Willingness to participate in the decision-making about renewable energy projects: the role of a temporal distance of impacts, perceived losses/gains and values

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Abstract

Public participation plays an essential role in ensuring public acceptability of energy transition. Yet, there has been little discussion on factors affecting people's willingness to participate in decision-making, especially at an early stage. To address this gap, this study explored whether and how the three factors: temporal distance (recent impacts versus distant impacts), gains/losses (gains versus losses) and values, affect people's willingness to participate in decision-making about renewable energy projects from an early stage. To test the hypotheses, a 2x2 between-subjects experimental study was conducted in Lithuania (n = 165). Contrary to expectations, results indicated that neither providing information on recent rather than distant impacts nor emphasising losses rather than gains on people's life and living environment did not increase people's willingness to participate in the decision-making at an early stage. Furthermore, no statistically significant interaction was found between the effects of temporal distance and gains and losses. Interestingly, the analysis revealed that the effect on willingness to participate in the decision-making at an early stage might depend on which value people strongly hold. More specifically, for people with stronger biospheric and altruistic values, emphasising the distant rather than recent impacts of sustainable energy transition can be more effective. Also, for people with stronger egoistic values, highlighting the losses compared to gains can increase their willingness to participate in decision-making at an early stage. The findings have important theoretical and practical implications for increasing people's willingness to participate in decision-making at an early stage.

Keywords: public participation, temporal distance, gains, losses, willingness to participate in the decision-making, values

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Willingness to participate in the decision-making

With the Paris agreement (2015), countries around the world have committed to phasing out greenhouse gas emissions by the mid-century (United Nations, 2015). The transition to sustainable energy generated using renewable energy sources, such as wind and marine energy, solar energy, bioenergy, geothermal energy or hydropower, is vital to avoid the irreversible consequences of climate change on biodiversity, people's health as well as well-being and the economy. Besides technological solutions needed for producing renewable energy, social acceptability is crucial to ensure successful energy transition (Bidwell, 2016). If people are excluded from the decision-making on how the energy transition should be implemented, public acceptability tends to be low (Perlaviciute & Squintani, 2020). In turn, this leads to resistance from society and halts the achievement of climate goals. Therefore, involving citizens in the decision-making is essential. The engagement of the citizens in the planning, development, implementation, management and assessment of projects organised by responsible actors is defined as public participation (Perlaviciute, 2019, p. 11).

Citizens can be included in public participation on different stages – from the very beginning, when international, national or regional plans are being discussed on a policy level or, later in the process, to evaluate the specific projects based on the adopted policies (Perlaviciute & Squintani, 2020). However, people tend to be not equally actively involved in decision-making at different levels. There is evidence suggesting that citizens prefer being involved in decision making on projects in their immediate environment compared to general visions in their municipality or country-wide (Perlaviciute & Squintani, 2020). At the same

time, citizens are more accepting of the policies if they can influence major decisions that have immense implications (Perlaviciute & Squintani, 2020). For instance, the location or type of renewable energy infrastructure. Yet, the paradox is that major decisions are made at the policy level and are no longer discussed at the project level. Hence, wanting to influence major decisions is not compatible with the preference to participate in micro-level decision making. Thus, to ensure public acceptability of sustainable energy transition, it is important to gain a better understanding of what motivates people to participate in decision-making from an early stage. Yet, there has been little discussion on factors affecting people's willingness to participate in decision-making. To address this gap, the proposed research aims to study whether and how the three factors: temporal distance of impacts, gains/losses and values, affect people's willingness to participate in decision making about renewable energy projects from an early stage.

Temporal distance

People are motivated to take action when they clearly understand the outcomes of action or inaction. The more distant the impact is, the less inclined people are to act. These perceptions referring to the different conceptions of short-term and long-term events are defined as the temporal distance (Balbo & Jeannot, 2015). This applies to pro-environmental behaviour in general. In a similar vein, it can be assumed that the intention to take action could also manifest as a person's willingness to participate in the decision-making. Based on the construal level theory, it takes less effort for people to comprehend the recent impacts of climate change compared to the distant ones (Brügger et al., 2016). For instance, it is relatively easy to imagine how heat waves feel. However, it is far more difficult to picture how it would feel to live in a 1,5ºC higher temperature compared to pre-industrial levels, 30 years from now. Recent impacts of climate change are more vivid to us, hence easy to

comprehend, on the contrary – the information presented in the distant future is less tangible, thus, harder to understand (Brügger, 2015). Hence, seemingly distant consequences of climate change are one of the reasons why people are less interested in this problem compared to more familiar matters, such as the economic downturn (Bertolotti & Catellani, 2014). Yet, numerous climate policies are characterised by long time horizons that include multiple generations (Sparkman et al., 2021). Policies, visions and programs discussed on the policy level are often long-term, abstract, complex, thereby people need more efforts to comprehend the outcomes of these policies. Thus, it can be assumed that reducing perceived temporal distance would increase willingness to act. Therefore, the hypothesis is that people are more willing to participate in decision-making at an early stage when *recent* rather than *distant* impacts on people's lives and living environment are emphasised (H1).

Comparing gains and losses

Furthermore, the sustainable energy transition can provide various gains for the society, such as reduced CO2 levels, economic benefits. On the contrary, failure to act would bring public losses, for instance, a threat to humans' health conditions and a detrimental impact on wildlife and biodiversity, among many others. Gains can be described as the presence of positive outcomes (Bertolotti & Catellani, 2014), such as improved health conditions after switching to renewable energy resources. Losses outline the presence of negative conditions (Bertolotti & Catellani, 2014), for instance, increased household energy costs. This implies that the potential outcome can be formulated in different ways, attributing them positive or negative meaning. The process of evoking different consequences – positive or negative – associated with the fact of adopting or not adopting the same specific behaviour is referred to as message framing (Balbo & Jeannot, 2015). Furthermore, based on the loss aversion theory (Kahneman & Tversky, 1979), people evaluate outcomes relative to a

reference point and have a preference towards anticipated losses rather than gains (Cheng & He, 2017). In other words, even if the object or certain amount is the same, losing something has a more considerable effect than gaining (Cheng & He, 2017). Hence, people may express more concern with the potential losses rather than gains of the sustainable energy transition on people's lives and living environment. For instance, presenting the outcome that switching energy production from fossil fuel to renewable energy sources could improve the citizens' health condition would have a smaller effect on a person than stating that citizens' health condition may worsen if continuing using fossil fuel. In line with this reasoning, it can be assumed that people would be more motivated to take part in public participation to prevent potential loss rather than to ensure possible gains. Building on this, the hypothesis is drawn that people are more willing to participate in decision-making at an early stage when losses rather than gains on people's lives and living environment are emphasised (H2).

