Local acceptance – impact factors

IEA Wind TCP Task 28: Social Science of Wind Energy Acceptance

Prof. Dr. Gundula Hübner
Institute of Psychology
WG Health- and Environmental Psychology
Martin Luther University Halle-Wittenberg

Social Psychology
MSH Medical School Hamburg
University of Applied Sciences and Medical University

EGRD Webinar, 24.11.2020
understanding

- acceptance
- annoyance
- factors
• acceptance
high levels of acceptance on local level – constant result pattern
Example: U.S. National Survey (Firestone et al., 2018)
underestimated acceptance – overestimated opposition

Hübner et al., 2019:
Acceptance Factors of Renewable Energies
Federal Agency for Nature Conservation (BfN), FKZ 3516830100
• annoyance
average annoyance induced by wind turbines rather low

Hübner et al., 2019

Shadow-flicker and noise limited to those experiencing it on their property.
annoyance – evaluation of a perception

- single item assessment, „not annoyed – very annoyed“
- comparable to an attitude assessment, „do not like – like very much“
- assess a general evaluation of the wind turbine impact
- captures no information on the stress reactions
„Strongly” Annoyed Stress Scale (Inclusive Symptoms)
Residents represent a small portion of the population.
Few differences between U.S. and European annoyance stress levels

<table>
<thead>
<tr>
<th>% (n)</th>
<th>U.S. National Survey</th>
<th>European Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total n</td>
<td></td>
</tr>
<tr>
<td>sound</td>
<td>1.1% (16) 1441</td>
<td>4.3% (28) 657</td>
</tr>
<tr>
<td>landscape change</td>
<td>1.5% (22) 1441</td>
<td>0.0% (0) 445</td>
</tr>
<tr>
<td>lighting</td>
<td>1.2% (18) 1441</td>
<td>1.2% (10) 817</td>
</tr>
<tr>
<td>shadow flicker</td>
<td>0.2% (3) 1441</td>
<td>0.2% (1) 445</td>
</tr>
<tr>
<td>total</td>
<td>2.3% (33) 1441</td>
<td>3.7% (38) 1029</td>
</tr>
</tbody>
</table>
Noise annoyance appears less related to wind project characteristics, but more to planning process; U. S. and EU (Germany/CH) very similar.

<table>
<thead>
<tr>
<th>Pearson correlation</th>
<th>U. S</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to nearest turbine (excluding those that cannot hear)</td>
<td>.197 (.0001) 779</td>
<td>.057 (.357) 261</td>
</tr>
<tr>
<td>Sound pressure level, day (excluding those that cannot hear)</td>
<td>.116 (.060) 264</td>
<td>.204 (.016) 139</td>
</tr>
<tr>
<td>Number of turbines in the nearest project</td>
<td>.365 (.0001) 1316</td>
<td>.398 (.0001) 648</td>
</tr>
<tr>
<td>Planning process fairness</td>
<td>–.395 (.0001) 639</td>
<td>–.397 (.0001) 565</td>
</tr>
<tr>
<td>Planning process annoyance/stress</td>
<td>.490 (.0001) 709</td>
<td>.467 (.0001) 620</td>
</tr>
<tr>
<td>Present attitude towards wind project</td>
<td>–.362 (.0001) 1294</td>
<td>–.620 (.0001) 644</td>
</tr>
</tbody>
</table>
comparable result patterns

- field studies combining physical, social/psychological factors
  - Health Canada – stress symptoms due to wind turbine noise, but not connected to objective factors, e.g. sound pressure level (Michaud and colleagues, 2016 etc.)
  - Finnish study – infrasound does not explain symptoms related to wind turbines (Maijala and colleagues, 2020)
  - German studies (interdisciplinary team, Hübner, Pohl and colleagues, funded by BMWi)
    TremAc – no evidence for annoyance by infra sound
    InterWind – ongoing; seismic, acoustic, psychological
- laboratory study on noise impact of infra sound
  non perceivable infra sound levels not related to annoyance (Krahé and colleagues, 2020)
- epidemiological analysis
  Danish study – no reliable relation between wind turbines and illness (Poulsen and colleagues, 2018 etc.)
• factors
social dimensions – the most important local acceptance factors

- economical impact
- implementation energy transition
- social norms
- planning process / trust
- impact on nature and residents
conclusion: what can be done

- provide sense
  - reliable energy and climate politics
  - indirect benefits for nature protection

- planning process – make positive feelings possible
  - new formats, younger residents
  - make positive majority salient, norm activation

- share benefits, reduce impacts
  - direct / indirect financial benefit
  - local nature compensation measures
  - reduce emissions

- create knowledge
  - assessment standards needed
  - evaluate mitigation measures
  - stress symptoms – not explained by simple features
**literature selection**


Task 28: Social Acceptance of Wind Energy Projects
https://community.ieawind.org/home | http://www.socialacceptance.ch