



Driemaandelijks overzicht van relevante literatuur over windenergie en gezondheid Q4-2024

Periode: Oktober t/m december 2024

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 conferentieverlagen, 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	Oktober- December 2024
Aantal artikelen gevonden met zoekstrategieën voordat selectie heeft plaatsgevonden	164
Aanvullende referenties gevonden via andere bronnen (dit betreft niet de grijze literatuur)	0
Aantal referenties na verwijdering van duplicaten	147
Verwijderde referenties omdat ze niet relevant zijn (voldoen niet aan inclusie en exclusie criteria)	137
Aantal relevante artikelen geselecteerd door reviewers	6
Aantal artikelen waarover reviewer 1 en reviewer 2 hebben afgestemd (grensgevallen)	4
Totaal aantal relevante artikelen (na afstemmen)	7

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Overzicht van de relevante studies

1. Titel: Environmental Impact of Wind Farms

Samenvatting (gekopieerd uit artikel): The aim of this article is to analyse the global environmental impact of wind farms, i.e., the effects on human health and the local ecosystem. Compared to conventional energy sources, wind turbines emit significantly fewer greenhouse gases, which helps to mitigate global warming. During the life cycle of a wind farm, 86% of CO₂ emissions are generated by the extraction of raw materials and the manufacture of wind turbine components. The water consumption of wind farms is extremely low. In the operational phase, it is 4 L/MWh, and in the life cycle, one water footprint is only 670 L/MWh. However, wind farms occupy a relatively large total area of 0.345 ± 0.224 km²/MW of installed capacity on average. For this reason, wind farms will occupy more than 10% of the land area in some EU countries by 2030. The impact of wind farms on human health is mainly reflected in noise and shadow flicker, which can cause insomnia, headaches and various other problems. Ice flying off the rotor blades is not mentioned as a problem. On a positive note, the use of wind turbines instead of conventionally operated power plants helps to reduce the emission of particulate matter 2.5 microns or less in diameter (PM 2.5), which are a major problem for human health. In addition, the non-carcinogenic toxicity potential of wind turbines for humans over the entire life cycle is one of the lowest for energy plants. Wind farms can have a relatively large impact on the ecological system and biodiversity. The destruction of animal migration routes and habitats, the death of birds and bats in collisions with wind farms and the negative effects of wind farm noise on wildlife are examples of these impacts. The installation of a wind turbine at sea generates a lot of noise, which can have a significant impact on some marine animals. For this reason, planners should include noise mitigation measures when selecting the site for the future wind farm. The end of a wind turbine's service life is not a major environmental issue. Most components of a wind turbine can be easily recycled and the biggest challenge is the rotor blades due to the composite materials used. © 2024 by the authors.

Referentie: Bošnjaković, M., Hrkać, F., Stoić, M. & Hradovi, I. (2024). Environmental Impact of Wind Farms. *Environments - MDPI*, 11(11).

Link naar bron: <https://doi.org/10.3390/environments11110257>

2. Titel: Policy insights for wind energy from a choice experiment stated preference efficient design in Apulia region (Italy)

Samenvatting (gekopieerd uit artikel): The present work argues that wind energy is either a positive or negative determinant against the risks associated with its use, and aims at: evaluating the incidence of energy risks on the perception of wind energy; analysing the trade-offs between a wind farm installation, land conservation and energy risks; suggesting adequate policy indications for the efficiency of future energy markets. The study compares the results from logit models, which estimate the distribution of the utility coefficients with a Choice Experiment approach using a stated preference efficient design and honesty priming techniques to overcome the hypothetical bias. Main findings indicate a positive attitude for the proposed wind energy scenarios in terms of Aesthetical impact, CO₂ and Bill savings, and Costs, as well as more densely distributed wind farms producing more energy. Installation and maintenance costs and the rate of avian collisions are considered acceptable. From the main findings, useful policy insights assess the efficiency of wind farms projects to reduce costs and energy prices. Simplification of bureaucracy, direct economic benefits for local communities, citizens' participation, and dissemination of information are key practices for future developments of wind energy markets. © The Author(s) 2024.

Referentie: Caporale, D., De Lucia, C., dell’Olio, L. & Paziienza, P. (2024). Policy insights for wind energy from a choice experiment stated preference efficient design in Apulia region (Italy). *Economia Politica*, 41(3), 963-995.