Interaction between temporal distance and gains/ losses on willingness to participate

As discussed above, a temporal distance of policy outcomes and potential gains and losses are important factors when considering citizens' willingness to take part in public participation, especially at the policy level before the main decisions are made. In addition to that, it is essential to understand how these factors together influence willingness to participate in the decision-making at an early stage. As mentioned in the previous section, people express more concern about the potential losses than gains. However, it is not always the case. Gains and losses can have a different effect regarding the construal level they are considered at (White et al., 2011). More specifically, White et al. (2011) demonstrated that losses paired with low-level construal and gains paired with high-level construal have the most effective outcomes in regards to recycling intentions. Furthermore, the more distant in a future event is, the more effort it takes to construe mental representation of it (Brügger et al.,

2016). Hence, the impacts in the recent future are considered as low-level construct and impacts the distant future – as a high-level construct (White et al., 2011). In other words, people think in more abstract terms about something that is more distant and in more concrete terms – when it is close (Sparkman et al., 2021). Thus, it may be assumed that losses combined with recent impacts should be more effective for increasing willingness to participate in the decision-making at an early stage compared to gains paired with distant impacts. Thus, in line with this reasoning, we hypothesise that gains are more important in influencing people's willingness to participate in decision-making at an early stage when the distant impacts are emphasised compared to recent impacts. Similarly, losses are more important in influencing people's willingness to participate in decision making at an early stage when the recent impacts are emphasised compared to distant impacts (H3).

The role of values for willingness to participate in the decision-making

Another important factor playing a significant role in people's life is values. Values can be defined as desirable trans-situational goals that vary in importance and serve as guiding principles in the life of a person or other social entities ideals (Steg & De Groot, 2019, p. 168). In regards to the environmental domain, four main types of values are broadly discussed: biospheric, altruistic, egoistic and hedonic. Various studies have explored how values are linked with people's energy policy preferences. Yet, little attention is devoted to analysing how differences between endorsed values relate to people's willingness to participate in policy-making. Based on the value theory (Swartz, 1992), values serve as a reference point when evaluating various consequences (Steg & De Groot, 2019). In other words, people base their evaluations of various events, behaviours on information that is relevant for the values they find most important (Perlaviciute & Steg, 2015). To illustrate this, when considering issues related to climate change, people with stronger biospheric

values emphasise the importance of protecting the environment, altruistic – well-being of others, egoistic devotes attention to safeguarding personal resources and hedonic focus on their own pleasure and comfort (Perlaviciute, 2019). However, if a person supports the policy, this does not imply that person would also be willing to participate in the decision making. Hence, to address this gap, it is important to understand better how values influence willingness to participate in the decision-making. It is known that people with more strongly endorsed transcendent values (biospheric and altruistic) are more likely to engage in pro-environmental behaviour or express environmental attitudes, beliefs (Steg & De Groot, 2019). Conversely, people with stronger self-enhancement values (egoistic and hedonic) focus on self-interests (Bouman & Steg, 2020). It is assumed that people are more motivated to take part in public participation when there are implications for their core values (Perlaviciute, 2019). Considering that decision-making at an early stage often focuses on more abstract, environmental or social aspects, this means that implications for personal interest are less evident. Furthermore, values are abstract constructs that are not limited to concrete situations (Steg & De Groot, 2019). It is stated that people base their evaluation of the distant future on abstract considerations, such as values, and consider concrete circumstantial information for the recent, more concrete outcomes (Brügger, 2015). Hence, it can be assumed that values are more important in influencing people's willingness to participate in decision-making at an early stage when distant impacts are emphasised, compared to recent impacts (H4).

In sum, the proposed research aims to study whether and how the temporal distance of impacts, gains/losses and values affect willingness to participate in decision making about renewable energy projects at an early stage.

1 hypothesis: People are more willing to participate in decision-making at an early stage when recent rather than distant impacts on people's lives and living environment are emphasised.

2 hypothesis: People are more willing to participate in decision-making at an early stage when losses rather than gains on people's lives and living environment are emphasised.

3 hypothesis: Gains are more important in influencing people's willingness to participate in decision-making at an early stage when the distant impacts are emphasised compared to the recent impacts. Losses are more important in influencing people's willingness to participate in decision making at an early stage when the recent impacts are emphasised compared to distant impacts.

4 hypothesis: Values are more important in influencing people's willingness to participate in decision-making at an early stage, when distant impacts are emphasised, compared to recent impacts.

Methods

Participants

The online questionnaire was disseminated in Lithuania, employing a non-probability convenience sampling technique to recruit the participants. Participants did not receive any reward or financial benefit for time investment. In total, 194 participants filled the questionnaire, out of which 29 questionnaires were excluded. Specifically, two questionnaires were excluded because respondents were younger than 18 years old, and 27 incomplete questionnaires were excluded (respondents did not answer the question on the main variable about their willingness to participate in the decision-making at an early stage). Hence, in total, 165 responses were used for further analysis. The questionnaire was developed using Qualtrics survey, all questions were provided in Lithuanian language[1]. In total, 128 (77.60%) participants were female, 34 (20.60%) male and 3 (1.80%) chose option "Other". The age of the participants ranged from 19 to 81, the mean age of the participants is 33.62 years (*SD*=14.22). The participants are diverse in terms of income. Additionally, the majority of respondents had a higher education degree. Regarding living area, most of the respondents indicated living in one of the major cities in Lithuania (Vilnius, Kaunas, Klaipėda, Šiauliai).

[1] The questionnaire was initially designed in English and then translated to Lithuanian language by two independent translators. Both translators were native Lithuanian speakers. One of the translators was familiar with the measured constructs. The other translator was not familiar with the research topic but was fluent in English. Both translations were compared, and final statements were formulated in Lithuanian. Furthermore, a pilot study was conducted (n = 11) to gather feedback from the participants, based on which translations were adjusted and improved.

More detailed demographic information about the participants is provided in table 1 in Appendix A.

