policy output: across-national analysis of energy policies in Europe, *Environmental Research Letters*, 12(11), DOI: 10.1088/1748-9326/aa8f80
- Antosiewicz M., Nikas, A., Szpor, A., Witajewski-Baltvilks, J., Doukas, H. (2020). Pathways for the transition of the Polish power sector and associated risks. *Environmental Innovation and Societal Transitions*, 35, 271-291.
- Armitage, C. & Connor, M. (2001). Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *The British Journal of Social Psychology*, 40(4), 471-499.
- Arvola, A., Vassallo, M., Dean, M., Lampila, P., Lähteenmäki, L., Shepherd, R. (2008). Predicting intentions to purchase organic food: the role of affective and moral attitudes in the Theory of Planned Behaviour. *Appetite*, 50 (2-3), 443-454.
- Bandura, A. (2008). Toward an agentic theory of the self. *Advances in Self-Research*, 3, 15-49.
- Bergmann, Z., Ossewaarde, R. (2020). Youth climate activists meet environmental governance: ageist depictions of the FFF movement and Greta Thunberg in German newspaper coverage. *Journal Of Multicultural Discourses*, 1-24. doi: 10.1080/17447143.2020.1745211
- Bertoldo, R., & Castro, P. (2016). The outer influence inside us: Exploring the relation between social and personal norms. *Resources, Conservation and Recycling*, 112, 45-53.
- Biały, W., Boloż, L., Sitko, J. (2021). Mechanical processing of hard coal as a source of noise pollution. Case study in Poland. *Energies*, 14, 1332. <https://doi.org/10.3390/en14051332>
- Biały, W., Grebski, W., Galecki, G., Kaniak, W. (2020). Environmental impact of the mechanical coal processing plant. *Acta Montanistica Slovaca*, 25, 139-149. <https://doi.org/10.46544/AMS.v25i2.1>
- Bijańska, J., Kuzior, A., Wodarski, K. (2018). Social perception of hard coal mining in perspective of region's sustainable development. *Management Systems in Production Engineering*, 26(3), 178-183. <https://doi.org/10.1515/mspe-2018-0029>
- Bijańska, J., Wodarski, K. (2020). Model of process management system in enterprises of hard coal mining industry. *Management Systems in Production Engineering*, 28, 112-120. <https://doi.org/10.2478/mspe-2020-0017>
- Brauers, H., Oei, P.-Y. (2020). The political economy of coal in Poland: drivers and barriers for a shift away from fossil fuels. *Energy Policy*, 144, 111621.
- Broomell, S.B., Budescu D.V., Por, H.-H. (2015). Personal experience with climate change predicts intentions to act. *Global Environmental Change*, 32, 67-73. <https://doi.org/10.1016/j.gloenvcha.2015.03.001>
- Chersich, M., Scorgie, F., Wright, C., Mullick, S., Mathee, A., & Hess, J. et al. (2019). Climate change and adolescents in South Africa: The role of youth activism and the health sector in safeguarding adolescents' health and education. *South African Medical Journal*, 109(9), 615. doi: 10.7196/samj.2019.v109i9.14327
- Chmiela, A., Smoliło, J. Gajdzik, M. (2022). A multifaced method of analyzing the amount of expenditures on mine liquidation processes in SKR S.A. *Management Systems in Production Engineering*, 30(2), 130-139. <https://doi.org/10.2478/mspe-2022-0016>
- Coal mines in Europe. 09.07.2021. *Energy Industry Review*. <https://energyindustryreview.com/analysis/coal-mines-in-europe/>
- Cordano, M., Frieze I.H. (2000). Environmental managers: applying Ajzen's theory of planned behavior. *The Academy of Management Journal*, 43, 627-641. <https://doi.org/10.2307/1556358>

- Czy wpływy z emisji CO<sub>2</sub> rozpląną się w budżecie? <https://www.cire.pl/artykuly/materialy-problemowe/149915-czy-wplywy-z-emisji-co2-rozplyna-sie-w-budzecie>
- David, R.R. (2022). Coal Production in 2022: Boom or Bust? *Energy Industry Review*, June 23, 2022, <https://energyindustryreview.com/metals-mining/coal-production-in-2022-boom-or-bust/>
- DeGroot, J. & Steg, L. (2007). General beliefs and the theory of planned behavior: The role of environmental concerns in the TPB. *Journal of Applied Social Psychology*, 37(8), 1817-1836, DOI: 10.1111/j.1559-1816.2007.00239.x
- Diederich, J., Goeschl, T. (2014). Willingness to pay for voluntary climate action and its determinants: field-experimental evidence. *Environmental and Resource Economics*, 57, 405-429. <https://doi.org/10.1007/s10640-013-9686-3>
- Dienes, Ch. (2015). Actions and intentions to pay for climate change mitigation: environmental concern and the role of economic factors. *Ecological Economics*, 109, 122-129.
