EXPERT GROUP SUMMARY ON
RECOMMENDED PRACTICES

14. SOCIAL ACCEPTANCE OF WIND ENERGY PROJECTS

1. EDITION 2013

Submitted to the Executive Committee
of the International Energy Agency Implementing Agreement
for Co-operation in the
Research, Development and Deployment of
Wind Energy Systems

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FOREWORD

The International Energy Agency Implementing Agreement for Co-operation in the Research, Development, and Deployment of Wind Energy Systems (IEA Wind) is a vehicle for member countries to exchange information on the planning and execution of national, large-scale wind system projects and to undertake co-operative research and development projects called Tasks or Annexes.

As a final result of research carried out in the IEA Wind Tasks, Recommended Practices, Best Practices, or Expert Group Reports may be issued. They have been reviewed and approved by participants in the research Task, and they have been reviewed and approved by the IEA Wind Executive Committee as guidelines useful in the development and deployment of wind energy systems. Use of these documents is completely voluntary. However, these documents are often adopted in part or in total by other standards-making bodies.

A Recommended Practices document includes actions and procedures recommended by the experts involved in the research project.

A Best Practices document includes suggested actions and procedures based on good industry practices collected during the research project.

An Experts Group Studies report includes the latest background information on the topic as well as a survey of practices, where possible.

Previously issued IEA Wind Recommended Practices, Best Practices, and Expert Group Reports can be found at www.ieawind.org on the Task 11 web pages.

Executive Summary

The IEA Wind Task 28 working group has elaborated these Recommended Practices. Task 28 involves experts from 10 countries, including the United States, Canada, seven European countries, and Japan. Task 28 works as an interdisciplinary and cross-cultural exchange platform with the goal to support the successful development of wind energy in the participating countries. The group published a report on the state-of-the-art of research and project implementation strategies within the participating countries in 2010 (Huber and Horbaty (ed.) 2010). More information can be found at www.socialacceptance.ch.

Wind power is recognised as an important contributor to renewable energy, climate, and energy security targets set by many countries around the globe. However, actual wind power development is often delayed. In some instances, specific projects meet with fierce opposition from the regional or local level, and the media often vividly portray such debates. Social acceptance—defined here as societal consensus on the planning, construction, and operation of wind power projects—therefore has the potential to become a powerful facilitator of wind development. Moreover, as increased deployment results in an increasing number of wind power projects and technology improvements push towards larger and larger machines, the impact of the industry on landscapes and the communities that host wind power projects is not expected to decline. As such, the issue of social acceptance must be taken into account in new wind power initiatives and projects.

These Good Practice Recommendations are aimed at planners, policymakers, and practitioners of wind power development. They present strategies from around the world that have been successfully used to improve wind power projects, for the benefit of all, and to implement projects that are acceptable to a majority.

The recommendations are structured around five primary themes that IEA Wind Task 28 participants identified as playing a key role in shaping and determining social acceptance: 1) Policy and Strategy (including Planning and support regimes), 2) Well-being and Quality of Life (including property value prices and landscape / ecosystems), 3) Distributional Design (including Costs and Benefits for the host communities), 4) Procedural Design (including Processes, Consultation and Involvement), and 5) Implementation Strategies (e.g., Local Empowerment).

IEA Wind Task 28 participants are aware that there is no common recipe for such a complex and context-specific topic as social acceptance. These good practices have been effective in the past and are expected to facilitate greater support of wind energy; however, it is unlikely that all social opposition and barriers to wind energy projects can be resolved even if all recommendations are observed. Every project is unique and involves specific challenges. Any project is likely to result in many trade-offs and compromises because resources to deal with acceptance may be limited. Nevertheless, these recommendations can help to avoid or minimise problems.

Each chapter includes a description of the social acceptance issues, general recommendations that have to be adapted to local context, and a justification summarising the experience of IEA Wind Task 28 participants. IEA Wind Task 28 participants especially recommend readers to the examples drawn from IEA Wind member countries. These offer practitioners the possibility to start with tangible ideas and strategies.

Contents

1 Introduction

1.1 The Issue of Social Acceptance of Wind Energy

Wind power is recognised as an important contributor to renewable energy, climate, and energy security targets set by many countries around the globe. The frequency with which policymakers around the world have established targets and the consistently favourable impressions of wind power among the general populace documented in a multitude of public opinion polls suggests a certain general acceptance of wind power. However, actual wind power development is often delayed in countries including those in Europe, North America and Asia (See IEA Wind Annual Reports). In some instances, specific projects meet with fierce opposition from the regional or local level, and such debates are often vividly portrayed by the media. Social acceptance—defined here as societal consensus on the planning, construction, and operation of wind power projects—therefore has the potential to become a powerful facilitator of wind development. Moreover, as increased deployment results in an increasing number of wind power projects and technology improvements push towards larger machines, the impact of the industry on landscapes and the communities that host wind power projects is not expected to decline. As such, the issue of social acceptance must be taken into account in new wind power initiatives and projects.

1.2 Purpose

This document consists of "Good Practice Recommendations" and is aimed at planners, policymakers, and practitioners of wind power development. It presents strategies from around the world that have been successfully used to improve wind power projects, for the benefit of all, and to implement projects that are acceptable to a majority. For persons involved in developing wind power projects, there are concepts and ideas for how to manage and address issues raised by proponents and opponents of a given project. Policymakers should gain an understanding of how the broader context, including rulemaking processes and the consenting process can be structured in order to help to facilitate social acceptance at multiple levels of society.

The recommendations contained herein offer references and examples from several countries presenting innovative regulations, concepts, and development approaches. The Annex includes a (non-exhaustive) list of additional references. This supplementary literature details guidelines and recommendations with a more specific focus on the individual regulations and background of a particular country or locality.

The Good Practice Recommendations detailed here presume a minimum level of effort to develop projects in a socially responsible manner. In this regard, the following items are proposed as a pre-set of considerations:

- Avoid sites with potentially high conflicts (e.g., close to dwellings, in areas protected for landscape or environmental reasons)
- Anticipate and minimise potential adverse project impacts (e.g., by choosing an appropriate turbine model, or by adapting to wildlife behaviour such as migrating birds)
- Maximise benefits for local communities, such as by means of an equitable distribution of the positive and adverse impacts of a project (e.g., local host community residents often bear a disproportionate share of negative project impacts,

efforts to support the local tax base or utilise local goods and services can help to more equitably distribute a particular projects costs and benefits).

1.3 Structure

This document is structured around five primary themes that play a key role in shaping and determining social acceptance. These five themes form an overarching structure for this report as each theme is addressed in its respective chapter. Some cross references indicate linkages to other themes; however, they are not exhaustive.

The five themes and the individual topics covered under each of these themes are highlighted here:

- Policy and Strategy
  - Elements of energy policy, such as renewable energy targets and energy concepts
  - Elements of spatial planning, such as siting criteria and processes
  - Elements of financial support regimes
  - Policy at multiple levels (e.g., national/supranational, local/regional/state levels)
- Well-being and Quality of Life
  - Impacts on standard of living, such as property value prices
  - Concerns over health, annoyance, and stress related to noise; low-frequency sound; shadow flicker; or obstruction markings
  - Valuation of landscape and ecosystems
- Costs and Benefits: Distributional Design
  - Models for balancing benefits and impacts of wind power projects for persons living in the immediate vicinity of a project
- Consultation and Involvement — Procedural Justice
  - Processes to involve individuals within the host community(s) in order to create the opportunity for residents to raise concerns and for public input to improve projects for the benefit of all
- Implementation Strategy
  - Analysis and de-conditioning of pre-set ideas and plans
  - Organisational structure aiming at local empowerment

1.4 Limitations

Social acceptance involves a wide range of stakeholders, including: the general public, various institutions and associations, project developers, financiers, and residents of local project host communities. It also touches many disciplines, including medicine and psychology (aspects of well-being), biology (ecosystem effects), psychology and sociology (procedural fairness), policy and spatial planning, and economics (distribution of costs and benefits). As there are an array of overlapping elements and linkages among the various issues covered, an exact delineation of the chapters is difficult. Moreover, there is no common "recipe" for such a complex and context-specific topic as social acceptance. These good practices have been effective in the past and are expected to facilitate greater support of wind energy; however, it is unlikely that all social opposition and barriers to wind energy projects can be resolved even if all recommendations are observed. Every project is unique and involves specific challenges, and any project is likely to result in many trade-offs and compromises as resources to deal with acceptance may be limited. Nevertheless, the

recommendations can help to avoid or minimise problems and speed up the planning and implementation processes.

The following recommendations are based on the experience of the working group members in their various fields of expertise, discussions within the working group and current literature. The exchange platform of IEA Wind Task 28 enabled the group to identify common issues, useful approaches, and innovative strategies from the participating countries. They do not, however, present a necessary checklist or any "must", but rather are intended to initiate innovative processes in the context of the reader.

2 Policy and Strategy

Social acceptance of wind power is affected by perceptions of need (for wind power), a desire for equitable processes, the potential for wildlife impacts, and perceptions of sound and aesthetics among other factors. Policy is a fundamental element influencing each of these variables and is particularly important because it governs precisely how wind energy affects a country and the local communities where projects are sited. Policy development occurs at the national, regional, and local levels whereby the actual design and instruments depend on the institutional arrangements of each nation-state. The former is often focused on strategy and goals while the latter two frequently emphasise project implementation. All three levels must interact and enter into dialogue with one another as well as with the diverse array of communities and stakeholders to be affected (see also Principles for Procedural Design). Policy must also remain adaptable and flexible as priorities evolve or as new information is brought forth.