Procedure

Before beginning the survey, the participants were asked to consent to participate in the online study. The real purpose of the research: "to gather a better understanding of what factors affect people's willingness to participate in decision-making about renewable energy projects, especially at an early stage, before main decisions are made" was withheld to avoid influencing the answers. At the beginning participants were informed that the aim of the study is: "to gather a better understanding of public opinion on sustainable energy transition, especially at an early stage, before main decisions are made." Before submitting the survey, participants were given a debriefing, informing them about the real purpose of the research. After providing the consent, participants were asked to answer demographic questions. Next, respondents filled the Environmental values scale (Steg et al., 2014). Then, participants were randomly assigned to one of the five conditions and received one example of the invitation to participate in the decision-making (see below for detailed information). After reading it, participants were asked to evaluate their willingness to participate in the decision-making. Lastly, manipulation checks were included.

Design

To test the hypotheses, a 2x2 between-subjects experimental design was applied. Participants were presented with an example of an invitation to participate in the decision-making about the sustainable energy transition. The invitation stated that their municipality plans to replace fossil energy sources (e.g., gas) with more renewable energy sources (e.g., wind, solar) to promote a sustainable energy transition. It was indicated that the development

is still at an early stage: “the development of such energy transition is still at an early stage of the decision-making process, namely no decisions have been taken.” Moreover, it was mentioned that the transition to sustainable energy has an impact on various components of human’s life: “such a sustainable energy transition has impact on people’s life, society and the living environment”. Finally, participants were invited to join the public participation: “hence, the municipality would like to invite the public to participate in decision making about the municipal energy transition from the early stage”.

In the control condition, participants received the invitation mentioned above with no additional information. In the experimental condition, besides the general information, the additional text was added with the manipulations: 1) the temporal distance (recent impacts versus distant impacts of sustainable energy transition) and 2) the potential gains if the municipality takes steps towards sustainable energy transition versus the potential losses if the municipality does not take steps towards sustainable energy transition. These manipulations are described further in detail below.

Temporal distance

In the recent impact condition, the impact of presented gains or losses for the year 2023 was given to participants: “your participation is important for shaping the impact of the sustainable energy transition for the 2023”. In the distant impact condition, the impact of presented gains or losses for the year 2050 was displayed: “your participation is important for shaping the impact of the sustainable energy transition for 2050”. The year 2050 was chosen based on the target year adopted in main climate policies, such as European Green Deal (European Commission, 2019).

Gains and losses

In the gains condition, participants were given four statements of potential gains if a municipality takes steps towards the sustainable energy transition. Each statement was based on the different values, highlighting the aspect of energy transition that would be most important for the person with the strongest respective value. More specifically, statement to cover biospheric value included the aspect of protecting the environment "the local environment and wildlife will be protected"; altruistic value – the well-being of other people "health condition of people living in the area will get better"; hedonic value – own comfort "the use of energy will be safer and more comfortable"; egoistic value – personal resources, i.e., money "household energy costs will be decreasing". In losses condition, participants were presented with four statements of potential losses if a municipality does not take steps towards the sustainable energy transition. Statements included the same content as gains condition, only formulated as losses. For instance, a statement to cover biospheric value included: "the local environment and wildlife will be endangered", altruistic value – "health condition of people living in the area will get worse"; hedonic value – "the use of energy will be less safe and comfortable"; egoistic value – "household energy costs will be increasing". All statements are presented in the examples of the invitations in Appendix B.

Materials & Measures

Environmental values scale

The Environmental values scale (Steg et al., 2014) was used to evaluate respondents' values. The scale consists of 16 values. Participants are asked to rate on a 9-point scale (from -1 – *Opposed to my values* to 7 – *Of supreme importance*) how important each value is for them "as a guiding principle in their life". In previous studies, Cronbach's alpha ranged from 0.73 to 0.91. More specifically, $\alpha = 0.73$ for hedonic values, $\alpha = 0.76$ for egoistic values, $\alpha = 0.79$ for altruistic values and $\alpha = 0.91$ for biospheric values (Steg et al., 2014). In this study,

Cronbach's alpha was α= 0.77 for hedonic values, α= 0.75 for egoistic values, α= 0.67 for altruistic values and α= 0.87 for biospheric values.

Willingness to participate

Respondents were asked to indicate to what extent they are willing to participate in the decision making about sustainable energy transition at an early stage. Answers were based on a 7-point Likert scale ranging from 1 – *not willing to participate* to 7 – *very much willing to participate*.

Manipulation checks

Temporal distance

To check how people perceived the presented year – 2023 (recent impacts) as recent or distant, respondents were asked whether they consider shaping impact for 2023 as influencing *recent* or *distant impacts*. Out of 67 respondents, 56 identified 2023 as recent (manipulation worked as expected) and 11 – as distant (manipulation did not work as expected). Similarly, to check how people perceived the presented year – 2050 (distant impacts) as distant or recent, respondents were asked whether they consider shaping the impact for 2050 as influencing *recent* or *distant impacts*. Out of 65 respondents, 38 identified 2050 as distant (manipulation worked as was expected) and 27 as recent (manipulation did not work as was expected).

Gains and losses

Moreover, the perception of gains and losses were checked. To check how people perceive presented gains, participants were asked to indicate what impact will it have if their municipality would take steps towards the sustainable energy transition: "there would be

potential gains" or "there would be potential losses"? Out of 66 respondents, 63 perceived that there would be potential gains (manipulation worked as was expected) and 3 – there would be potential losses (manipulation did not work as was expected). Analogously, to check how people perceive presented losses, participants were asked to indicate what impact will it have if their municipality would not take steps towards the sustainable energy transition: "there would be potential gains" or "there would be potential losses"? Out of 66 respondents, 64 perceived that there would be potential losses (manipulation worked as was expected) and 2 – there would be potential gains (manipulation did not work as was expected).

Results

First of all, to test hypothesis 1, hypothesis 2 and hypothesis 3, a two-way ANOVA was performed. The model included the willingness to participate in decision making at an early stage as the dependent variable, and temporal distance (recent impacts versus distant impacts) and gains/losses (gains versus losses) were included as independent variables. Simple main effects analysis revealed that temporal distance (recent impacts versus distant impacts) did not have a statistically significant effect on willingness to participate in decision making at an early stage ($p = 0.15$) (hypothesis 1). Similarly, potential gains/losses also did not have a statistically significant effect on willingness to participate in decision making at an early stage ($p = 0.38$) (hypothesis 2)[2]. Moreover, contrary to our expectation, there was no statistically significant interaction between the effects of temporal distance (recent impacts versus distant impacts) and gains and losses (gains versus losses), F (1, 130) = 0.63, $p = 0.43$, $\eta^2 = 0.005$ (hypothesis 3).

