



IEA WIND TASK 28

SOCIAL ACCEPTANCE OF WIND ENERGY PROJECTS “Winning Hearts and Minds” STATE-OF-THE-ART REPORT

Country report of Japan

Editor: Yasushi Maruyama

Email: ym@nagoya-u.jp

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Framing the Issue

0. Introduction by the Operating Agent of IEA Wind Task 28

In 2009, many governments and organizations set new targets for CO₂ reductions, renewable energies in general, as well as specific targets for wind energy deployment. All these targets require many single projects to be carried out both onshore and offshore that necessitate hundreds of siting decisions and therefore hundreds of communities accepting a wind project nearby.

Research and projects are ongoing in many countries on how acceptance could be fostered, but we need to look beyond national borders to learn from each other and to complement each other's approaches. While Denmark has one of the longest traditions of co-operatively owned wind farms, Japan may bring its expertise in generating additional benefits for the communities hosting the turbines. While Ireland and Canada know about the effects of wind parks on tourism, Norway has conducted actual research on communication between society and science, e.g. concerning bird risks with wind farms.

In the framework of the IEA Wind Implementing Agreement, Task 28 collects and disseminates the current knowledge on how to increase acceptance of wind energy projects with the aim of facilitating implementation of wind energy and climate targets.

Ten countries have officially committed to Task 28 and have provided an input for cross-national comparison and discussion by writing a national report such as the one on hand. The Japanese report has been incorporated into the international State-of-the-Art Report by IEA Wind Task 28, available also on www.socialacceptance.ch.

Industry Status and Stakeholders

1. National Wind Energy Concepts

Wind power generation has historically been ranked lower than photovoltaic power generation in politics. In particular, whereas photovoltaic power generation has received renewed attention since 2007, wind power generation has been left further behind. The new administration of the Democratic Party of Japan, which came into power in September 2009, has set a policy target to increase renewable energy on 10 percent by 2020 using primary energy. However, it has not yet stated its position on wind power generation.

In Japan, there are subsidized projects for R&D and promotion of wind power generation, but they have not necessarily worked well. The Renewable Portfolio Standard (RPS) Law, which was originally enacted to encourage the use of new energy (energy technology in the process of diffusion) including wind power generation, is actually not effective enough to widespread wind power generation. In addition, the procedures for introducing wind power generation require the consent of local residents in order to apply for a grant, yet consensus building with residents is still only based on the experience of project implementing bodies.

a. Policies and strategies for wind energy

At the end of March 2009, the total installed capacity of wind power generation in Japan was 1.85 million kW. The government aims to introduce 3 million kW by 2010, thus requiring a 1.6-fold increase to existing facilities.

Concerning laws to promote new energy in general including wind power generation, the Act on Special Measures for the Promotion of New Energy Use, etc. (New Energy Law) was enforced in 1997. In 2003, the RPS Law was introduced, making it obligatory for electric power suppliers to generate a minimum proportion of electricity from new energy. The breakdown figures for fiscal 2009 are as follows: wind power generation 2.74 billion kWh, photovoltaic power 0.6 billion kWh, water power 0.85 kWh, and biomass 3.17 billion kWh⁽¹⁾.

However, another aspect is that the amount required by the RPS Law is effectively an upper limit on the amount of wind power to be introduced. The transmission networks in Japan are owned by 10 electric power companies, and in principle, there is no power transmission among these companies. Enterprises with abundant wind resources have already met the required amount of new energy stipulated in the RPS Law and have started to limit the introduction of wind power generation. As a result, wind power generation projects are selected by drawing lots or bidding, and the introduction of wind power generation is restricted. In addition, there are time limits about years after approval of grid connection.

There are also other laws that hinder the introduction of wind power generation. Japan is prone to earthquakes, so there are strict regulations under the Building Standard Law. An amendment of the Building Standard Law in 2007 required seismic assessments to be conducted for wind power generation as well. Immediately after the law was amended, it became obligatory for every wind turbine to be approved by the Minister of Land, Infrastructure, Transport and Tourism. As a result, some new construction projects for wind power generation were delayed or cancelled⁽²⁾.

