Rijksinstituut voor Volksgezondheid
en Milieu
*Ministerie van Volksgezondheid,
Welzijn en Sport*

Driemaandelijks overzicht van relevante literatuur over windenergie en gezondheid *Q4-2022*

Periode: Oktober t/m december 2022

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17 januari 2023
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Het Expertisepunt Windenergie en Gezondheid houdt voor haar kennisbasis de wetenschappelijke literatuur bij over windenergie en gezondheid. Elke drie maanden wordt een overzicht gemaakt van de nieuwgevonden wetenschappelijke en grijze literatuur.

In dit document vindt u het overzicht van de literatuur gevonden in de hierboven aangegeven periode.

Literatuuropbrengst

Hieronder wordt eerst een overzicht gegeven van de wetenschappelijke artikelen gevonden in diverse literatuurdatabanken. Daarna volgt een (niet-uitputtende) opsomming van overige relevante bronnen, zoals (Nederlandse) onderzoeksrapporten en conferentieverslagen, ook wel grijze literatuur genoemd.

Disclaimer

Deze selectie is tot stand gekomen met behulp van een zoekprofiel (zie bijlage Methode Zoekstrategie) en toepassing van inclusie en exclusiecriteria. Op deze documenten is geen dataextractie toegepast noch is er een algemeen kwaliteitsoordeel aan gegeven.

Literatuur gepubliceerd in wetenschappelijke tijdschriften

Tabel 1 Overzicht van het aantal gevonden studies

Fase	Okt-Dec 2022
Aantal artikelen gevonden met zoekstrategieën voordat selectie heeft plaatsgevonden	172
Aanvullende referenties gevonden via andere bronnen (dit betreft niet de grijze literatuur)	0
Aantal referenties na verwijdering van duplicaten	**142**
Verwijderde referenties omdat ze niet relevant zijn (voldoen niet aan inclusie en exclusie criteria)	110
Aantal relevante artikelen geselecteerd door reviewers	9
Aantal artikelen waarover reviewer 1 en reviewer 2 hebben afgestemd (grensgevallen)	23
Totaal aantal relevante artikelen (na afstemmen)	**16**

Overzicht van de relevante studies

1. Titel: Analysing citizens' perceptions of renewable energies in rural areas: A case study on wind farms in Spain

Samenvatting (gekopieerd uit artikel): The promotion of rural development can benefit from the advancement of renewable energies as potential sources of growth and income in an integrated economy. Rural areas have attracted a significant proportion of renewable energy installations, mainly wind energy. Moreover, the development of renewables has been explicitly claimed as a key instrument to support rural economies through job creation, new sources of income for landowners and local authorities, and more sustainable industries with the revitalization of their productive systems. However, the installation of renewable energies can have, in the short and long term, different impacts on the territory. This study explores Campo de Belchite citizens' perception of the effects wind energy installations has on the economy, demography, and employment opportunities. The Campo de Belchite county (Aragon) was used as a case study due to its wind-farm development. Citizens perceptions on the socio-economic effects and expectations of renewable energies have been explored on the basis of their responses to an online survey. Findings show a great heterogeneity between agents and territories, both in the evaluation of impacts and in their hopes. The management model plays a critical role for achieving its social acceptance. This work contributes with industrial and energy policy insights that call for a more decentralized, participatory and transparent management models. © 2022 The Author(s)

Referentie: Duarte, R., García-Riazuelo, Á., Sáez, L. A. & Sarasa, C. (2022). Analysing citizens' perceptions of renewable energies in rural areas: A case study on wind farms in Spain. *Energy Reports, 8*, 12822-12831. doi:10.1016/j.egyr.2022.09.173
Link naar bron: https://doi.org/10.1016/j.egyr.2022.09.173
Opmerkingen:

2. Titel: Exposition de la population au bruit émis par les éoliennes en France métropolitaine [Exposure of the population to noise from wind turbines in mainland France Context]

Samenvatting (gekopieerd uit artikel): The WHO guidelines on environmental noise stress that evidence on the health effects of wind turbine sound levels is either non-existent or of poor quality. Against this backdrop, a feasibility study was conducted in France in 2017. Objective. The objective was to suggest a methodology for calculating wind turbine noise in order to quantify the number of residents exposed to different levels of audible noise from wind turbines and to estimate the public health implications should health effects be demonstrated. Materials and methods. The selection of the Harmonoise noise prediction model was validated by comparing predictions from this model with measurements taken during a campaign on a wind farm. The exposure levels determined from this model were then cross-referenced with the number of people living near wind farms. The number of people exposed to noise produced by wind turbines during typical daytime and night-time operating conditions was thus determined for mainland France as a whole and for each French region. Results. Compared to other sources of environmental noise (e.g. transportation), exposure to wind turbine noise is very moderate, with more than 80 % of the exposed people exposed to sound levels below 40 dBA. The total number of people exposed to more than 30 dBA is about 686,000 and 722,000 people for daytime and night-time, respectively, i.e. about 1 % of the French population in 2017. Conclusion. These results are the first assessment of exposure to noise from wind turbines on the scale of mainland France as a whole.