Then, taking into account that the manipulation of temporal distance (recent impacts versus distant impacts) did not work as was expected, additional analysis was carried out using manipulation check measures instead of both manipulations – temporal distance (recent impacts versus distant impacts) and gains/losses (gains versus losses) – as independent variables. The pattern of results with manipulations checks as independent variables was

[2] Additionally, considering that manipulation check of gains/losses variable has worked as expected, a separate analysis was carried out including in the model only gains/losses without temporal distance as an independent variable and willingness to participate as the dependent variable. Results revealed that there was no statistically significant effect of gains/losses on willingness to participate in decision-making at an early stage, F (1, 132) = 0.86, $p = 0.36$, $\eta^2 = 0.01$ (hypothesis 2).

similar to that with the manipulations. Specifically, whether the recent or distant impacts were presented did not affect a person's willingness to participate in decision-making at an early stage ($p = 0.37$) (hypothesis 1). Also, gains/losses did not have a statistically significant effect on willingness to participate in decision making at an early stage ($p = 0.84$) either (hypothesis 2). Lastly, there was no significant interaction between these two manipulation check factors F (1, 128) = 1.48, $p = 0.23$, $\eta^2 = 0.01$ (hypothesis 3).

Furthermore, one-way ANOVA was conducted to examine whether there are differences between experimental groups and the control group. Firstly, the effect of temporal distance (recent impacts versus distant impacts) on willingness to participate in decision making at an early stage was measured using planned comparison. However, results revealed that there was no statistically significant difference between the control and experimental groups (F (1, 162) = 1.38, $p = 0.24$). In other words, neither providing information about recent impacts nor distant impacts did not influence willingness to participate in decision making at an early stage compared to not providing any information about temporal distance. Similarly, the effect of gains/losses on willingness to participate in decision making at an early stage was examined using planned comparison. There was no significantly statistical difference between control and experimental conditions as well (F (1, 162) = 0.55, $p = 0.46$). This means that including information about potential gains or losses did not affect willingness to participate in decision making at an early stage compared to not providing any information about gains and losses.

Lastly, it was examined whether values are more important in influencing willingness to participate in the decision-making at an early stage, when distant impacts are emphasised, compared to recent impacts (hypothesis 4). ANOVA was performed to test the effect of the interaction of temporal distance (recent impacts versus distant impacts) and each value (biospheric, altruistic, egoistic and hedonic) separately on willingness to participate in

decision making at an early stage. Results indicated that only biospheric F (1, 129) = 26.61, $p < 0.05$, $\eta^2 = 0.21$ and altruistic F (1, 129) = 15.856, $p < 0.05$, $\eta^2 = 0.12$ values influence willingness to participate in decision making at an early stage. However, there was no significant interaction between either biospheric F (1, 129) = 0.19, $p = 0.66$, $\eta^2 = 0.002$ nor altruistic F (1, 129) = 0.08, $p = 0.78$, $\eta^2 = 0.001$ values and temporal distance on willingness to participate in decision making at an early stage.

Furthermore, additional analysis was carried out using manipulation check measures of temporal distance (recent impacts versus distant impacts) instead of the initial variable. The pattern of results with manipulations checks as independent variables was in part different to that with the manipulations. As before, results showed that biospheric value affected the willingness to participate in decision making at an early stage F (1, 127) = 27.467, $p < 0.05$, $\eta^2 = 0.22$. Also, temporal distance influenced willingness to participate in decision making at an early stage F (1, 127) =7.004, $p < 0.05$, $^{\eta 2} = 0.06$. However, as opposed to the previous analysis, results showed that there was a significant interaction between biospheric values and temporal distance F (1, 127) = 6.488, $p < 0.05$, $\eta^2 = 0.05$. When the scores of biospheric value are high, this value is more important in influencing people's willingness to participate in decision-making at an early stage when distant impacts are emphasised, compared to recent impacts (figure 1). This result suggests that in line with our expectation, for people with stronger biospheric value, emphasising the distant impacts of sustainable energy transition can motivate people more to participate, compared to emphasising the recent impacts. Similar results were shown for altruistic value. Altruistic value F (1, 127) = 18.799, $p < 0.05$, $\eta^2 = 0.15$ and temporal distance F (1, 127) =7.462, $p < 0.05$, $\eta^2 = 0.06$ affected the willingness to participate in decision making at an early stage. Additionally, as with biospheric value, contrary to the previous analysis, results showed that there was a significant interaction between altruistic value and temporal distance F (1, 127)

=) = 7.255, $p < 0.05$, $\eta^2 = 0.06$. When the scores of altruistic value are high, altruistic value is more important in influencing people's willingness to participate in decision-making at an early stage when distant impacts are emphasised, compared to recent impacts (figure 2). This result suggests that in line with the expectation, for people with stronger altruistic value, emphasising the distant impacts of sustainable energy transition can motivate people more to participate, compared to emphasising the recent impacts. However, in regards to egoistic and hedonic values, no significant differences were found.

Figure 1

The plot of the interaction between temporal distance and biospheric value on willingness to participate in the decision-making