Concerning the reduction of greenhouse gas emissions, it is possible that Japan will set a high goal (25%), meeting specific requirements, in which case more wind power generation will need to be introduced.

b. Incentive programs for wind energy

As an extra-governmental organization of the Ministry of Economy, Trade and Industry, the New Energy and Industrial Technology Development Organization (NEDO) provides grants for research and development projects and the introduction of facilities⁽³⁾.

In addition, there is a private-sector effort called the "Tradable Green Certificate System." This is a system whereby the environmental added value of electricity generated from natural energy including wind energy is sold. It is traded in the form of "Tradable Green Certificates" which are approved by a third-party institution (the Green Energy Certification Center)⁽⁴⁾.

¹ Energy defined in the Act on Special Measures for the Promotion of New Energy Use, etc. It is considered to be an essential energy for introducing alternative energy, which is not sufficiently widespread because of economic constraints. It has almost the same meaning as renewable energy.

c. Spatial planning

In Japan, there are many laws concerning land use such as the Forest Act, the Agricultural Land Act, the National Land Use Planning Act, the City Planning Act, and the Natural Parks Act, and these laws require approvals and licenses for installation⁽⁵⁾. Some regional and local authorities (such as Wakkanai and Nagano) have set guidelines for land use particularly for wind power generation. In addition to existing regulations such as national parks, they carry out zoning for preserving ecosystems and landscapes, prohibit the construction of wind turbines, and make preliminary surveys compulsory. However, there are problems in the process of zoning, and the participation of various stakeholders has not been achieved. As a result, in some areas, there have been opposition movements against projects outside restricted areas, and in other areas, it has become virtually impossible to build wind power generation facilities. Thus, the guidelines do not function well.

d. Strategies: From policy to local acceptance

In Japan, wind power generation is considered to be outside the scope of the Environmental Impact Assessment Law. However, NEDO is developing an environmental impact assessment manual to minimize the environmental impact of wind power generation on the relevant regions. The flow of the manual is broadly as follows: (1) disclosing and reading business and service documents; (2) disclosing and reading draft evaluation reports; (3) creating evaluation reports; (4) applying for grants; and (5) commercializing⁽⁶⁾. Above all, local residents can submit opinions on the business and service documents and draft evaluation reports. In addition, to apply for grants, approval from local residents is required⁽⁶⁾.

Moreover, "New Energy Vision" is regarded as one of the indirect supports for wind power introduction by NEDO. The vision is formulated by the local authority who expects to introduce renewable energies including wind power. It often contains a potential resource reserve, a numerical target of introduction and a principle of enlightenment activity. NEDO subsidizes the local authorities for a part of formulation cost. In many cases, as the vision is formulated by the diversified range of actors collaboratively, it underpins wind power introduction to a certain degree. Though the vision is not legally binding, it sometimes contributes to local acceptance substantially.

2. Stakeholders / target groups

The stakeholders of electric power infrastructure for wind power generation in Japan are electric power companies. Regarding site locations, there are various stakeholders, such as environmental groups and general citizens who are interested in the natural environment and the living environment in the target areas. Regarding financial institutions, project finance has been provided by major banks.

a. Stakeholder's perspectives towards wind energy

Generally, there is a strong tide of opinion that supports wind power generation. Wind power generation is recognized as an environmental measure. It is increasingly used in advertisements (Toyota, Idemitsu, etc.), and is becoming recognized as an environmental symbol. However, when a plan for wind power generation is actually proposed, sometimes local residents and environmental protection groups become concerned about various issues and start opposition movements. Therefore, they would appear to agree with the principle but not the reality.

b. Utilities / grid owners

In Japan, ten electric power companies are in charge of one area each and have a virtual monopoly in their respective area. They are one of the most influential stakeholders, and they are passive or negative towards renewable energy, in particular wind energy.

