

Assessment of perceived legitimacy in policy evaluation applied to Dutch regional energy strategies

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Abstract

Large-scale changes in society are needed to achieve the policy goals for a transition to a sustainable energy system in the Netherlands. In a democratic system such goals can only be achieved when policy is accepted by the population. Most previous studies have investigated which factors influence the acceptance of local wind farms where self-interest can play a dominant role. But for national policy it may be just as important to better understand which policy characteristics affect citizens' perceived legitimacy, based on public interest, of plans to generate more solar and wind energy at the national level. In the present study we examined this in the context of the Dutch Regional Energy Strategies (RES). The RES are local decision processes to determine where wind turbines and solar parks are going to be placed in 30 Dutch regions before 2030. We identified 7 factors that may affect the perceived legitimacy of the RES plans. We tested the effects of the 7 actors in a vignette study with a representative sample of Dutch citizens ($n=2729$). The results show that 6 out of 7 factors had a statistically significant effect on the perceived legitimacy of the presented plans in a random intercept model. The strongest effects on the perceived legitimacy were observed for citizen participation ($B=-0.89$ for full participation vs. no participation) and the impact on landscape ($B=-0.87$ for low impact on cost vs. low impact on the landscape) on an 11-point scale (1=fully unacceptable, 11=fully acceptable). The model-based estimated legitimacy score for the least legitimate scenario in the eyes of citizens was

3.75 vs. 7.57 for the most legitimate scenario. This implies that if policy makers find the perceived legitimacy of local sustainable energy generation to be important, they should consider the set of criteria for policy legitimacy we have studied. This study also showed that our approach is feasible for (ex-ante) policy evaluations, taking into account a broad set of evaluation criteria.

Introduction

THE REGIONAL ENERGY STRATEGIES (RES) IN THE NETHERLANDS

Large-scale changes in local societies are needed to achieve the policy goals for a transition to a sustainable energy system in Europe. The Dutch Climate act (*Climate act*, 2019) prescribes a reduction of greenhouse emissions in the year 2030 of 49 % (116 Mton CO₂-eq.), compared to 1990. To meet this policy goal companies, civil society organizations and the Dutch national government made a climate agreement containing a package of measures and agreements (*Climate act*, 2019; *Climate agreement*, 2019). Part of this agreement is that the electricity sector will reduce CO₂-eq. emissions by 20 Mton, by using less coal and natural gas and using more wind and solar. In the 1990s, the Dutch government gave municipalities and local communities little say in the siting of wind farm locations, leading to resistance and civil unrest which slowed down and blocked the construction of new wind farms (Akerboom, 2018; Hoppe, 2021; Wolsink, 1996, 2007). As a part of the Climate agreement a new model emerged for governance of local sustainable energy generation: The Regional Energy Strategies (RES). The Netherlands have been divided into 30 regions. For

each region its local authorities as municipalities and provinces draft a plan to generate sustainable energy in the region by means of wind farms and large-scale solar PV installations on land. The contribution of the individual regions is voluntary, but together, these plans must amount to the annual generation of 35 TWh (126 PJ) of sustainable generated electricity, about a quarter of the Dutch national electricity consumption in 2030. These 30 energy regions have an informal position. They form no part of current constitutional-legal decentralized government, and there is no legal basis for them (Elzinga & Lunsing, 2020; Hoppe, 2021). However, they play a fundamental role in the planning- and decision-making process. Ultimately, final decisions about the placement of a specific wind farm or large-scale solar PV installation are made by democratically elected councillors of the municipality where the installation is to be located. The Climate agreement emphasizes the importance of citizen participation in the RES to increase acceptance of these plans among residents (*Climate agreement*, 2019).

ACCEPTANCE AND PERCEIVED LEGITIMACY OF CLIMATE POLICY IN THE NETHERLANDS

About 77 % of the Dutch population believes that the climate is changing (partly) due to human action. Many citizens (76 %) feel at least slightly concerned about climate change (Scholte et al., 2020). The importance of acting is recognized by most citizens, 76 % believe that it is important to phase out coal, oil, and gas in favor of sustainable energy sources (such as solar and wind). However, there is no consensus on what measures are regarded as justified to counteract climate change. People with less trust in the government or who have trouble to make ends meet, more often feel negative about policy measures to mitigate climate change (Scholte et al., 2020). The development of onshore wind farms, and to a lesser degree, large-scale solar PV installations, often meets resistance of local residents (Evers et al., 2019). Such an opposition can result in project delays or cancellations, which may reduce the likelihood that the national climate policy goals are achieved. Policy makers have organized more intensive citizen participation processes after past incidents with local opposition against wind farms, although more participation does not automatically translate to increased acceptance and perceived legitimacy (Roth et al., 2017). Sometimes participation processes lead to adjustments in the plans, for example a reduction of the turbine height, or additional financial benefits for residents (Hemelaar, 2021). While such adjustments may reduce opposition against new wind farms, they may also sometimes reduce the amount of generated energy and new, additional, initiatives may then be required to achieve policy goals.

The Netherlands is a densely populated country¹ and the efforts to generate the required amounts of sustainable energy generation on land to meet the Paris agreement, will change its landscape and will have an impact on local citizens. For example, the presence of nearby wind turbines can reduce the value of properties, in particular when wind turbines are visible from the home (Dröes & Koster, 2014; Gibbons, 2015; Sunak & Madlener, 2016). Some citizens are concerned about poten-

tial health effects of living near wind farms (Bolin et al., 2011; Crichton & Petrie, 2015). To achieve policy goals timely and tailor these plans to the needs of citizens, it is important that policy makers have a thorough understanding of how citizens perceive their policy plans to generate sustainable energy. In other words, do they perceive the policy plans to be legitimate?

