

Article

Survey Results on Using Nudges for Choice of Green-Energy Supplier

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Abstract: One of the most important climate change mitigation strategies is to exploit the potential of individual behavioral changes in order to reduce greenhouse gas (GHG) emissions, and the insights of behavioral economics are proving helpful in this regard. This contributes to improving traditional instruments, developing new ones related to choice architecture (nudges), and combining them within behavioral decarbonization intervention strategies. It is important, in terms of their effectiveness and efficiency, whether the instruments of such interventions are supported by citizens. This paper presents the results of a survey of Polish respondents' ($n = 1064$) reactions to hypothetical nudges regarding the choice of a “green energy” supplier. The main research questions of the study are: how much civic support do these behavioral intervention tools have, and what is the importance of selected factors for their acceptance? The aim of the study is to present nudges as one of the strategies of pro-environmental behavioral change and to analyze selected factors of acceptance of these instruments by the Polish society. There are two main conclusions of the research: (1) Poles' support for the green nudges analyzed is comparatively high, like in other European countries; (2) statistically significant differences in support for one of them are age and individual political party preferences.

Keywords: energy policy; individual energy behavioral changes; choice architecture; green nudge acceptance; own research; Poland



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1. Introduction

Global warming is a cause of concern for electricity consumers at large, as reflected in the existence of a consensus on the urgent need for radical changes in energy consumption patterns and pollutant emissions resulting primarily from over-reliance on fossil energy sources [1,2]. The expression of this consensus at a global level is the Paris Agreement (COP21) [3], and the Katowice package contains common and detailed rules, procedures and guidelines that operationalize the Paris Agreement [4]. COP21 agreed on collective action to reduce the risks and impacts of climate change, with each participating country committing to submit further nationally determined plans to reduce national greenhouse gas (GHG) emissions. Each EU Member State is also required to submit a 10-year National Energy and Climate Plan (NECP) setting out how it will meet its national targets, including a binding national target to reduce GHG emissions not covered by the EU Emissions Trading Scheme (ETS) [5].

The NECP for Poland presented in 2019 envisaged reducing GHG emissions by 7% below 2005 levels and increasing the share of renewable energy in final energy consumption to 22–23% in 2030. In February 2021, the Council of Ministers approved a new energy strategy, “Energy Policy of Poland until 2040”, which “... contributes to the implementation of the Paris Agreement [and] is a national contribution to the EU's climate and energy policy” [6] (p. 5). The document stipulates, inter alia, that in 2030 the share of renewable energy sources in gross final energy consumption in Poland shall amount to at least 23% (in 2040 it should increase to 28.5%), and the reduction of GHG shall amount to 30% (compared

to 1990) [6] (pp. 7–8). It also states that by implementing the objectives and measures set out therein, a low-carbon energy transformation will be carried out in Poland, with the end user playing an active role, thus emphasizing the importance of households in this process. According to Keiser et al. [7] a key strategy for reducing GHG emissions is a massive shift in demand from carbon-intensive energy (mainly coal and oil) to green i.e., environmentally friendly, renewable, carbon-free energy sources such as wind, solar, biomass and thermal energy. Currently, fossil fuel-based electricity generation accounts for the second largest share of global GHG emissions (25% in 2019) [8], presenting unique challenges in the transition to low-carbon energy systems. These systems have different dimensions: technical, economic, environmental, social and political, with a large number of interrelated variables that intertwine in very complex ways. Sustainable energy development is therefore influenced by many factors, the number of which is neither defined nor considered definitive [9]. Moreover, the interdependence of these factors varies between countries, regions and/or time periods [10].

The technical factors of energy systems ultimately determine the extent to which different sectors can be decarbonized [11]. However, it is largely non-technical factors, mainly regulation, but also public acceptance and consumer choice, that determine the level of actual progress [12,13]. Thus, academic and policy discourses appreciate the potential of individual behavioral change to reduce carbon emissions as one of the strategies for climate change mitigation [14–17]. Changing household behaviour, as part of climate change mitigation, is at the same time seen as an inexpensive and quick intervention measure [18]. It can make a significant contribution to achieving our GHG emission reduction targets and accelerating the transition to a more sustainable lifestyle is seen as one of the most urgent tasks facing the planet and its inhabitants [2].

Political interventions to promote sustainable household behaviour mainly rely on the provision of information, financial incentives, legal orders and bans. However, they often prove ineffective in motivating people to engage in voluntary sustainable behaviour, or they may act too slowly to achieve key adaptation and mitigation objectives [19]. In contrast, many empirical studies show that the use of insights from behavioral economics on human judgement and decision-making contributes to improving information, financial and legal instruments and allows the development of new tools and behavioral intervention strategies, leading to desired sustainable and durable changes in actors' behaviour [2,20–23].

The use of insights from behavioral science in public interventions on pro-environmental behaviour change can improve the potential effectiveness of the public policy instruments used and significantly reduce GHG emissions over time. However, the instruments of such interventions may not be supported by citizens, which may hinder their implementation or be counterproductive [24] (p. 22) and [25]. Therefore, an equally important evaluation criterion is the degree of support that citizens give to the behavioral interventions used to modify climate change mitigation behaviour [15,26–28].

One of the behavioral approaches to increasing the frequency of sustainable behaviour is based on the concept of nudging [19,29,30]. It is based on the bounded rationality of humans and provides a whole range of innovative tools based on libertarian paternalism, the use of which in public policy has been justified by Thaler and Sunstein [31]. Still under development, nudge theory provides new knowledge about “what drives human behavior and how to change it for the common good” [32] (p. 113).