The electric power companies have exclusive authority and responsibility to operate and manage transmission networks. They are extremely cautious in negotiations concerning interconnection systems of wind power generation, and make requests to wind power producers or refuse requests at their discretion.

Seven of the ten electric power companies are concerned that the introduction of wind power generation may adversely affect the safety and security of electric power systems and the quality of electricity. Since 1999, they have restricted the total amount of wind power generation that they will accept. This is the biggest factor restricting the wind power generation market in Japan.

The Agency for Natural Resources and Energy takes measures to mitigate the effect of wind power generation on electric power systems. Such measures include rechargeable batteries and interconnected lines among electric power companies. Concerning the latter, more than one electric power company reached an agreement in December 2009 to newly introduce wind power generating systems of 100,000 to 200,000 kW and carry out experiments to stabilize the power systems by interconnecting among each company.

c. Developers / investors

The top four wind power producers have a total share of about 50%⁽⁷⁾. They are funded by various companies such as electric power companies, trading companies, and independent companies.

Some companies raise funds for constructing wind power generation by setting up investment funds, such as Green Power Investment Corporation (GPI). GPI decided to construct a wind farm in Poland in 2007 and signed a 20-year contract with a state-operated power company to sell electric power⁽⁸⁾.

The time and cost that power producers spend on consensus building and their responses to stakeholders are diverse, one reason for which is that there are no strict guidelines. Some business establishments spend considerable sums on building consensus with stakeholders.

However, as mentioned in 2-e, utility interconnections are sometimes decided by drawing lots, which makes careful consensus building difficult. Before a project is adopted, there is great uncertainty and it is impossible to spend a large amount of money on an environmental impact assessment. Furthermore, once a project is adopted, it must be commenced within the designated time limit.

d. Financial institutions

Major banks which provide project finance for wind power generation in Japan include The Bank of Tokyo-Mitsubishi UFJ, Mizuho Bank, Mizuho Corporate Bank, Sumitomo Mitsui Banking Corporation, and the Development Bank of Japan.

e. National opinion makers, policy makers and general opinion

Policy planning and surveys concerning wind power generation are carried out by the Ministry of Economy, Trade, and Industry, and the Ministry of the Environment. The Ministry of Economy, Trade, and Industry (Agency for Natural Resources and Energy) focuses on the introduction and promotion of wind power generation and the policies, laws, and grants for technological development. On the other hand, the Ministry of the Environment focuses on operations concerning environmental conservation such as research on environmental impact.

In addition, there are groups that seek action from the government through lobbying activities: Institute for Sustainable Energy Policies (ISEP), Wild Bird Society of Japan, Nature Conservation Society of Japan, WWF Japan, etc. Furthermore, in some cases, local environmental groups play a central role in starting opposition movements, while in other cases, non-local residents may set up a signature collecting campaign against the construction of facilities.

Opinion leaders include university professors and experts. They express different opinions according to their standpoints: some are for wind power generation to help combat global warming whereas others refer to its effect on electric power systems.

f. Educators

In environmental education in educational institutions, wind power generation is generally looked upon favorably as an important alternative renewable energy that helps mitigate global warming and improve energy security.

In some cases, academic experts are called to a planned site for wind power generation and hold study meetings concerning wind power generation. They play an active role in communicating with local residents by answering their many questions and introducing their knowledge from a neutral standpoint.

In addition, in response to recent enhanced environmental education, sometimes wind power producers and wind turbine manufacturers give lectures at universities. Thus, energy education for students is on the rise. Also, a simulation game has been developed and employed in the coursework of a graduate school of public policy to find a solution of environmental disputes on wind power siting⁽⁹⁾.

g. National, regional and local administration

The Tokyo metropolitan government has set a goal for the proportion of renewable energy in the total energy consumption of Tokyo at about 20 percent⁽¹⁰⁾. From 2010, the Tokyo metropolitan government will impose an "Obligation to Reduce Total Greenhouse Emissions" on business establishments that emit more than a certain amount of greenhouse gas. One way to meet this obligation is energy supply from interconnected regions. The Tokyo metropolitan government and Aomori Prefecture reached an agreement concerning "Interregional Cooperation for Renewable Energy" and Tokyo is making efforts to use electricity generated from renewable sources including wind energy. Such agreements are expected to expand in the future, and may help promote renewable energy and the opening of electric power systems.

h. Local population

In the early stages, wind turbines were popular symbols of regions. However, as they have become widespread, opposition has gradually increased.