2.1 National and Supranational[1] Policy Good Practices

2.1.1 Recommendations

- Establish stable long-term policy
- Consider identifying explicit targets, standards, or goals
- Ground wind energy policy in a comprehensive energy strategy that includes grid development and expansion
- Design policy with provisions to facilitate social acceptance (e.g., explicitly consider provisions that encourage cooperative or community-based projects)
- Fund research to better understand non-technical market barriers (e.g., property values impacts) and develop technology that mitigates social acceptance challenges
- Provide informed guidance for permitting and approval standards and processes

2.1.2 Justification

Considering climate change and energy security, demand for wind energy is expected to grow into the future. Establishing a coordinated and integrated national energy policy that defines the role and expectations for wind energy while also clarifying the need, allows time for proper planning, and creates the space for gradual transitions to occur. More specifically, long-term policy facilitates the development of adequate land-use and spatial planning policy, helps to attract investment in projects and technology development (manufacturing and research and development [R&D]), and provides an adequate timeframe to develop appropriate regulations for projects. Explicit standards, targets, or goals can further help to clarify the direction in which a country is moving and establish more concrete expectations among regions where projects are likely to be built. A well-defined, long-term vision has been shown to help create an atmosphere that focuses on solutions and is not stalled by questions of "why wind energy?"

In addition to establishing a long-term vision, national policy good practice suggests that development models that are known to facilitate social acceptance (e.g., community or locally owned wind projects) be explicitly included in and supported by national plans. Moreover, provisions should be in place for research and efforts to identify and resolve remaining social

[1] For example, in the case of the European Union

acceptance challenges. For example, research targeting issues—such as property values impacts, or annoyance resulting from wind turbine nuisances (e.g., noise, shadow flicker)—could provide critical new information about the nature of social acceptance challenges and the required regulatory provisions to resolve them. In addition, funding for public and private sector R&D can offer technical solutions to social acceptance barriers (e.g., obstruction lighting or use of mitigation technology equipment).

In cases where potential host communities may not have adequate knowledge, budget, or time to evaluate proposed projects, informed guidance and clearly defined national siting standards can also provide assistance to local officials and other stakeholders and consistency for the industry.

2.1.3 Examples

CANADA

In 2009, the Canadian province of Ontario introduced its Green Energy and Green Economy Act (GEGEA 2009) with the aim of streamlining approvals for renewable energy projects by establishing a one-stop approval process. Inspired by the German example, the Green Energy Act also installed a feed-in-tariff system to guarantee specific prices for energy from renewable sources, and established the right to connect to the electricity grid for renewable energy projects that meet certain requirements (technical, economic, regulatory). Moreover, the Green Energy Act aims at establishing a smart grid to support the development of renewable energy and prepare for new technologies like electric cars. The different elements of the Green Energy Act should help to stir investments in renewable energy and create jobs in the "green economy". Other provinces, such as Prince Edward Island and Nova Scotia, also opted for a feed-in-tariff system (Nova Scotia 2010). The latter is focused primarily around a community-based feed-in-tariff program.

DENMARK

Denmark has prioritised domestic energy production for decades, including wind and other renewable energies. This long-term national strategy—coupled with favourable feed-in tariffs, the gradual emergence of the wind industry, and the ability of local landowners to build and operate wind project cooperatively—helped create a strong domestic wind power industry. However, Denmark has not paused in formulating national policy to continue to support growth of the domestic wind industry. In addition to signing onto the European Union's renewable energy commitments, which continue to emphasise the importance of wind energy, Denmark has taken deliberate steps to analyse social acceptance barriers and to ensure that national policy is congruent with other strategies to increase social acceptance. For example, the Danish Energy Agency funded a multi-year study on Low Frequency Noise from Wind Turbines (Delta 2010) and Denmark's 2008 Renewable Energy Act (REA 2008) offers critical components included for the specific purpose of facilitating social acceptance. The Renewable Energy Act specifically gives local citizens the option to invest in up to 20% of project equity; provides funds to local authorities to enhance local scenic and recreational values; and creates a fund to support early-stage project development activities (e.g., wind resource assessment, environmental assessment, negotiation of turbine purchase contracts, organisation of local meetings) among local wind turbine owners' associations. A fourth scheme on compensation of value to real property loss is currently under revision.

GERMANY

The German Renewable-Energies-Law of 2001, with its concrete targets and feed-in-tariff support, spurred an unprecedented growth of renewable energies. Detailed review of the law every few years minimises excessive costs and increases the economic competitiveness of renewable energy. The federal energy concept of 2010 (EC 2010) and the 2011 "energy package" continue this path by setting even more ambitious targets and raising amounts of R&D funding for renewable energies. In addition, since 2004, an on-going research program on broad-based socioeconomic impacts from renewable energies, including social acceptance, has been in place. This research program has provided specific insights on the drivers of public acceptance of renewable energy such as individual cost-benefit perceptions, the importance of transparent and just procedural process, public perceptions and priorities with respect to new transmission development, and the impacts of nuisance variables (e.g., obstruction lighting) on human health, among other findings.

In addition, national policy with respect to the allocation of business tax revenues from wind projects has also been an important driver of social acceptance of wind energy projects—70% of business tax revenue from wind energy projects is transferred to the community where the wind project is located and 30% to the communities where the operators are registered. This provides an immediate benefit for the local communities as well as a form of direct compensation for localised nuisances (e.g., noise and landscape impacts) associated with wind energy projects.

UNITED STATES

The examples above can be contrasted with the United States where inconsistent federal policy has resulted in multiple boom and bust cycles in the industry, and the absence of a broad–based national goal has made it difficult to initiate robust regional planning for both wind and transmission development. Tax rules in the United States have also limited the ability of individual local investors to capture and monetise the primary federal incentive for wind energy, the Production Tax Credit. Such unintended barriers to financing community wind mean that only about 2% of projects in the United States today entail some form of local ownership.

Despite the absence of consistent national policy, individual states have, to some extent, taken the lead in setting explicit targets for renewable energies and even in initiating state and regional transmission and wind development planning strategies. In addition, the U.S. Department of Energy (DOE) has operated within its existing authority to fund effective outreach and education programs, such as the Wind Powering America (WPA)-initiative (WPA 2012), along with critically important research on wildlife and property values impacts. The DOE funds have also supported the development of various multi-stakeholder planning processes around wildlife issues and transmission development.

2.2 Local, Regional, & State Policy Good Practices

2.2.1 Recommendations

- Proactively plan for wind energy by identifying specific areas for wind development and, where reasonable, areas to be excluded from wind development; align planning with the broader regional and national planning processes.
- Account for local/regional experience and culture when identifying specific areas for wind development and formulating permitting and approval standards and processes.
- Create mechanisms to allocate project benefits among the communities and private individuals located in the immediate vicinity of wind energy projects.
- Integrate wind energy policy into existing regulatory frameworks and institutions, whenever possible.
- Consider including provisions for third-party intermediary to facilitate negotiations between host communities and project developers.
- Design policy to facilitate transparent, direct proceedings, public participation, and open exchange of information throughout the development process. For participation to be perceived as "democratic," participation above and beyond typical regulatory minimums may be required.
- Consider policy that promotes local economic development and allows project host communities access to other benefits from wind energy projects.

2.2.2 Justification

Local policy affects siting, allocation of potential project impacts, and local participation in development. Local or regional policy is important because it is the local residents and host communities that often face the most obvious downsides of wind energy projects (e.g., changes in landscape). Local policy must elicit a balance that permits wind energy development in a just and equitable manner while simultaneously minimising project impacts on host communities.

Designating specific areas for development as well as specific exclusion areas can help to mitigate opposition when projects are proposed. Experience suggests, however, that local policy must also address procedural processes (see also Consultation and Involvement: Procedural Justice) for development (i.e., the ability of local host community residents to feel they have some level of influence over project outcome), along with substantive regulatory standards. Open, democratic, multi-stakeholder, and participatory process are particularly critical because increased local participation tends to enhance knowledge and understanding of the project—both on the side of the citizens and of those developing the project. With an open democratic process, a third-party intermediary may be beneficial to facilitate discussions between project developers and the public. One challenge with implementing local policy in this way is that it may create inconsistencies in policy between jurisdictions. This can present barriers for the project developers. In such cases, it may be important for state authorities to provide minimum guidance or standards for local policy.

Development plans are recommended even in countries with low population density and in developing countries. While the growing need for electricity in developing countries might justify any action taken to install wind energy without securing public acceptance, this may result in problems with local citizens in the future.

Ultimately, local policy should be developed with the concept of wind energy becoming a part of everyday life—integrated in existing structures, economically, ecologically, and socially. To achieve this level of integration, usually a person or a group in the community is needed to drive the project and pay attention and respect to the community's diverging interests. This can be the project developer, but effectiveness tends to be greater when community leaders take on this role, be they politicians, heads of organisations, or spokespersons of other groups. To fully integrate wind energy into a given community, access to information both about the concrete project and wind energy in general is necessary. If needed, assistance from outside experts should be available and allowed. Policy that facilitates the necessary discussion, compromise, and transparency to fully integrate wind energy is largely process-driven, but also relies on technical experts to inform the development of technical standards.