For a better understanding of the perception of citizens for policy plans to generate sustainable energy, earlier studies (Ellis & Gianluca, 2016; Liebe et al., 2017; Walter, 2014) have mostly focused on acceptance by citizens as an outcome, in particular acceptance of a specific initiative such as acceptance by local residents of a new local wind farm. Several factors have been shown to affect acceptance of sustainable energy policy in different countries, and in particular specific initiatives for new wind farms: characteristics of the plans (e.g. turbine height), citizen participation, perceived costs and benefits, trust in authorities, distributional justice and knowledge (e.g. Hall et al., 2013; Huijts et al., 2012; Jobert et al., 2007; Langer et al., 2016; Strazzera et al., 2012; Walter, 2014; Wolsink, 1996, 2007). Rather than focusing on citizen perception and acceptance of a specific sustainable initiative where self-interest can play a dominant role, we will in this study examine citizen motives for policy acceptance or rejection regarding the RES plans which are based on perceived public interest. That makes our approach somewhat more abstract and respondents may perceive a greater psychological distance toward the idea of RES plans than toward a specific initiative for a local wind farm. With a more distant perspective, people are more likely to consider their own ideological values for decision making rather than circumstantial contextual information, which can impact evaluative consistency (Ledgerwood et al., 2010). That brings us to our research question: To what extent do different policy characteristics affect citizen's perceived legitimacy of local renewable energy policy in the Netherlands? In the next paragraph we will conceptualize perceived legitimacy and its underlying dimensions and in the Methods section we show how these dimensions were operationalized with respect to the RES to answer our research question.

THEORETICAL APPROACH

In this study we focus on the perception of legitimacy by citizens. Ideas about legitimacy have developed over time, and different approaches have been applied in the past by different research disciplines. Sociologists emphasise the voluntary acceptance of authority and power, lawyers use the concept mainly in the legal sense (i.e. in accordance with the applicable law), while philosophers focus on the moral and ethical foundations of justice (Bakker, 2001; Bokhorst, 2014). A common approach (Tyler, 2006) in psychology for perceived legitimacy stems from ideas by Weber, where it is defined as belief in the appropriateness of an authority. We draw on work by Beetham (1991) for our approach to (perceived) legitimacy: the voluntary acceptance of government authority based on considerations of public interest. Grounds for acceptance on considerations of public interest may be whether this authority is perceived to be substantively and procedurally in accordance with the law, and whether the authority is perceived to be the outcome of a morally just political process. In our view, this definition adequately credits different ideas on legitimacy, and fits our purpose of examining perceived legitimacy of policy.

1. 519 citizens/km², 2021, CBS CBS. (2021). <https://www.cbs.nl/en-gb/figures/detail/37296eng?q=traffic%20density>

Criteria for policy legitimacy

We will examine whether consent for RES policy is granted by citizens on grounds of perceived public interest and how this perceived legitimacy is affected by different potential policy-features of the policy that are presumed to be criteria for potential sources of legitimacy. Based on literature (Bakker, 2001; Beetham, 1991; Bokhorst, 2014; Noije, 2019; Vringer & Carabain, 2020) and in particular Noije (2019) we distinguish several criteria, ranging from input-legitimacy to aspects of the process and the outcome, see Figure 1.

Several sub-criteria are defined:^a Input legitimacy: 1) Substantive representativeness arises if one recognizes oneself in the substantive principles and choices of authorities and policy. 2) Formal representation occurs when people recognize their representatives as having the authority to speak or decide on their behalf. 3) Descriptive representation occurs when people can identify themselves (similar personal characteristics, especially socio-economic and demographic) with the people who speak on their behalf or make decisions about them. 4) Accountability covers that authorities account for their actions.^b Throughput legitimacy: 1) Accurate and transparent information, actively given by the authorities. 2) Responsiveness means that the interests of all those involved are carefully taken into account. 3) Citizen participation is that people are actively involved in the decision-making. 4) Equality of law means that the government treats everyone equally. 5) Legal certainty means that the authorities act consistently.^c Output legitimacy: 1) Effectiveness is the extent to which the government achieves its policy goal(s) with the policy pursued. In addition to the target effects, other effects on welfare and wellbeing are also considered. 2) Efficiency, expressed in the degree to which the government does reach the policy goals relatively better (faster, cheaper, etc.) than other groups could do themselves. 3) Distributive justice concerns the question of what is an equitable distribution of scarce resources (benefits and expenses), both financially and otherwise. 4) Transparency of the policy outcomes are monitored, communicated openly and honestly and are accessible, explainable, insightful, comprehensible/understandable for informed citizens.

Methods and approach

STUDY DESIGN

To explore to what extent different policy characteristics affect citizen's perceived legitimacy of local renewable energy policy in the Netherlands we carried out a conjoint experiment for the Dutch Regional Energy Strategies (RES). Factorial Survey Experiments (FSE), also called vignette or conjoint experiments, are a multi-factorial survey method. In a typical vignette study respondents read several short descriptions of situations to elicit judgments about these different scenarios (Atzmüller & Steiner, 2010). The difference with a standard survey is the systematic variation of factors in these descriptions to create a multitude of different scenarios that participants evaluate. Using this method it is possible to assess to what extent different attributes affect the overall judgement of the topic of interest. The advantage over using a standard survey lies mainly in the higher realism that can be achieved by presenting situations instead of separate attributes (Aguinis & Bradley, 2014). In ex-ante policy evaluation it may be particularly useful because it allows assessing which combination of potential policy factors will be perceived as more legitimate.