There have been opposition movements in some areas but not in others. Thus, the attitudes of local residents towards wind turbines vary. Today, adverse health effects of low-frequency sound and vibration are increasingly a concern for local residents⁽¹¹⁾. Some doctors claim that the low-frequency sound of wind turbines damages the human body and there have been many reports in the media. This strengthens the opposition movement, but there are also many who question the scientific rationale.

The existing manuals in Japan for the introduction of wind turbines and for environmental impact assessment include a section on discussions with local residents. However, actual operations are left to the discretion of wind power producers.

i. Visitors / tourists

In some areas, new energy facilities including wind power generation facilities are used as a tourism resource to attract more visitors and tourists. In other areas, there are concerns about the coexistence and safety of wind power generation in terms of sky sports such as paragliding and hang gliding⁽¹²⁾.

Variables Influencing Social Acceptance

3. Well-being

As the introduction of wind power generation spreads, the number of cases involving destruction of landscapes and bird strikes has risen. In recent years, in particular, issues involving low-frequency sound (or infrasonic vibration) are attracting attention, and the number of cases where local residents oppose wind power generation because of noise has increased. For reference, there are about 370 wind farms across Japan and more than 1,500 wind turbines have been built⁽⁷⁾. Environmental disputes include bird strikes, landscape, noise, etc. and the number of disputes arisen after construction is as shown in Table 4-1, which will be described in more detail below.

Table 4-1 Disputes on wind power generation

Bird strikes	Destruction of nature	Landscape	Source of water	Safety	Noise	Low-frequency sound	Land price
6	1	3	1	1	7	7	1

Source: Created by authors based on Nakazawa's documents⁽¹²⁾.

Note: In some cases, there are multiple disputes at one site. There are 14 sites where disputes arose after construction.

a. Standard of Living, Quality of Live and Health

In some sites in Japan, adverse health effects of low-frequency sound have become an issue. The term "Wind Turbine Syndrome" can now be found in the newspapers and other media⁽¹³⁾. This term implies "disease," and some people recognize the term as such. When wind turbines start to operate, some affected residents report symptoms such as numbness of the body or headaches, and that these symptoms are alleviated when they move away from the wind turbines⁽¹³⁾. In addition, some doctors assert that the low-frequency sound of wind turbines causes health damage⁽¹⁴⁾. However, there is no scientific basis for such arguments. The degree of effect differs among individuals, and there are no specific countermeasures at present. The ministry of the environment is reportedly planning to investigate health effects of all wind turbines in Japan⁽¹⁵⁾.

b. Lights, Noise, Shadow

In Japan, disputes over noise have increased since around 2006⁽¹²⁾. In particular, concern about health damage caused by low-frequency sound has increased dramatically since around 2008. However, it is not always the case that disputes lasted after the construction of wind turbines⁽¹²⁾.

The problem of shadow flicker, which is seen abroad, is not serious in Japan. In some areas, people cite this as one reason to oppose the installation of wind turbines, but it has never been the main reason.

c. Dynamic of regional identity, place attachment

In the early 1990s, a town development project in Tachikawa Town, Yamagata Prefecture (presently Shonai Town) was implemented and following this, many municipalities introduced wind power generation as a symbol of regional identity. Generally, wind power generation is still popular among municipalities for regional identity.

On the contrary, environmental disputes have arisen after the construction of wind turbines in some cases. There have been few disputes over landscape as main issue, but there is a case involved a town that was the setting of a story in history books as follows.