2.2.3 Examples

DENMARK

Historically, wind development in Denmark was an organic process emerging from individual and community ambitions, and social acceptance was not a significant issue. However, as available land has diminished and turbines have grown larger, localities have been required to establish or modify existing guidelines for wind energy projects. This process has various technical elements around issues including wildlife impacts, sound emissions, and project decommissioning. The Danish Wind Turbine Secretariat (VIND 2012) is an independent body within the Ministry of Environment that provides expertise and advice to local authorities around wind energy planning. The independent nature of the Secretariat allows it to provide unbiased technical assistance to local policymakers and assists local officials in balancing new wind development with preserving the quality of life among host communities. The Secretariat therefore represents an institutionalised strategy for the enhancement of procedural design.

THE NETHERLANDS

In the Netherlands, the Netherlands Agency, Agentschap NL (ANL), operates wind teams with the support of the Ministry of Economic Affairs, responsible for the renewable energy policy, and with the support of the Ministry of Infrastructure and Environment responsible for spatial planning (ANL 2012). With the wind teams, ANL coaches and gives guidance to concrete projects, as an independent body. The role that ANL wind teams take in the several stages of the development of a project often is crucial for the development of projects.

Wind teams are composed of two experts, backed up in the group of experts. They keep in contact with the initiators of a project and the stakeholders. They do not represent the state, or some public body. The wind teams work for the interest of realising a wind energy target with support and acceptance. In principle, everyone involved in a project, or with a plan, can ask for the support of a wind team. Every wind team has a dedicated region, knows the people, institutions and conditions, also the political environment, in the area. The characteristics of the operation of a wind team are the following:

Strategy of cooperation: The central role of a wind team is to function as a mediator between interests and help the stakeholders to cooperate. The additional responsibilities of a wind team are as follows:

- A wind team organises the cooperation between different parties. A stable, tailor-made working structure in which every party has its role is set up (e.g., steering committee, working groups). Techniques to increase trust are used.
- A wind team brings several interests into alliances with the project to gain more support. The chances of a project to be successful are much greater when it is supported by other groups in the region. Organising an alliance-factory is a method in which all entrepreneurs and companies and organisations in the regions are asked what and how they can gain by the wind project
- A wind team tries to bring the project owners to think in a wider scope and on a higher level. Wind projects often start as the idea of a few, and to connect these initiatives to a bigger plan for the whole region is often a solution and brings the possibilities to make the approach more professional.
- A wind team will empower parties involved in the project and will manage a power-balance among them—a tailor-made approach is necessary to do so. The result will be that the development of the wind farm is seen as a spatial development of the region. Wind projects are confronted with a lot of problems and conflicting interests, especially in the definition phase of a project. Investing in such a process is very risky. The operations of a wind team give the private parties the trust to invest in the development of their plans.

Input of knowledge: a wind team is backed by experts and has good contacts. It will bring in what is seen as "objective" knowledge and facts. This makes officers of municipalities often more confident and helps in the communication strategy of the project.

UNITED STATES

The DOE Wind Powering America (WPA 2012) initiative has worked to educate and inform state, local, and regional public officials, citizen groups, and stakeholders about wind energy, specifically its benefits and impacts for the purpose of supporting responsible development of wind energy. Working through a network of state and local government officials and non-governmental organisations, WPA provides technical information and assessments and informs localities about what has been effective elsewhere. The U.S. DOE Wind for Schools initiative (WFS 2012) supports WPA by working with schools to install wind turbines on-site for the purpose of educating students about renewable energy resources and engaging the broader community in open discussion about wind energy. By supporting community education and experience with wind power, these two initiatives have provided the forums for open community dialogue and discussion around issues related to wind power at the local, regional, and state level.

In addition, various states, including Colorado and Texas, have engaged in efforts to designate specific renewable energy zones or areas where wind development is to occur. Such efforts have been necessary to resolve the issues of transmission constraints and access; however, they have also engaged the state and local political process to identify and establish areas for renewable energy development.

3 Well-being and Quality of Life

What is the impact of a wind power project on the well-being of local residents and their quality of life? This is a question that frequently arises in discussions of social acceptance of wind power. Indeed, there is some justification for fear and concern on the part of local residents because wind power projects result in significant changes within a host community and represent a relatively unknown source of development. Failure to establish a relationship of trust between wind farm operators, licensing authorities, other decision-makers and local residents may have substantial adverse effects on the implementation of wind power projects or even, in extreme cases, prevent them entirely. Even if a court decides a legal dispute in favour of a wind farm, thereby enabling its construction to go ahead, there may still be persistent and repeated complaints. Particularly in the case of major disputes, persistent conflict increases the likelihood of problems with future plans and may even prevent the potential opportunity for repowering after the useful life of the equipment has been exhausted. Conversely, the more local residents perceive the entire planning and implementation of a wind farm as a fair process, the more prepared they will be to accept it. This section provides a summary of recommendations on how to address the issues and fears that relate to the impact of wind power installations on the well-being and quality of life of local residents or regional stakeholders (e.g., tourism operations). Adequately managing and mitigating these concerns is critical to building and maintaining the trust that fundamentally underlies a successful, accepted project. Recommendations are based on practical experience and research findings.

3.1 Standard of Living

Quality of life is a function of both standard of living and well-being. The former relates, for example, to changes in the appearance of the landscape, which may precipitate falling property values, fears of lost local economic potential (e.g., tourism), and injustice associated with the distribution of project benefits (both within the community and in terms of project profits leaving the community). Well-being, in contrast, emphasises potential health or annoyance factors. Here we focus on managing and mitigating those variables affecting one's actual or perceived standard of living.

3.1.1 Recommendations

Provide opportunities for host community residents to access direct project related material benefits. Create such opportunities by:

- Facilitating opportunities for low-threshold financial participation by local stakeholders, or suggest cooperative models; shares may be offered to non-local-community members, but only after local citizens' demand is satisfied
- Considering providing direct benefits (e.g., cheaper wind-generated electricity for local residents, a community energy or economic development fund)
- Offering material compensation models that extend not only to landowners but their neighbours, thereby ensuring that benefits are distributed equitably within the community and are commensurate with potential impacts.

Stimulate indirect material benefits in order to further offset the perceived costs of a project by:

- Involving local businesses as much as possible in planning, construction, and maintenance of the facility
- Turning the project into a local asset by organising wind-power-related local festivals, sight-seeing tours, or other events connected with the wind power project

Work to develop local respect, and encourage an atmosphere of fairness, inclusivity, and appreciation by:

- Integrating local expertise and knowledge, in particular that of local residents, into the development and planning process
- Creating clear and transparent processes that facilitate citizens' participation throughout the development, planning, and operations period of the life-cycle (see also Consultation and Involvement: Procedural Justice and Implementation Strategy)
- Establish a spirit of fairness between neighbours (see also Consultation and Involvement: Procedural Justice)
- Taking misgivings, concerns, and emotions seriously; demonstrate sincere efforts to mitigate or address local concerns

The employment of a neutral third party that collects and analyses data might help to manage unfounded concerns or biases.

3.1.2 Justification

Perceived fairness in the planning process is a primary driver of quality of life concerns and general acceptance of a local wind farm. It is important not only to create material benefits but also to accept the local residents as experts, educated and knowledgeable of their home region. In the United States and elsewhere, projects frequently pay significant landowner lease payments and contribute a great deal to the local government in the form of property tax or payments in lieu of tax. In particularly sensitive areas or where land parcel size is relatively small, developers may also rely on good neighbour payments or, in some cases, property value guarantees. In addition, developers of accepted projects often seek to engage the local community early and often throughout the development process in order to build trust, communicate on-going efforts and plans, and minimise surprises. Many developers in the United States also seek to utilise local goods and services to the maximum extent possible. This means that local labour is often capitalised on for basic construction services like road building, pouring foundations, and other civil works.

Having created an atmosphere of fairness and inclusiveness, it is also important to address concerns with neutral third-party data. For example, the impact of wind power installations on property values has been surveyed in Denmark and the United States (Hoen et al. 2010). Most reliable recent studies indicate that there is no detectable reduction in property values in communities adjacent to wind power installations. Neither the sight of the wind power installations nor the distance of the property from the installations has a constant, measurable, and statistically significant effect on the selling prices of properties. It is possible, however, that where reductions in value do occur, these effects are either too small or too rare to be systematically visible or statistically detectable. Similar findings exist with regard to impacts on tourism—to date, no adverse effects on tourism have been detected in Germany, the United States (Lilley et al. 2010), or Denmark.

The subsequent section on “costs and benefits” contains additional discussion around issues of local financial participation and the development of local benefits; the section on “consultation and involvement” contains additional discussion around issues of procedural questions.

3.2 Well-being / Stress Impact

Apart from possible standard of living impacts, wind projects also have the potential to affect quality of life and well-being via induced annoyance and, in some extreme cases, stress. Empirical studies exist that permit causal conclusions about the stress effects of shadow flicker and obstacle identification. Accordingly, it is possible to draw up generally valid recommendations from this body of work. There are also repeated complaints about sound produced by wind power installations, despite compliance with respective sound limits or regulations.

Resistance to wind power installations may also be connected with the development of high-voltage/extra-high-voltage transmission lines as well as associated grid infrastructure. Perception of these problems—like any other perception—is influenced by subjective considerations. Nevertheless, when residents voice complaints, it may be assumed that they experience these as real, regardless of the findings of empirical studies. This demonstrates all the more clearly the importance of communication (see also Consultation and Involvement: Procedural Justice) with affected parties during every phase of project development and operation. As a general principle, there is a need to take the population seriously and hold joint discussions about possible solutions. The distance between wind power installations and residential buildings must comply with the relevant provisions, but should be as generous as possible. It goes without saying that this also applies to other conditions. Including local expertise increases the quality and acceptance of a project.