Referentie: Evrard, A. S., Écotière, D., Demizieux, P., Giorgis-Allemand, L. & Guillaume, G. (2022). Exposition de la population au bruit émis par les éoliennes en France métropolitaine [Exposure of the population to noise from wind turbines in mainland France Context]. *Environnement, Risques et Sante, 21*(5), 355-360. doi:10.1684/ers.2022.1675
Link naar bron: https://doi.org/10.1684/ers.2022.1675
Opmerkingen: Artikel gaat over blootstelling aan geluid van windturbines (de effecten hiervan op gezondheid, welzijn of perceptie zijn [nog] niet gepresenteerd). Artikel is in het Frans. Gerelateerd engelstalig artikel: Related article in English: Ecotière, D., Demizieux, P., Guillaume, G., Giorgis-Allemand, L., & Evrard, A.-S. (2022). Quantification of Sound Exposure from Wind Turbines in France. International Journal of Environmental Research and Public Health, 19(1), 23. https://doi.org/10.3390/ijerph19010023

3. Titel: Exposure to wind turbines, regional identity and the willingness to pay for regionally produced electricity
Samenvatting (gekopieerd uit artikel): To reduce greenhouse gas emissions the expansion of renewable energies is vital. However, negative externalities in the regions where wind turbines are installed raise local opposition. A promising way to promote the installation of regional energy plants is the use of regional electricity labels. This paper examines if there is a willingness to pay for regionally produced electricity and whether the willingness to pay is related to exposure to wind turbines or causally affected by regional identity. To that end, this study is based on a large-scale survey among more than 1800 individuals in Germany including a combined priming and stated choice experiment on electricity contracts in combination with official data on wind turbines. The results of the econometric analysis reveal a highly significant willingness to pay a price premium for regional electricity contract attributes. In addition, we find no empirical evidence for a relationship between the exposure to wind turbines and the willingness to pay for regionally produced electricity. Furthermore, the estimation results provide evidence that regional identity reduces the willingness to pay for regionally produced electricity. The results have implications for public policy as well as commercial enterprises. © 2022 Elsevier B.V.

Referentie: Groh, E. D. (2022). Exposure to wind turbines, regional identity and the willingness to pay for regionally produced electricity. *Resource and Energy Economics, 70*. doi:10.1016/j.reseneeco.2022.101332
Link naar bron: https://doi.org/10.1016/j.reseneeco.2022.101332
Opmerkingen:

4. Titel: Experts versus the Public: Perceptions of Siting Wind Turbines and Performance Concerns
Samenvatting (gekopieerd uit artikel): Experiences of wind turbines (WT) shape public perception and acceptance of the technology, influencing government policy, deployment, and land-use policies of wind turbines. This paper attempts to find changes in public perceptions over the last three decades and differences between experts and the public over different land-use options. A semi-structured questionnaire that integrates a visual survey of 10 images of WT technology in different urban, landscape and seascape settings was presented to both groups. The perceptions of siting, proximity, landscape type, and maturity of urban wind turbines' technology in renewable energy generation were contrasted. The results revealed that both the public and experts alike significantly preferred images of WT inclusion in seascape and landscape settings and responded negatively to images of WT as an addition to buildings in urban contexts. Images of wind turbines around transport settings were ranked in the second set of

acceptances, after landscape settings, indicating that closer proximity to WT is acceptable, but for a short duration. The analysis also highlighted a preference by the public for aesthetically engaging WT, even if they resulted in lower energy yields, but were less accepted by the experts who based their judgment on technical performance.

Referentie: Hamza, N., Borg, R. P., Camilleri, L. & Baniotopoulos, C. (2022). Experts versus the Public: Perceptions of Siting Wind Turbines and Performance Concerns. *Energies, 15*(20). doi:10.3390/en15207743
Link naar bron: https://doi.org/10.3390/en15207743
Opmerkingen:

5. Titel: What makes local energy projects acceptable? Probing the connection between ownership structures and community acceptance
Samenvatting (gekopieerd uit artikel): Community ownership of wind energy has been found to increase acceptance, but the reasons for this are poorly understood. Here, we compare different communities' attitudes towards local onshore wind energy projects in order to gain a deeper understanding of the characteristics of ownership which are conducive to community acceptance. Using a postal survey in Scotland (n = 318), we compared three communities with varying degrees of ownership regarding their (1) support for the local wind project; (2) perceptions of energy justice; (3) perceived impacts; and (4) ownership and benefit preferences. One-way ANOVAs and the Potential for Conflict Index2 identified that residents in the two communities with a degree of ownership were more associated with greater acceptance, processes, and outcomes (i.e. more just and inclusive development processes and more fairly distributed benefits and impacts), than residents living near the privately-owned development. Additionally, we provide evidence that a co-operative can achieve similar acceptance and energy justice as a fully community-owned project. Overall, the results indicate that policymakers should take seriously the connection between the tenets of energy justice and ownership models in their policy and planning efforts.