Policy consists of several attributes with varying levels. Therefore, many potential policy scenarios can be created. It is not feasible to let citizens judge all these scenarios, therefore it is common to use a so-called mixed design where every participant only judges a subset of vignettes. Careful construction of subsets is necessary to be able to efficiently estimate the effects of attributes on the overall judgement.

In our experiment we had 7 factors that varied in 2 or 3 their attribute levels across vignettes, a 2X2X3X3X3X3X2 design (see Table 1), leading to a vignette population of $n = 648$. In the next paragraph we describe how we selected this specific set of factors. Based on a pilot test it was feasible to present each participant with 4 different policy scenarios. With that many factors and a limited number of vignettes per respondents, it is advised to use software to select a maximally efficient design (Su & Steiner, 2020). In our case we used Sawtooth and the balanced overlap method led to an optimally efficient design

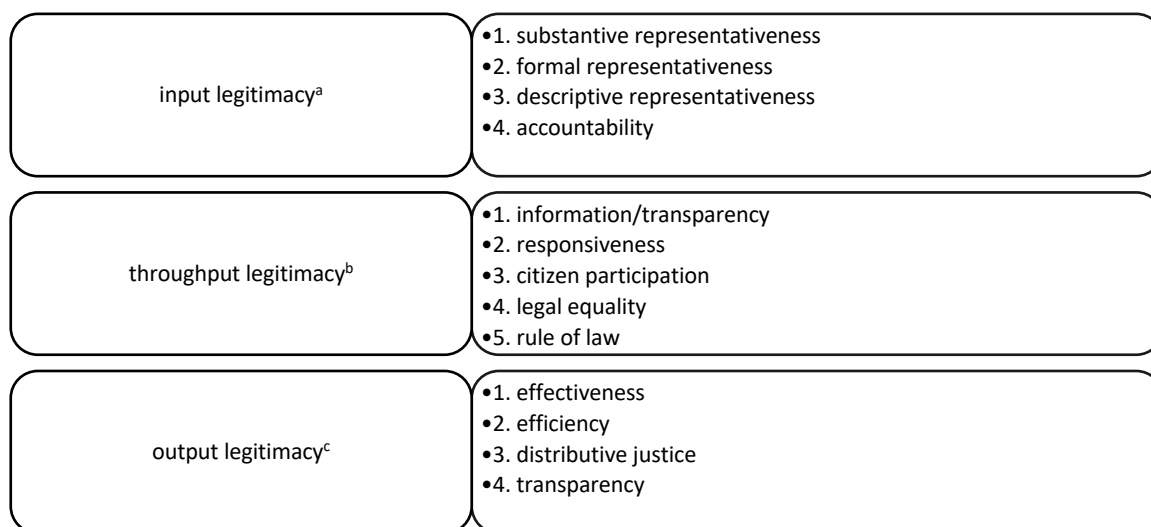


Figure 1. Criteria for Legitimacy, see also Noije (2019).

where simulations indicated that standard errors of all main and 2-way effects were well below the recommended 0.05 cut-off point (Sawtooth).

VIGNETTES

It is important to include the most relevant policy characteristics for perceived legitimacy in the construction of our RES policy vignettes. We followed the following steps to come to our selection as presented in Table 1. First, we interviewed an expert (expert 1) regarding the RES policy to identify planned policy variations that existed in practice and related societal issues that might be relevant for perceived legitimacy. During the interview, we connected these policy variations to our theoretical framework (see Figure 1, Table 1) and compared it with approaches in empirical studies on acceptance of wind energy. To ensure completeness, we asked this expert near the end of the interview whether theoretical concepts that were included in the framework but were not spontaneously mentioned by the expert whether any of those theoretical concepts could be relevant to include. Then, we designed a concept version of factors and attributes. Only aspects of throughput and output legitimacy were included in the vignette design because it did not seem possible to link input legitimacy to actual variations in policy and to keep the number of factors limited to ensure comprehensibility for respondents. Therefore we assessed input legitimacy with a questionnaire preceding the vignette experiment (see Variables paragraph).

This concept vignette design was then discussed in consultation with four experts studying the RES, including expert 1, to verify whether the formulated factors and attributes corresponded sufficiently with actual policy variations and whether they were sufficiently complete (also taking the criteria for legitimacy into mind, see Figure 1) and understandable. Based on this consultation, the authors revised the vignette concept. An additional level was added to the distribution of financial profits ('Profit of wind turbines and solar panels is distributed across people who live nearby') for completeness, as we assumed this level might be considered most legitimate by some citizens.