Surveys on the degree of acceptance of nudges by citizens, indicating relatively high support for them, were conducted in several countries, but did not include Poland [33–37]. In Poland, the author conducted such a study in October 2020, thus filling the existing research gap. At that time, it was the first Polish-wide research on the acceptance of nudges. The selected results presented in this article analyze the reaction of Polish respondents to nudges regarding the choice of green energy supplier. The main research questions of the study are: how much support do these behavioral intervention tools have among Poles, and what is the importance of selected factors for their acceptance? The need for further research into the relationship between socio-demographic factors and differences in

support for nudges within countries indicates [35], “little evidence—at least outside the United States—has yet emerged on which population groups support nudging and what factors shape these attitudes” [34] (p. 1422). The aim of the study is to present nudges as one of the strategies of pro-environmental behavioral change and to analyze selected factors of acceptance of these instruments by the Polish society. This aim was achieved by reviewing the literature on the subject and analyzing the results of our own survey conducted on a representative group of Polish respondents and formulating on their basis some recommendations for the decarbonization policy makers in Poland. Following the argument of Cialdini et al. [38] that on the scale of one million households “small effects can add up to large-scale policy consequences”, the results obtained may contribute to the development of an effective mitigation policy.

The study is divided into six main parts beginning with the Introduction (Section 1), which presents the background, justification for undertaking the research and the main objectives of the study. Section 2 reviews the literature on nudges as one example of behavioral interventions in the area of decarbonization. Section 3 is devoted to the presentation of own research and the characteristics of the research sample, and Section 4 presents the results of this research. The chapter ends with a summary which is a discussion of the obtained results (Section 5) and conclusions (Section 6).

2. Literature Review

2.1. Choice Architecture and Nudges

Behavioral interventions are to include interventions that involve neither command-and-control regulations nor financial incentives—e.g., information provision, appeals to values and norms, engagement and restructuring choice options (so-called nudges) [39]. Nudges attempt to make the target behaviour easier by influencing a person’s environment [40]. They are related to the best-known approach of behavioral economics facilitating good decision-making, termed choice architecture, which reverses the fortunes of predictable cognitive and motivational errors. For real people, the conditions under which a choice is made matter, so choice architects (creators of the environment, the interpretive framework for the choice) can have considerable power to influence the decisions made and the outcomes achieved [41].

According to Thaler and Sunstein [31] (p. 6) a nudge “is any aspect of choice architecture that changes people’s behaviour in a predictable way without prohibiting any options or significantly altering economic incentives. To be considered a nudge, the intervention must be easy and cheap to avoid”. By suggesting rules for nudges, choice architects can help people make good decisions that are in their long-term interest, while not restricting their freedom [42] (p. 399). Nudges influence behaviour by changing the environment in which decisions are made, without reducing the available options and without changing the financial incentives, costs and benefits. Nudging leaves freedom of choice intact, is cheap to implement and is more acceptable than traditional paternalism [27] (p. 2); [43,44]. According to John and Stocker [45] (p. 206) nudge is an acronym for “a family of lightweight behavioral public policy tools based on presenting opportunities to encourage citizens to follow their long-term interests and support common goals”. The group of these tools currently includes a number of techniques designed to influence human behaviour, so they are divided into different types and kinds in the literature [31] (p. 6, 252); [35,43,46–49].

Nudge and nudging have their opponents and supporters. Opponents of their use in public policy deplore the loss of freedom, accusing this type of regulation of being too paternalistic and of threatening individual autonomy (compare e.g., [50–56]). Their supporters, responding to these objections, emphasize the merits of nudges and point out that, in fact, in many cases they are not paternalistic at all, but are largely cases of rational persuasion see [50] (p. 136) and [29,31,57–61].

2.2. Green Nudges

In the literature, nudges aimed at correcting market failures and promoting environmentally responsible behaviour, thereby reducing negative environmental impacts, are referred to as green nudges and are considered not to be motivated by paternalism [59,62]. Such nudges are intended to promote the well-being of both present and future generations, which is why they are also referred to as “social nudges” [30,63].

Pro-environmental behaviour can be motivated by activating world views, beliefs, norms and internal values, and this contributes to increasing the effectiveness of green nudges [64]. The literature distinguishes different groups of them, e.g., eco defaults (e.g., compulsory renewable energy registration schemes); context re-framing (e.g., stressing social gains rather than personal sacrifice); conveying social expectations (e.g., matching energy use with adjacent ones); the use of eco-labels [18] or information disclosure; warnings; social norms and default rules [30,65].

Other, more broadly described, classifications of green nudges found in the literature are presented in Table 1. These classifications are diverse but not exclusive, and each lists defaults as one type of green nudge. The use of default values (rules, options) is a classic, easy to implement and most commonly used green nudge [2,19,66], but also gives promises to change actual behaviour into sustainable behaviour [7,65]. By setting a particular decision as the default, policy makers are able to strongly influence people to take that decision, especially when people lack information and the choice environments are confusing [67]. Although by default people are directed to a specific decision, they are always free to choose other options, which shows respect for freedom and autonomy [68–70].

Table 1. Green nudges-kinds.

Study	Kinds/Types	Description
[62]	pure nudges/ defaults, provision and simplification of information, changes to the physical environment and reminders moral nudges/ inter-personal motivations and social comparisons, moral suasion, and goal setting and commitment	lead to “do the right thing”; in order to nudge people into pro-social behaviour that may be in their own interest, use their cognitive limitations but do not assume that in their decisions they make errors; usually work through rearranging the existing choice environment; they reward “doing the right thing” with psychological utility; they intentionally trigger psychological reactions such as fun, fear, shame or pride; they use e.g., social proof, comparisons with others; lead to conscious psychological reactions of people who are nudged and compared to pure nudges they are more prone to boomerang effect or backlash; usually stay noticed because they may not be adjusted to the preferences of the individual or because the individual does not want to be nudged
[30,59]	appeal to people’s self-image or self-identity as “pro-environmental consumers” or harness people’s private sense of “social identity” appeal to social conformism involve the modification of defaults	people may be nudged to be more pro-ecological by simplifying the way the information on a product’s characteristics is provided; increasing the salience of certain futures (for example by using eco-labels) can simplify the way of communicating information about selected product features and increase awareness among consumers they are based on the tendency of people to imitate their peers (“follow the herd” tendency); sometimes they convey specific norms by comparison; other work by stimulating people to compete for social status, for example, nudging people to demonstrate ecological behavior to others carefully setting the default value is considered a very effective nudge because it seizes two biases: the force of inertia (abandoning the default option requires commitment and reflection) and suggestion (the default rules take into account an informational signal that can trick people into complying with the rules).

