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Acceptability of Energy Policies

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1. Summary

To effectively reduce environmental problems caused by fossil energy use, policies have to be developed that will help reduce these problems. Importantly, people have to evaluate these policies as acceptable. If many people do not find the policies acceptable they are not likely to be implemented in democratic societies. Using a questionnaire including a conjoint analysis, we systematically tested which characteristics of energy policy influence its acceptability. Furthermore, we tested the influence of individual characteristics on policy acceptability.

A sample of 261 participants in the Netherlands completed the questionnaire. The results show that the most important policy characteristic influencing the acceptability of energy policies is the type of behaviour that is targeted by the policy. Policies targeting the adoption of energy efficient technologies are evaluated as most acceptable, followed by policies targeting the adoption of renewable energy sources. Policies targeting shifting time of energy use or policies that aim at changing behaviour to reduce energy use (e.g., lowering the thermostat) are least acceptable.

Next, we tested if acceptability depends on whether the policy comprises a pull or push measure. Pull measures aim to make the desired energy behaviour more attractive (e.g., subsidies for solar panels), while push measures aim to make the undesired behaviour less attractive (e.g. increasing the costs of energy from non-renewable sources). The acceptability of pull and push measures strongly depends on how the costs of a pull are financed and how the revenues of a push measure are allocated. Acceptability increases when the revenues of a push measure are used to decrease fixed costs of energy, thereby directly benefiting people. Importantly, acceptability also increases when revenues are allocated in a way that benefits the environment. For pull measures, acceptability decreases when they are funded by increasing fixed costs of energy. Acceptability also decreases when push measures are funded by decreasing investments in sustainable energy sources.

Additionally, we found that the more people see themselves as a pro-environmental person and the more they think their government aims to reduce its environmental impact, the more acceptable they find policies aiming to reduce environmental problems. However, the findings from our large survey in Switzerland, Italy and the Netherlands shows that environmental self-identity is already very strong among our participants. Therefore, it may be difficult to further strengthen environmental self-identity among these participants.

Overall, our findings suggest that policy makers aiming to implement environmental policy measures that are acceptable to the public could best:

- implement measures targeting energy efficiency (e.g., energy efficient appliances) or renewable energy sources;
- ensure that revenues of push measures are allocated in a way that benefits people or the environment;
- strengthen the extent to which people see themselves as a pro-environmental person or show that the government aims to reduce its environmental impact.

2. Background

To reduce environmental problems caused by fossil energy use, governments and policy makers develop various policies that aim to reduce these environmental problems. However, for these policies to be implemented in democratic societies it is important that people generally find these policies acceptable. When acceptability is low people may protest against these policies, or try to avoid the policy, which may inhibit behaviour change in line with the policy. For example, in response to the ban on conventional incandescent light bulbs consumers may panic buy many of these light bulbs to have a supply for when the ban comes into place. Likewise, people may protest against renewable energy initiatives that they do not agree with, which may block the renewable energy projects. An important question is therefore: Which factors influence the acceptability of policies aiming to reduce fossil energy use?

We studied key factors that may be related to energy policy acceptability. First, the type of measure may influence the acceptability of the policy. Although push measures have shown to be more effective in changing behaviour, pull measures are generally found to be more acceptable (Steg, Dreijerink, & Abrahamse, 2006). Push measures aim to make the undesirable behaviour less attractive, for example by increasing the costs of energy inefficient appliances. Pull measures aim to make the desired behaviour more attractive, for example by decreasing the costs of energy efficient appliances.

The acceptability of push or pull measures is likely to depend on how a pull policy is funded or how the revenues of a push policy are spent. Many people may not realize that pull measures (i.e. making desired behaviour more attractive) cost money, while push measures (i.e. making the undesired behaviour less attractive) generate revenues. Research has shown that pull measures are more acceptable when funding comes from outside the domain of the policy behaviour, for example when policies are funded from general taxes, compared to being funded from the same domain as the policy behaviour (Steg et al., 2006). In contrast, push policies are more acceptable when revenues are allocated in the same domain as the behaviour being targeted (Steg et al., 2006; Schuitema & Steg, 2008). For example, people find it more acceptable when revenues from push measures aimed at increasing costs of car use are allocated to reduce car taxes than when they benefit general public funds; people benefit directly when revenues are used to reduce their fixed costs for car use. We will extend this research by examining the acceptability of push policies when revenues directly benefit consumers (by reducing fixed energy costs of consumers) versus allocating revenues in a way that benefit the environment (by funding sustainable energy sources). More specifically, we will test the acceptability of allocating revenues of push measures within the domain either benefiting the consumer (reducing fixed costs for energy) or benefiting the environment (increasing funds for implementing sustainable energy sources) or allocating revenues to general public funds. Similarly, we will test the acceptability of pull measures that are funded from within the domain either associated with costs for consumers (increasing fixed costs for energy), costs for the environment (reducing funding for sustainable energy sources) or from general public funds.