We tested the presentation of the vignettes and additional questionnaire to check for possible biases and comprehensibility. Ten citizens, selected by Kantar, our fieldwork agency, were online professionally interviewed for about 35 minutes each. The researchers observed the interviews anonymously in the online meeting. Based on the test interviews, we made adjustments. As a number of simplifications to the formulation of the vignette levels and the addition of an extra level to the attribute 'ownership' as respondents indicated that the option for wind farms and solar parks to be owned by government would be considered most legitimate, but not present in the concept version of the vignettes. This level had not been included in the initial concept because this potential policy characteristic does not exist in the actual policy plans according to the interviewed experts. We did not include a factor on policy effectiveness, as preferences regarding effectiveness may be strongly correlated with perceived input legitimacy. See Figure 2 for an example of the presentation of the vignettes.

When you think about everyone's interest, to what extent do you consider this RES plan acceptable?

SURVEY PROCEDURE AND STUDY POPULATION

We expected the respondents to be unfamiliar with the policy in their region. Therefore we presented participants some contextual information about the national goals and general processes of the RES at the start of the survey, both through text (ca 10 lines and a number of pictures: of a solar park, a set of wind turbines, and a picture of the RES regions in the Netherlands) and through a video with a duration of 1 minute and 17 seconds. We presented the participants four vignettes about policy variants and asked them to what extent they find these variants acceptable from a public interest point of view. We considered that this task might be relatively complex to respondents and to familiarize respondents with the task and attributes we introduced factors one by one, presenting each level for that attribute, and asked respondents about their preferences for different policy features. Afterward the Vignettes task commenced.

On 19 November 2021, an invitation to respond on the online questionnaire and vignettes was sent by e-mail to a sample of 5844 citizens aged 18 and over, proportionally stratified according to gender, age, education level, household size and region. The representative sample was selected by Kantar from the NIPObase, which is a panel of more than 100.000 people who are regular invited to respond on online surveys. In the event of non-response Kantar sent a reminder by e-mail. Panel members have received information regarding the purpose, privacy, storage of data and use of the collected data and have signed an informed consent form. In addition, for the video-interviews, the researchers who were watching the interviews signed a form agreeing to respect the privacy of the participants (no recording, not personally approach any of the interviewees), to leave in case of recognizing a participant, and to only use the information for scientific research, never for commercial purposes.

VARIABLES

In addition, and before presenting the vignettes, we assessed separately the general perceived legitimacy of the RES policy directly after the introduction video at the beginning of the questionnaire, with the following text and question:

We would like to know whether you consider the existence of Regional Energy strategies legitimate. By that, we mean whether you consider it acceptable that such policy exists, when you think about everyone's interests. When you think about everyone's interests, do you find it acceptable that there are regional Energy Strategies? (11 point scale, fully unacceptable-fully acceptable).

The main outcome of our conjoint experiment was perceived legitimacy of the presented vignettes. This was assessed in a similar way with an 11 point scale and verbal descriptions only on both ends of the scale (see Figure 2).

Also a number of statements were constructed to assess criteria for perceived input legitimacy, applying a 7 point scale (strongly disagree-strongly agree). No statements on accountability were included in the questionnaire, as respondents who participated in the video interviews indicated that they considered piloted items on accountability confusing and perceived to have insufficient information to judge whether responsible authorities could be held accountable for their policy choices. In-

Table 1. Attributes with levels for the conjoint experiment with preferences of participants as expressed in familiarization task between brackets.

Attribute	Levels	
Efficiency preference	Impact on landscape must be as small as possible, even if the costs will be higher (67.8% ¹) The costs must be as low as possible, even if the impact on the landscape will be larger (14.0%)	Output legitimacy: Efficiency
Placement turbines and solarparcs	Wind turbines and solar parcs are more often placed in municipalities with more space (34.7%) Wind turbines and solar parcs are more often placed in municipalities where more energy is used (38.8%)	Output legitimacy: Distributive justice (burden)
Distribution of profits	Profits of wind turbines and solar parcs are distributed across people who live nearby (11.7%) Profits of wind turbines and solar parcs are evenly distributed across people in the municipality (56.1%) Only people who invest in wind turbines and solar parcs get the profits (16.9%)	Output legitimacy: Distributive justice (profits)
Ownership	Wind turbines and solar parcs are owned by people nearby (17.0%) Wind turbines and solar parcs are owned by investors (10.7%) Wind turbines and solar parcs are owned by the government (52.7%)	Output legitimacy: Distributive justice (influence)
Information	All people in the municipality were informed personally and completely about the RES plan (67.1%) People nearby were informed personally about the RES plan. Other people were informed later. (14.1%) All people in the municipality were informed through the local newspaper after the RES plan was final (10.3%)	Throughput legitimacy: Transparency
Participation /influence	The opinion of citizens played an important part in making the RES plans (61.9%) The opinion of citizens played a limited part in making the RES plans (29.5%) The opinion of citizens played no part in making the RES plan (2.5%)	Throughput legitimacy: participation, responsiveness
Procedures	When following all procedures, conscientiousness is more important than speed (84.2%) When following all procedures, speed is more important than conscientiousness (5.9%)	Throughput legitimacy: policy in line with rules and laws.

¹ Preferences as expressed in the familiarization task. The 'no preference' level is not shown, therefore percentages do not add up to 100.