Table 1. Cont.

Study	Kinds/Types	Description
[71]	provision of information changes in the physical environment green default social norms and regular feedback	the use of available but reliable information leads to less complexity of choice, the most popular type of green support is often combined with changes to the default option; in this case it is very important to provide real-time information that can be used as a nudge targeting energy consumption or energy efficiency, and provides transparency about current energy are particularly suitable for motivating behaviors related to waste reduction, sorting, management and recycling, as well as reducing food waste, e.g., reducing the size of the dishes used in hotels and restaurants or using innovative sorting devices to improve waste segregation a very perspective type of nudge, used successfully primarily to motivate to reduce energy consumption and to encourage energy-saving behavior; social norms through peer comparisons are used to reduce energy and water consumption and to encourage waste sorting; providing information in the form of social feedback (on current energy consumption patterns) combined with frequent information can lead to a reduction in energy consumption; linking feedback reports and peer comparisons becomes more effective;

Currently, the literature offers various explanations for the impact of defaults on people's choices [7]. The explanation of the success and effectiveness of defaults is mainly based on the following concepts and theories in behavioral economics: status quo bias and inertia, endorsement and expert advice, ease and satisficing behaviour, loss aversion, reference points, endowment effect [7,66]. However, there is also another, social default-effect explanation, indicating that defaults communicate implicit norms [72], i.e., they signal what is the normatively desired course of action [73]. By setting defaults, choice architects (e.g., decarbonization policy makers) thus indirectly engage in norm signaling [74]. At the same time, individuals who reject the norm demonstrate a “boomerang effect”, e.g., caused by the fact that the choice architect is viewed as opposed to one's (political) ideology [75] or is not being trusted [59].

Social norms are implicit assumptions or beliefs about what appears to be a universal standard of goodness or adequacy in a social environment. They are regularly adhered to unconsciously but not unconditionally because people have personal norms, values and personal backgrounds that may set limits on when and what norm they adhere to. Individuals tend to conform to norms because they seek to avoid/obtain social disapproval/approval and possibly related sanctions [76], and in case of violation they seek to avoid feelings of guilt, shame or remorse, which also applies to personal norms. [7]. For this reason, standards are sometimes also referred to as nudges [68,77,78].

Defaults can be “green”. So called green default rules are rules that determine sustainability-oriented default behaviour [68–70,79]. They can promote social objectives and deliver beneficial outcomes while preserving freedom of choice and therefore showing respect for diversity. This is one of their main advantages [29] (p. 12), [68].

Changing the default option to “green”, for example, can be used to promote increased diffusion of green energy. When the consumer chooses the type of electricity supply, the default setting is “green” electricity, as in the nudges analyzed later in this article. The consumer can actively opt out of the default green option and actively opt for a conventional electricity supply [66](p. 17). However, this requires effort, reflection and a conscious change of option.

The literature presents the results of quite a few studies on the use and effectiveness of green default in different areas of pro-environmental behaviour. Table 2 presents only selected examples of the use of these instruments relating to the choice of green electricity provider. These examples confirm the quite high effectiveness of defaults in this area.

Table 2. Studies focused on the analysis of the impact of green defaults on the choice of green energy (in time order).

Study	Outcome
[80]	Using the case study method, the research was conducted in three countries. Significant effects of the default options were found, including green energy in the default contract increasing the number of people using this type of energy.
[81]	Results presented for an original survey experiment on which nudges affect the choice of contract for renewable energy or conventional energy. Defaults seem to have worked as expected and, in comparison to the other analyzed nudges (mental accounting, priming, decoy, framing, social norms), had a significant impact; choice of green energy increased by 44.6%.
[72]	The results of a randomized controlled trial in Germany indicate that consumers are more likely to buy ‘green’ energy contracts (nearly tenfold) despite the higher price of this energy, if opting out requires them to be proactive in rejecting the default option and it seems this effect is not the result of unawareness.
[82]	The results of the online experiment indicate that (when green energy cost extra) active choosing had larger effects in promoting green energy use (82% of the participants) than did green defaults (76% stayed with the default) due to the interaction between people’s feelings of guilt and reactance.
[83]	The analyses based on experimental and empirical approaches and their results show that the alignment of default intentions and ‘pure’ individual preferences are influenced by the relative price of green electricity; green defaults have diverging costs and benefits for different groups in society, therefore significant impact on consumer welfare and well-intentioned default choice, stimulating initial “good” behavior, does not interfere with subsequent “other” individual choices.
[84]	Using two design elements from the existing electricity markets and laboratory experiment, it was investigated whether the preferences of electricity consumers are the same in the conditions of no default option and in the conditions of its occurrence, and it was found that green defaults at a low price premium did not match subjects’ preferences while those with higher premiums were found to be a better fit.
[44]	As a result of a field study in the residential electricity market, it was found that the green default settings are effective, but when set at a relatively cheap level they do not correspond to consumer’s preferences and have distributional effects. They make poorer households pay more than they would like to in order to use green electricity, and they do not increase willingness of the richer households to pay for it.
[7]	Using macroeconomic and microeconomic data, based on real (not experimental) evidence, it was found in Germany that green defaults that automatically include consumers in green energy sources persist, especially among consumers who are concerned about unfavorable climate change.
[85]	Two large-scale field studies conducted in Sweden have shown that green energy defaults are effective in influencing both businesses and households. The presentation of green energy as a standard option has meant that around 80% of customers (from both groups) have stayed with green energy for at least four years. Acceptance of green defaults was slightly more frequent among women than among men participating in the research.