Link naar bron: <https://doi.org/10.1007/s40888-024-00325-2>

3. Titel: After the battle: Emergent norms and the silencing of dissent in a Norwegian wind power community

Samenvatting (gekopieerd uit artikel): In the small municipality of Åfjord on the Norwegian coast, home to one of Europe's largest onshore wind power installations, we observed a shift in critical attitudes towards a specific wind power development plan. Initially considered legitimate standpoints within an ongoing debate over land use, these viewpoints transformed into silenced opinions, or acquiescence, as the project progressed from the planning stage to fully operational wind power plants. A demand for consensus emerged within the local community. Through qualitative analysis of in-depth interviews with concerned stakeholders and community members, we employ a social norm perspective to explore the catalysts behind that shift and discuss potential consequences of the transformation. The article transcends the conventional explanatory approach to opinions on wind power development and provides valuable insights to the field of research on social acceptance. Specifically, it demonstrates that key drivers of acceptance, such as economic spin-off effects, can evolve into codes dictating legitimate behaviour and opinions in host communities. This poses a potential threat to the free exchange of opinions and local democracy. © 2024 The Authors

Referentie: Figari, H., Leiren, M. D. & Krange, O. (2024). After the battle: Emergent norms and the silencing of dissent in a Norwegian wind power community. *Energy Research and Social Science*, 118.

Link naar bron: <https://doi.org/10.1016/j.erss.2024.103765>

4. Titel: Overcoming the headwinds: Can policy design shape public acceptance of wind power in Sweden?

Samenvatting (gekopieerd uit artikel): This paper explores wind power attitudes in Sweden, considering the proximity of wind power installations, using a large-scale survey (N = 5280). The study examines if attitudes were affected by policies that provide collective financial benefits through municipal tax revenues, personal benefits through direct compensation, or openings for democratic involvement. Only 15 % of the respondents expressed negative attitudes to wind power as a measure to speed up the transition to a fossil free society, while 26 % were negative to wind power built within 5 km from their homes. Attitudes were mainly predicted by ideological standpoints, environmental concern and political and governmental trust. The study found that for wind power constructed in the home municipality, respondents preferred collectively distributed financial benefits, while direct personal compensation offers the best prospects to influence ideologically motivated attitudes. None of the policy interventions tested in this study had any significant effect on respondents with strongly negative views. © 2024 The Authors

Referentie: Lindvall, D., Sörqvist, P. & Barthel, S. (2024). Overcoming the headwinds: Can policy design shape public acceptance of wind power in Sweden? *Energy Research and Social Science*, 116.

Link naar bron: <https://doi.org/10.1016/j.erss.2024.103674>

5. Titel: Pride of ownership: Local views on community-owned wind energy development in M'Chigeeng First Nation, Canada

Samenvatting (gekopieerd uit artikel): This paper draws attention to Indigenous communities who have been understudied in the social acceptance and renewable energy

transition literatures. As Canada's federal government endeavors to act towards reconciliation between Indigenous and non-Indigenous citizens, Indigenous communities are taking pioneering roles as owners in the renewable energy sector. In the province of Ontario, M'Chigeeng First Nation is one such pioneer in Ontario's wind energy space, operating as sole owner of two wind turbines since 2012. Our survey of 161 M'Chigeeng members, requested by the community, tests a range of hypotheses that emerged from earlier face-to-face interviews and dovetail with the social acceptance literature. A majority (60 %) of respondents have a positive attitude towards their turbines and while positivity is significantly correlated with most of the hypothesized predictors (e.g., community affinity, fair process, fair benefits, information sharing, pride, relationships (conflict), and reconciliation), the regressions show that positivity towards the turbines is most consistently predicted by positive emotions, pride, and the project representing a form of Indigenous-Settler reconciliation. That said, only 37 % of the sample agree that the project represents reconciliation. The implications of this exploratory case study are discussed in relation to community goals and the wider renewable energy transition. © 2024 The Authors

Referentie: Mang-Benza, C., Baxter, J. & Corbiere, J. (2024). Pride of ownership: Local views on community-owned wind energy development in M'Chigeeng First Nation, Canada. *Energy Research and Social Science*, 118.

Link naar bron: <https://doi.org/10.1016/j.erss.2024.103722>

6. Titel: Quantifying social factors for onshore wind planning – A systematic review

Samenvatting (gekopieerd uit artikel): The integration of social factors into quantitative planning models is essential for accelerating the deployment of onshore wind turbines by identifying feasible potential early in the planning stage. This systematic literature review analyzes the existing quantification of social factors associated with onshore wind power and methods for integrating these factors into planning models. Disamenities due to visual and landscape impacts, proximity to settlements, and justice considerations are the most quantified so far and frequently cited as being the most important factors affecting the social acceptance of onshore wind turbines. Furthermore, the quantification of these could be improved through visual impact assessment techniques, standardized choice experiments, and the assessment of justice beyond the spatial distribution tenet. Future research should also focus on understanding the dynamics of social acceptance and the resulting uncertainty of quantified social factors. Amongst the different planning models, multi-objective optimization has become increasingly popular, as it can integrate social factors endogenously and exogenously, is suitable for different planning scales, and is able to examine the trade-offs between cost-effectiveness, local disamenities, and distributional justice. However, very few studies have investigated the impact of using different methods for quantifying social factors on the resulting socially- and techno-economically-optimal system costs and spatial turbine allocations. Challenges also remain in overcoming the complexity for integrating network connection costs and their externalities into planning models. This review serves as an overview for energy system modelers, planners, and quantitative social scientists to better integrate social factors into onshore wind planning models. © 2024 The Authors

Referentie: Tsani, T., Weinand, J. M., Linßen, J. & Stolten, D. (2024). Quantifying social factors for onshore wind planning – A systematic review. *Renewable and Sustainable Energy Reviews*, 203.