3.2.1 Recommendations

- Minimise the light intensity of aircraft obstruction markings by:
    - Abandoning xenon-markings
    - Synchronising navigation lights
    - Applying light intensity adjustment
    - Creating less-stressful planning and construction periods
    - Allowing and using demand-oriented navigation lights
- The duration of shadow flicker should not exceed 30 minutes per day, with a maximum of 30 hours per year.
- Minimise turbine and project related sound emissions by:
    - Complying with sound control regulations
    - Evaluating appropriate turbine setbacks and distances from occupied buildings for each project individually
    - Taking into account both two-dimensional noise propagation maps, and the specific topography (e.g., wind shadow in valleys that cut off other background noise and thereby give prominence to the noise of wind power installations)

- Minimise sound-related surprises, and actively mitigate abnormal sound levels:
    - Enable the people to become gradually accustomed to the wind power turbines, (e.g., by building up the wind power plant in two or three phases)
    - Take problems seriously and follow up immediately
    - Set-up means to file complaints that are quickly and easily accessible
    - Identify and resolve any technical problems immediately
    - Engage local residents to solve problems, test various solutions, and communicate the activities carried out
    - Provide independent, third-party research and information for the people to get a picture for themselves (e.g., studies on the effects of infra-sound)
- High-voltage and very-high-voltage transmission lines:
    - Maximise the distance of overhead lines from residential buildings
    - Combine overhead lines and underground cables wherever possible

3.2.2 Justification

A recent study investigated the stress impact of aircraft obstruction markings on residents living in the vicinity of a wind power plant (Hübner and Pohl 2010 and 2012). This research included more than 400 residents from 13 wind farms—and revealed no evidence of substantial annoyance caused by obstruction markings. However, 16% of survey respondents were strongly annoyed and, on average, small stress effects were evident. A differentiated analysis suggests specific strong stress responses, which infer a need for action. Under certain weather conditions, like cloudless nights, obstruction markings caused strong annoyance. Moreover, xenon-markings clearly caused more intense and multifaceted stress responses than light-emitting diodes (LED) or blade colour-markings. Additionally, xenon negatively affected the general acceptance of wind energy. Synchronised navigation lights were less annoying than non-synchronised lights under certain weather conditions. The Germany Wind Association, BWE, also developed a concept for obstacle lighting designed to minimise light emissions from onshore and offshore wind farms (BWE 2008).

A field study (Pohl et al. 2000) including 223 residents living in the proximity of wind energy turbines at the northwest West Coast part of Germany provides empirical evidence that exposure to shadow flicker of more than 15 hours per annum (weighted value) presents a substantial nuisance in terms of the German federal immission protection law (1997). The results of the investigation indicate that if shadow flicker is below 15 hours of exposure per annum, substantial nuisance and adverse effects on residents' quality of life can be avoided. However, a British study (DECC 2011) found "that the frequency of the flickering does not pose any special risk to human health". In these recommended practices, to support social acceptance, a maximum burden is included that should be considered.

Research on sound from wind farms does not hint any existence of acute health impacts from wind power. However, even if the wind parks' sound level stays within the standards (e.g., 45 dB at night), resident complaints continue in some cases. Therefore, to create acceptance, low sound levels seem important.

Mixed results concerning the acceptance of transmission lines are reported. For example, two German studies provide evidence that underground cables are more broadly accepted when compared to overhead lines when close to dwellings, but in Ireland, opposition even against underground cables is reported. Since health concerns are one of the main objectives against transmission lines, adequate distance from dwellings should be maintained.

3.2.3 Examples

GERMANY
The German consenting rules already include the results of studies on shadow flicker. Demand-oriented navigation lights are included in the 2010 federal Germany Energy Concept (EC 2010). Concerning the acceptance of transmission lines, the 2011 Grid Expansion Acceleration Act (NABEG 2011) grants participatory rights to everyone early on in the process. A federal plan for grid expansions ensures a more efficient and less invasive new grid structure.

IRELAND
The transmission system operator in Ireland in large projects identifies Point A and Point B and sets out potential routes between the two. Through public consultation, a preferred route emerges and it is this one that goes ahead for the consenting processes. Although this procedure does not solve all acceptance problems, this approach fosters consensus. See EirGrid (2012).

SWITZERLAND
There were sound problems at a Swiss wind farm. Together with the community, possible solutions have been discussed, including reduced capacity during the night. The implementation of the approaches was communicated to the population by the community.

3.3 Valuation of Ecosystems

Quality of life is also affected by perceptions of the robustness and vitality of the natural ecosystem. Fears about harmful effects on animals, especially birds and bats, are frequently put forward as an argument against wind power installations. It is beyond the scope of these recommendations to describe the actual impacts of wind power installations on the wildlife; however, readers can find a plethora of such literature from various sources, including the respective national wildlife protection organisations. The following recommendations consider how fears over wildlife and ecosystem impacts can be addressed.

3.3.1 Recommendations

- In connection with the Environmental Impact Analysis, carry out biological studies of possible sites at the same time as the technical studies, and cooperate with nature conservation experts in detailed analyses.
- Involve local nature conservation experts in inventories.
- In the discussion on birds being killed by wind turbines, discuss the global context of climate change and environmental problems, since wind power contributes to solving global problems and ultimately protects birds and their habitats. The discussion should also take into account the species that are at risk (if they are endangered or specifically valuable to the population).
- Provide information and data from studies detailing the potential impacts of wind power installations (NABU 2012, BFN 2012, WE 2012, NW 2012) on various forms of wildlife, including birds and bats.
- As a general principle, use the newest technology, such as radar detection of bird flocks, or temporarily shut down wind turbines during flying times where appropriate (especially for migratory species).

3.3.2 Justification

Environmental stress issues are covered by environmental impact assessments. In addition, local residents frequently have extensive knowledge of their surroundings. Including this local expertise not only demonstrates regard for residents, but may also yield very valuable

information that makes it possible to optimise the project—and possibly even speed up the authorisation procedure. (See also Consultation and Involvement: Procedural Justice).

3.3.3 Examples

DENMARK
Involvement and compensation of commercial fishery (Dong 2010): Nearly all commercial fishermen in Denmark are organised in the "Danish Fishermen´s Association" (DFA). The fishermen were actively included in the Environmental Impact Assessment (EIA) on offshore wind projects. Reports on fish and fisheries for the given area were made, and fishermen were heard before, during, and after to help make the reports as accurate as possible. Further, apart from the legal requirements, contact is to be made to minimise the disturbance of fishery during construction as much as reasonable possible. Negotiations must, if possible, be finished before work commences offshore. The compensation is paid to the DFA, which decides about the allocation. The DFA can choose between two kinds of payments: lump sum payment or yearly payment.

JAPAN
Based on the idea of adaptive management, some projects have started an implementing periods of curtailment to reduce collision risk for migratory and endangered birds. In the case of migratory birds, the operator observes the population of birds at sunrise and sunset and shuts down the turbines when the birds are likely to fly in the vicinity of the project. Advanced technologies are anticipated to enable automatic monitoring by radar and video.

THE NETHERLANDS
In the Netherlands, a process of what is called "nature inclusive design" is developed. Together with the planning of the wind turbines, nature-development is planned in the same area and operated as one project. In consequence, the total effect of the project might be positive for nature. In the near shore Noord-Oost-Polder project, a ramp to safeguard the farm from collisions with ships is built in such a way that it will serve as a refuge for birds. The project with 86 turbines and a total of 516 MW of power, in a protected nature area (nature 2000 on basis of the EU directive) has in total a positive effect on the wild life and bird (ducks) population in the area. The plan received its permissions and construction on the project will begin.

The same process was used in the wind farm in Delfzijl in the Northeast of The Netherlands, where turbines are built onshore on a dam. Within the wind farm project, an extra dam on the seashore was built as a nesting and refuge place for seagulls. The seagull colony grew bigger after construction of the wind farm—so what was seen in the beginning as a threat to the project became an opportunity and produced extra support.

NORWAY
How may partnerships between parties representing opposing interests be enabled? At Smøla, a wind park (150 MW) was built in an area with a population of white-tailed sea eagles, which together with other concerns caused a public conflict (Solli 2010). An interesting case of developing and supporting knowledge on bird-wind farm collisions in the wake of a heated public conflict has been played out. R&D projects were enabled through cooperation between the developer and Norwegian Institute for Nature Research (NINA). The "BirdWind" project conducted by NINA focused on pre- and post-construction conflicts between birds and wind turbines in coastal Norway. The study emphasises that the use of before-after control-impacts are important when studying population trends of white tailed eagles. Both well-known and new methods and technologies of observation and supervision where assessed and tested for the study of white-tailed sea eagles. Important results from the R&D projects show that the overall population on Smøla appears stable (but interpretation is difficult because the search effort is much higher in the project period); however, a decreasing population inside the wind-power plant area is due to mortality and displacement. These R&D efforts will be translated into future reports on good practices through GPWind, which is an international initiative similar to IEA Wind Task 28.

