COMMUNITY ACCEPTANCE OF RENEWABLE ENERGY

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What makes onshore wind and solar farms more and less acceptable to communities?

RESEARCH SUMMARY

Renewable energy is crucial in the fight against climate change. Onshore wind and solar farms are being built all over the UK as part of this effort, but **which types of renewable energy projects are most acceptable to local communities?** We analysed data going back to 1990 on planning applications, and tested which characteristics are commonly associated with planning success or failure. This gives us an indication of what makes projects popular (and unpopular) with communities, given that local attitudes are one of the factors considered when councils make planning decisions. It's important to know what makes projects acceptable to the public for policymakers to design appropriate energy policies, and for developers to design suitable projects. It's also important to know **which communities are most likely and/or able to get involved in planning processes** so we don't site all renewable energy in the same places, which is arguably unfair on host communities. We tackled these research questions by using a range of datasets to calculate the characteristics of onshore wind and solar farm projects in Great Britain, and the areas they are proposed in. We then conducted statistical tests to investigate the relationship between these characteristics and the project's planning outcome. This involved extensive work using **GIS (Geographical Information Systems)** to calculate the spatial properties of projects, such as the type of land cover, the distance from protected areas such as National Parks, and the social deprivation of the local area. By finding out which projects are more and less likely to be approved (and where), we can gain important insights into community acceptance of renewable energy. These insights can then be used by policymakers, developers, and practitioners (such as planners) to design policies, projects, and plans that achieve positive outcomes for society, the economy and the environment.

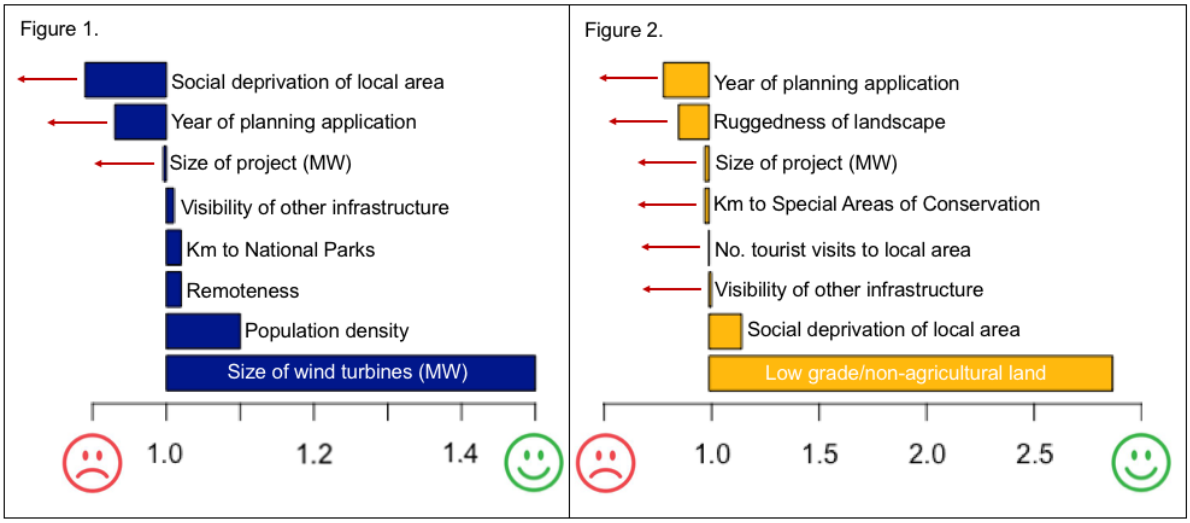
PROJECT DETAILS

It is important that the transition to sustainable energy is planned in a way that is fair to communities, acceptable to society, and protects the environment (as well as protecting the climate). If people don't

support this transition, or if it is carried out in ways that are not environmentally sensitive, it will not be sustainable in the long-term. The research is part of the UK Energy Research Centre's ADVENT project (ADdressing Valuation of Energy and Nature Together), in collaboration with colleagues in the School of Geography who specialise in social and environmental justice. We hope our findings will contribute to planning the UK's energy future in a way that is sustainable for people, nature, and the climate.

RESULTS

- **12 characteristics relating to community acceptance are significantly associated with planning outcomes for onshore wind and solar farms** (Figures 1 and 2). This includes 4 for onshore wind, 4 for solar, and 4 spanning both.
- Findings relate specifically to Great Britain (1990-2017), though may also have relevance to other places going through energy transitions.



Figures 1 and 2. Characteristics of planning applications for onshore wind (left) and solar farms (right) that make them more/less likely to gain planning approval. Bars represent estimates of how many more/less times likely a project is to be approved given an increase in the score for that characteristic.