Referentie: Hogan, J. L., Warren, C. R., Simpson, M. & McCauley, D. (2022). What makes local energy projects acceptable? Probing the connection between ownership structures and community acceptance. *Energy Policy, 171*. doi:10.1016/j.enpol.2022.113257
Link naar bron: https://doi.org/10.1016/j.enpol.2022.113257
Opmerkingen:

6. Titel: Do people prefer offshore to onshore wind energy? The role of ownership and intended use
Samenvatting (gekopieerd uit artikel): Global investments in offshore wind energy are expected to escalate over the coming decades, fueled by improvements in technology, declining costs, and increasing political support. The complexity, scale, and location of these developments make international ownership and export of electricity more feasible. We examine how the general public's acceptance of wind energy will be affected by a political shift in focus from onshore to nearshore or offshore locations, from local or national dominance of ownership to international dominance, and from meeting local or national needs to meeting international ones. We use a nationwide choice experiment with 1612 individuals in Norway to reveal the preferences for these attributes and apply a mixed logit regression model to estimate the willingness to pay to avoid certain outcomes. We show that, although respondents prefer offshore and nearshore locations to onshore ones, they are even more concerned with maintaining local or

national control both through ownership and intended use of the added electricity. Although the preferences for national ownership are strong for both nearshore and offshore alternatives, the preference for meeting national needs becomes less important when wind energy developments are located farther off the coast. Three wind energy scenarios are used to further investigate these preferences: 1) international consortium for offshore wind energy, 2) national alliances for nearshore wind energy, and 3) local energy communities for onshore wind energy. We also discuss how a shift to nearshore and offshore wind energy can be enabled by paying greater attention to people's concerns over national control of wind energy resources. © 2022 The Authors

Referentie: Linnerud, K., Dugstad, A. & Rygg, B. J. (2022). Do people prefer offshore to onshore wind energy? The role of ownership and intended use. *Renewable and Sustainable Energy Reviews, 168*. doi:10.1016/j.rser.2022.112732
Link naar bron: https://doi.org/10.1016/j.rser.2022.112732
Opmerkingen:

7. Titel: Opposing out loud versus supporting in silence: who wants to participate in decision-making about energy projects?
Samenvatting (gekopieerd uit artikel): Public participation in decision-making is widely expected to contribute to democratic society, better decisions, and higher public acceptability of energy projects. The realization of the desired functions of public participation depends, however, on who participates in decision-making. In opinion surveys about two planned wind parks in the Netherlands, we found that opponents were more willing to participate than supporters. Those who would not accept the project under any conditions were more motivated to participate than those who may accept the project if certain conditions were met. Furthermore, motivation to participate was associated with stronger negative emotions towards the project (e.g. angry, disappointed), and weaker positive emotions (e.g. happy, proud). Taken together, public preferences to participate in decision-making can affect the desired functions of public participation, as not everyone will equally participate. Our findings have important implications for energy policies primarily focusing on demographic representativeness in participation: it is also important to consider the representation of different perspectives in decision-making. Also, incorporating people's different emotions towards energy projects can be a valuable route to effective public participation, in addition to the dominating rationalistic approach. © 2022 The Author(s). Published by IOP Publishing Ltd.

Referentie: Liu, L., Perlaviciute, G. & Squintani, L. (2022). Opposing out loud versus supporting in silence: who wants to participate in decision-making about energy projects? *Environmental Research Letters, 17*(11). doi:10.1088/1748-9326/ac9f24
Link naar bron: https://doi.org/10.1088/1748-9326/ac9f24
Opmerkingen:

8. Titel: Diverse Pathways for Power Sector Decarbonization in Texas Yield Health Cobenefits but Fail to Alleviate Air Pollution Exposure Inequities
Samenvatting (gekopieerd uit artikel): Decarbonizing power systems is a critical component of climate change mitigation, which can have public health cobenefits by reducing air pollution. Many studies have examined strategies to decarbonize power grids and quantified their health cobenefits. However, few of them focus on near-term cobenefits at community levels, while comparing various decarbonization pathways. Here, we use a coupled power system and air quality modeling framework to quantify the costs and benefits of decarbonizing the Texas power grid through a carbon tax; replacing

coal with natural gas, solar, or wind; and internalizing human health impacts into operations. Our results show that all decarbonization pathways can result in major reductions in CO2 emissions and public health impacts from power sector emissions, leading to large net benefits when considering the costs to implement these strategies. Operational changes with existing infrastructure can serve as a transitional strategy during the process of replacing coal with renewable energy, which offers the largest benefits. However, we also find that Black and lower-income populations receive disproportionately higher air pollution damages and that none of the examined decarbonization strategies mitigate this disparity. These findings suggest that additional interventions are necessary to mitigate environmental inequity while decarbonizing power grids.