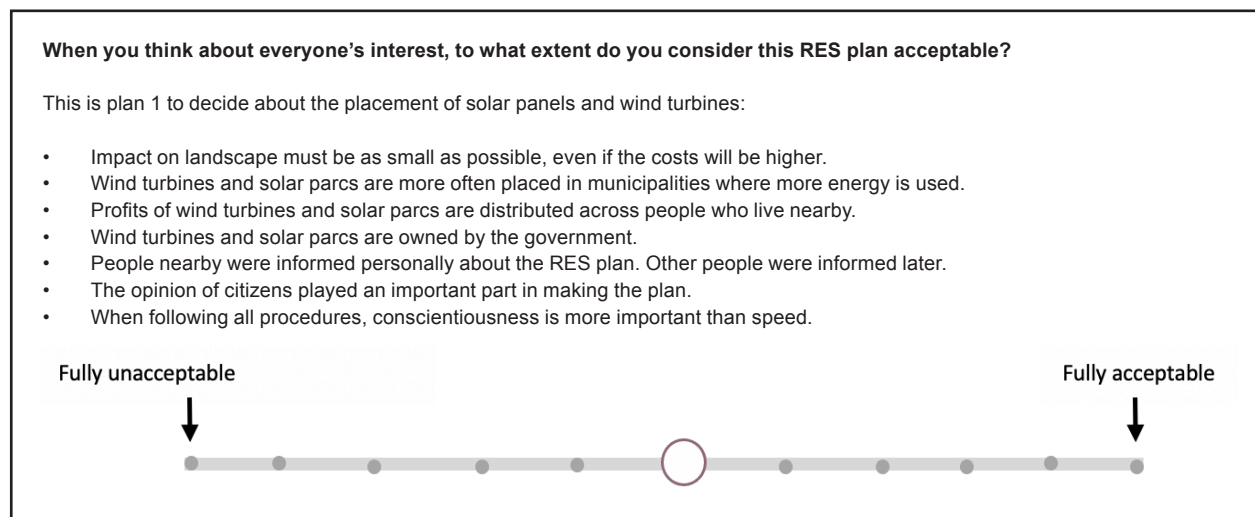


Figure 2. Presentation of the vignettes, an example.

formation on the background variables sex, age, education level, household income, urban density of the residence was available through the panel. In addition, we asked respondents a number of questions regarding the awareness and perceived level of understanding of the RES. This information was considered as relevant background information as an indication of whether respondents had a sufficient comprehension of the RES policy to understand the questionnaire items and vignettes.

THE STATISTICAL ANALYSIS

To test the effects of attribute levels on perceived legitimacy of local renewable energy policy a multilevel linear model was used. Multilevel models (often referred to as mixed models or random effects models) take into account the nested structure of data. In our case, perceived legitimacy scores of the presented scenarios (vignettes) are nested within respondents, as each respondent judged 4 different scenarios. We used a random intercept model (using SPSS, version 28) to take the varying levels of perceived legitimacy between participants into account and maximum likelihood estimation was used to estimate effects. Attribute levels were entered as predictors and unstandardized beta coefficients were calculated with 95 % confidence intervals. Beta coefficients represent the estimated effect of each level compared to the reference category. This can be interpreted on the original 11-point legitimacy scale. Reference categories were chosen based on the highest preference for a specific level as expressed in the familiarization task before the experiment started (see Table 1).

Results

PARTICIPANT CHARACTERISTICS

The questionnaire was fully completed by 2729 (47 %) of the invited citizens between November 19th and December 7th 2021. Our sample characteristics and the representativeness for five population characteristics is described in Table 2. Household income was low (<29.500 Euros) for 15 % of participants, medium (29.500–73.000 Euros) for 43 % and high (> 73.000 Euros) for 2 % and 22 % didn't know their income or didn't want to declare it. Participants lived mostly in urban areas (72 % > 1000 addresses per km²) as opposed to rural areas (28 % < 1000 addresses per km²). The large majority of participants (87 %) was not aware of the existence of a RES plan for their own region. After watching the RES video and reading the general information provided the majority of participants indicated to understand what the RES are (66 %), but they found it less clear who takes decisions regarding the placement of wind turbines and solar parks (44 %) or how decisions are being made (42 %).

OVERALL RES LEGITIMACY AND INPUT LEGITIMACY

Figure 3 displays the frequency distribution of overall legitimacy scores for the RES. Higher scores indicate higher perceived legitimacy. With an average RES legitimacy score of 7.5 (SD = 2.2) participants perceived the existence of the RES on average as more legitimate than not. Figure 4 displays the frequency distribution of agreement with several statements regarding the perceived input legitimacy of the RES by partici-

Table 2. Sample characteristics and population reference.

	Respondents (n = 2729)	Dutch population 2021 ¹
Sex		
Female	49%	51%
Male	51%	50%
Age		
18-29	13%	19%
30-39	14%	15%
40-49	18%	16%
50-64	33%	26%
65+	23%	23%
Education level		
Lower	26%	27%
Middle	42%	38%
Higher	32%	35%
Household size		
1	22%	20%
2	40%	34%
3	15%	16%
4	17%	20%
5+	7%	11%
Nielsen regions		
Large cities (Amsterdam, Rotterdam, The Hague) + surrounding municipalities	15%	16%
Rest of the West	29%	30%
North	11%	10%
East	21%	21%
South	24%	24%

1. Statistics Netherlands (CBS) Gold Standard (<https://www.cbs.nl/nl-nl/maatwerk/2021/44/gouden-standaard-2020>).

pants. Participants agreed to a large extent with most substantial representativeness items (items 1–5) indicating that they largely recognized themselves in the goals the government has set and the means to achieve them. Only for item 5 agreement was lower, indicating mixed opinions regarding the amount of attention in society for the advantages and disadvantages of solar and wind energy. Agreement with formal and descriptive representative items (items 6–10) was lower than for the substantial representativeness items. In particular there was less agreement with the descriptive representativeness items (items 9–10), indicating that most participants did not think that their municipal counsellors were a good representation of themselves or others.

