

Science for Environment Policy

Measuring emotional response and acceptance of wind turbines

Wind energy will likely continue to play a leading role in reaching the EU's renewable energy targets. However, in some areas wind turbines face social opposition based in large part on the visual impact of wind turbines in the landscape. A new study outlines a novel methodology to measure emotional response to wind turbine visuals, which may assist wind farm planners in gauging public acceptance.

The EU's Renewable Energy Directive¹ requires the EU to meet at least 20% of its total energy needs with renewables by 2020. In a 2009 report², the European Environment Agency concluded that while environmental constraints appear to have only a limited impact on wind energy potential, social constraints — particularly concerns regarding the visual impact of wind farms — may hinder the development of onshore wind energy.

During the planning stage for new developments, stakeholders are typically given opinion surveys and interviews to assess acceptance and opposition. Yet even when the general attitude to wind turbines is progressive, limited support is given for proposed windfarms near people's own homes. Opponents often perceive turbines as 'ugly' or unappealing against a more natural landscape. Such feelings are accompanied by physiological changes, such as changes in heart rate and increase in sweat secretion.

This study presents a novel way to gauge attitudes towards the visual impact of wind turbines, using physiological and psychological measures to assess emotional response. In the study, 21 participants — all undergraduate students from a single, urban British university — were given a questionnaire to assess their attitude towards wind turbines in terms of being 'supporters' or 'non-supporters'.

They were then shown several pictures of different landscapes, each of which had been photo-manipulated four times to insert an image of either a wind turbine, church, pylon or power plant. While being shown the pictures, skin conductance response (SCR), a known indication of emotional response, was measured via each person's hand.

Participants were asked to say whether they found each picture pleasant or not, and to judge the strength of their reaction (their 'arousal'). Aversive pictures (e.g. injuries, war scenes) were used as controls.

The researchers hypothesised that emotional reactions and SCR to images of wind turbines would be more negative and intense than to other manmade structures (churches, pylons or power plants), particularly in opponents of turbines.

Overall, participants rated the turbine pictures as more pleasant than but equally arousing as pylons; more pleasant and less arousing than power plants; and equally as pleasant and arousing as churches. Lower SCR was also associated with churches than with turbines, while SCRs for turbines, pylons or power plants were not significantly different from each other.

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22 October 2015
Issue 432

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Source: Maehr, A., Watts, G., Hanratty, J. & Talmi, D. (2015). Emotional response to images of wind turbines: A psychophysiological study of their visual impact on the landscape. *Landscape and Urban Planning*. 142: 71-79. DOI: 10.1016/j.landurbplan.2015.05.011

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To cite this

article/service: "[Science for Environment Policy](#)":

European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

1. <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0028>

2. <http://www.eea.europa.eu/publications/europes-onshore-and-offshore-wind-energy-potential>

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This seems to disprove the researchers' hypothesis that landscapes with wind turbines would generate stronger SCRs than control sceneries. In addition, while wind farm supporters rated turbine pictures as more pleasant than non-supporters in the pre-experiment questionnaire, differences in the experiment itself were minor.

The researchers say this study indicates it is possible to produce measurable and different SCRs from landscape pictures, and this methodology should be investigated further with a larger number of participants to fully understand emotional response to wind turbines. As SCR is beyond volitional control, it would also help to overcome bias in conventional surveys of stakeholder attitudes. The method also avoids issues such as asking participants to make decisions based solely on their own knowledge about wind farms, or on their 'imagination' of the visual impact.

The researchers suggest decision makers could use this method to collect accurate data on the emotional responses of the local public, applying an easy-to-use rating scale, in order to assist the development of wind turbine applications at the planning stage.