Another policy characteristic that may affect energy policy acceptability is which type of behaviour is targeted by the policy. Policy can target four types of energy behaviour: adopting sustainable energy sources, energy efficiency behaviours (e.g. buying energy efficient appliances), curtailment behaviour (changing behaviour to reduce energy use, e.g., lowering the heater), and changing the time of energy use (e.g., switching energy use to times when renewable energy is abundant). Research has shown that policies targeting efficiency behaviours are generally more acceptable than policies targeting curtailment behaviour (Poortinga, Steg,

Vlek, Wiersma, 2003). We will extend this research by also examining whether the acceptability of policies varies for policies targeting energy sources and changing time of use, respectively.

In addition to policy characteristics, individual characteristics may influence the acceptability of policies aiming to reduce environmental problems. Research has shown that the extent to which people see themselves as a pro-environmental person (i.e., have a strong environmental self-identity) is an important predictor of pro-environmental preferences and behaviour (Van der Werff, Steg, & Keizer, 2013). We will test to what extent environmental self-identity is related to the acceptability of policies aiming to reduce environmental problems caused by fossil energy use. Another important factor that may influence the acceptability of energy policies is the extent to which people think their government aims to reduce its environmental impact. The more you think your government aims to reduce its environmental impact, the more you may find it acceptable when the government implements policies that aim to reduce environmental problems as it is more credible.

3. Method

3.1 Participants

We conducted an online study among members of a panel consisting of members from the general population. A total of 261 participants took part in the study. Age ranged from 16 to 78 years with a mean of 48 years ($SD = 16.8$); 49% of the participants were male, 51% female. Figure 1 shows that most participants lived alone or with a partner.

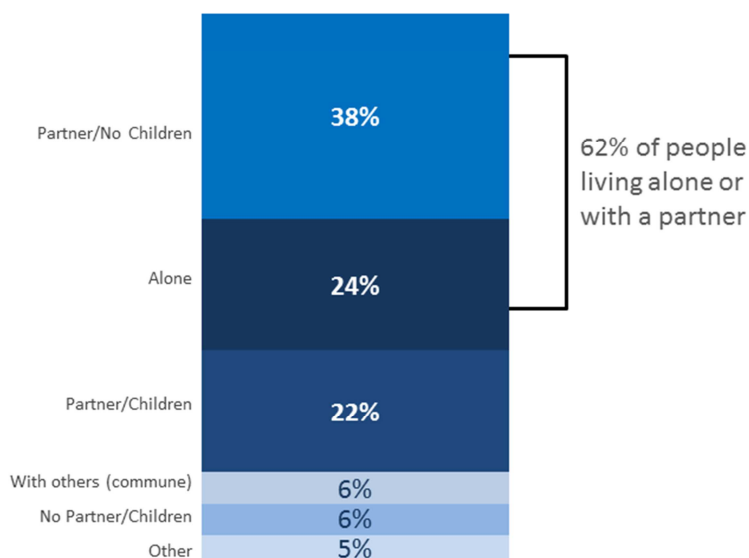


Figure 1: Household type

The level of education of the participants was comparable to the average in the Netherlands (Statline, 2016), although people with primary school as the highest level of education were

slightly underrepresented and people with three years of university as their highest level of education were overrepresented (see Figure 2).

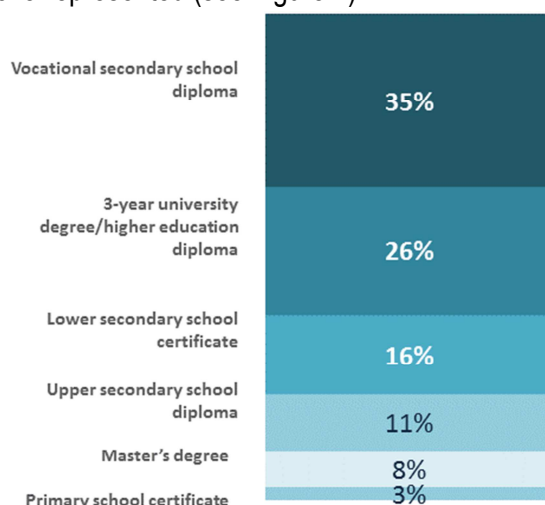


Figure 2: Overview of the highest level of education of the participants

3.2 Procedure

The questionnaire included a conjoint analysis and measures of individual factors. In the conjoint analysis participants were asked to rate the acceptability of 24 energy policies. The 24 policies systematically varied on the type of behaviour they targeted, type of measure (push or pull) and how pull policy was financed or how revenues of push policy would be allocated, respectively (see Figure 3).