- Elbakian, A. et al. (2018). Automated separation of basalt fiber and other earth resources by the means of acoustic vibrations. In Acta Montanistica Slovaca. Vol. 23, no. 3 (2018), pp. 271-281.
- EURACOAL, (2022). The voice of coal in Europe: Slovakia, <https://euracoal.eu/info/country-profiles/slovakia/>
- European Commission. (2020a). Assessment of the final national energy and climate plan of Czechia, Commission Staff Working Document, Brussels, 14.10.2020, SWD(2020) 902 final
- European Commission. (2020b). Assessment of the final national energy and climate plan of Romania, Commission Staff Working Document, Brussels, 14.10.2020, SWD(2020) 922 final
- European Commission. (2020c). Assessment of the final national energy and climate plan of Slovakia, Commission Staff Working Document, Brussels, 14.10.2020, SWD(2020) 924 final
- European Commission. (2021). Special Eurobarometer 513. Climate Change. Report. Citizen support for climate action. [https://climate.ec.europa.eu/citizens/citizen-support-climate-action\\_en](https://climate.ec.europa.eu/citizens/citizen-support-climate-action_en)
- European Environmental Agency (2021). Air pollution still too high in most EU Member States, <https://www.eea.europa.eu/highlights/air-pollution-still-too-high-1>
- European Parliament resolution of March 14 2019 on climate change – a European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy in accordance with the Paris Agreement (2019/2582(RSP)). [https://www.europarl.europa.eu/doceo/document/TA-8-2019-0217\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-8-2019-0217_EN.html)
- European Parliament resolution of January 15 2020 on the European Green Deal (2019/2956(RSP)). [https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005\\_EN.html](https://www.europarl.europa.eu/doceo/document/TA-9-2020-0005_EN.html)
- European Social Survey. (2018). Public Perceptions on Climate Change and Energy in Europe and Russia: Evidence from Round 8 of the European Social Survey. Public attitudes to welfare, climate change and energy in the EU and Russia (PAWCER), [https://www.europeansocialsurvey.org/docs/findings/ESS8\\_pawcer\\_climate\\_change.pdf](https://www.europeansocialsurvey.org/docs/findings/ESS8_pawcer_climate_change.pdf)
- Eurostat (2020). Energy consumption in EU households. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:20220617\\_EnergyConsumption.png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:20220617_EnergyConsumption.png)
- Eurostat (2022). EU energy mix and import dependency. [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU\\_energy\\_mix\\_and\\_import\\_dependency#Coal](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_energy_mix_and_import_dependency#Coal)
- Fishbein, M., Ajzen, I. (1975). Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research, Addison-Wesley Pub. Co.: Toronto, ON, Canada.
- Gas Infrastructure Europe. (2021). Decarbonization in Central-Eastern and South-Eastern Europe: how gas infrastructure can contribute to meet EU's long-term decarbonization objectives. [https://www.gie.eu/download/brochure/BROCH\\_CEE\\_SEE\\_2021.pdf](https://www.gie.eu/download/brochure/BROCH_CEE_SEE_2021.pdf)
- Gerbelová H., Spisto A., Giaccaria S. (2021) Regional Energy Transition: An Analytical Approach Applied to the Slovakian Coal Region, *Energies*, 14 (1):110. <https://doi.org/10.3390/en14010110>
- Glandon, TA. (2003). EDI adoption: controls in a changing environment. *Advances in Management Accounting*, 11, 287-317. [https://doi.org/10.1016/S1474-7871\(02\)11012-4](https://doi.org/10.1016/S1474-7871(02)11012-4)
- Greaves, M., Zibarras, L. D. & Stride, C. (2013). Using the theory of planned behavior to explore environmental behavioral intentions in the workplace, *Journal of Environmental Psychology*, 34, 109-120.
- Hair, J. F., Babin, B. J., & Krey, N. (2017). Covariance-Based Structural Equation Modeling in the Journal of Advertising: Review and Recommendations. *Journal of Advertising*, 46(1), 163-177. DOI: 10.1080/00913367.2017.128
- Hąbek, P., Biały, W., Livenskaya, G. (2019). Stakeholder engagement in corporate social responsibility reporting. The case of mining companies. *Acta Montanistica Slovaca*, 24(1), 25-34.