3. Materials and Methods

3.1. Research Description

The degree of citizen acceptance of behavioral public policy instruments, which constitutes their social legitimacy, has been studied in several developed countries: United States, Canada, Brazil, Mexico, Australia, China, Japan, South Africa, South Korea, Russia, Sweden, Denmark, France, Belgium, Germany, Italy, United Kingdom and two Central and Eastern European countries: Hungary and Ukraine [34–36,86,87]. These countries represent different cultural and geographical regions, as well as different socio-economic systems and political traditions, and their citizens have different knowledge of and attitudes towards climate change. For most of these countries, their systems are based on a chosen form of democracy in which the voice of the people should be of great importance (freedom of expression).

The survey research presented in this paper on the acceptability of selected nudges as tools of choice architecture was conducted in Poland between 21–27 October 2020, a time when virtually the entire world was affected by the COVID pandemic. It had a huge, but as yet undocumented, impact on the public’s views on government policy to combat the

pandemic, and policy in general. This situation may have influenced responses to some of the survey questions.

The study was commissioned by the University of Szczecin and conducted on a nationwide research panel called Ariadna using Computer Assisted Web Interviewing (CAWI) method (Ariadna is a Polish nationwide research panel audited by the Organisation of Market Opinion Research Firms (OFBOR). The panel registers ca. 100,000 Polish consumers aged 15–65. Each panel participant is subject to verification, and thanks to the registration procedures used, the data collected is reliable and credible and guarantees that real people with an established identity take part in the survey. This distinguishes research conducted on the Ariadna panel from internet surveys and polls conducted with random people. The Ariadna panel excludes conducting research with the use of random methods of selecting respondents [<https://www.panelariadna.pl>; <http://www.maison.pl/index.php/panel> (accessed on 23 January 2022)]).

The study used the methodology and questionnaire also applied in most other studies (mentioned above) on the acceptability of nudges in different countries. An English-language version of this questionnaire is available at [35,87]. The survey questionnaire was translated into Polish and some questions (e.g., about participation in elections and support for politicians, income level, education level) were adapted to Polish conditions. The survey questionnaire, made available online to respondents, consisted of 53 questions designed to obtain a broad characterisation of the research sample (15 questions), respondents' assessment of health and life satisfaction (9 questions), respondents' trust, risks and concerns (10 questions), and attitudes towards selected nudges (15 questions). Three additional questions were attention filters. Questions were presented to respondents in a random order. A time filter was also applied—respondents who answered in less than half the median time needed to complete the survey were rejected.

The potentially confusing word “nudge” (or its translation) was deliberately not used in the survey and the hypothetical policy instruments were described as simply and understandably as possible.

3.2. Survey Sample

The research sample consisted of 1064 people. A random-quota sample was used, where quotas were selected according to representation in the population of Poles aged 18 and over for sex, age and size of place of residence (According to the Central Statistical Office (CSO), at the end of 2019 there were 31438 thousand people aged 18 and over in Poland [88]. With a significance level of 95%, the sampling error on which the survey was conducted is 3%. The survey was not framed). Selected characteristics of the research sample are presented in Table 3.

Most of the people participating in the study were female (52.4%), over 55 years of age (32.0%), with a medium level of education (41.8%), living in cities (42.4%) and mostly in medium-sized cities (19.6%). At the time of the survey, they were mainly employed, with a contract of employment (47.3%). The largest part of respondents, who did not refuse to answer the question about their income level, were people whose households had a net income between 2000 and 4000 PLN (36.7%). From the point of view of the analysis of the acceptability of selected nudges, it is also important that these were mainly people with children (65.0%). The largest part of the respondents (45.1%) did not have extreme political views, but in the last elections in Poland more people voted for the PiS coalition (28.9%), and for the PO coalition only three percentage points less.

Table 3. Sample demographics.

Characteristic		Frequency	Percentage
Gender (Gen)	Male	558	52.4
	Female	506	47.6
Age (years) (Age)	18–24	145	13.6
	25–34	215	20.2
	35–44	169	3.0
	45–54	195	18.3
	55 and more	340	32.0
Education (Edu)	Primary/vocational school (P/VS)	213	20.0
	Secondary school (SS)	445	38.2
	Higher education (HE)	406	37.6
Size of place of residence ¹ (PoRes)	Village	400	37.6
	Small town	137	12.8
	Medium town	209	19.6
	Big town	189	17.8
	Very big town	129	12.2
Net monthly income (NIn) (in PLN) ²	<1000	42	5.0
	1001–2000	93	11.2
	2001–3000	159	19.1
	3001–4000	146	17.6
	4001–5000	145	17.5
	5001–7500	144	17.4
	7501–10,000	73	8.8
	>10,000	31	3.7
	refusal to answer	233	21.8
Children (Child)	Yes	692	65.0
	No	373	35.0
Political preferences (PPref)	Law and Justice Party + United Poland + Agreement (PiS)	307	28.9
	Civic Coalition (Civic Platform + Modern + Polish Initiative + The Greens) (PO)	274	25.8
	Democratic Left Alliance + Spring + Left Together (DLW)	132	12.4
	Polish People’s Party + Kukiz 15 (PSLK)	82	7.7
	Confederation Liberty and Independence (KON)	67	6.3
	Other	34	3.2
Political beliefs (PBel)	Very conservative (right wing) (VCon)	56	5.7
	Conservative (Con)	97	9.8
	Rather conservative (RCon)	84	8.5
	It’s hard to say, a bit conservative and a bit liberal (HtoS)	446	45.1
	Rather liberal (RLib)	105	10.6
	Liberal (Lib)	136	13.7
	Very liberal (VLib)	66	6.7
	Refusal to answer	74	7.0

¹ small town—up to 20 thousand inhabitants; medium city—from 20,000 to 99,000 inhabitants; big city—from 100,000 to 500,000 inhabitants; very big city—over 500,000 inhabitants. ² In October 2020, the average net salary was PLN 3938 [88]. On the days of the survey, the average euro exchange rate = 4.58 PLN.