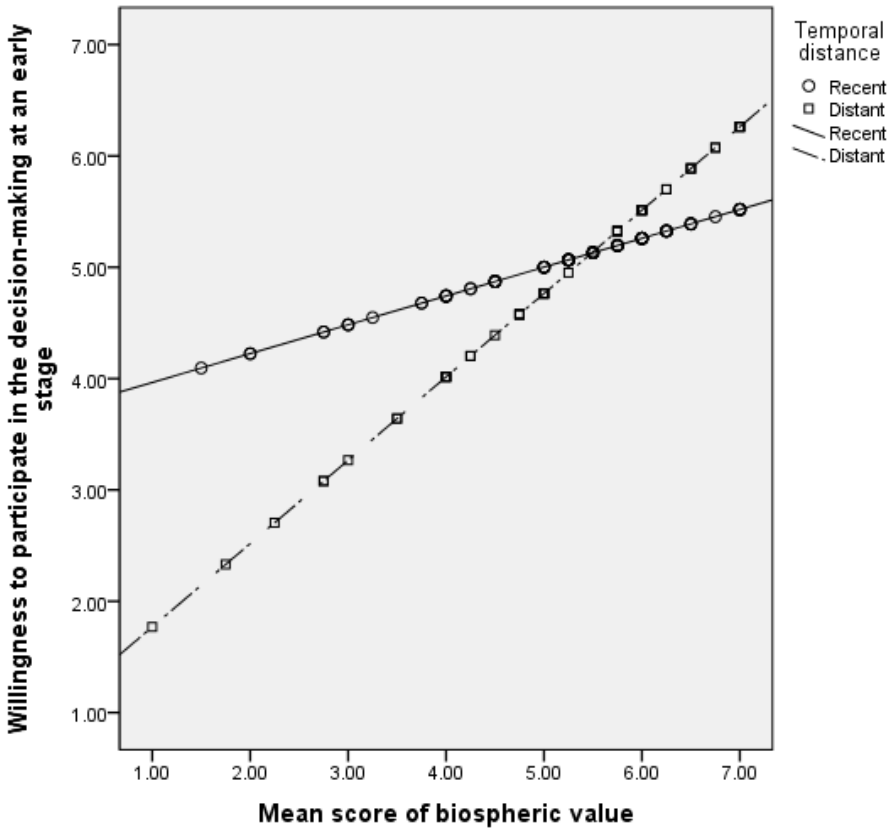
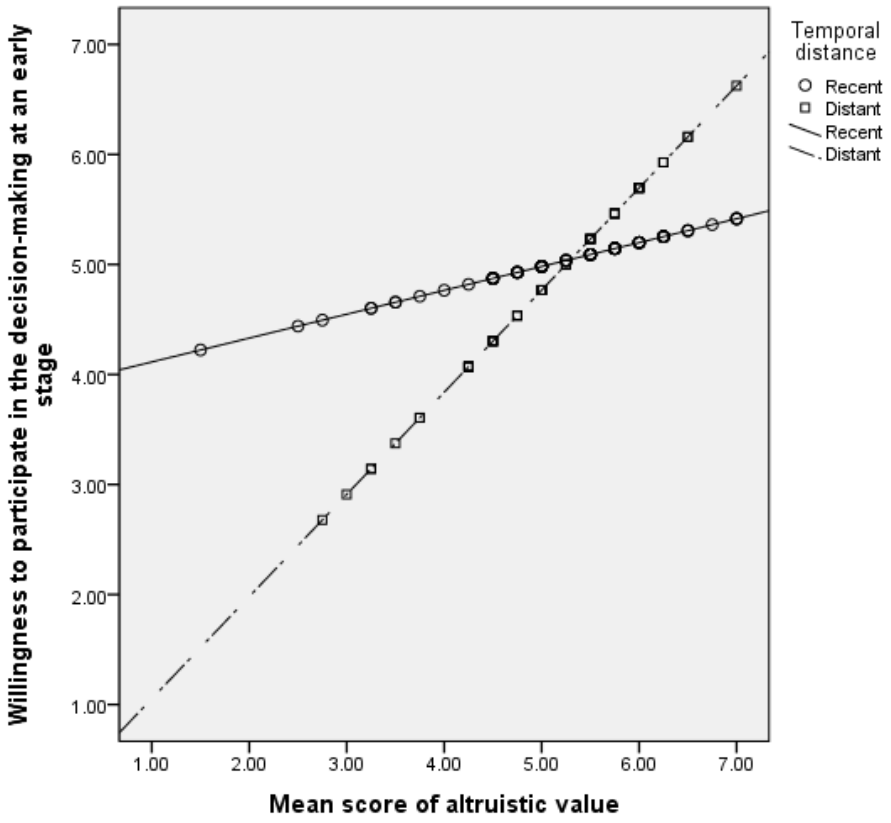


Figure 2

The plot of the interaction between temporal distance and altruistic value on willingness to participate in the decision-making

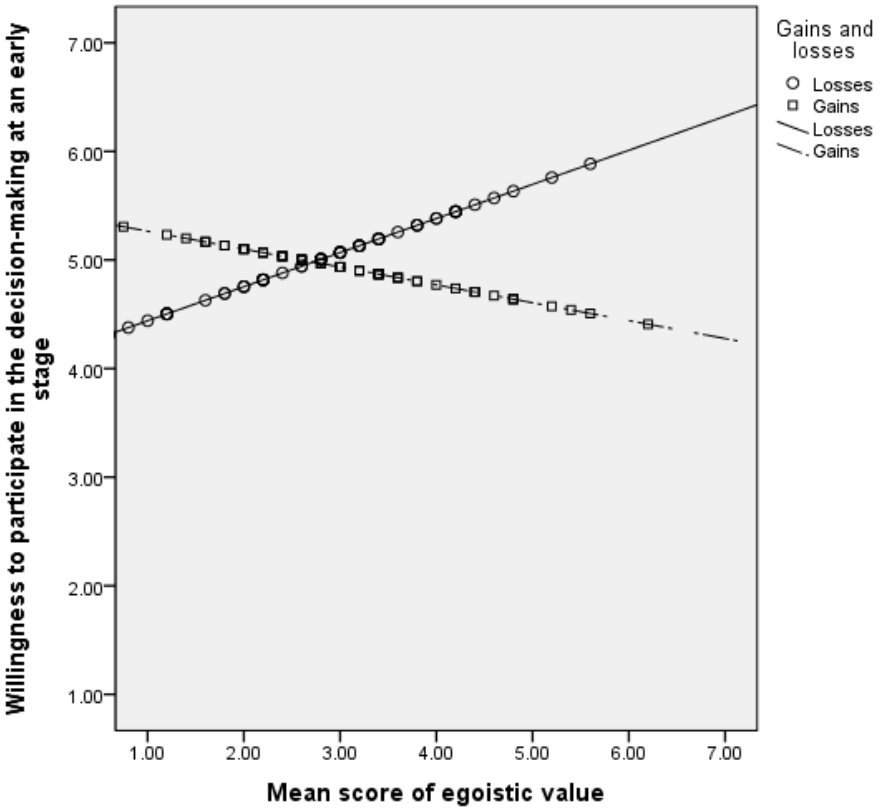


Additional analysis was carried out to explore whether a similar relationship between values and gains/losses could be identified. More specifically, whether certain types of values are particularly important in influencing willingness to participate in the decision-making at an early stage, when potential gains are emphasised, compared to losses. ANOVA was performed to test the effect of the interaction of gains versus losses and each value (biospheric, altruistic, egoistic and hedonic) separately on willingness to participate in decision making at an early stage. No significant interactions between values and gains/losses on willingness to participate in decision making at an early stage were found: biospheric F (1, 129) = 0.33, p = 0.56, η^2 = 0.002, altruistic F (1, 129) = 0.31, p = 0.86, η^2 = 0.0002, egoistic