SWITZERLAND
To enhance mutual understanding, the Swiss Wind Energy Association "Swiss Eole" actively seeks opportunities to collaborate with environmental non-governmental organisations (NGOs) on the national level. Examples of this collaboration include the following:

- Together with the Swiss Ornithological Institute (SOI 2012), the Swiss Wind Energy Association has elaborated and published an information sheet on the protection of birds when planning and operating wind energy turbines.

- The largest Swiss Environmental NGO, "Pro Natura" (2012), and Suisse Eole have held a joint conference on wind energy and environmental protection. Wind energy planners and local "Pro Natura" activists gave presentations of their perspective of several wind energy projects in the planning stage and on their ways to collaborate. In the final discussion, speakers emphasised their respect for both nature protection and the development of wind energy and their will to find appropriate solutions.

In the "Code of Conduct" project, led by the Swiss Federal Office of Energy, wind energy planners, utility companies, federal authorities, and environmental NGOs have collaborated to find a common "standard" of sustainably developing wind energy in Switzerland. While this goal could not be achieved, all participants highlighted the high value of these discussions and their will to exchange information on a regular basis.

3.4 Spatial Development and Landscaping – a Dutch example

Until 2004, the Dutch policy tried to "fit turbines into the landscape". The preferred siting strategy was simple and accepted only lines of turbines along lines of infrastructure. According to the Ministry of Planning, this strategy would lead to harmonious and clear arrangements. Single solitaire turbines were abandoned, as were other arrangements. Since the study of Ton Matton's "dance of the turbines" (Motton 2006), the approach changed. In 2006, the state landscape architect advised the government to change the policy as modern wind turbines were much higher. Policymakers and landscape architects followed the advice. First, Matton advised to decide with all parties on the national level in which areas turbines could be concentrated and in which areas turbines should be abandoned. The impact on the landscape is not an objective measurable impact but a cultural phenomenon. How to arrange turbines in a pattern with respect to the landscape is a question of perception and sensation of the view as experienced by the people who will see it. So it is a matter of landscape design.

The state landscape architect referred in his advice to the PhD thesis, of Martijntje Smits (2002)[2], who argues that controversies surrounding the introduction of new technologies can often be explained in terms of a clash between cultural categories. These "monsters" come into being when cultural categories are inadequate to fit new phenomena. A wind turbine of 132-m high in a flat polder landscape can be considered a "monster" that does not fit the two separate categories of landscape and renewable energy. Whereas farmers and initiators are fascinated by the clashing categories and embrace the monster, others do everything to expel the monster by claiming the impossibility of implementing these new machines in the arcadia landscape. A third approach is to adapt the monster to existing categories of buildings. The fourth strategy that Smits mentions as the most promising one is pragmatic assimilation, in which both the technology and the cultural categories are being adapted.

The state landscape architect used this strategy in the elaboration of his advice. Most important is how to address the cultural categories with which the existing landscape is described. It is not a matter of pattern or height, but wind turbines need a "landscaping story". A turbine can come into this story as a landmark, depending on where it is seen and by whom.

Paul van Beek, in studies for the city of Amsterdam (van Beek 2012), elaborates on this strategy. In analysing view sheds of several turbine arrangements, he found how the perspective and distance work in the experience of the sensation of the turbines. There are three typical distances, which each need a different story. Farther away from the turbine, one can experience the turbines as an element in the horizon, together with other elements. Coming nearer within a distance of 3–4 km (depending on the hub height), turbines can be

[2] The reference is historical to explain the development of social acceptance—it is not a technical recommendation of the reference is cited here.

viewed as a whole element in the landscape. Coming closer, one sees and experiences only the foot of the tower and the detailed design of the direct surrounding of the turbine. The rotor and blades are high up in the sky and normally not seen straight.

In the Wieringermeer project, this strategy was used during the cultural events in the discussions with the public. The distances were used to organise the discussion with the public. The idea was to give the people in the vicinity of the turbines a say in the design of the direct surrounding. The foot of the tower was handled as a special place, with a dedicated design. The area might have other functions. For example, people proposed cycling paths and resting and charging benches.

The "meaning" of the existing landscape and the "meaning" of the turbines was discussed with a wider group (3–4 km distance). The meaning of landscape and turbines depends on the relation one can have with the landscape or the turbines. A design contest with the college students focused on the meaning of the towers in the landscape. Combinations with discos, shopping malls, and light towers were dominant. Financial participation and the possible use of maintenance roads as a cycling network for recreation were the two main elements that were integrated in the plan and used to harmonise the meaning of the landscape and wind turbines and to avoid the clash of the two cultural categories. As a result, there were almost no objections when the Municipality Council permitted the plan.

4 Costs and Benefits: Distributional Design

The reductions in carbon dioxide (CO_2) emissions that result from wind power installations are significant at national and international levels. Benefits of wind power for energy security, macroeconomic benefits, or air pollution mitigation mostly occur on a national or regional level. However, what's primarily apparent at the local level are perceived material and immaterial "costs, such as a change in the landscape and an increase in industrial infrastructure. Moreover, if the wind power project is owned and operated by companies or groups that are not a permanent member of the local community, there may be little or no direct economic or financial benefit for the local host community. Under such circumstances, residents may feel a sense of injustice or that they are being exploited by outside corporate interests.

Strategies seeking an equitable distribution of project benefits and costs are ideally established at an early stage of the project. This makes them an integral part of the project. Such strategies are *not* a bribe but a means to achieve a balance of interests and fair distribution of positive and negative project impacts. To be clear, land rent or lease payments to the owners of the wind turbine sites are not considered as a means of enhancing or creating a more fair distribution project impacts.

General Recommendations

- Identify the key interests of the various stakeholder groups (financial, environmental, well-being).
- Form new relationships among stakeholder groups, by balancing their interests and creating opportunities for win-win situations.

4.1 Recommendations for Developers

To balance financial interests and thus create an increased potential for new and positive relationships between the wind energy project and the local residents/community, developers should consider the following:

- Boost the local economy by:
    - contracting with local companies for basic construction activities such as pouring foundations, building roads, establishing grid interconnection, and transporting equipment;
    - purchasing local products (e.g., gifts for VIPs, snacks for guided tours); and
    - hiring local residents for operations and maintenance labour, tour guides, etc.
- Allow residents/communities to participate as shareholders (potentially by offering them shares at a special price if otherwise not practicable).
- Create a positive link with the wind power production; for example, by setting up a company for the wind power project that is based in the municipality so that the taxes generated by the project flow to the host municipality.
- Consider allowing the residents/communities to purchase the locally generated electricity on preferential terms.
- Offer an "indirect" land rent or the ability of owners of neighbouring parcels to participate as shareholders. This is especially important when a neighbouring landowner actually has the ability to install a wind turbine on his/her land eliminated simply because it is not possible to erect several wind power projects immediately adjacent to one another.

- Address the potential issue of a change in property value. Compensation measures can be considered if a change in property value is clearly addressed and the evidence is demonstrated.

Construction and operation of a wind power plant makes use of the community's infrastructure (roads, waste disposal, etc.) and can impose potential visual and sound impacts on the residents. To compensate for the use of the community infrastructure and to improve the well-being of the affected residents, and to create projects that serve the interests/needs of the residents/municipalities or to balance environmental and well-being interests and create an enhanced relationship between the wind power project and the environmental, stakeholders may consider:

- Implementing measures to maintain/improve the environmental quality of the wind park site and the area surrounding it
- Developing compensation measures or mitigation banks elsewhere; for example, wildlife impacts may be offset by the development of a specific wildlife preserve or habitat area

Local perception of compensation/improvement measures is critical and may depend heavily on the origin of the proposal. If the compensatory actions are proposed by the project developer, they may not be well received by the residents. An independent third-party, who is trusted by all (or most of the) stakeholders, may facilitate the process of reducing the possibility that good intentions will be misconstrued.

4.2 Recommendations for Communities/Municipalities

To build a stronger sense of local ownership and autonomy or to assist in securing the benefits of local wind resources in your region, you may consider, for example:

- Creating an investment company that will hold a majority or minority share in a local wind power project; keep in mind that this entails risk because the project may not be profitable
- Requiring your local or regional utility to participate in wind power projects or to develop its own wind power plant

4.2.1 Justification

All electricity-generating technologies, including wind power, have some negative aspects (well-being and quality of life). Some of the negative impacts might not be justifiable by general discourses such as "stop global warming" or "sustainable development". Besides efforts to reduce negative impacts, imbalance in terms of risk and benefit often results in a conflict between the developer and host community. Residents do not always experience the benefits that accrue from successful wind power projects and some may be annoyed or bothered by a project (see the table below). Such sentiments may underlie more broad-based opposition to wind power, which is often espoused as if there were little impact to the local environment (e.g., as an "environmentally friendly project").

Table 1: Balance of Costs and Benefits

	Benefit	Cost
Developer	Electrical power selling	Initial cost Operation and maintenance
Nationwide society	Reduction of CO_2 emission (precaution of biodiversity destruction, energy security, air pollution mitigation, etc.) Ecological modernisation	Cost Risk to reduce local biodiversity
Local society Local authority constructor	Tax Construction demand	Sound environmental impact Natural landscape Local eco system Local justice such as consensus building (procedural justice) Cultural context
Residents	Landscape enhancement Indirect economic effect	

The basic concept of distributional justice is to enhance the (local) benefits. The Danish ownership model is one typical example that realises appropriate opportunities to benefit from the wind power project. However, distributional justice does not mean simple compensation: As the interest of people varies, *the most important* value cannot be addressed here. The primary concept is to build a connection between various interests of the stakeholders and wind power project. Therefore, additional creativity is desired in order to produce added benefits that touch the array of interests of stakeholders. The various examples also show that there is no standard answer; instead, the optimum tends to be the one that best fits the local social context.