3.3. Variables and Method of Analysis

In the studies analyzed, respondents were asked whether they would approve or disapprove of the selected nudges. In line with previous studies conducted in other countries, only a statement of their approval or disapproval was asked, without measuring the intensity of approval or disapproval on any scale. The independent variable was therefore the respondents’ answers to the two questions on acceptance of the following formulated green defaults:

1. Do you approve or disapprove of the following hypothetical policy?

The government encourages, without requiring electricity providers, to adopt a system in which consumers would be automatically enrolled in a “green” (environmentally friendly) energy supplier but could opt out if they wished. (DF1)

2. Do you approve or disapprove of the following hypothetical policy?

The government sets requirements for large electricity suppliers to adopt a system that would automatically enroll consumers in a “green” (environmentally friendly) energy supplier, but if they wanted to, they could opt out of it. (DF2)

The aim of DF1 is to encourage customers into green energy providers, and DF2 requires energy providers to default customers into green energy. Both are characterized by different levels of depth of public intervention in people’s lives, and are therefore of a slightly different nature and may be perceived and evaluated differently by respondents.

Given that differences in socio-economic status shape people’s thoughts, feelings and behaviour [89], the first group of dependent variables included characteristics of the research sample selected from Table 3, i.e., gender, age, level of education, size of place of residence, net monthly income, having children. The second group of independent variables (Table 4) consisted of political party preferences and political beliefs. Two social norms of the respondents were also defined: concern for the environment (moral norm) and institutional trust (custom moral norm) in order to better characterize the research sample.

Environmental concern refers to the extent to which individuals believe that their own behaviour causes negative environmental consequences (i.e., awareness of consequences). Individuals who are more environmentally concerned will be more aware of the environmental consequences of their actions. The more aware people are of these consequences, the more likely they are to take responsibility for environmental problems (i.e., attribution of responsibility). In turn, a sense of responsibility increases the likelihood that they feel a strong sense of moral obligation to act for the environment [90,91]. Therefore, caring for the environment can be treated as a synonym for environmental attitudes [92].

Table 4. Results: demographic characteristics/variables.

Variables		DF1			DF2			CoEnv		InTru	
		Approve	p-Value	Hypotheses	Approve	p-Value	Hypotheses	M	SD	M	SD
Sample		69%	-	-	66%	-	-	5.1	1.42	2.5	1.67
Gen	Male	71%	0.16684	H0	67%	0.41030	H0	5.4	1.29	2.4	1.67
	Female	68%			65%			4.9	1.46	2.6	1.67
Age	18–24	73%	0.27206	H0	66%	0.0002	H1	4.8	1.34	2.4	1.55
	25–34	63%			58%			4.7	1.38	2.4	1.58
	35–44	69%			61%			5.0	1.41	2.5	1.68
	45–54	72%			62%			5.2	1.46	2.5	1.60
	55 and more	70%			77%			5.5	1.27	2.5	1.81
Edu	P/VS	65%	0.19348	H0	60%	0.18120	H0	4.8	1.49	2.6	1.64
	SS	68%			66%			5.2	1.40	2.5	1.71
	HE	72%			68%			5.1	1.35	2.6	1.66
PoRes	Village	65%	0.36353	H0	62%	0.04682	H1	5.0	1.38	2.3	1.75
	Small town	71%			61%			5.1	1.39	2.2	1.58
	Medium town	70%			70%			5.2	1.42	2.7	1.65
	Big town	72%			69%			5.2	1.33	2.5	1.72
	Very big town	72%			72%			5.3	1.47	2.3	1.62
NInc	<1000	58%	0.29267	H0	61%	0.06213	H0	5.0	1.46	2.2	1.61
	1001–2000	65%			67%			5.2	1.30	2.5	1.70
	2001–3000	69%			73%			5.3	1.34	2.3	1.68
	3001–4000	70%			66%			5.1	1.40	2.6	1.68
	4001–5000	78%			75%			5.2	1.29	2.7	1.79
	5001–7500	69%			62%			5.0	1.47	2.2	1.55
	7501–10,000	66%			66%			5.3	1.67	2.7	1.79
	>10,000	65%			68%			5.6	1.35	2.4	1.67
	refusal to answer	69%			59%			5.0	1.36	2.5	1.59
Child	Yes	70%	0.33552	H0	68%	0.06822	H0	5.6	1.37	2.5	1.70
	No	67%			63%			5.5	1.41	2.4	1.60

Institutional trust (trust in public institutions) is an element of social trust that influences the general feeling of security and people's tendency towards pro-social attitudes. According to Lahno [93], a person trusting an institution is making themselves vulnerable to the actions of others guided by the institution, as a consequence of which they know about the regularities (or irregularities) of institutional behaviour and about the behavioral incentives (or obligations) as set by the institution. The level of institutional trust of individuals may therefore determine the evaluation and acceptance of government policies and their tools. People who have more trust in government would be more willing to accept government nudging [34] (p. 1423).