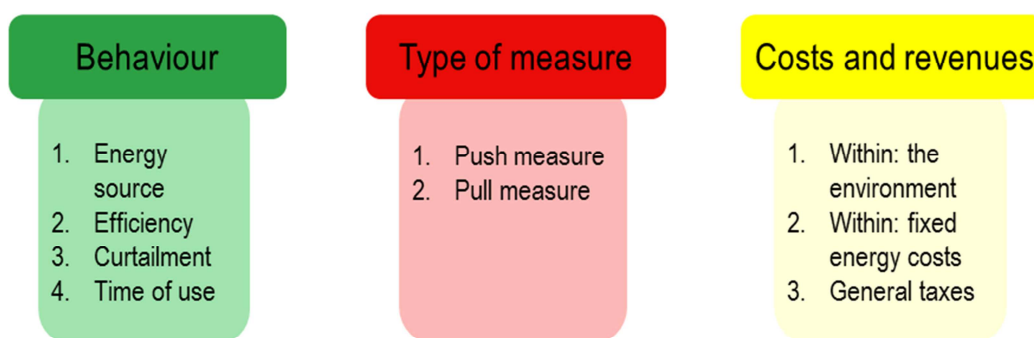


Figure 3: Overview of the three factors with 4, 2 and 3 levels where the policies systematically varied on

Policy characteristics

First, to vary behaviour type, policies either targeted energy sources (sustainable energy sources versus fossil energy sources), energy efficient appliances, curtailment behaviour (changing behaviour to reduce energy use, e.g., lowering the heating), or on changing the time of using energy (switching energy use to times when renewable energy is widely available). Second, two types of measures were varied: push versus pull measures. Finally, pull measures were either financed from and revenues of push measures were allocated to: 1) general public funds, 2) reduced (for pull) or increased (for push) investments in renewable energy sources; 3) the fixed costs of energy use would increase or decrease (meaning the consumer would pay extra or save money). Hence, in total we included $4 * 2 * 3 = 24$ policies.

Below is an example of a description of a policy measure. In this example the policy measure focuses on energy efficient appliances, was a push measure, and revenues are allocated to general public funds:

'The use of energy efficient appliances will be promoted by introducing a fee on energy inefficient appliances. The revenues of this policy measure will be allocated to general funds of the government.'

Individual characteristics

We used three items to measure this environmental self-identity (I see myself as a pro-environmental person; Engaging in pro-environmental behaviour is an important part of who I am; I am the type of person who acts pro-environmental). Participants indicated to what extent they agreed with these statements on a scale ranging from 1 (Completely disagree) to 7 (Completely agree). The items formed a reliable scale ($\alpha = .93$) with a mean of 4.86 ($SD = 1.24$).

We included three items to measure the extent to which participants think the government aims to reduce its environmental impact (I think the government aims to reduce its environmental impact; I think the government designed policies and procedures to reduce its environmental impact; I think it is part of the government's mission to be sustainable). Participants again indicated to what extent they agreed to the statement on a scale ranging from 1 (Completely disagree) to 7 (Completely agree). The items formed a reliable scale ($\alpha = .84$) with a mean of 4.22 ($SD = 1.17$).

4. Results

4.1 Importance of the policy characteristics

We tested the importance of the policy characteristics (type of behaviour; type of measure; financing pull measures by increasing and allocating revenues to reduce fixed energy costs (within domain – self); financing pull measures by reducing investments and allocating revenues to increase investments in sustainable energy sources (within domain - the environment).

The most important factor influencing the acceptability of energy policies is the type of behaviour targeted by the policy, see Figure 4. Whether pull measures are financed by increasing fixed energy costs or revenues of push measures allocated to reduce fixed energy costs is the next most important factor influencing acceptability. The type of measure is the third most important factor. Finally, whether pull measures are financed by reducing investments to benefit

the environment or revenues of push measures are allocated to increase investments to protect the environment is the least important factor influencing policy acceptability.