4.2.2 Examples

GERMANY

Germany has decided by law to distribute the relevant trade tax so that 70% of the trade tax remains with the municipality where the wind farm is located. By contrast, the municipality where the operator is based receives only 30% of the trade tax. However, as in other countries, there are also other ways of organising an attractive exchange, which have already been listed in the recommendations above—for example, offering low-threshold material participation. Since this can involve considerable expenses for project owners and operators in considerable expense, there is an increasing tendency to develop cooperative models.

In regions where participation by local residents is not very attractive in view of long payback periods, other solutions could be considered. For example, it is possible to set up a municipal fund that can be used to support sustainable and innovative projects, etc. In addition, the depreciation schedule should be such that the affected local authority(s) start receiving tax revenues shortly after a given installation goes into service. There are also smaller-scale solutions that enable the local authorities to realise the benefits of the wind power installations, such as using regional offerings of all kinds.

Community ownership of wind farms is extremely successful in the windy coastal regions of northern Germany. In the German region North Frisia (close to the Danish border) 90% of the wind power plants are citizen-owned. When all the areas designated for wind development had been used, the citizens asked the government to define further areas, as appropriate, for wind energy. Clearly, their ownership of the existing wind parks increased their engagement and interest in additional wind energy installations. The shares start at €2,000, so that they involve as many residents as possible. Shares are prioritised for those persons living in the immediate vicinity of the wind farm. Participating farmers largely support the model, and it is already serving as a successful model in other countries, such as Ireland. Based on this experience, community ownership is most likely to be successful, particularly in windy regions where a dependable, highly profitable wind resource is present. Cooperative models or compensation arrangements, such as municipal funds, may be better suited to other regions where

project profitability depends more on the economies of scale and efficiencies that might be gained by single-owner, corporately developed projects.

Local German policy has also enabled and supported the development of citizen wind parks since the late 1980s. Because of their organic origins, these projects, which emerged from local initiative, have become a cultural asset within the community. Owned by local shareholders, the whole community feels responsible for and proud of the wind park. For example, shares of local wind parks are presented as gifts for anniversaries, etc. However, citizen wind parks are most attractive in regions with a very good wind resource, where projects may not require the highest levels of efficiency and economies of scale to be profitable. In less-attractive wind regions— or regions with lower income levels, such as in East Germany—different local participation models have emerged. For example, cooperatives that own and operate one wind turbine as part of a larger utility or corporate project allow for citizen-owned wind projects to realise the economies of scale necessary to be viable with lower-quality wind resources. In some localities, policy may be required to facilitate or incentivise such development models.

JAPAN

To create more equitable distribution of resources, Japanese community wind power projects have attempted to create cascading effects. They issue certificates for investors, inscribe the names of applicants on wind turbines, publicly solicit nicknames for a wind turbine, and hold wind turbine tours. These attempts aim to add value to the local investment and motivate investors toward environmental action. In the local communities, ripple effects have been created through a network of human exchange between local residents and people from outside the region. In a ceremony to celebrate the completion of a wind turbine, various events, including agricultural experience and eco-tours, are held to deepen the relationship with local residents through wind turbines. There are also efforts to use such events to boost the local economy, including sales of local special products. In addition, there is a fund for local development created by asking investors to contribute their dividends with matching funds from an NGO and the local government.

THE NETHERLANDS

Local development within a national framework involved the local community. In the Wieringermeer, the municipality permitted a plan for building 110 new turbines (October 2011) with almost no objections. Together with the building plan and permission, a policy memo on participation was accepted.

At the start of the initiative, a strong animosity existed among local politicians and inhabitants against wind energy: “enough and too much” was the common opinion in the area. But the initiators, agrarians, and owners of the existing older and much-smaller turbines (beside Vattenfall and the research institute ECN) had a firm commitment to make only a plan that could count on support from the local community.

In the two and a half years of planning, the initiators conducted two wind events in the town in order to involve the population in their planning. In the first event, the public and inhabitants were engaged to express their opinion and requirements on wind energy. The questioning was framed in a cultural program with excursions to existing wind turbines, with wind music and wind games for children. The ideas where translated into the plans of the wind farm. The second event consisted of a one-week program with public hearings; turbine-design workshops; a contest for the students of the local colleges; and discussions with politicians, landscape architects, and artists. The concrete building plans were presented in addition to the ideas for a participation-community fund, and a town-owned turbine became a reality. Active involvement of the public proved to be a positive driver for the project.

The reconstruction plan was developed in a cooperative process in which all market (Vattenfal ECN, farmers) and public parties (municipality, province, and state) worked together in a steering committee chaired by the municipality and sectorial working groups. Agentschap NL (ANL) initiated the start of these processes with trust-building between the involved parties. ANL secured that every party could play its role in the planning procedure beside the others.

Distributional Justice

In the Netherlands, the “dorpsmolen” village mill is a concept that is spread in the North (Friesland) and is now applied in the Wieringermeer. A wind turbine is owned by the community and financed by the public, which enjoys the returns. In effect, the turbine is seen as one’s own. Revenues of the exploitation of wind energy are used for common services within the communities.

A second, less-risky concept involves bonds that can be bought by the public, and that have the same effect on the support of wind energy projects. In the Wieringermeer, a third form is developed as a "sustainability fund". A small fee on the returns of the wind energy fills the fund. Every year, anyone in the community can submit plans to be supported by the fund. So every year, the community "automatically" is confronted with the positive effects of wind energy.

SWITZERLAND

Juvent SA, owning and operating company of the Mont Crosin wind farm (Mont Crosin 2012) (16 turbines, 24 MW), which is located in a very rural area is committed to create benefits for the local community:

- The guided wind park tours in Switzerland's first wind park have attracted 40'000 visitors per year for more than ten years. The local restaurant is a primary beneficiary of these tours, but they also support the local farmers who work as tour guides. Farmers are also able to sell their products to visitors and provide the added recreational value of tours by horse cart.
- The operating company hires local farmers for basic supervision and maintenance work in the wind park.
- The local bakery and diary offer "wind bread" and "wind cheese" (i.e. produced entirely with power from the local wind park) and sell these products both locally and outside of the immediate host community.
- When receiving guests or visitors, the operating company offers local products (bread, cheese, apple juice, dried meat, etc.) served by farmer women instead of hiring a professional catering company.

UNITED STATES

Community wind has also played a small but significant role in wind power development in the United States. Financial models that use small amounts of local equity (e.g., 1%–5% of total project cost), which is then leveraged with equity investments from institutional investors, has helped build successful locally owned projects, with relatively limited amounts of local capital across a number of states, including Minnesota, Iowa, Nebraska, and others. In addition the development of these financial models has benefited the broader industry by pioneering one of the more efficient mechanisms to capture the federal tax credits that are available for wind energy in the United States. Other community ownership models, such as farmer-based cooperatives and investments by municipal utilities, have further contributed to the advancement of community wind in the United States. Such projects are often welcomed by the local community because the income provided by wind power projects represents a significant incremental addition to the income for the typical rural farmer or resident.

5 Consultation and Involvement: Procedural Justice

The way in which decisions are made, and are perceived to be made, has a critical impact on social acceptance. Regulators and developers should seek to uphold "procedural justice" by ensuring all those involved in the decision-making process have adequate opportunities to have a say, are provided with appropriate information, and are treated with respect. Research has shown that those projects with high levels of participation are more likely to be accepted and successful, while projects that might otherwise be viable can actually be rendered unacceptable as a result of poor decision-making processes. Fair and effective procedural design is therefore not only important in moral terms, but can also deliver material advantages and mutual benefit to all stakeholders involved.

Good procedural design is underpinned by a number of principles, including efficiency, effective outcomes, and justice. There is a range of normative models defining rules, criteria, and the way that appropriate processes can be established (e.g., Latour 2004). The practice of decision-making should seek to reflect the normative principles of justice and due process. The way in which these are translated into specific responsibilities, roles, and mechanisms are inevitably specific to a given institutional context and will therefore vary considerably from place to place.

Procedural justice is therefore an important goal, but can lead to disagreement about what this may mean in practice and how it can be applied to specific contexts. To reflect principles of justice and recognise the importance of specific local institutional arrangements, it is suggested that, ideally, all stakeholders should be involved in a two-stage process. The first stage is for all stakeholders to agree to uphold the principles that define procedural justice and which stakeholders would like to be upheld throughout the decision-making processes. These principles can be agreed by all stakeholders and will provide a consensual basis for developing more detailed guidance. The second stage is for stakeholders to agree to a more specific set of protocols for how these principles could be applied in specific contexts and by specific stakeholders involved in wind power deployment. It may be useful to develop separate protocols for different aspects of wind deployment, because these will involve a different range of stakeholders such those involved in spatial planning or community benefits. However, this document focuses on the general aspects of engaging with the public.

5.1 Recommendations

5.1.1 Principles for Procedural Design

At a national or regional level, every stakeholder (including regulators, developers, amenity and environmental groups, and trade representatives, etc.) should discuss and agree to abide by the core principles for procedural justice. These may vary according to cultural and geographic contexts, but wherever possible, these should try to address the following:

- *Inclusivity and comprehensiveness*: Opportunities for engagement should be provided for every person or interest that may be affected by the deployment of wind energy and, where necessary, proactive measures taken to ensure these views are fed into the decision-making process.
- *Mutual respect*: Every stakeholder involved in the decision-making process must respect the opinions, positions, fears, and beliefs of other interests.