The two variables in the third group of variables were determined from the results of respondents' answers to the following survey questions:

- How much are you concerned about the environment?
- How much do you trust the following institutions?

In both cases, a seven-point Likert scale was used, where 1 meant 'no concern' or 'no confidence' and 7 meant 'high concern' or 'full confidence'.

The variables used in the analysis are quantitative and qualitative, expressed on different measurement scales. For this reason, they are analyzed separately. To verify the hypotheses of their independence, a non-parametric test of independence was used χ^2 . In the analysis of dependency between the acceptance level of DF1 and also DF2 and the dependent variables (population characteristics), it was assumed in each case that:

Hypothesis 0 (H0): *The variables examined are independent.*

Hypothesis 1 (H1): *The variables examined are dependent.*

Test calculations χ^2 were performed for a significance level of $\alpha = 0.05$.

4. Results

Tables 4 and 5 show the assessment of environmental concerns (CoEnv) and the assessment of institutional trust of respondents (InTru). In general, Poles' concerns about the environment are moderately high. Only nearly 1/5 of the population shows high concern for the environment.

Table 5. Results: political characteristics/variables.

Variables		DF1			DF2			CoEnv		InTru	
		Approve	p-Value	Hypotheses	Approve	p-Value	Hypotheses	M	SD	M	SD
Sample		69%	-		66%			5.1	1.42	2.5	1.67
PPref	PiS	71%	0.9003	H0	69%	0.00183	H1	5.1	1.39	3.9	1.74
	PO	73%			69%			5.4	1.42	1.7	1.12
	DLW	70%			74%			5.4	1.24	1.7	1.09
	PSLK	66%			55%			5.2	1.31	2.1	1.33
	KON	63%			57%			4.5	1.34	1.9	1.35
	Other	68%			53%			5.2	1.23	2.2	1.45
PBel	VCon	77%	0.80374	H0	63%	0.46885	H0	4.8	1.59	3.7	2.25
	Con	74%			72%			4.9	1.35	3.8	1.84
	RCon	69%			70%			4.8	1.44	3.3	1.77
	HtoS	67%			66%			5.1	1.38	2.5	1.54
	RLib	67%			60%			5.3	1.42	1.8	1.15
	Lib	71%			70%			5.5	1.27	1.6	1.15
	VLib	68%			67%			5.5	1.22	1.5	1.04

Poles are somewhat differentiated in terms of these concerns, as indicated by the value of the standard deviation for the entire survey sample and $V \approx 28\%$. Taking into account

the characteristics of the community (independent variables analyzed), it can be noted that, compared to other people categorized by these characteristics, less concerned are men and people:

- in the first stage of early adulthood (25–34 years old),
- living in rural areas,
- with the lowest level of education,
- that have no children,
- whose monthly net income in the household was within the first income bracket or between PLN 5000 and PLN 7500,
- who voted in the last elections for the KON (a grouping of R-GAL parties) (To determine the position of the Polish parties was used Chapel Hill Expert Survey [94] which contains expert ratings of the parties' positions in 31 countries (all European Union members, Norway, Switzerland and Turkey). The position of each party is considered in two dimensions. One is economic: the left–right spectrum. One is cultural: the GAL-TAN spectrum, which contrasts green, alternative and libertarian (some say postmodern) values with traditional, authoritarian and nationalistic ones. The position of the coalition in Poland was determined as the average of the positions of the parties included in the coalition.)
- with very conservative political views.

Potentially, these groups of people may be less aware of the environmental impact of their own actions and have a limited sense of moral obligation to act for the environment. Therefore, they may show low support for green default.

In contrast, trust in public institutions in Poland is very low. The descriptions of hypothetical policy instruments (two green defaults) specify that they are proposed by the government. Therefore, in Tables 4 and 5 the level of trust in the government is presented as institutional trust. As many as 44% of the total respondents indicated a lack of trust in the government and only 2% had full trust in the institution. The average level of trust is therefore low, quite varied ($V \approx 67\%$), and the vast majority of Poles trust the government below the average. Taking into account the characteristics of the collective, it is noticeable that, compared to other persons distinguished according to the category of these characteristics, women and persons:

- during late adolescence (18–24 years) and the first stage of early adulthood (25–34 years),
- living in big cities,
- having a secondary education,
- having no children,
- whose monthly net income in the household was within the first income bracket and those with an income between PLN 5000 and PLN 7500,
- in the last election voting for DLW (a grouping of L-GAL parties),
- showing very liberal (left-wing) political beliefs show less support for both green defaults.

Potentially, these groups of people could show less support for the Polish government's policy and its proposed green default.

Relatively high confidence in the Polish government (almost 50% higher than average) is declared by those with conservative views and those who in the last election voted for the ruling coalition PiS (a grouping of R-TAN parties).

The percentage support for the two hypothetical policy instruments was taken as the degree of acceptance of the nudges presented to respondents. In Figure 1, Poles' support for these instruments for changing behaviour to be more sustainable is compared with the support shown in the surveys from the eight European countries and Russia. On this basis, it can be determined that Polish support for DF1 and DF2 is comparable to that found in other countries (based on the same survey methodology), and, as in most countries, support for DF1 is slightly higher than for DF2. Bearing in mind the different nature of these green nudges (Incentivizing customers versus requiring energy suppliers), it is likely that the depth of the suggested interventions is important for the difference in support.