- **Smaller onshore wind and solar farms were more likely to be accepted** than larger ones (in terms of the megawatts of electricity they can generate). However, **larger wind turbines (in terms of their individual size) were more likely to be accepted**, suggesting that fewer larger turbines are preferable to many small ones.
- Projects proposed in places with greater visibility of other modern infrastructure (e.g. buildings, roads, pylons) were more likely to be accepted, indicating **the importance of visual impact to acceptance**, especially when projects are proposed in less developed areas.
- The social deprivation of the local area was also important. We found that **richer areas are more likely to *accept* wind farms, but *reject* solar farms**. Why? This is something we are exploring in ongoing research.
- The year of the planning application was important for both technologies. **For each year that passed between 1990 and 2017, it became harder for projects to be accepted.** This could be because the most suitable sites are being used up, or it could indicate that communities eventually reach 'saturation point' when it comes to renewable energy.
- **Solar farms are more likely to be accepted when located on low grade or non-agricultural land**. For example, projects on non-agricultural land were on average 2.86 times more likely to be approved

than those on high quality land. This illustrates that there are conflicts arising between traditional uses of the countryside, such as growing food, with renewable energy generation.

- An important issue is that renewable energy requires a lot more land than traditional power stations, meaning we need to think carefully about how best to use limited space to achieve all the things society needs from nature, including food, energy, recreation, natural resources, clean air, and clean water. These are known as **ecosystem services**, and it is the overall aim of the ADVENT project to understand how we can balance these services with low carbon energy.

RECOMMENDATIONS

When planning the UK's energy future, it is important that issues around ecosystem services and justice are taken into consideration. We propose the following three recommendations:

- **Improve representation in decision-making for less powerful stakeholders** so that all perspectives are heard. Proactively engage with hard-to-reach communities so that renewable energy infrastructure does not become a new form of uneven development across social groups.
- **Increase provision of community benefit packages** to ensure that the costs and benefits of renewable energy (including relating to ecosystem services) are evenly distributed across society. Also promote ownership models that benefit host communities and enhance local acceptance.
- **Raise public awareness of trade-offs involved in the low carbon transition** (such as changes to rural landscapes) so that preferences are informed and balanced. Encourage public debate about the different types of energy future that could be pursued, so that people have opportunities to share their views and to deepen their understanding of the pros and cons of different options.

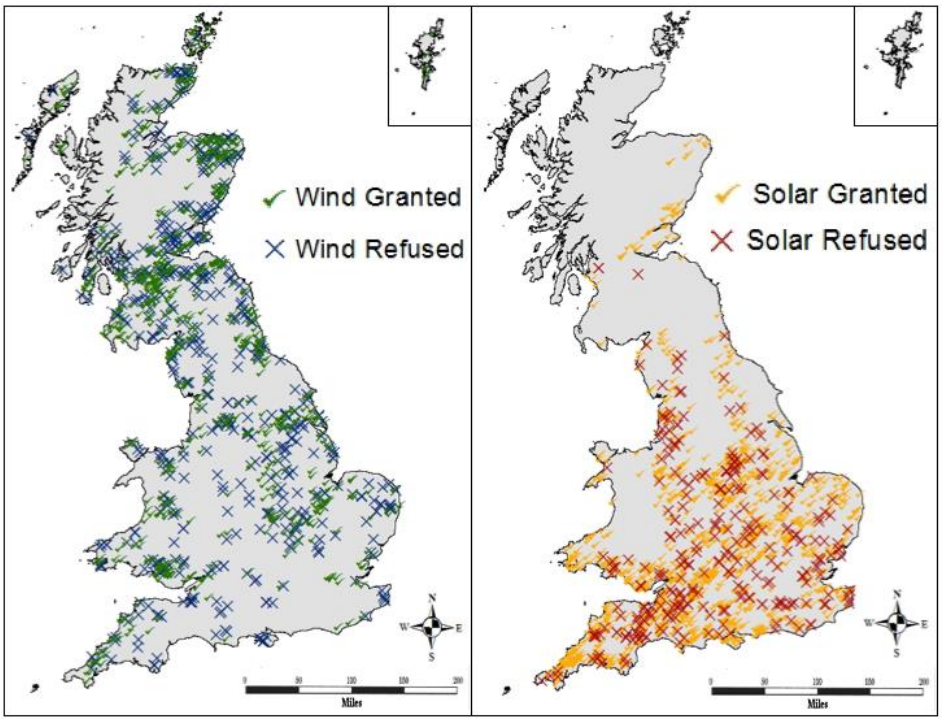


Figure 3. Locations of granted and refused onshore wind and solar farms in Great Britain (1990-2017)

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