- *Transparency and consistency*: All stakeholders should act in an open and consistent way, upholding the principles of free access to information and clarity in communication.
- *Create adequate space and time for deliberative dialogue*: Engagement in decision-making should be based on the principle of deliberation, or interactive discussion.
- *Sensitivity towards the local context and cultural relationships*: In every region, there are social or cultural specifics that should be incorporated in the principles of procedural justice.
- *A balanced, evidence-driven discussion*: Debates should be balanced in recognising both the benefits and costs of wind energy and that any representations should be supported wherever possible by verifiable evidence.
- *On-going opportunities for dialogue*: The ability of different parties to engage in the debates over wind energy should not necessarily be restricted to specific points in any decision-making process. Opportunities for engagement should be provided as early as possible and should be kept through the whole process even though not many people might use it at an early stage.
- *Empowering participants*: It should be recognised that some interests will require support, awareness-raising, and capacity-building in order to adequately engage in any participatory process.

5.1.2 Protocols for Practice

In order to translate these principles into operational guidance, it is suggested that stakeholders agree on the areas in which more detailed protocols should be developed to guide the processes and actions of specific decision-making processes. It is anticipated that such protocols should define the following:

- The roles and responsibilities of the stakeholders involved
- Aspects of process management, including the availability of third parties to manage and arbitrate the decision-making process
- Opportunities for public participation, including the stages at which community input will be sought, the way in which this will be determined, and how the impact of the process will be reported
- Arrangements for determining and distributing benefits from wind energy project
- Access to information
- Capacity-building measures
- Opportunities for different stakeholders to challenge any decisions made
- Transparency and consistency: All stakeholders should act in an open and consistent way.

The actual areas for which these will need to be developed will depend on the geographic and institutional context. Protocols may be needed for a number of areas, such as in the examples below:

Protocol for public engagement with proposed wind energy projects: The purpose of such a protocol could be to provide detailed operational guidance for communities, developers, and statutory authorities on how effective public engagement can be secured in the case of proposed wind energy projects. Such a protocol could include:

- Identifying the range of stakeholders that should be involved in discussion on developing a wind energy project

- Specifying the expectations that different stakeholders should have on when they should be engaged on discussions on wind energy projects and the way in which their views will be taken into account
- Mechanisms and standards that can help deliver a procedural justice for all stakeholders in decision-making for wind energy projects
- Identifying the appropriate mechanisms for engaging with stakeholders
- The establishment of criteria that can be used to evaluate the fairness of the decision-making process (see principles above)

Protocol for spatial planning and related infrastructure: The purpose of such a protocol would be to provide a shared understanding of the appropriate procedures for the authorisation of wind energy projects and identifying the issues that should be taken into account when making decisions on specific wind energy proposals (standards, impact assessments, etc.).

Protocol for delivering community benefits from wind energy projects: The purpose of this protocol could be to provide detailed operational guidance for communities, developers, and statutory authorities on the ways in which community benefits can be enhanced in the delivery and social acceptability of wind energy projects. The following section on discusses this topic in further detail.

5.1.3 Justification

Procedural justice is central to social acceptance. This has been highlighted by a wide range of researchers (Gross 2007, Wolsink 2007, Hindmarsh 2010), who have shown that open and transparent decision-making processes can result in a "fair process effect" where people have been shown to accept certain negative consequences if they perceive the decision has been made in a fair way.

5.1.4 Examples

Principles for Procedural Justice: A good example of this is the Good Practice methodology for social acceptance, developed by the Sustainable Energy Agency Ireland (SEAI 2012).

Protocols for Practice: A number of countries have developed protocols for a variety of aspects of wind energy development. These include:

CANADA

Best Practices for Community Engagement and Public Consultation (CanWEA 2011): CanWEA is a national, non-profit organisation that promotes responsible and sustainable growth of wind energy on behalf of the Canadian wind energy industry. This best practice guide addresses important aspects of procedural design through how developers should plan and manage community engagement activities. In addition to general principles and practices, this guide provides step-by-step instructions aimed at supporting developers to how they plan and manage their projects' community engagement activities.

UK

The Protocol for Public Engagement with Proposed Wind Energy Developments in England (RABDTI 2007): This was one of a suite of documents commissioned by the UK government to overcome some of the challenges facing social acceptance of wind energy in the UK. This sets out the importance of effective community engagement and shows how key principles (such as access to information) can be translated into action in the context of planning processes in the UK, and it asks for developers, regulators, and other stakeholders to sign up to specific commitments when dealing with wind energy developments.

Tools and mechanisms for engagement: While the protocols above set out the general principles for ensuring procedural justice is embedded in decision-making processes, it is also important to recognise the great impact that specific, innovative measures can have on the understanding and involvement of local communities in discussions over wind energy. Some good examples of this from Germany and Norway follow.

GERMANY

Guided tours to existing parks: To provide direct experiences and dismantle prejudices of wind energy projects, guided tours to existing parks are a valuable method for visually gaining realistic impressions of possible effects of wind projects. Including adequate information tools, these tours can help to bring discussions back to a factual level. In this respect, a German project fostering offshore acceptance is an exhibition ship touring at the German coasts of the North and the Baltic Sea (Offshore 2012).

Local town meetings, hearings, and public discussions: Local town meetings, hearings, and public discussions are basic methods of public consultation. They are applied in most countries and in the process of many planning procedures. To respond to the societal dimension of grid integration questions and the increasing need for new transmission lines, in Germany, a federal project "Forum for Grid Integration of Renewable Energy", organised by the Deutsche Umwelthilfe (DUH), is funded by the Federal Ministry for the Environment: The Forum has been specifically created to aid, support, and promote the social and political realisation of the expansion of the power supply network (Forum Netzintegration 2012). During the project runtime, a central module was a sequence of many town meetings in regions where new lines are planned.

A special feature connected to the sequential town meetings was applied within this project by providing an "Expert Menu": The residents were asked about topics they would like to know more about, such as technical measures or electromagnetic pollution. Based on the query results, external and independent experts were invited to give public lectures about the chosen topics.

Follow-up activities (e.g., community festivals): To increase the emotional connection between the wind projects and the residents as well as to improve the integration in the community after the installation was realised, there should be participatory activities. These should emphasise and visualise the benefits the community gains from the wind projects. Good examples for celebrating the reached goals have especially been told from community wind farms (Abo Wind 2003).

NORWAY

The Guri Center (Guri Center 2012) is a culture center at Smøla in Norway, an island that has the one of the largest wind farms in Northern Europe, a wind farm that has caused conflict related to the issue of bird collisions, which has led to on-going research projects on collision risk (Cedren 2012). The center has a large indoor exhibition, "Meeting with the wind", which explores wind power, mythology, and religion history. The exhibition combines the use of an audio guide, interactive station and pictures, text, and film (Kristiansund 2012).

The Bessakerfjellet wind farm located in Fosen (57.5 MW) illustrates the good practice of follow-up, participative activities. The developer built a cabin, "Møllestua", on the top of Bessaker Mountain, in the wind farm area, that enables the visitors to get a nice overview over a large area. This cabin is open for everyone. In 2010 a "cabin book" was put there and by the end of the year, 2100 visitors had signed the book. The cabin has become a target or destination for people both living in the Fosen area and for people visiting the area. Due to licensing requirements, the road leading up to the area is closed 3 km below the cabin, but is now open 7 weekends per year, enabling elderly and disabled to visit the cabin.

Capacity building for engagement: Different parties and interests have different capacities in engaging with debates over wind energy projects. There are a range of examples of where this has been recognised, and support and advocacy provided for those parties that faced challenges in effectively articulating their views and to provide guidance to developers and regulators on how best to engage with local communities. These examples follow.

DENMARK

Danish Wind Turbine Secretariat (VIND 2012): The secretariat is a team institutionally connected to the Ministry of the Environment, but it does not execute governmental tasks. The task of the secretariat is to support municipalities in facilitating wind energy planning (i.e., support siting processes that serve the interest of neighbours and nature conservation). A main task for the secretariat is to give support to particular planning issues that municipalities bring forth, aimed at contributing to more efficient planning processes.

GERMANY

To support conflict prevention and solutions in the context of renewable energy use, an intermediary institution was established in Germany: the Clearingstelle EEG (Clearingstelle EEG 2012), an independent "clearing agency" for the Renewable Energy Sources Act, commissioned and exclusively funded by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

The ordinary courts usually settle disputes through litigation that is often costly and time-consuming. However, the Clearingstelle offers alternative dispute resolution options that may prove more efficient and cost-effective. Such options include mediation, joint dispute resolution, and arbitration. Thereby, opposing parties can avoid costly litigation and tedious, lengthy court action, but still achieve a feasible and mutually acceptable solution. Furthermore, the Clearingstelle provides general advice on how to apply the provisions of the Renewable Energy Sources Act. This outreach helps to avoid problems before they occur. Thus, plant and grid operators in particular may benefit from our services by avoiding disputes.