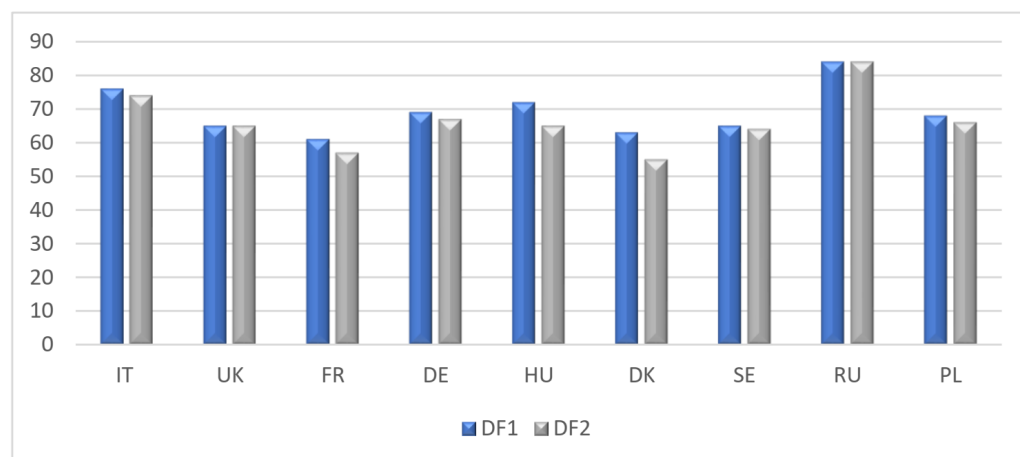


Figure 1. Overview on the approval of DF1 and DF2 nudges in the eight European countries and Russia.

Tables 4 and 5, on the other hand, present the results concerning the acceptance of DF1 and DF2, taking into account the division of the research group according to the assumed characteristics. We can state with conviction that regardless of the variable (feature) taken into account, the majority of Poles support both DF1 and DF2. However, taking into account the analyzed independent variables (group characteristics) it should be indicated that, in comparison with other respondents from a given category of characteristics, lower support for both green default is shown by men and people:

- in early adulthood (25–34 years),
- residing in rural areas,
- those with the lowest level of education,
- having no children,
- whose monthly net household income was within the first income bracket,
- who in the last election voted for the coalition PSLK (a grouping of R-GAL parties),
- with liberal political views.

The contingency table analysis for individual respondent characteristics—a comparison of observed and expected observations according to the assumed independent variables—revealed generally small differences in support for green defaults. The discrepancies between observed and expected numbers are not so small as to be statistically insignificant, which was confirmed by the results of the test χ^2 .

The p -value results and the accepted hypothesis are given in Tables 4 and 5. Statistically significant differences are found only in the case of the support expressed for DF2 by Poles of different ages (from different age groups) and by political preferences (voting in the last election).

5. Discussion

The majority of Poles (81%) see the problem of climate change and its consequences as the greatest challenge facing humanity in the 21st century [95] and express growing support for clean, so-called green energy [96,97]. On the basis of the results of the research presented in this article, which was based on accepting the social norm of environmental concern, it can be indicated that in Poland more environmentally conscious consumers are likely to be female, more educated, who come from large cities, have children, belong to the middle class and have liberal political beliefs.

More than half of Poles (58%) believe that their country should rely more on renewable energy sources to tackle the climate crisis, and 64% are in favor of the government introducing stricter measures to force changes in citizens' behaviour [95]. Although green nudges are not strict climate policy measures, they are also supported by a majority of Poles at a level comparable to other European countries (Figure 1).

Compared to traditional interventions such as taxes and fines, citizens in general are more likely to accept nudges, tend to welcome them if they promote objectives they themselves support and are implemented by parties with whom they can identify [61]. In contrast, research in Germany shows that green defaults automatically involve consumers in renewables and persist, especially but not only, among those concerned about climate change [7]. According to [34] there is also theoretically the relationship between trust in public institutions and support for nudging, “People who have high trust in public institutions would be more willing to accept government nudging”. This relationship has even been used to explain international differences in support of nudges [35].

From the research carried out for this article, two related observations emerge. On one hand, the goal promoted by green defaults is supported by Poles, most of whom have concerns about the state of the environment. On the other hand, however, the lack of trust in the government shown by almost half of the citizens in the study may be a factor in Poland inhibiting the acceptance of the tools introduced by the government and holding back or delaying the desired behavioral changes suggested by the nudges (‘boomerang effect’). In the situation of low trust in the government in Poland, a good solution could be the creation of something like a “nudge unit”, which could operate independently of the government, but should bring together experts who have more knowledge and would make better decisions on pro-ecological behavioral change in Polish society. Such solutions are suggested by the results of research carried out in Sweden presented in [98]. Currently, there is no institution in Poland that could fulfil such a role. Perhaps the creation of ‘nudge units’ at the level of local governments would be a better solution than the introduction of nudges by the government, as compared to the government, the local government administration enjoys greater (by half) public trust in Poland [99]. Future research conducted in Poland should confirm/disprove the validity of such a solution. The more so, as the results of the research presented in [100] emphasize the importance of shaping conscious attitudes in the self-government environment, as well as building knowledge and skills and continuously raising the competences of self-government employees in the field of energy policy and sustainable development.

According to a recent Climate Survey in Poland, women (62%) are more likely to support renewable energy sources than men, a difference of as much as eight percentage points. Support for renewable energy is comparable across all age groups, and further development in renewable energy would be supported by 57% of those with lower incomes and 60% of those with higher incomes [95]. However, support for green energy sources is not the same as support for public policy tools to induce the use of these sources. Based on the results of the research carried out for the article, only one thing is agreed: more women than men support CF1 and CF2 and this support is over 60%. However, the difference in support by gender turns out to be statistically insignificant. What is statistically significant, and only for DF2, is the age of the people and individual political party preferences. Small, although statistically significant, differences in support of DF2 by age group of Poles suggest that older people are more supportive of this type of green default than younger people. This may be due to their greater life experience and better understanding of the seriousness of the emissions problem (knowledge) or their greater imputed responsibility for the living conditions of their children’s and grandchildren’s generation. Confirmation of this requires further research, although as indicated in [14] individual awareness, diversity of norms and knowledge play a key role in the transition to a green economy.