Referentie: Luo, Q., Copeland, B., Garcia-Menendez, F. & Johnson, J. X. (2022). Diverse Pathways for Power Sector Decarbonization in Texas Yield Health Cobenefits but Fail to Alleviate Air Pollution Exposure Inequities. *Environmental Science and Technology, 56*(18), 13274-13283. doi:http://dx.doi.org/10.1021/acs.est.2c00881 10.1021/acs.est.2c00881
Link naar bron: https://doi.org/http://dx.doi.org/10.1021/acs.est.2c00881 10.1021/acs.est.2c00881
Opmerkingen:

9. Titel: Audibility of wind farm infrasound and amplitude modulated tonal noise at long-range locations
Samenvatting (gekopieerd uit artikel): Wind energy is one of the fastest growing sources of renewable energy in Australia. However, wind farm noise (WFN) continues to attract complaints from residents living near wind farms, including from residents who live relatively long-distances (>1 km) away. Here we use a computational approach to assess the audibility of infrasound and amplitude modulated (AM) tones at long-range locations. Our approach considers the uncertainty associated with WFN measurements and human hearing variability. We show that infrasound is not audible to residents with normal hearing who live at distances greater than 1 km from a wind farm, but the measurements at one wind farm showed that AM tones occurring at low frequencies may be perceived up to distances of 9 km. Although these results from South Australian wind farms may not be reflective of other wind farm settings, these results support that AM tones could be the main reason behind WFN complaints at long-range locations, and thus warrant further attention to help make wind farms more acceptable to impacted residents. © 2022 Elsevier Ltd

Referentie: Nguyen, P. D., Hansen, K. L., Lechat, B., Hansen, C., Catcheside, P. & Zajamsek, B. (2022). Audibility of wind farm infrasound and amplitude modulated tonal noise at long-range locations. *Applied Acoustics, 201*. doi:10.1016/j.apacoust.2022.109106
Link naar bron: https://doi.org/10.1016/j.apacoust.2022.109106
Opmerkingen:

10. Titel: Repower to the people: The scope for repowering to increase the scale of community shareholding in commercial onshore wind assets in Great Britain
Samenvatting (gekopieerd uit artikel): Internationally, commercial onshore wind farms are starting to reach the end of their operational or consent life, posing a new and mounting challenge with potentially dramatic permutations for the sector. Replacing existing turbines with new infrastructure through repowering has the potential to significantly increase the installed capacity of existing onshore wind sites without also

increasing the footprint of development. However, local community opinions will form an important aspect of such end-of-life decision making. Traditionally, community benefit funds have been used to provide financial payments to host communities, but this is not always what is sought by a local community. The repowering of wind sites presents a distinct moment to reconsider and renegotiate how a local community benefits from hosting wind infrastructure. Herein lies an opportunity for the community to partner with commercial developers to obtain shared ownership of repowering projects, potentially through the support of existing community energy organisations. This paper draws upon semi-structured interviews with commercial developers, community energy practitioners and intermediary bodies in Great Britain to critically evaluate, for the first time, the scope for repowering to increase the scale of community shareholding in commercial onshore wind assets. The findings reveal support for shared ownership in principle with various rationales for this support, but many challenges are identified in practice. Recommendations are provided regarding how planning systems and government policy could evolve to facilitate shared ownership during repowering. © 2022 The Authors

Referentie: Philpott, A. & Windemer, R. (2022). Repower to the people: The scope for repowering to increase the scale of community shareholding in commercial onshore wind assets in Great Britain. *Energy Research and Social Science, 92*. doi:10.1016/j.erss.2022.102763
Link naar bron: https://doi.org/10.1016/j.erss.2022.102763
Opmerkingen:

11. Titel: When energy justice is contested: A systematic review of a decade of research on Sweden's conflicted energy landscape
Samenvatting (gekopieerd uit artikel): The way in which we produce and consume energy has profound implications for our societies. How we configure our energy systems determines not only our chances of successfully dealing with climate change but also, how benefits and burdens of these systems are distributed. In this paper, we set out to map the literature on conflicts related to the energy system in Sweden using a framework of energy justice. The purpose of this exercise is twofold: first, to identify and understand energy conflicts in Sweden through the research that is published; and second, to identify gaps in the literature on energy justice in Sweden. This systematic review builds upon 40 scholarly articles focusing on energy conflicts in Sweden. All articles were written in the time period from January 2010 to January 2021. All articles were published in English in peer-reviewed scientific journals. The papers were analysed using a framework for energy justice that focused on the elements of distributional and procedural justice and recognition justice. The findings of the review suggest that there has been little explicit focus on energy justice in the literature on Sweden's energy system. Issues of distributional justice are most raised and procedural and recognition justice are often conflated in research. While conflicts over hydropower and nuclear have dominated in the past, wind energy in Sami territory is most problematised in the reviewed literature. The understanding of justice in the Swedish energy system is currently missing two elements: a rigorous handling of ecologically unequal exchange and restorative justice. © 2022