- Jonek Kowalska, I. (2015). Challenges for long-term industry restructuring in the Upper Silesian Coal Basin: What has Polish coal mining achieved and failed from a twenty-years perspective? *Resources Policy*, 44, 135-149.
- Kim, Y.J., Njite, D., Hancer, M. (2013). Anticipated emotion in customers' intention to select eco-friendly restaurants: augmenting the theory of planned behavior. *International Journal of Hospital Management*, 34, 255-262.

- Kochanek, E. (2021). The energy transition in the Visegrad group countries. *Energies*, 14(8), 2212. <https://doi.org/10.3390/en14082212>
- Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1-10.
- Kotchen, M.J., Boyle, K.J., Leiserowitz, A.A. (2013). Willingness-to-pay and policy-instrument choice for climate-change policy in the United States. *Energy Policy*, 55, 617-625. <http://dx.doi.org/10.1016/j.enpol.2012.12.058>
- Kotchen, M.J., Turk, Z.M., Leiserowitz, A.A. (2017). Public willingness to pay for a US carbon tax and preferences for spending the revenue. *Environmental Research Letters*, 12, 094012. <https://doi.org/10.1088/1748-9326/aa822a>
- Kuchler, M., Bridge, G. (2018). Down the black hole: sustaining national socio-technical imaginaries of coal in Poland. *Energy Research & Social Sciences*, 41, 136-147.
- Kundzewicz, Z.W., Painter, J., Kundzewicz, W.J. (2017). Climate change in the media: Poland's exceptionalism. *Environmental Communication*, 13, 366-380. DOI: 10.1080/17524032.2017.1394890
- Kuzior, A., Postrzednik-Lotko, K.A., Postrzednik, S. (2022). Limiting of carbon dioxide emissions through rational management of pro-ecological activities in the context of CSR assumptions. *Energies*, 15, 1825. <https://doi.org/10.3390/en15051825>
- Li, Y., Mu, X., Schiller, A.R., Zheng, B. (2016). Willingness to pay for climate change mitigation: evidence from China. *The Energy Journal*, 37, 179-194. <http://dx.doi.org/10.5547/01956574.37.SI1.yli>
- Maćkowiak-Pandera, J. (2018). Są unijne pieniądze na walkę ze smogiem, trzeba po nie tylko sięgnąć. <https://wysokienapiecie.pl/13218-sa-unijne-pieniadze-na-walke-ze-smogiem-trzeba-po-nie-tylko-siegnac/>
- Mancha, R., Muniz, K. & Yoder, C.Y. (2014). Studying Executives' Green Behaviors: An Environmental Theory of Planned Behavior, Research-in-Progress, <https://core.ac.uk/download/pdf/301362068.pdf>
- Manowska, A., Tobór Osadnik, K., Wyganowska, M. (2017). Economic and social aspects of restructuring Polish coal mining: focusing on Poland and the EU. *Resources Policy*, 52, 192-200.
- Midor, K., Biały, W., Rogala-Rojek, J., Matusiak, P. (2021). The process of designing the post-mining land reclamation investment using process map. Case study. *Energies*, 14, 5429. <https://doi.org/10.3390/en14175429>
- Ministry of the Environment of the Czech Republic. (2017). Climate Protection Policy of the Czech Republic: Executive summary, ISBN 978-80-7212-626-2
- Nigbur, D., Lyons, E. & Uzzell, D. (2010). Attitudes, norms, identity and environmental behavior: Using an expanded theory of planned behavior to predict participation in a kerbside recycling programme. *British Journal of Social Psychology*, 489(2), 259-284.
- O'Brien, K., E. Selboe, and B. M. Hayward. 2018. Exploring youth activism on climate change: dutiful, disruptive, and dangerous dissent. *Ecology and Society*, 23(3). <https://doi.org/10.5751/ES-10287-230342>
- Rečková, D., Rečka, L., Ščasný, M. (2017). Coal Transition in the Czech Republic, IDDRI and Climate Strategies, [https://www.iddri.org/sites/default/files/PDF/Publications/Catalogue%20Iddri/Rapport/201706-Report-coal\\_cz\\_Iddri-ClimateStrategies.pdf](https://www.iddri.org/sites/default/files/PDF/Publications/Catalogue%20Iddri/Rapport/201706-Report-coal_cz_Iddri-ClimateStrategies.pdf)
- Regulation (EU) 2018/1999 of the European Parliament and of the Council of December 11 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council. OJ L 328, 21.12.2018. [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L\\_.2018.328.01.0001.01.ENG](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0001.01.ENG)
- Reichl, J., Cohen, J.J., Klockner, Ch.A., Kollmann, A. (2021). The drivers of individual climate actions in Europe. *Global Environmental Change*,
- Reynolds, T.W., Bostrom, A., Read, D., Morgan, M.G. (2018) Now what do people know about global climate change? Survey studies of educated laypeople. *Risk Analysis*, 30, 1520-1538.
