

SusGrid is an interdisciplinary research project involving a team of academics from Norway and the UK that took place from 2011 to 2014. Against a backdrop of local controversy over new power line projects, notably the Hardanger case in Norway and the Beaully-Denny line in Scotland, the project aims to inform ambitious EU goals for renewable energy generation and the expansion of electricity networks. The overarching aim of the SusGrid project has been to provide significant knowledge input to develop a more sustainable grid regime that achieves social, economic and environmental goals. The project comprised six work tasks, four of which are summarised here: (1) Comparisons of public attitudes towards power lines in Norway, Sweden and the UK; (2) Economic incentives and benefits; (3) Landscape impacts, mitigation and public acceptance; (4) Public participation. Outputs from all work tasks are available from the project website: <http://www.cedren.no/Projects/SusGrid>

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Funding: Norwegian Research Council's Renergi programme, Statnett, Statkraft, NTE Nett, Troms Kraft Nett, Energi Norge, SINTEF/CEDREN, BKK, Hafslund Nett, Agder Energi Nett, NVE. The participation of industrial collaborators and environmental NGOs was facilitated by workshops conducted at several stages of the work programme.

Key tasks: The project consisted of six work packages. **WP1** Documenting and comparing the grid development regimes in Norway, Sweden and the UK; **WP2** Understanding public attitudes, engagement and knowledge; **WP3** Economic regulation and compensating measures; **WP4** Governance challenges; **WP5** Case studies: multidisciplinary analyses of grid development projects in Norway and the UK; **WP6** Converting trade-off conflicts to coherent policies for a sustainable grid regime.

Findings:

1. International comparison of public attitudes: Surveys were used to compare public attitudes in Norway, Sweden and the UK, with a total of 5107 participants. Analysis showed that levels of general and local acceptance of overhead power lines were significantly lower in the UK in comparison to Norway and Sweden, and that levels of trust in the system operator were lowest in the UK and highest in Norway.



There were also some similarities across the three countries. Participants generally disagreed that local residents were involved in the planning of new power lines, with perceived involvement lowest in Sweden. There was also generally low levels of familiarity with grid networks and with grid operators across the contexts. Finally, the findings provide strong evidence for the empirical distinction between 'public acceptance' and 'public support', and that general acceptance of power lines is higher than local acceptance. (Contact: Øystein Aas, oystein.aas@nina.no)

2. Economic incentives and benefits: Many new transmission lines face opposition from local communities on the grounds of environmental impacts and imbalance of distribution of costs and benefits between the communities and wider society. Whilst research suggests that direct compensation, benefit sharing methods, and property rights approaches can play a role in reducing community opposition, evidence also points to the potential for financial compensation to be seen as a form of bribery that intensifies local opposition. A novel economic approach is proposed based on the concepts of weak and strong sustainability, where the environment affected by grid developments, rather than the community *per se*, can be compensated. This approach instead of viewing the communities as economic actors appeals to their citizenship role within a sustainability framework. (Contact: *Tooraj Jamasb*, tooraj.jamasb@durham.ac.uk)

3. Landscape impacts, mitigation and public acceptance: A key factor determining public acceptance of power lines is the perceived visual impact on rural landscapes.



The T-shape pylon design

Public perceptions of diverse mitigation options, including novel pylon designs, were investigated using data from 1519 UK survey participants. The ‘T-shape pylon’ design was more strongly preferred than the traditional design. However, alternative designs received lower levels of public support than other mitigation measures such as undergrounding new lines and routing them away from homes and schools (Contact: *Patrick Devine-Wright*, p.g.devine-wright@exeter.ac.uk)

Analysis of qualitative data from the case studies revealed how arguments against power line siting opposed the countryside (viewed as natural, pristine) with power lines (viewed as industrial, artificial) - representations that are themselves embedded in institutional arrangements that promote this distinction. Findings also showed how different countrysides were represented in different ways, in an effort to show how ‘out of place’ new power lines in local areas would be. (Contact: *Susana Batel*, susana.batel@iscte.pt)

4. Public participation: Participatory aspects of the planning process, as perceived by local residents across four Norway and UK cases, were assessed using a qualitative research. Findings suggest that local residents generally, across all cases and countries, perceive opportunities for involvement in the planning process to be insufficient and unjust, linked to a lack of trust in TSOs and to low levels of acceptance. Ways to improve the capacity for local involvement in planning is a key challenge to increase procedural justice (Contacts: *Jørgen Knudsen*, jorgen.k.knudsen@sintef.no, *Susana Batel*)



Norwegian and UK case study areas

Conclusion: The SusGrid project provides significant knowledge input to develop more sustainable grid regimes and to foster understanding of public acceptance of new power lines. Findings suggest that the key factors promoting acceptance of power lines include trust in the TSO; fair and meaningful planning procedures that involve local residents; mitigation of visual and other environmental impacts and the adoption of a sustainability approach to environmental benefits.