Referentie: Ramasar, V., Busch, H., Brandstedt, E. & Rudus, K. (2022). When energy justice is contested: A systematic review of a decade of research on Sweden's conflicted energy landscape. *Energy Research and Social Science, 94*. doi:10.1016/j.erss.2022.102862
Link naar bron: https://doi.org/10.1016/j.erss.2022.102862
Opmerkingen:

12. Titel: Trade-offs in German wind energy expansion: building bridges between different interests, values and priorities
Samenvatting (gekopieerd uit artikel): Background: To achieve climate targets, a transition to low-carbon energy production is necessary. However, conflicts between different interests, values and priorities, particularly at the community level, can constrain this transition. This paper aims to analyze lines of conflict and opportunities to build bridges between conflicting interests in the expansion of wind energy in Germany at the local level, to achieve successful implementation of wind energy projects. Results: Our analysis of four cases of local-level wind energy projects in Germany shows that limited local options for action reinforce the need for local actors to maximize the benefits of energy transition projects. In addition to the conflict over scarce space, the lines of conflict at the local level run primarily along the dimensions of costs and benefits, winners and losers. Real or perceived procedural and distributive injustices had the potential to fuel resistance to wind energy projects in the analyzed cases. However, wind energy projects were successfully implemented despite the presence of local opposition. Conclusions: The results show that, by integrating procedural and distributive justice into the project planning and implementation and offering tailored solutions, community support for expansion of renewable energy projects can be enhanced. The paper advances the concept of societal ownership ("gesellschaftliche Trägerschaft"), which suggests the willingness of members of a community to tolerate decisions even when some conflicts related to the decision remain unresolved. Societal ownership is presented as an alternative to the concept of simple acceptance; it implies a more positive, more supportive community attitude, where members aim to address conflict as a normal aspect of decision making. Rather than sweeping alternative opinions aside, the community addresses alternative viewpoints, seeking to achieve greater procedural and distributive justice. In this way, a sense of societal ownership of a project can develop, enhancing its likelihood of success. © 2022, The Author(s).

Referentie: Reitz, S., Goshen, L. & Ohlhorst, D. (2022). Trade-offs in German wind energy expansion: building bridges between different interests, values and priorities. *Energy, Sustainability and Society, 12*(1). doi:10.1186/s13705-022-00365-1
Link naar bron: https://doi.org/10.1186/s13705-022-00365-1
Opmerkingen:

13. Titel: Energy justice in renewable energy projects: How learning about indigenous knowledge systems could inform systemic practice
Samenvatting (gekopieerd uit artikel): This article is aimed at organisations and researchers to urge them to adopt more systemic ways to deal with energy justice issues in renewable energy projects being built around the world to help meet the United Nations Sustainable Development Goal (UNSDG) 7. It will focus on solar and wind farms. While these projects positively contribute towards achieving UNSDG 7 (viz., affordable clean energy), they have also created a variety of justice issues, which need to be addressed. While measures have been taken more recently to redress these issues, we make the case that the application of systemic thinking and practice could maximise the positives and minimise negative impacts of creating short-term fixes without addressing the underlying root causes of the issues. Using two case studies, we will show how working systemically with indigenous populations and considering indigenous knowledge systems could help in dealing with justice issues. © 2022 John Wiley & Sons Ltd.

Referentie: Sankaran, S. & McIntyre-Mills, J. (2022). Energy justice in renewable energy projects: How learning about indigenous knowledge systems could inform

systemic practice. *Systems Research and Behavioral Science, 39*(5), 962-974. doi:10.1002/sres.2899
Link naar bron: https://doi.org/10.1002/sres.2899
Opmerkingen:

14. Titel: Analysis of the Community Acceptance Factors for Potential Wind Energy Projects in Greece
Samenvatting (gekopieerd uit artikel): The speedy increase in wind parks has brought to light a plethora of conflicts. Despite their benefits, there are more than a few who are opposed. The goal of this research is to study and evaluate the causes, so that such a project can take place in conditions of cooperation, mutual interest and profit for society and investors. The method chosen was a survey with approximately 600 responses in Attica, continental Greece and the islands. The data collected were analysed via SPSS on three levels: (i) descriptive statistics, (ii) binomial logistic regression to model the attitude towards wind farms, and (iii) factor analysis to identify latent factors that influence people's thoughts. The results show that the NIMBY effect has no significant influence on the acceptance of the project, contrary to expectations. Moreover, the acceptance of a project does not seem to be a class issue, as the analysis showed that attitude is independent of income. The frequency and logistic analysis showed as the main determinants of the public attitude: (i) in a positive way, open and continuous briefing during all the construction stages and minimisation of greenhouse gases emissions (i) in a negative way, the impact on flora and fauna and the lack of trust in the investors. © 2022 by the authors.