F (1, 129) = 1.426, p = 2.35, η^2 = 0.01, hedonic F (1, 129) = 0.68, p = 0.41, η^2 = 0.01. Analysis was also carried out using manipulation check measures of gains/losses instead of the initial variable. The pattern of results with manipulations checks as independent variables was in part different to that with the manipulations. No significant interactions between values and gains/losses on willingness to participate in decision making at an early stage were found for biospheric F (1, 127) = 0.12, p = 0.73, η^2 = 0.001, altruistic F (1, 127) = 1.09, p = 0.30, η^2 = 0.008 and hedonic F (1, 127) = 2.40, p = 0.12, η^2 = 0.02 values. However, as opposed to the previous analysis, results showed a significant interaction between egoistic value and gains/losses F (1, 127) = 4.86, $p < 0.05$, η^2 = 0.04. When the scores of egoistic value are high, this value is more important in influencing people's willingness to participate in decision-making at an early stage when losses are emphasised, compared to gains (figure 3). This result suggests that for people with stronger egoistic values, emphasising the losses if steps towards the sustainable energy transition are not taken, compared to emphasising the gains, can motivate people to participate more.

Figure 3

The plot of the interaction between gains/values and egoistic value on willingness to participate in the decision-making at an early stage



Discussion

The study investigated whether and how the perceived temporal distance of impacts of the sustainable energy transition, perceived gains/losses and people's values affect their willingness to participate in decision making about renewable energy projects at an early stage. The novelty of this study is twofold – firstly, the study tackles the knowledge gap on what factors affect people's willingness to participate in decision-making about renewable energy projects, especially at an early stage. Secondly, applied experimental design provides insights about the main and joint effect the aforementioned factors have on people's willingness to participate in the decision-making at an early stage.

To begin with, it was found that providing information on recent rather than distant impacts on people's life and living environment does not increase people's willingness to participate in the decision-making at an early stage. Based on the comparison with no information about temporal distance, providing any information on temporal distance (neither about recent impacts nor distant impacts) did not influence willingness to participate in decision making at an early stage. The results challenge the assumption that reducing psychological distance may be an effective strategy to encourage people to act by making the consequences of climate change more visual and personally relevant to people (Sparkman et al., 2021). Moreover, it was expected that the effect of perceived temporal distance on willingness to participate in the decision-making at an early stage might depend on which value people strongly hold. Indeed, the results showed that for people with stronger biospheric and altruistic values, emphasising the distant impacts of sustainable energy transition can motivate people more to participate than emphasising the recent impacts. This aligns with Brügger et al. (2015) findings that people refer to their values when evaluating the distant future. We extend this finding by showing in more detail that this particularly applies to people's biospheric value and altruistic value. Conversely, when thinking about more

recent impacts, people draw attention away from values and concentrate on situation-specific information (Brügger et al., 2015).

Furthermore, emphasising losses rather than gains on people's life and living environment did not prove to be more effective in enhancing people's willingness to participate in decision-making at an early stage. This contradicts the notion proposed by the loss aversion theory that people are more susceptible to losses than gains (Cheng & He, 2017). Nevertheless, it is also argued that loss aversion is affected by individual tendencies or situational factors and, thus, are not stable for all people (Rakow et al., 2020). Additionally, results showed that for people with stronger egoistic values, emphasising the losses compared to gains was more effective to increase people's willingness to participate in decision-making at an early stage. This extends the literature suggesting that people are more likely to take part in public participation if there is a threat to their core values (Perlaviciute, 2019) by showing that this particularly applies to people's egoistic values. Considering that people with stronger egoistic values prefer securing their personal resources, this can explain their motivation to participate in decision-making to prevent these losses.

Lastly, contrary to the expectation, there was no statistically significant interaction between the effects of temporal distance (recent impacts versus distant impacts) and gains and losses (gains versus losses). However, other studies support the idea that proximising the impacts of climate change does not necessarily result in increased willingness to act on climate change – it can result in positive, negative or do not have any effect on peoples actions at all (Brügger et al., 2015). Based on the construal level theory, manipulating levels of temporal distance does not directly increase or decrease willingness to act but instead influence how people construct the events mentally and what information they consider when making decisions (Brügger et al., 2015). It is suggested that when evaluating recent policies, people would be more likely to think about concrete and situation-specific

information. On the contrary, when evaluating policies in a more distant future, people would consider more abstract information, such as values. However, policies at an early stage are still quite abstract, thus even if recent impacts are emphasised, people may not necessarily construe it as a low-level construct that is more compatible with potential losses. In other words, people may have based their evaluations of whether to participate in decision-making or not on abstract considerations despite the differently emphasised outcomes – regardless they are presented in recent or distant terms.

Implications

The study employed an experimental design to study whether and how the three factors: perceived temporal distance of impacts, perceived gains/losses and values, affect people's willingness to participate in decision making about renewable energy projects from an early stage. For the first time, the study contributes to the knowledge about the main and joint effect of psychological distance and gains and losses play on people's willingness to participate in the decision-making at an early stage. In addition, the experimental design enables to explore the aforementioned relationships causally. Moreover, in this study, the combined effects of temporal distance/gains/losses and values are examined. This approach has the potential for providing important insights into whether or not the effect of perceived temporal distance and perceived gains/loss on willingness to participate would depend on which value people strongly hold.

Furthermore, the present findings have important practical implications. Results suggest that providing information on temporal distance and gains/losses may not result in increased people's willingness to participate in the decision-making at an early stage. Nevertheless, addressing different values can be effective in influencing people's willingness to participate in the decision-making at an early stage. More specifically, emphasising the

distant rather than recent impacts of sustainable energy transition may increase the participation of people with stronger biospheric value and altruistic value. For people with stronger egoistic values, emphasising the losses rather than gains may be more effective to increase their willingness to participate in decision-making at an early stage. As a result, the representation of people with different stronger values may increase the project's acceptability (Perlaviciute, 2019).