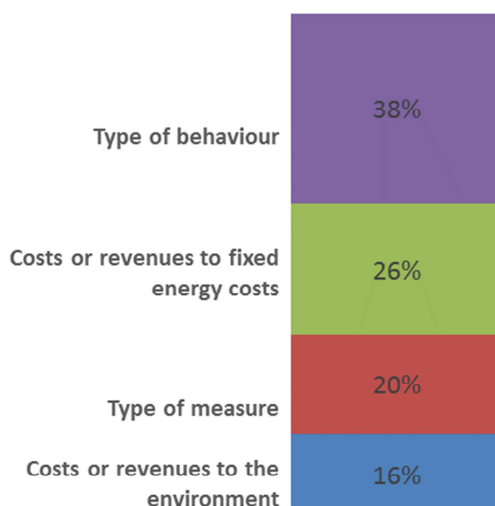


Figure 4: Importance of policy characteristics influencing policy acceptability

4.2 How do the policy characteristics influence acceptability?

Next, we calculated the part-worth scores for every level of each policy characteristic. The part-worth scores indicate to what extent each characteristic contributes to the acceptability of the policy measure. Figure 5 provides an overview of the part-worth scores showing how each characteristics influences acceptability of the policy measures. We found that policies targeting the adoption of energy efficient technologies (part-worth score = .24) and policies targeting the adoption of renewable energy sources (part-worth score = .10) are more acceptable than policies targeting curtailment behaviour (part-worth score = -.17) or shifting the time of energy use (part-worth score = -.18). The type of measure hardly influences the acceptability; push measures (part-worth score = .04) are only slightly more acceptable than pull measures (part-worth score = -.04). The acceptability of push or pull measures depends on the funding of the measure or the spending of the revenues. Acceptability is higher when revenues of a push policy are allocated to increase investments in renewable energy sources (part-worth score = .17) than when a pull measure is financed by decreasing investments in renewable energy sources (part-worth score = -.17). Finally, when revenues of a push policy are used to decrease fixed costs of energy, and thereby benefit people themselves acceptability is higher (part-worth score = .39) than when pull measures are funded by increasing the fixed costs of energy (part-worth score = -.39).

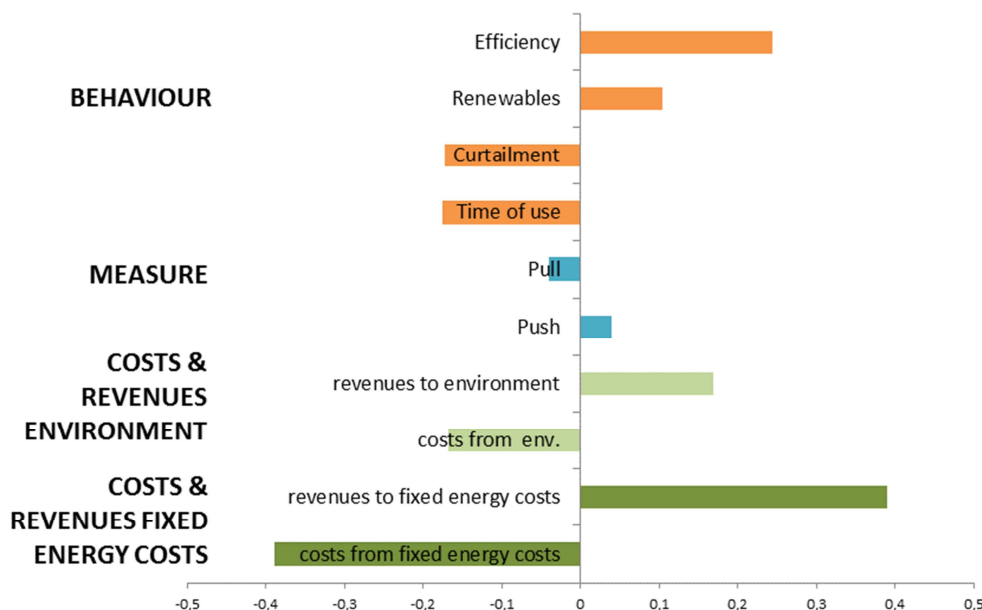


Figure 5: The part-worth scores showing how each level of the policy characteristics influences acceptability of the policy

These findings suggest policies targeting energy efficiency behaviour and the adoption of renewable energy sources are likely to be more acceptable than policies targeting curtailment behaviour or changing time of energy use. The acceptability of push or pull measures depends on how pull measures are financed and how revenues of push measures are allocated. Acceptability of push measures is higher when allocation of revenues benefits people themselves (e.g., by decreasing the costs of energy), or the environment.