Referentie: Skiniti, G., Daras, T. & Tsoutsos, T. (2022). Analysis of the Community Acceptance Factors for Potential Wind Energy Projects in Greece. *Sustainability (Switzerland), 14*(23). doi:10.3390/su142316009
Link naar bron: https://doi.org/10.3390/su142316009
Opmerkingen:

15. Titel: Wind Turbines, Public Acceptance, and Electoral Outcomes
Samenvatting (gekopieerd uit artikel): Despite a widespread public support for wind energy in general, wind turbine proposals attract a considerable amount of public opposition. At a time of political commitments to building more wind turbines for climate risk mitigation, we study the potential causes of this opposition and its electoral effects. Our analysis draws on a survey experiment in Switzerland, where the number of wind turbines will grow from a couple of dozens to many hundreds in the next three decades. We find that exposure to wind turbines increases public acceptance, but this affect does not translate into electoral turnout or vote choice. Moreover, locality or politicisation does not seem to have an effect at all—neither on acceptance nor on electoral outcomes. Our results suggest that voters do not reward or punish political parties for their positions on wind energy, even when turbines might soon be rising in their local area. © 2022 The Authors. Swiss Political Science Review published by John Wiley & Sons Ltd on behalf of Swiss Political Science Association.

Referentie: Umit, R. & Schaffer, L. M. (2022). Wind Turbines, Public Acceptance, and Electoral Outcomes. *Swiss Political Science Review, 28*(4), 712-727. doi:10.1111/spsr.12521
Link naar bron: https://doi.org/10.1111/spsr.12521
Opmerkingen:

16. Titel: Annoyance due to amplitude modulated low-frequency wind farm noise: A laboratory study

Samenvatting (gekopieerd uit artikel): This study tested for differences in perceived annoyance and loudness between road traffic noise (RTN) and wind farm noise (WFN) with amplitude modulation (AM) and tonality. Twenty-two participants, who were primarily university students with no previous exposure to WFN and aged between 19 and 29 (mean, 22 years old; standard deviation, 2) years old with normal hearing, underwent a laboratory-based listening test. Each participant rated perceived annoyance and loudness of WFN and RTN samples played at sound pressure levels (SPLs) ranging from 33 to 48 dBA. Probability modeling revealed that participants were the largest source of variability in ratings of perceived annoyance and loudness while noise type and SPL were relatively minor sources. Overall, no differences were found between WFN and RTN perceived annoyance or loudness ratings. On the other hand, no substantial differences in annoyance were found between low-frequency tonal AM and mid-to-high-frequency AM or "swish"WFN. © 2022 Acoustical Society of America.

Referentie: Zajamsek, B., Hansen, K., Lechat, B., Liebich, T., Dunbar, C., Micic, G. & Catcheside, P. (2022). Annoyance due to amplitude modulated low-frequency wind farm noise: A laboratory study. *Journal of the Acoustical Society of America, 152*(6), 3410-3421. doi:10.1121/10.0016499
Link naar bron: https://doi.org/10.1121/10.0016499
Opmerkingen:

Tabel 2 Indeling van de wetenschappelijke literatuur naar type en onderwerp.

	Hinder	**Slaap**	**Gezondheid divers**	**Anders (bijv. co-determinanten)**
Experimenteel	Zajamsek (2022)			Hamza (2022), Linnerud (2022), Umit (2022)
Observationeel (bijv. Cross-sectionele, cohort, of case control studies)				Duarte (2022), Groh (2022), Hogan (2022), Linnerud (2022), Liu (2022), Philpott (2022), Skiniti (2022)
Review				Ramasar (2022)
Tekstmining (bijv. sentiment analyse van (sociale) media artikelen)				
Case study				Duarte (2022), Reitz (2022), Sankaran (2022)
Anders (bijv. theoretisch model, opinie,...)			Luo (2022), Nguyen (2022)	Evrard (2022), Sankaran (2022),

Relevante Nederlandse onderzoeksrapporten en overige relevante grijze literatuur

Overzicht van relevante grijze literatuur

1. Titel: Achtergrondrapport Periodiek Overzicht Inwonerparticipatie Energietransitie in de Fysieke Leefomgeving – de eerste meting

Beschrijving (gekopieerd): Inwonerparticipatie heeft – mede door het nationale Klimaatakkoord en de Regionale Energiestrategieën (RES) – een belangrijke plek gekregen in de energietransitie. Met name op gemeentelijk niveau moeten veel keuzes worden gemaakt in de fysieke leefomgeving. Gemeenten hebben een regierol voor het vroegtijdig betrekken van inwoners bij het besluitvormingsproces voor een project of activiteit. Dit Periodiek Overzicht geeft een beeld van wat er gebeurt op het gebied van inwonerparticipatie en welke ondersteuningsbehoeften gemeenten hebben. Het laat ook zien hoe de inwonerparticipatie zich de komende jaren ontwikkelt. Tekst van: [https://energy.nl/publications/inwonerparticipatie-periodiek-overzicht/] Een uitgebreide samenvatting is te vinden op: https://publications.tno.nl/publication/34640185/z1PmOw/TNO-2022-P12122.pdf