- Ricardo Energy & Environment. (2019). Assessment of the Long-Term Strategies of EU Member States: Czechia.
- Ricardo Energy & Environment (2020). Assessment of the Long-Term Strategies of EU Member States: Slovakia, March 11, 2020.
- Romanian Government (2020). The 2021-2030 Integrated National Energy and Climate Plan, April 2020
- Romanian Ministry of Energy. (2022). Emergency law on the Decarbonization of the energy sector, <https://energie.gov.ro/a-fost-adoptata-ordonanta-de-urgenta-privind-decarbonizarea-sectorului-energetic/>
- Slovak Government (2019). Low-Carbon Development Strategy of the Slovak Republic until 2030 with a View to 2050.
- Snihotta, F. F., Pesseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health psychology review*, 8(1), 1-7.
- Stern, P.C. (2000). New Environmental Theories: Toward a coherent theory of environmentally significant behavior. *Journal of Social Sciences*, 56(3), 407-424.

- Sreen, N., Purbey, S., Sadarangani, P. (2018). Impact of culture, behavior and gender on green purchase intention. *Journal of Retailing and Consumer Services*, 41,177-189.
- Thoradeniya, P., Lee, J., Tan, R., Ferreira, A. (2015). Sustainability reporting and the theory of planned behavior. *Accounting, Auditing & Accountability Journal*, 28, 1099-1137. DOI 10.1108/AAAJ-08-2013-1449
- Trope, Y., Liberman, N. (2003). Temporal construal, *Psychological Review*, 110, 403-421.
- Turp-Balazs, C. (2022). Romania speeds up coal exit, but dash for gas worries environmental campaigners, *Emerging Europe*, June 2, 2022, <https://emerging-europe.com/news/romania-speeds-up-coal-exit-but-dash-for-gas-worries-environmental-campaigners/>
- United Nations (2022). Global impact of war in Ukraine: energy crisis. UN global crisis response group on food, energy and finance. August 2022. [https://unctad.org/system/files/official-document/un-gcrg-ukraine-brief-no-3\\_en.pdf](https://unctad.org/system/files/official-document/un-gcrg-ukraine-brief-no-3_en.pdf)
- United Nations Climate Change (2015). The Paris Agreement. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
- Vasev, N. (2017). Governing energy while neglecting health – the case of Poland. *Health Policy*, 121, 1147-1153.
- Wu, S.I.; Chen, J.Y. (2017) A model of green consumption behavior constructed by the theory of planned behavior. *International Journal of Marketing Studies*, 6, 119-132.
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological bulletin*, 132(2), 249.
- Weidman, S.M., Curatola, A.P., Linnehan, F. (2010). An experimental investigation of the intentions to accrue and disclose environmental liabilities. Lehman, C.R. (Ed.) *Ethics, Equity, and Regulation (Advances in Public Interest Accounting, vol. 15)*, Emerald Group Publishing Limited, Bingley, pp. 195-243. [https://doi.org/10.1108/S1041-7060\(2010\)0000015011](https://doi.org/10.1108/S1041-7060(2010)0000015011)
- Wiecek, D. (2019). The use of ANN in improving efficiency and ensuring the stability of the copper ore mining process. *Acta montanistica Slovaca*, 2019, Volume 24, Issue 1, pp 1-14.
- The World Bank Group. 2021. World Bank Group Climate Change Action Plan 2021-2025: Supporting Green, Resilient, and Inclusive Development. World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/35799>
- Zichová, K. (2021). Closing the Czech coal industry could cost 25,000 jobs, EURACTIV, June 2, 2021, <https://www.euractiv.com/section/energy/news/closing-the-czech-coal-industry-could-cost-25000-jobs/>
- Zhang, L., Fan, Y., Zhang, W. & Zhang, S. (2019). Extending the Theory of Planned Behavior to Explain the Effects of Cognitive Factors across Different Kinds of Green Products. *Sustainability*, 11, 4222, DOI: 10.3390/su11154222