PERCEIVED LEGITIMACY OF RES VIGNETTES

The average score for the vignettes was close to the midpoint of the scale ($M = 5.6$, $SD = 2.3$). The perceived legitimacy data we gathered in our vignette study has a hierarchical or multilevel nature. Scores vary not only across the vignettes (the lowest level, commonly referred to as Level 1), but also across the different participants in our study (Level 2, see (Hox et al., 1991)). The intraclass correlation (ICC) is the fraction of the total variation in the data that is accounted for by between-person variation. In our study the ICC was 0.25 (calculated with an intercept-only model), meaning that about 25 % of the total

variation in perceived legitimacy scores can be accounted for by differences between participants (i.e. 75 % of the total variation can be accounted for by differences between the vignettes). We take this degree of clustering into account by estimating a random intercept model.

Table 3 displays the estimated effects of the various attribute levels on perceived legitimacy of the RES vignettes in our random intercept model. Except for the spatial distribution factor, all attribute levels had a significant impact on perceived legitimacy. The largest effects were found for influence and efficiency. When the opinions of citizens play no role in the RES, participants rated the legitimacy on average 0.89 lower as compared to full participation of residents. For the efficiency factor, a higher cost-efficient vignette where the aim was to keep the costs as low as possible was on average rated 0.87 lower than an aim to keep the impact on the landscape as small as possible. The model can be used to calculate the expected average perceived legitimacy score of a vignette with a specific combination of attribute levels. To give an impression of the overall size of the effects, the estimated model-based mean legitimacy score (i.e. intercept) for a vignette with a combination of the highest legitimacy levels (as indicated by the model) was 7.57 [95 % CI: 7.44, 7.70]. The estimated mean of a vignette with a combination of the lowest legitimacy attribute levels was 3.75 [95 % CI: 3.61, 3.88].

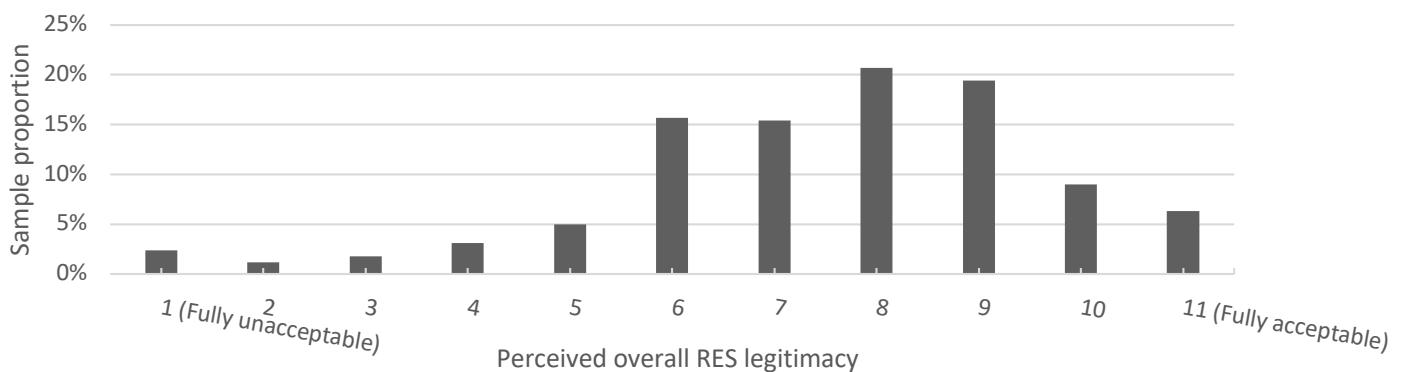


Figure 3. Frequency distribution of perceived overall RES legitimacy ($n = 2729$).

Table 3. Results of random intercept regression model for the effects of vignette attributes on perceived legitimacy.

Variables	Regression coefficient (B)	95% confidence interval
Low impact on cost (vs. low impact on landscape)	-0.87	[-0.94, -0.80]
Spatial distribution based on availability of land (vs. based on energy use)	0.01	[-0.06, 0.08]
Profits distributed amongst people who live nearby (vs. amongst residents in municipality)	-0.32	[-0.41, -0.23]
Profits distributed amongst investors (vs. amongst residents in municipality)	-0.54	[-0.63, -0.45]
Ownership by local residents (vs. ownership by government)	-0.29	[-0.38, -0.20]
Ownership by investors (vs. ownership by government)	-0.53	[-0.62, -0.45]
Medium information provision (vs. full information provision)	-0.29	[-0.38, -0.20]
Minimal information provision (vs. full information provision)	-0.40	[-0.49, -0.31]
Medium citizen influence (vs. maximum citizen influence)	-0.36	[-0.45, -0.28]
No citizen influence (vs. maximum citizen influence)	-0.89	[-0.97, -0.80]
Following procedures: speed over conscientiousness (vs. conscientiousness over speed)	-0.58	[-0.65, -0.51]

Discussion

In this study we explored to what extent different policy characteristics affect citizen's perceived legitimacy of local renewable energy policy in the Netherlands. We found that nearly all of the presented policy options matter, both when it comes to sources of output legitimacy and throughput legitimacy. We found that perceived legitimacy was the most negatively affected when in the vignettes a high impact on landscape was presented ($B = -.87$, as opposed to limiting costs) or a complete absence of citizen influence ($B = -.89$ as opposed to maximum influence). Citizen's preference for limiting impact on landscapes is also recognized by local civil servants and is reflected in actual RES plans which predominantly opt for a relatively high share of solar parcs rather than wind turbines.