Referentie: Batenburg, A. & Paradies, G. (2022). *Achtergrondrapport Periodiek Overzicht Inwonerparticipatie Energietransitie in de Fysieke Leefomgeving – de eerste meting* (TNO 2022 P11746). TNO.
Datum van publicatie: 11-2022
Link naar bron: https://publications.tno.nl/publication/34640186/pGUq2b/TNO-2022-P11746.pdf
Opmerkingen: In opdracht van het Ministerie van Economische Zaken en Klimaat

2. Titel: Inter-Wind – an Interdisciplinary Analysis of Wind Turbine Noise

Samenvatting (gekopieerd): Sound emissions of wind turbines play an important role for their acceptance. In order to understand the impact of these emissions on residents it is important to measure it accurately. Often this is done with a single item measure of annoyance. With the Annoyance-Stress-Scale a more nuanced approach to this problem is presented [1]. An empirical application in an interdisciplinary research project on noise annoyance of wind turbines is provided: In the proximity of a wind farm in southern Germany residents were interviewed along a standardised questionnaire (n = 148) and were able to use a noise reporting app to document their annoyance in real-time and synchronous with sound, ground motion, and meteorological measurements. The app data (n = 11) indicate higher complaint rates in the early morning, evening and night hours. Changes in rotation rate, as well as high rotation rates are associated with resident complaints. Both rotation configurations occur under different wind directions, and affect residents in different situations–with regard to location, day time, and activity. Tekst van: [https://www.ica2022korea.org/data/Proceedings_A08.pdf]

Referentie: Huebner, G., Mueller, F. & Pohl, J. (2022). *Inter-Wind – an Interdisciplinary Analysis of Wind Turbine Noise* [Paper presentation]. ICA 2022, Gyeongju, Korea.
Datum van publicatie: 24-10-2022
Link naar bron: https://www.ica2022korea.org/data/Proceedings_A08.pdf
Opmerkingen: Congres paper

3.Titel: Burgers over klimaatbeleid: een onderzoek naar zorgen en oplossingen

Beschrijving (gekopieerd): De Rijksoverheid wil burgers meer betrekken bij het klimaatbeleid. Wat zijn volgens Nederlandse burgers zorgen en aandachtspunten waar de Rijksoverheid bij de uitwerking van energie- en klimaatbeleid rekening mee zou moeten

houden? En in hoeverre willen Nederlanders participeren bij en geïnformeerd worden over energie- en klimaatbeleid? Tekst van: [https://energy.nl/publications/burgers-over-klimaatbeleid/] . Een uitgebreide samenvatting van het rapport is te vinden op: https://publications.tno.nl/publication/34640283/Di3cTv/TNO-2022-burgers.pdf

Referentie: Klösters, M., Paradies, G., Schlindwein, L. & Batenburg, A. (2022). *Burgers over klimaatbeleid: een onderzoek naar zorgen en oplossingen* (TNO 2022 P10568). TNO.
Datum van publicatie: 09-2022
Link naar bron: https://publications.tno.nl/publication/34640280/qFBygo/TNO-2022-P10568.pdf
Opmerkingen: In opdracht van het Ministerie van Economische Zaken en Klimaat

4. Titel: Het kan met gemak wind op zee en zon op dak
Beschrijving (gekopieerd): De energietransitie in Nederland zal versnellen richting 2030. Naast de noodzaak in het kader van de klimaatproblematiek is er ook de verhoogde regeerakkoorddoelstelling en een (te verwachten) extra Fit for 55 verplichting vanuit de Europese Unie. Het voortgangsoverleg Klimaatakkoord heeft in het voorjaar van 2022 vanuit haar gelederen een Werkgroep Extra Opgave ingesteld die moest inventariseren (met inachtneming van alle ontwikkelingen en doelstellingen) wat de totale behoefte aan elektriciteit in 2030 zal zijn en op welke wijze deze kan worden opgewekt. De werkgroep kende een maatschappelijke reflectiegroep waarin de NLVOW en Windalarm hebben deelgenomen. Het eindrapport "Alles uit de kast" is inmiddels zonder deze reflectie plaats te geaccordeerd door het voortgangsoverleg klimaatakkoord en door Minister Jetten aan de Tweede Kamer aangeboden. Dit position paper reflecteert op de Werkgroep Extra Opgave en bestrijdt haar conclusie dat de verhoogde doelstellingen niet zonder extra wind op land en zon in weiland kunnen worden bereikt. Tekst uit: [samenvatting van het rapport]

Referentie: Kusters, N., Tiemersma, J. J., Swellengrebel, H., Videler, P. & Koks, A. (2022). *Het kan met gemak wind op zee en zon op dak*. Windalarm & NLVOW.
Datum van publicatie: 28-08-2022
Link naar bron: https://www.hetkanmetgemak.nl/rapport
Opmerkingen: Reflectie op het rapport: https://nlvow.nl/system/files/article-files/2022-09/rapport-alles-uit-de-kast-eindrapportage-werkgroep-extra-opgave.pdf