Some authors found that left-wing views implied greater support for nudging than right-wing views did, but discovered ‘no systematic correlation along approval and party affiliations’ [34]. Results of such research indicate that individual political party preferences were significant predictors of the support for nudging driven by the left-GAL [98]. On the other hand, the results of polls conducted in Poland show that DF2 has the highest support among people who voted in the last elections for a coalition DLW, a left-GAL position, which was determined on the basis of the positions of the constituent parties. These results therefore confirm previous findings by other authors.

There is no doubt, as pointed out in [22], that consumer behaviour is embedded in social, economic and institutional contexts that need to be thoroughly understood and taken into account at all stages of the policy process and the timing is ripe for behavioral climate policy. Behavioral interventions are more likely to be effective when both cognitive and contextual barriers to decision-making are reduced [39]. Their effectiveness and efficiency require estimating and focusing on the emissions-reduction potential of different behaviors (high- versus low-impact behaviors) and the likelihood that people who are in a position to do so will actually adopt the suggested behaviour (i.e., ‘behavioral plasticity’) [101]. The proper incorporation of behavioral insights into the climate change policies based on them is therefore a very broad, multi-pronged area for further research.

6. Conclusions

In recent years, the findings of behavioral economics have strongly influenced the traditional understanding of processes and patterns of decision-making and public policy. It is now widely recognized that individual decision-making deviates from a rational and perfectly informed optimization process and requires an in-depth understanding of behavioral aspects. The heterogeneity of individual socio-demographic dimensions (e.g., education and age), structural characteristics (e.g., housing type and size), behavioral and social characteristics (e.g., awareness and norms) and social interactions contribute to reinforcing these differences [14].

The design of choice architecture is one approach that takes into account these insights into human behaviour, and the interventions undertaken should take into account that there are many forces that interact when we decide how to behave in a given situation. Research on choice architecture has shown that in quite a number of cases it is possible to structure the decision-making environment in such a way that the expressed interests of individuals are more closely linked to social goals [102]. This research is still ongoing and also concerns testing the support and effects of behavioral interventions to promote sustainable behaviors related to GHG emission reduction.

The literature highlights that behavioral change can deliver significantly more emissions reductions than the supply of low-carbon infrastructure or the policy commitments in the Paris Agreement. Switching households to a green electricity supplier could, under different behavioral scenarios, contribute to a 63%–65% reduction in GHG by 2030 compared to the 2017 baseline [103]. Households should therefore serve as the main “change agent” in the transition towards green economies. Their behaviour should therefore be placed at the epicenter of the research agenda and climate policy considerations and become an essential element of it [17].

Consumer energy behaviour is driven by various internal factors and external barriers. Households have different levels of knowledge and awareness about the state of the climate and the environment, levels of motivation to change energy behaviour and levels of consideration when assessing the costs and utility of these changes. All these household attributes are heterogeneous and change over time and space [103]. Additionally, individuals do not make decisions in isolation, they are susceptible to social norms that may stimulate pro-environmental behaviour and are a better explanation for such behaviour [103–106].

These observations refer in particular to the Polish economy, which, based mainly on fossil energy sources (mainly coal), has made little progress in transforming its energy system. This transformation has so far been politically and technologically driven, mainly due to the great importance of coal mining regions for the political support of those in power and the construction of energy policies and strategies around the dominant role of coal in the system as well as the excessive focus on technological indicators such as the energy mix, energy efficiency, etc. Changes proposed at the EU level have often been perceived through the prism of economic risk, additional costs, compromising the country’s energy security and even treated as attempts to impose solutions that do not take into account Polish specificities.

The acceleration of the energy transformation in Poland was announced by the strategy “Energy Policy of Poland until 2040”, adopted in 2021. Although the question of how the individual goals presented in this document will be implemented and how to meet the challenges of implementing low-carbon assumptions of this document remains open, the document provides an opportunity to consider more thoroughly the social factor in the context of the upcoming changes. As the results of the Climate Survey and the research carried out for the purpose of this article show, Poles are open to and motivated by these changes.

The research presented in this article fits into a broad research agenda by providing some insights and confirming (or not) the findings of studies conducted by other authors. They can also be helpful to energy policy makers and the choice architects working with them. Firstly, Poles are highly aware of climate change and take responsibility for these changes (high level of moral concern for the environment) and this should be used in the energy policy strategy in Poland. Secondly, the use of green defaults analyzed in the article, quite strongly supported by Poles, may contribute to a relatively cheap achievement of the objectives of this policy. Third, when framing green defaults, significant differences (indicated in Tables 3 and 4) of the characteristics of the people to whom they will be addressed should be taken into account.

The research presented in this article has its own specificity, implications and limitations. Firstly, the specificity of the research is reflected in the selection of the research sample and the dependent and independent variables adopted for the analysis. The inclusion of other variables in the research, e.g., provision of information to respondents during the research about the price differences between green energy and fossil-fuel-based energy, should affect the obtained results. Secondly, the research should be replicated. Repeating them in the current, definitely different economic and political situation in Poland (and in the world) may give different results. The Ukrainian—Russian war, which broke out in February 2022 has already and will continue to be reflected in rising conventional energy prices due to reduced access to Russian resources. Despite the fact that Poles are already a nation that is aware of the sources and effects of climate change, changes caused by the situation of war may affect their attitudes towards green energy, increase the acceptance of nudges that promote its consumption and thus influence the change of energy culture in Poland, which ultimately shapes energy decision-making and the resulting GHG emissions. This seems to be an interesting direction for further research.

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