Limitations and future research

The present research was limited in several ways. Firstly, the sample of the study is relatively small. Additionally, the participants were recruited employing a non-probability convenience sampling technique. Though the sample was quite diverse in terms of participants age and income, the majority of participants had a higher education degree. Also, only around a fifth of the participants were male, resulting in an unequal representation of gender. Thus, due to the limited sample and homogeneity among the participants, the sample may not be sufficiently representative and thus cannot be generalised to a larger population. For future studies, it is recommended to conduct research with a larger and more representative sample.

Secondly, manipulation of the factors needs to be considered. The manipulation of the temporal distance did not work as expected as more people perceived distant impact conditions as having recent impacts. Further analysis was carried out with manipulation checks instead of the initial variable to address this issue in this study. Still, future studies could better address this issue. For instance, define different levels of temporal distance phrasing in the duration of time rather than displaying the concrete year. Also, in this study, losses and gains were manipulated, presenting either the potential losses or the potential gains of the sustainable energy transition, namely suggesting the scenarios of whether the transition

to sustainable energy happens or not. This allows comparing how gains and losses influence willingness to participate in decision-making at an early stage when it is not yet decided whether to proceed with the transition to sustainable energy. However, this approach does not allow to compare how potential gains and losses of such energy transition affect willingness to participate in further decision-making, namely when the transition to renewable energy has been decided and the losses/gains are associated with the proceeding of this transition. Future studies could explore whether the results would be different if manipulation would contain both – potential gains and losses if a municipality takes steps towards the sustainable energy transition.

Lastly, people's willingness to participate in decision-making at an early stage was measured by employing the self-report technique. Thus, respondents' answers may have been affected by social desirability – the tendency of the respondents to adjust their responses in surveys or experiments to appear more favourably (Vesely & Klöckner, 2020). Furthermore, even though people indicated a high willingness to participate in decision-making at an early stage, this does not necessarily mean that they would actually take part in public participation. Additionally, the overall score of willingness to participate in the decision-making at an early stage and the expressed acceptability for transition to sustainable energy in the municipality is relatively high across all groups, including the control groups. Thus, it can be assumed that most respondents that have participated in the research already are in favour of such energy transition, making it more difficult to detect whether the manipulation of additional factors such as temporal distance or gains/losses additionally increase willingness to participate in the decision-making at an early stage. Future research could address the gap between self-reported willingness to participate and actual participation. For instance, conducting an experiment in a natural setting employing an objective measure of willingness to participate in the decision-making at an early stage instead of self-reported measures.

Conclusion

To conclude, this research investigates people's willingness to participate in the decision-making about renewable energy projects from an early stage. Based on the findings of the study, it can be concluded that providing information on the temporal distance and possible gains/losses may not be an effective strategy to increase willingness to participate in the decision-making. However, the results point out the importance of values people strongly hold on willingness to participate in the decision-making at an early stage. Specifically, emphasising the distant impacts of sustainable energy transition compared to recent ones can motivate people with stronger biospheric and altruistic values to participate more. In addition, emphasising the losses rather than gains can be more effective in increasing people's with stronger egoistic value willingness to participate in decision-making at an early stage. In sum, the current study contributes to enhancing the knowledge gap on how a temporal distance of impacts, gains/losses and values can increase willingness to participate in decision making about renewable energy projects at an early stage.

References

Balbo, L., & Jeannot, F. (2015). The fit between message framing and temporal distance: An efficient way to promote an innovative product. *Recherche et Applications En Marketing (English Edition)*, *30*(1), 28–49. https://doi.org/10.1177/2051570714563686

Bertolotti, M., & Catellani, P. (2014). Effects of message framing in policy communication on climate change. *European Journal of Social Psychology*, *44*(5), 474–486. https://doi.org/10.1002/ejsp.2033

Bidwell, D. (2016). Thinking through participation in renewable energy decisions. *Nature Energy*, *1*(May). https://doi.org/10.1038/nenergy.2016.51

Bouman, T., & Steg, L. (2020). Engaging City Residents in Climate Action: Addressing the Personal and Group Value-Base Behind Residents' Climate Actions. *Urbanisation*, 245574712096519. https://doi.org/10.1177/2455747120965197

Brügger, A., Dessai, S., Devine-Wright, P., Morton, T. A., & Pidgeon, N. F. (2015). Psychological responses to the proximity of climate change. *Nature Climate Change*, *5*(12), 1031–1037. https://doi.org/10.1038/nclimate2760

Brügger, A., Morton, T. A., & Dessai, S. (2016). "Proximising" climate change reconsidered: A construal level theory perspective. *Journal of Environmental Psychology*, *46*, 125–142. https://doi.org/10.1016/j.jenvp.2016.04.004

Cheng, Q., & He, G. (2017). Deciding for future selves reduces loss aversion. *Frontiers in Psychology*, *8*(SEP), 1–8. https://doi.org/10.3389/fpsyg.2017.01644

Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12,

2015, T.I.A.S. No. 16-1104.

Perlaviciute, G. (2019). Public participation in decision making on energy projects: when does it lead to better and more acceptable energy projects? Squintani, L., Darpö Jan, Lavrysen, L., & Stoll, P.-T. (Eds.). Managing facts and feelings in environmental governance (Ser. New horizons in environmental and energy law). Edward Elgar Publishing.

Perlaviciute, G., & Steg, L. (2015). The influence of values on evaluations of energy alternatives. *Renewable Energy*, *77*, 259–267. https://doi.org/10.1016/j.renene.2014.12.020

Perlaviciute, Goda, & Squintani, L. (2020). Public Participation in Climate Policy Making: Toward Reconciling Public Preferences and Legal Frameworks. *One Earth*, *2*(4), 341–348. https://doi.org/10.1016/j.oneear.2020.03.009

Rakow, T., Cheung, N. Y., & Restelli, C. (2020). Losing my loss aversion: The effects of current and past environment on the relative sensitivity to losses and gains. *Psychonomic Bulletin and Review*, *27*(6), 1333–1340. https://doi.org/10.3758/s13423-020-01775-y

Sparkman, G., Lee, N. R., & Macdonald, B. N. J. (2021). Discounting environmental Policy:The effects of psychological distance over time and space. *Journal of Environmental Psychology*, *73*(February 2020), 101529. https://doi.org/10.1016/j.jenvp.2020.101529