5. Titel: Monitor RES 2022. Een voortgangsanalyse van de Regionale Energie Strategieën
Beschrijving (gekopieerd): Het PBL verzorgt, op verzoek van het ministerie van Economische Zaken en Klimaat voor het Nationaal Programma RES, een onafhankelijke monitoring van de Regionale Energie Strategie (RES). Omdat, volgens afspraak, er in 2022 geen nieuwe RES-plannen worden geleverd door de regio's is dit rapport een voortgangsanalyse van de RES 1.0. In 2021 zijn de RES'en 1.0 in alle regio's bestuurlijk vastgesteld door provincies, gemeenten en waterschappen. Met een RES brengen 30 energieregio's samen met maatschappelijke partners, bedrijfsleven en bewoners regionaal breed gedragen keuzes tot stand om doelen uit het Klimaatakkoord uit 2019 te verwezenlijken. Het gaat hierbij om: 1) de regio's moeten uiterlijk in 2030 samen ten minste 35 terawattuur (TWh) elektriciteit produceren met windturbines en grootschalige zon-pv-systemen op land en 2) regio's moeten ieder een Regionale Structuur Warmte (RSW) opstellen.
Update van nationale spiegel van RES-plannen: Het PBL reikt met de Monitor RES een 'nationale spiegel' van de RES'en aan. In deze Monitor RES 2022 reflecteren we op de stand van zaken rond de RES. We analyseren wat de voortgang is bij het bereiken van

het 2030-doel van 35 TWh. De resultaten en conclusies uit de Monitor RES 1.0 vormen hierbij het startpunt. PBL kijkt daarbij naar de ontwikkelingen rond de thema's Leefomgeving, Bestuurlijk draagvlak en Energiesysteem. Daarnaast kijken we naar hernieuwbare energiebeleid in andere landen in Europa. De focus ligt op benaderingen die inspiratie kunnen bieden bij de RES. Deze monitor bevat geen analyse rond het RES-thema 'Participatie' en de RSW. Er is namelijk geen input van alle regio's voor deze onderwerpen. Doorontwikkeling RES en monitoring: De regio's zijn bezig met de uitvoering en uitwerking van hun RES-plannen en hebben in 2022, volgens afspraak, geen nieuwe regionale energiestrategieën vastgesteld. Deze monitor kan worden gezien als een tussentijdse Monitor. In juli 2023 leveren de regio's een voortgangsdocument van de RES 1.0 plannen. Voor een RES-update met kaderstellende ruimtelijke gevolgen, bijvoorbeeld als er nieuwe zoekgebieden worden aangewezen, maakt een regio een RES-herijkingsdocument, waarvoor een milieueffectrapportage plicht geldt. In de regulier te verschijnen Monitor RES volgt het PBL dit proces. Tekst van: [https://www.pbl.nl/publicaties/monitor-res-2022]

Referentie: Matthijsen, J., Chranioti, A., Sorel, N., Eerens, H., van der Veen, R., Nabielek, P. & Evers, D. (2022). *Monitor RES 2022. Een voortgangsanalyse van de Regionale Energie Strategieën* (4985). Planbureau voor de Leefomgeving.
Datum van publicatie: 8-12-2022
Link naar bron: https://www.pbl.nl/publicaties/monitor-res-2022
Opmerkingen:

6. Titel: Assessment of community responses to noise from German onshore wind turbines
Samenvatting (gekopieerd): Within five exposed areas in Germany, the effects of wind turbine (WT) noise on annoyance and disturbances were assessed, with a total of 463 participants living at a distance to the nearest WT of up to 5 km. Exposure response analysis was carried out for the percentage of people highly annoyed (HAV) by WT noise with annoyance assessed according to ISO/TS 15666. With a correlation of r = .26, the effect size of the noise rating level Lr,24hrs (LAeq for daytime and nighttime) on WTN annoyance is small. Other contextual factors contribute to the explanation of the annoyance. Particularly, these are the visual impacts of the WT, lack of recreation, reduced sojourn quality outdoors, and negative attitudes towards the local WT. The results further indicate that the WT amplitude modulations seem to affect the noise annoyance. Following suggestions from the literature, a composite annoyance score based on factor analysis, including annoyance due to noise, visual impacts, and stress-related responses regarding WT-induced lack of recovery outdoors, was constructed and related to the distance to the nearest WT. Results of exposure-response analysis regarding the composite score are presented at the conference. Tekst van [https://www.ica2022korea.org/data/Proceedings_A08.pdf]

Referentie: Schreckenberg, D. & Grossarth, S. (2022). *Assessment of community responses to noise from German onshore wind turbines* [Paper presentation]. ICA 2022, Gyeongju, Korea.
Datum van publicatie: 24-10-2022
Link naar bron: https://www.ica2022korea.org/data/Proceedings_A08.pdf
Opmerkingen: Congres paper