This is because citizens perceive solar parcs to have less impact on landscape as well as higher energy prices, compared to wind turbines. The importance of citizen influence for perceived legitimacy is consistent with many studies (Ek & Persson, 2014; Liebe et al., 2017; Lienhoop, 2018).

The other policy options we presented in the vignettes had a more moderate impact. The perceived legitimacy was lower when:

- profits were distributed amongst people who live nearby $B = -.32$ or amongst investors $B = -.54$ as opposed to distribution among all citizens in the municipality,
- when wind turbines or solar parcs were owned by investors, $B = -.53$ or local residents, $B = -.29$ as opposed to ownership by government, and
- when less information was provided (medium: $B = -.29$, minimal: $B = -.40$ as opposed to full information)
- when speed was preferred over conscientiousness $B = -.58$ when following formal procedures.

Ownership and distribution of profits are closely related, but not necessarily the same. As ownership is about influence, having a say during realization and management of the wind turbines or solar parc, while the distribution of profits is purely focused on the financial gains. It is notable that citizens considered it more legitimate if profits are distributed among all citizens of the municipality, compared to distribution among investors or citizens who live nearby. This can indicate that citizens do not have much trust in the fairness of alternative options to divide the financial benefits, in line with Lienhoop (2018): Investing is not accessible and affordable for all citizens. Added to that, citizens may feel that investors should not be entitled to the full share of the profits, as they do not always share in the burdens of living nearby. The climate agreement (2019) strives for a 50 % local ownership, to ensure distributional justice and local public support.

Contrary to common expectations, this study found lower perceived legitimacy when wind farms and solar parks are owned by the citizens themselves, or owned by investors, compared to ownership by government. Although ownership by citizens is perceived as more legitimate than by investors which is in line with (Liebe et al., 2017). Our findings are also in line with Ek and Persson (2014), who showed that citizens negatively value private ownership, and prefer wind farms to be owned by municipalities or cooperations. The important role that citizens attribute to the

Dutch government is striking in the light of a sharp decline in citizens' trust in government (Engbersen et al., 2021). Low trust in authorities may have also contributed to the importance that respondents attached to conscientiousness over speed.

Interestingly, we found no evidence for a preference of the policy option to place wind turbines and solar parcs in municipalities with more space or to place wind turbines and solar parcs in municipalities where more energy is used. This is despite the public debate about interregional justice, where some citizens argue that allocating wind turbines to regions with a lot of space to support other regions that use much energy is perceived as unfair. Possibly, respondents in our experiment considered it unfeasible to place wind turbines in highly urban regions that use a lot of energy, or they considered the potential disadvantage that more people in the highly urban regions would be affected by nearby wind turbines outweigh the potential advantage of distributional justice. Finally, it may be that our description of the policy option was not specific enough for respondents to influence their judgment.

Apart from the effects of the different policy characteristics on perceived legitimacy it is interesting to note that the intra-class correlation in our experiment was much lower (0.25), than in other vignette studies (0.70-0.79 in Liebe et al. (2017) and 0.63 in Parkins et al. (2021) investigating effects of policy attributes on local acceptance of wind farms with a comparable 11-point scale. This finding suggests that in our experiment the evaluation of participants was influenced more by the policy characteristics presented in the vignettes than in those other studies. This may be due to the different context of our study where we focused on perceived legitimacy of renewable energy plans instead of local acceptance of wind farms. It appears that when citizens evaluate the local acceptance of wind farms they are more influenced by person-related factors like whether they already have a wind turbine in the vicinity (Liebe et al., 2017) or their political orientation (Parkins et al., 2021). Future studies could investigate the extent to which such citizen-related factors may also affect legitimacy evaluations.

When it comes to evaluating the RES as currently applied in the Netherlands we considered it striking that most participants were not aware of the existence of this policy (87 %). After providing brief information about the policy the average legitimacy score was closer to full acceptability than to unacceptability even though respondents still did not understand completely by whom, or how exactly, policy decisions about local renewable energy generation are being made. Responses to the input legitimacy statements suggest that most participants in general support the goal (preventing climate change and a more independent energy supply) and the method (generating solar and wind energy), and that an adequate public debate seems to have taken place. However, it is less obvious that the formal authorities are being acknowledged and that people feel represented by the responsible authorities. The extent to which these factors play a role in judging the perceived legitimacy of renewable energy plans relative to throughput and output legitimacy factors remains unknown and is a topic for future study.