6 Implementation Strategy

The development of an implementation strategy intended to increase social acceptance is based on the application of each of the previous topics. Policies and strategies on multiple levels are needed for direction; well-being and distributional justice are to be reckoned with and given a place in procedural design. As such, planning an implementation strategy entails the integration of each of these pieces into one typical approach that can be adapted to any local situation or need. This process can be divided in two parts:

- An initiation phase of "analysis and de-conditioning"
- The establishment of an organisational structure that aims at local empowerment

Of course, the organisation of a project is continuously evolving during a development, as new stakeholders arise, social settings change, and policies change.

6.1 Analysing & De-conditioning

"When you see the drawing, your imagination is in the box". Wind energy development typically—and wrongly—starts with a project plan defined in megawatts, locations, etc., and then begins to formulate local participation options, communication plans, financial compensation schemes, etc. Such an approach obstructs opportunities for local empowerment and coupling of interests. In an optimal scenario leading to a high level of social acceptance, a development is characterised by:

- "Out-of-the-box" analysis of the area in which the wind project is planned
- Assurance that all interests in the local area are reckoned with: National heritage, the natural environment and ecosystems, the landscape, local economics, and other factors are all integrated in the development.
- A flexible plan that can be altered along the way, to give meaning to all parties involved in different ways and to react accordingly when a new party comes along partway through the process—this implies a clear focus on the direction of a development, but an open mind-set concerning the real outcome
- A balance between the "economics" of all parties—the more the economics are balanced, the stronger the plan, which can be worked out differently for different parties; for example, a developer will be interested in the solvability of a project, a project operator in the electricity output, a neighbour in his/her property value, and a citizen farther away in his "experience of the area"

To achieve the characteristics of the optimal development scenario, one must start with a phase of "analysing and de-conditioning", as described in this optimal scenario.

6.1.1 Recommendations

Wind energy development should not start with a set project plan, but with an out-of-the box analysis of the area and a de-conditioning of the project: Look out for local developments in a broad social or economic sense. Find the answers to questions such as: what's important for the people of the community, what makes them proud, or with what do they identify themselves? Then they must try to incorporate these aspects into the planning process. This is the starting point for further development based on local empowerment and a cooperative design plan.

6.1.2 Justification

Without social acceptance, wind energy developments are becoming increasingly difficult. Social acceptance is largely based on local stakeholders' perception of the development. By integrating these stakeholders and their local interests into the project design, a development plan will be energised by more than just a wind power project. Alternatively, a stand-alone project that makes no attempt to be integrated into the social, economic, and cultural fabric of a given locality has much greater potential for resistance in many forms, which in many cases cannot be "bought off" in the end.

The Dutch study, "Binding Energy", by Professor Teisman (not available at date of publication) demonstrates how wind energy has been given a place in a regional development process in the Netherlands in several cases. On these processes, Professor Teisman concludes the following:

- Resistance against wind energy from external sources appears not to be the most important reason for failing to achieve the envisaged capacity of wind power.
- Internal factors—such as insufficient capacity to initiate, insufficient attention from the authorities for the arrangements and unique characteristics of the initiative, conflicts of interest between and within authorities, and the inability to convert these into broader common interests—are often far more important.
- The realisation of wind parks does not depend on the perseverance of a single party. Rather, it hinges on the development capacity of a chain of parties and their ability to involve other actors in the network or area. A process facilitator can provide this.

6.2 Using Local Empowerment

Social acceptance is heightened when local people are driving the process. This means that local residents and authorities may want to begin planning for wind energy well before actual project proposals are put forth. Ideally, this entails the integration of plans for wind power into long-term local and regional planning processes. Most of the time, however, local interests alone are not sufficient to fully drive the successful development of a (large) wind power plant. As such, there is still a major role for developers, electricity companies, investors, and planning authorities. Nevertheless, during the project development process, stakeholders and their interests should be given a place at the table. This is not to suggest that every remotely related stakeholder be given the same position and weight in the decision-making process. However, the historically dominant parties in wind power development should be aware of the fact that local involvement is also crucial to the success of wind power projects. Local participation can be envisioned as a balance between the following:

- Good project management (the hard figures)
- Good process management (keeping all crucial stakeholders on board)
- Giving meaning to the project (approach the development from abstract to specific)
- Kindling enthusiasm (enthusing local key-groups by generating incentives)

6.2.1 Recommendations

In the sense of conceptual ideas, the following list intends to give some general ideas to make these ideas more practicable:

- Try to arrange a transparent definition of the framework of the plan, and define the initial conditions under which other interests can join and in which phase
- Start with ideas from the above-mentioned process of "analysing and de-conditioning" and forge them together with local stakeholders into a project-plan that maintains flexibility:
    - Realise that while the process evolves, other interests and parties might become relevant to the project and could be taken on board in order to strengthen the developments basis
    - Start by bringing local people (citizens, entrepreneurs, and shopkeepers) together to develop the potential local meaning of having wind power in their community—and answer the question, "What can wind power deliver to the local environment and economy?"
    - Take the subjects and ideas and build one integrated plan, based on local meaning and co-creation among different interests
    - Build up a local support group of directly involved stakeholders
    - Build up a local mirror group of indirectly involved stakeholders
- Arrange for:
    - Good project-planning and management
    - Good process planning and management in which a balance of interests and powers is guaranteed by a neutral third-party agent who is solely dedicated to the result of the whole
    - The content of the project and the mindset of the participants, both of which should be oriented to the local meaning of the project (i.e., effect for the local economy, social environment, and nature)
    - Events and content in which stakeholders can kindle enthusiasm—empowering
- Visualise the project:
    - Realise that the perception of the beholder produces the image, not the factual drawing or picture
    - Start with the imagination of the local stakeholders and the local meaning
    - Try to use these "visions" when coming down to the technical plan
- Communicate continuously:
    - Send information and messages, and listen
    - Adapt the message, means, sender, target group, etc., following the stage of the development
    - Demonstrate the positive aspects

6.2.2 Justification

Rather than pushing forward projects in a defensive way by trying to convince opponents that impact can be minimised (visual impact, noise, birds, etc.) or compensated, a positive approach starts from the positive value of the project for the direct environment and surrounding stakeholders.

Appropriate siting (for example, by making use of synergy with local elements in the landscape/ecosystem) and involvement of local residents and local economic interest (community ownership/participation) will not only speed up the planning process but also will make more sites available for wind power.

6.2.3 Examples

THE NETHERLANDS

The development of a large wind farm near Eemshaven got a positive thrust when it could be coupled with the development of the local seaport. It even developed further into becoming an "energy hub". In the Wieringermeer, the development of a large wind farm involves several developers, local and regional authorities, and all existing turbine owners, who should be included in a repowering plan as part of the whole process. A neutral party facilitates the development process. The local inhabitants are involved by several activities like a wind-weekend (two days of broad activities around the theme wind energy), the development of a role playing game, sessions to get input for participative planning and development, etc. The Wieringermeer brought farmers a research institution and a utility as part of one plan for the whole municipality (90 towers of 5 MW). In Zuidlob, 34 towers of 3 MW were developed by all the inhabitants of the region (mostly farmers and civilians) in cooperation with the municipality and province. In the province of Friesland, ANL organised all the local wind farm owners in one platform. The platform made an offer for the public parties for a reconstruction policy that would dismantle all the existing 315 turbines and construct 200 new ones in one integrated approach. The effect will be a better landscape and an increase in renewable energy by 500% (380 GWh to 2,000 GWh).

Appendix

Some national and regional recommendations that include social acceptance aspects follow (without this list being claimed to be exhaustive):

Guidelines for Institutions and Authorities

- National spatial planning guidelines, in 2008, information of building wind power (Koskinen and Laitinen 2010) (Finland)
- Repowering of wind turbines – guidance for local authorities (Neddermann et al. 2009) (Germany)
- Planning Guidelines for Local Authorities on Wind Energy Development (DoEHLG) (Ireland)
- Guidelines for planning and localisation of wind energy (T-1458), 2007 in (Solli 2010) (Norway)
- The Wind Energy Concept and its follow up; Recommendations for the planning of wind energy projects in Switzerland (Gilgen et al. 2010) (Switzerland)
- Wind energy and social acceptance: Guidelines for local authorities in Québec (Feurtey et al.) (Canada)
- Permitting handbook (NWCC 2002) (United States)

Guidelines for Developers/Producers

- European Best Practice Guidelines for wind energy development (EWEA 1999) (Europe)
- Den gode proces (Danmarks Naturfredningsforening et al. 2009) (Danmarks Naturfredningsforening et al. 2009) (Denmark)
- Best Practice Guidelines for the Irish Wind Energy Industry (IWEA 2008) (Ireland)
- Guidelines and checklists for investors (Ott et al. 2008) (Switzerland)
- Best Practices for Community Engagement and Public (CanWEA 2011) (Canada)
- AWEA Siting Handbook (AWEA 2008) United States)
- Best Practice Guidelines for implementation of wind energy projects (auswind 2006) (Australia)
- Guidebook on introducing wind power generation for wind power producers (NEDO 2008) (Japan)

Guidelines for Community Projects

- Bankable Models which Enable Local Community Wind Farm Ownership (TLT Sollicitors 2007) (UK)
- To catch the wind: The potential for Community Ownership of Wind Farms (Renewable Energy Partnership 2004) (Ireland)

General

- The Protocol for Public Engagement with Proposed Wind Energy Developments (Centre for Sustainable Energy et al. 2007) (England / Wales)
- Best Practice Guidelines: Consultation for offshore wind energy developments (BWEA 2002) (UK)

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