4.3 Individual differences in policy acceptability

Finally, we examined to what extent individual characteristics are related to the acceptability of policies. In line with our expectations, we found that people with a stronger environmental self-identity find the policies aiming to reduce environmental problems more acceptable ($r = .50, p < .001$). Furthermore, the more people think their government aims to reduce its environmental impact the more acceptable they find the policies aiming to reduce environmental problems ($r = .45, p < .001$).

These findings suggest that to increase policy acceptability it is important to strengthen the extent to which people see themselves as a pro-environmental person or show that the government aims to reduce its environmental impact.

Using the large survey collected for the PENNY project (see deliverable 1.3 of the PENNY project) we compared the strength of environmental self-identity among countries. As can be seen in Figure 6, environmental self-identity is strong among the participants in Switzerland, Italy and the Netherlands. Particularly, the participants in Italy reported a strong environmental self-identity. These findings suggest that among our participants in the Netherlands environmental self-identity may be strengthened thereby strengthening the support for policies aiming to reduce

environmental problems. In Switzerland and particularly Italy it may be more difficult to strengthen environmental self-identity and thereby promote support for policies aiming to reduce environmental problems among our participants as environmental self-identity is already very strong. Environmental self-identity can be strengthened by reminding people of their past pro-environmental actions (Van der Werff, Steg, & Keizer, 2014).

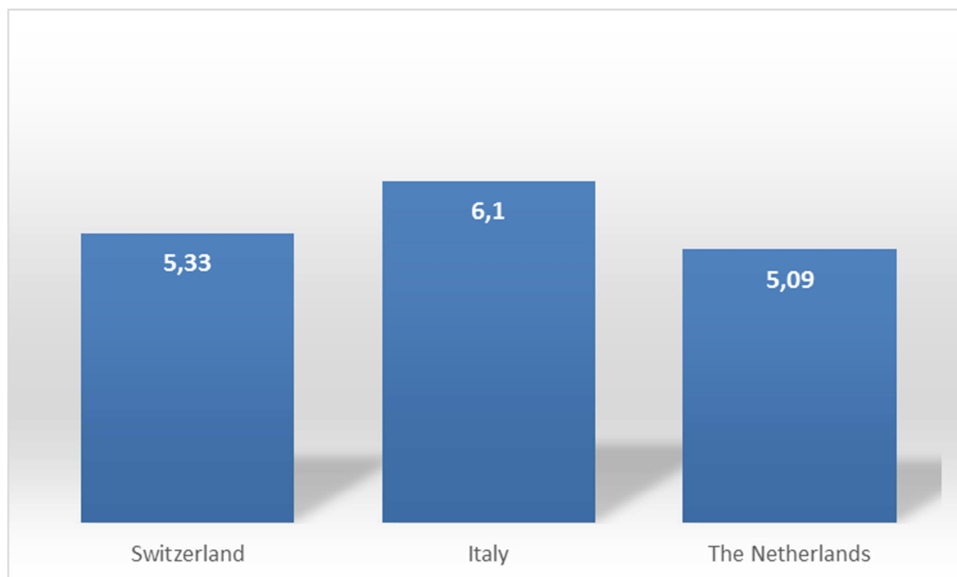


Figure 6: The strength of environmental self-identity in Switzerland, Italy and the Netherlands on a scale from 1 to 7.

5. References

Poortinga, W., Steg, L., Vlek, C., & Wiersma, G. (2003). Household preferences for energy-saving measures: A conjoint analysis. *Journal of Economic Psychology*, 24(1), 49-64.

Schuitema, G., & Steg, L. (2008). The role of revenue use in the acceptability of transport pricing policies. *Transportation Research Part F: Traffic Psychology and Behaviour*, 11(3), 221-231.

Schuitema, G., Steg, L., & Rothengatter, J. A. (2010). The acceptability, personal outcome expectations, and expected effects of transport pricing policies. *Journal of Environmental Psychology*, 30(4), 587-593.

Statline (2016). Retrieved from <http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=82816NED&D1=0&D2=0&D3=0&D4=0&D5=2,5-6,8-10,12-13&D6=a&D7=69&VW=T> on November 8 2017.

Steg, L., Dreijerink, L., & Abrahamse, W. (2006). Why are energy policies acceptable and effective?. *Environment and Behavior*, 38(1), 92-111.

Van der Werff, E., Steg, L., & Keizer, K. (2013). The value of environmental self-identity: The relationship between biospheric values, environmental self-identity and environmental preferences, intentions and behaviour. *Journal of Environmental Psychology*, 34, 55-63.

Van der Werff, E., Steg, L., & Keizer, K. (2014). I am what I am, by looking past the present: the influence of biospheric values and past behavior on environmental self-identity. *Environment and Behavior*, 46(5), 626-657.