Steg, L., & De Groot, J. I. M. (2019). Environmental Psychology. In *International Journal of Research -GRANTHAALAYAH* (Vol. 3, Issue 9SE). https://doi.org/10.29121/granthaalayah.v3.i9se.2015.3215

Steg, L., Perlaviciute, G., van der Werff, E., & Lurvink, J. (2014). The Significance of Hedonic Values for Environmentally Relevant Attitudes, Preferences, and Actions. *Environment and Behavior*, *46*(2), 163–192. https://doi.org/10.1177/0013916512454730

Vesely, S., & Klöckner, C. A. (2020). Social Desirability in Environmental Psychology Research: Three Meta-Analyses. *Frontiers in Psychology*, *11*(July), 1–9. https://doi.org/10.3389/fpsyg.2020.01395

White, K., Macdonnell, R., & Dahl, D. W. (2011). It's the mind-set that matters: The role of construal level and message framing in influencing consumer efficacy and conservation behaviors. *Journal of Marketing Research*, *48*(3), 472–485. https://doi.org/10.1509/jmkr.48.3.472

Appendix A

Table 1

Demographics of respondents

Baseline characteristic		%
Gender	Female	77.6
	Male	20.6
	Other	1.8
	I do not want to indicate	0
Mean age (SD)		33.62 (*SD*=14.220)
Level of education	Primary education	0.6
	General secondary education	12.1
	Vocational education	1.8
	Higher education	84.2
	Other, namely: _____	1.2
	I'd rather not say	0
Living area	Major city	81.8
	Town	6.7
	Suburb	4.8
	Rural area	3.6
	Other	3
Household income	Less than 1500 euros per month	33.9
	Between 1500 and 3000 euros per month	43.6
	Between 3001 and 4500 euros per month	13.9
	Between 4501 and 6000 euros per month	2.4
	More than 6000 per month	3
	I'd rather not say	3

Appendix B

Examples of the invitations to participate in the decision-making about the transition to sustainable energy that were presented to the participants

Control condition

A sustainable energy transition in your city

Your municipality plans to replace fossil energy sources (e.g., gas) with more renewable energy sources (e.g., wind, solar) to promote a sustainable energy transition.

The development of such energy transition is still at an early stage of the decision-making process, namely no decisions have been taken. Such a sustainable energy transition has an impact on people's life, society and the living environment. Hence, the municipality would like to invite the public to participate in decision making about the municipal energy transition from the early stage.

Your participation is important for shaping the impact of sustainable energy transition.

Gains and recent impact condition

A sustainable energy transition in your city

Your municipality plans to replace fossil energy sources (e.g., gas) with more renewable energy sources (e.g., wind, solar) to promote a sustainable energy transition.

The development of such energy transition is still at an early stage of the decision-making process, namely no decisions have been taken. Such a sustainable energy transition has impact on people's life, society and the living environment. Hence, the municipality would

like to invite the public to participate in decision making about the municipal energy transition from the early stage.

What can be gained if your municipality takes steps towards the sustainable energy transition?

- Household energy costs will be decreasing
- Health condition of people living in the area will get better
- The use of energy will be safer and more comfortable
- The local environment and wildlife will be protected

Your participation is important for shaping the impact of sustainable energy transition for the 2023.

Losses and recent impact condition

A sustainable energy transition in your city

Your municipality plans to replace fossil energy sources (e.g., gas) with more renewable energy sources (e.g., wind, solar) to promote a sustainable energy transition.

The development of such energy transition is still at an early stage of the decision-making process, namely no decisions have been taken. Such a sustainable energy transition has impact on people's life, society and the living environment. Hence, the municipality would like to invite the public to participate in decision making about the municipal energy transition from the early stage.

What can be lost if your municipality does not take steps towards the sustainable energy transition?

- Household energy costs will be increasing
- Health condition of people living in the area will get worse
- The use of energy will be less safe and comfortable
- The local environment and wildlife will be endangered

Your participation is important for shaping the impact of sustainable energy transition for the 2023.

Gains and distant impact condition

A sustainable energy transition in your city

Your municipality plans to replace fossil energy sources (e.g., gas) with more renewable energy sources (e.g., wind, solar) to promote a sustainable energy transition.

The development of such energy transition is still at an early stage of the decision-making process, namely no decisions have been taken. Such a sustainable energy transition has impact on people's life, society and the living environment. Hence, the municipality would like to invite the public to participate in decision making about the municipal energy transition from the early stage.

What can be gained if your municipality takes steps towards the sustainable energy transition?

- Household energy costs will be decreasing
- Health condition of people living in the area will get better
- The use of energy will be safer and more comfortable
- The local environment and wildlife will be protected

Your participation is important for shaping the impact of sustainable energy transition for the 2050.

Losses and distant impact condition

A sustainable energy transition in your city

Your municipality plans to replace fossil energy sources (e.g., gas) with more renewable energy sources (e.g., wind, solar) to promote a sustainable energy transition.

The development of such energy transition is still at an early stage of the decision-making process, namely no decisions have been taken. Such a sustainable energy transition has impact on people's life, society and the living environment. Hence, the municipality would like to invite the public to participate in decision making about the municipal energy transition from the early stage.

What can be lost if your municipality does not take steps towards the sustainable energy transition?

- Household energy costs will be increasing
- Health condition of people living in the area will get worse
- The use of energy will be less safe and comfortable
- The local environment and wildlife will be endangered

Your participation is important for shaping the impact of sustainable energy transition for the 2050.

Appendix C

Debriefing form

At the beginning of the study, you were informed that the aim of this research is to gather a better understanding of public opinion on sustainable energy transition, especially at an early stage, before main decisions are made.

However, the real purpose of the study is different and was withheld in order to avoid influencing the answers.

The purpose of this research is to gather a better understanding of what factors affect people's willingness to participate in decision-making about renewable energy projects, especially at an early stage, before main decisions are made.

This research is based on the experimental design. At the beginning of the study, you have received an example of the invitation (chosen by random order) to participate in the decision making. Overall, there are five different types of invitations. In the control condition, an invitation without any additional information is presented (no manipulations). In the other four types of invitations, additional information to the invitation is added, giving different information on two aspects 1) the temporal distance (recent impacts or future impacts) and 2) the potential gains or the potential losses.

As it was mentioned at the beginning, participation in the research is voluntary. If you decide to no longer participate in the research, you do not need to explain why, and there will be no negative consequences for you.

Do you consent to submit your data?