STRENGTHS AND LIMITATIONS

This study has a number of strengths. Our large sample size allowed for a fairly precise estimate of the effects. The factorial survey design allowed us to present realistic scenarios and

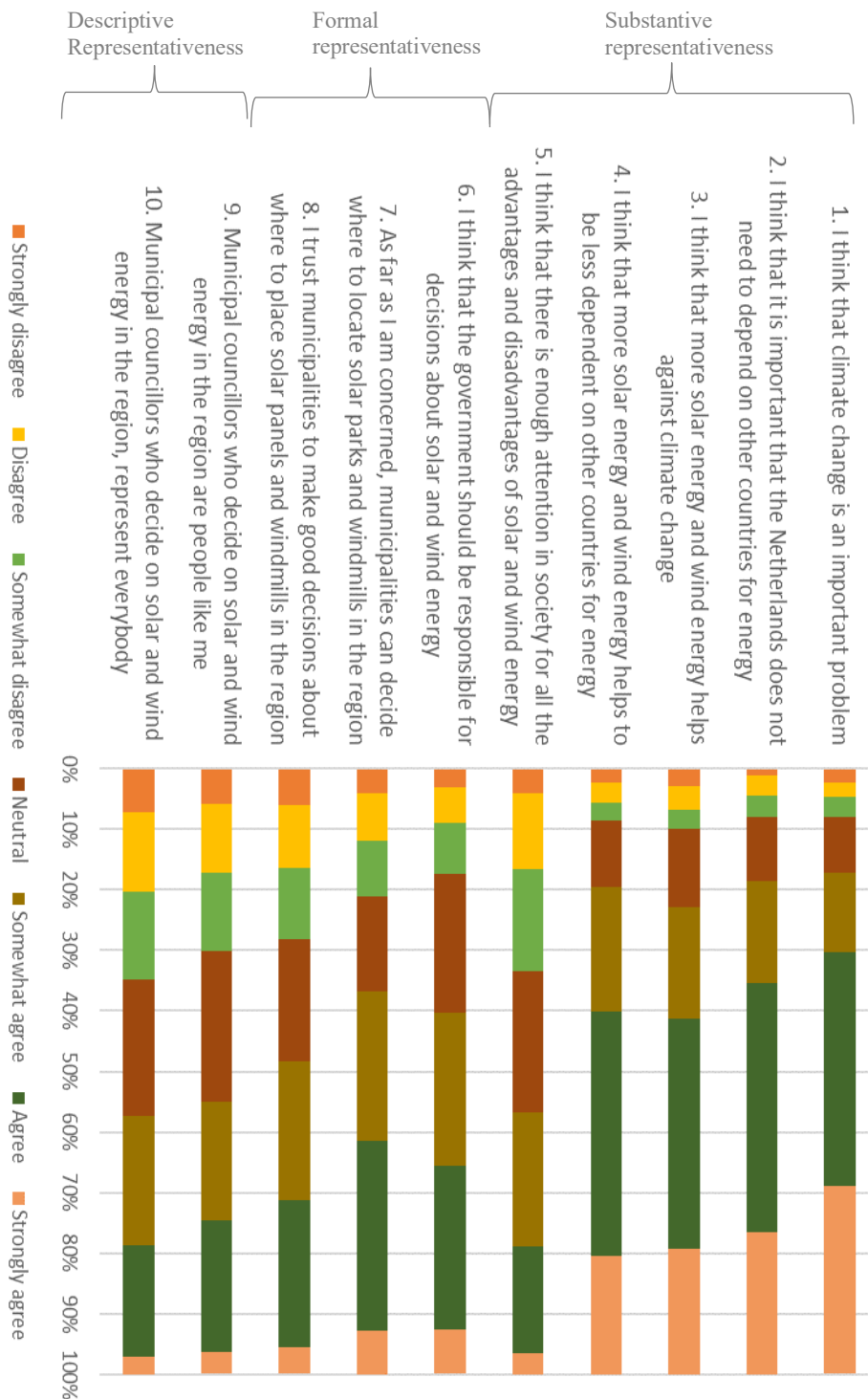


Figure 4. Frequency distribution of agreement with input legitimacy statements (n=2729).

assess how respondents value attributes relatively to other attributes. The fairly abstract RES policy that was the object of our study is a novelty compared to other studies on acceptance of sustainable energy policy, which may help respondents to answer the questions in a way that is consistent with their ideological norms and values, which can provide valuable information for policy makers. By studying perceived legitimacy rather than acceptance, we were able to focus on motives for acceptance due to perceived public interest. Perceived legitimacy was approached with a theoretical framework that al-

lowed for a broad and systematic approach to the research design.

A limitation of our study was that we were able to consider only seven factors in our analysis, due to constraints of the choice tasks for the respondents. However, we tried to limit the consequences of this limitation to select carefully the most important factors, but this does not mean that other factors cannot be relevant. The 2nd limitation of our study we want to mention is that it can be that the presentation of some factor levels are not clear to all respondents, which can limit the value

of our conclusions. However, we tried to minimize this by the execution of a pilot in which potential respondents were interviewed on these aspects of the conjoint task. The 3rd limitation of our study is that potential interaction effects were not analyzed. Possible effects between groups of citizens and the position of minorities are beyond the scope of this study. Finally we want to mention that based on our approach conclusions about when a policy is acceptable or not cannot be made. We have no indication at which level on the 11-point scale between fully acceptable and fully unacceptable, used in our study, citizens will finally in majority accept the policy. But our study does give indications which legitimacy factors matter and which are more and which are less important.

CONCLUSIONS AND IMPLICATIONS

We conclude that nearly all RES policy options we presented to Dutch citizens and which directly relate to policy legitimacy criteria, were perceived to be important for the acceptance of RES policy. This implies that if policy makers find the perceived legitimacy of local sustainable energy generation to be important, they should consider the set of criteria for policy legitimacy we have studied. This study shows also that our approach is feasible for (ex-ante) policy evaluations, taking into account a broad set of evaluation criteria.

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