Link naar bron: <https://doi.org/10.1016/j.rser.2024.114762>

7. Titel: Shaping stable support: Leveraging digital feedback interventions to elicit socio-Political acceptance of renewable energy

Samenvatting (gekopieerd uit artikel): In democratic countries, the success of energy policies hinges on citizens' support and their acceptance of policy outcomes. In this study, we develop a digital feedback intervention to prompt citizens with information that visualizes the geographical distribution of wind turbines and to evaluate the effects on socio-political acceptance. In an online experiment, we exposed 430 German citizens to a personalized digital feedback intervention and elicited their acceptance of renewable wind energy. The results are threefold: First, citizens' acceptance of renewable wind energy that results from digital feedback is lower than initially claimed. Second, citizens who meaningfully engage with the digital feedback intervention are more likely to revise their acceptance of wind energy. Third, and surprisingly, citizens' ecological attitude and place attachment to their current residence had no significant effect on the extent to which they revised their acceptance of renewable wind energy. Our results demonstrate that digital feedback interventions can act as a "sensor" for socio-political acceptance. This contributes to informing citizens about energy policy outcomes and provides valuable insights for policymakers promoting a participatory democracy paradigm. © 2024 The Authors

Referentie: Wagon, F., Fridgen, G. & Tiefenbeck, V. (2024). Shaping stable support: Leveraging digital feedback interventions to elicit socio-Political acceptance of renewable energy. *Energy Policy*, 195.

Link naar bron: <https://doi.org/10.1016/j.enpol.2024.114307>

Opmerkingen:

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

	Hinder	Slaap	Gezondheid divers	Anders (bijv. co-determinanten)
Tekstmining (bijv. sentiment analyse van (sociale) media artikelen)				
Case study				Caporale D (2024) Mang-Benza C (2024)
Observationeel (bijv. Cross-sectionele, cohort, of case control studies)				Lindvall D (2024)
Experimenteel				Wagon F (2024)
Review				Bošnjaković M (2024) Tsani T (2024)
Anders (bijv. theoretisch model, opinie,...)				Figari H (2024)

Nederlandse onderzoeksrapporten en overige grijze literatuur

Overzicht van grijze literatuur

1. Titel: *Het Windmolendrama - Hoe de uitrol van industriële windturbines een nieuwe toeslagenaffaire dreigt te worden*

Beschrijving (gekopieerd): Door het hele land worden bewoners geconfronteerd met windparkplannen nabij hun woning. Ze voelen zich hierdoor overvallen. De plannen blijken een lange voorgeschiedenis te hebben, waar maar weinig tegenin te brengen lijkt. Clintel vroeg aan onderzoeksjournalist Elze van Hamelen om in kaart te brengen wat er allemaal speelt rondom de bouw van industriële windturbines op land. Het is namelijk een complex dossier: er spelen bestuurskundige, juridische, wetenschappelijke en technische vragen, die allemaal op elkaar inhaken in een politiek proces, waarbij een lobby een dominante positie heeft. Voor de gemiddelde burger is het een uitdaging om hier grip op te krijgen.

Referentie: Hamelen, E. v. (2024). *Het Windmolendrama - Hoe de uitrol van industriële windturbines een nieuwe toeslagenaffaire dreigt te worden*.

Datum van publicatie: 31-10-2024

Link naar bron: <https://clintel.nl/rapport-het-windmolendrama/>

2. Titel: *Technical, economic and environmental effects and public perception of wind turbine blade life cycle management (Deliverable D2.2)*

Beschrijving (gekopieerd): To achieve a climate-neutral Europe by 2050, energy must be generated from renewable energy sources with installations and operations that fit within a circular economy. This requires a transition in wind energy from linear to circular material use, with a special focus on eliminating (production) waste and reusing and recycling of wind turbine blades. The aim of this study, as part of the Horizon Europe project EoLO-HUBs, is to identify the challenges in circular End-of-Life (EoL) solutions for wind turbine blades. First, an inventory is made of all possible EoL routings and solutions with a prediction of future blade designs, materials and volumes. Next, the impact on costs and environment is analyzed for two Dutch offshore wind farm EoL scenarios. Finally, the Dutch public's perception is studied in detail to provide insights for socially aware decision-making in the blade EoL process.

Referentie: : Harald van der Mijle Meijer, Johan Peeringa, Melanie Klösters, Lars Heldring, Simone Mancini, Joep Breuer, Ruben Peuchen (2024). *Technical, economic and environmental effects and public perception of wind turbine blade life cycle management (Deliverable D2.2)*.

Datum van publicatie: 31-12-2024

Link naar bron: <https://publications.tno.nl/publication/34643690/65ykYH6Y/mijle-meijer-2024-technical.pdf>