The town was the setting of a myth in two ancient chronicles, Kojiki and Nihon Shoki, so the project received strong opposition from historians. In particular, because the image of the setting sun in this area appears many times in historical documents, it was requested that the landscape should be preserved as a historical heritage. In addition, an association for transmitting culture in the region stated that the town "has attracted many people who visit to experience ancient times vicariously and has given pride and peace to local residents." It also said "In this landscape, we feel connected to our distant ancestors. It is important to protect and hand down the cultural heritage of our ancestors including myths, Shinto music and dance, and rice planting with music"⁽¹⁶⁾ thus showing strong attachment to the old landscape from ancient times.

d. Valuation of ecosystems

There have been many discussions on the effects of wind turbines on ecosystems. In Japan, bird strikes involving rare raptors including golden eagles and white-tailed sea eagles have become a problem. The number of bird strikes in Japan is not known. According to the Ministry of the Environment, concerning Steller's sea eagles and white-tailed sea eagles in Hokkaido, 21 cases have been confirmed since 2002.

From 2007 to 2009, to promote wind power generation and protect wild animals simultaneously, the Ministry of the Environment examined ways of reducing the risk of bird strikes, when selecting sites for demonstration experiments of measures to prevent bird strikes and for the construction of wind power generation facilities (e.g. color painting of wind turbine blades, developing a system to detect approaching birds, surveying routes and assembly places of migrant birds, analyzing the risk of bird collisions based on the conditions of weather and sites, etc.)⁽¹⁷⁾.

Some people are concerned that, associated with the construction of wind power generation facilities, forests are being cut down for the construction of power transmission towers, widening of roads, storage spaces for materials, and dumping places for surplus soil, resulting in environmental destruction such as mudslides, soil runoff, and contamination of drinking water and sea water⁽¹⁸⁾. In some areas, the planned construction site is between the roosts and feeding grounds of migrant birds and is on their flying route, and there are concerns about the effects. In such areas, it is discussed that the wind turbines are stopped while migrant birds are in the vicinity⁽¹⁹⁾.

4. Distributional justice

Concerning Japanese ownership models, there are profit-making and non-profit business establishments, and wind turbines are owned by local communities or outsiders. In most cases, wind power projects are operated by private profit-making enterprises. Although most of them are outsiders, some consider the participation of local capital. The relationship between forms of ownership and social acceptance has not been examined sufficiently. According to distributional justice, economic benefits are distributed to the local community where the site is located. On the other hand, in Japan, there is a model called “Community Wind Turbine” which tries to distribute the returns on investment to people both inside and outside the region.

a. Distributional justice

Generally, through the installation of wind power generation facilities, profits such as construction demand and fixed asset taxes are distributed to the local community where the site is located. Regarding the sharing of profit beyond this framework, there are two systems: capital participation in the project implementing body and project finance. Examples of the former are the establishment of a local capital-based enterprise, operation by the municipality, operation by an intermediate body (third sector), etc. For the latter, there is a system of Community Wind Turbine which raises investment also from the general public outside the region. There has been criticism of outside enterprises earning money from selling electric power by wind power generation and monopolizing the profits. On the other hand, this activity helps improve the distributional structure in the region as a solution to the problem of distributional justice⁽²⁰⁾.

Furthermore, in some cases, profits are distributed via Tradable Green Certificates (for details, see 3-d. Financial institutions). This is not the distribution of economic profit; rather, it is the distribution of benefits such as psychological satisfaction from contributing to environmental activities and opportunities to publicize one’s contribution to those activities.

Compensation is not provided for losses such as a decrease in land prices caused by the installation of wind turbines.

b. Ownership models

As forms of ownership of wind power generation in Japan, there are profit-making and non-profit business establishments, and wind turbines are owned by local communities or outsiders. In Japan, most wind power projects are operated by private profit-making enterprises (Figure 5-1). The domestic mass media often report on opposition movements against private wind turbines, but this is not always because wind turbines are privately owned. In some cases, private wind turbines are accepted by local residents. It would appear that ownership forms are one of the factors affecting social acceptance.

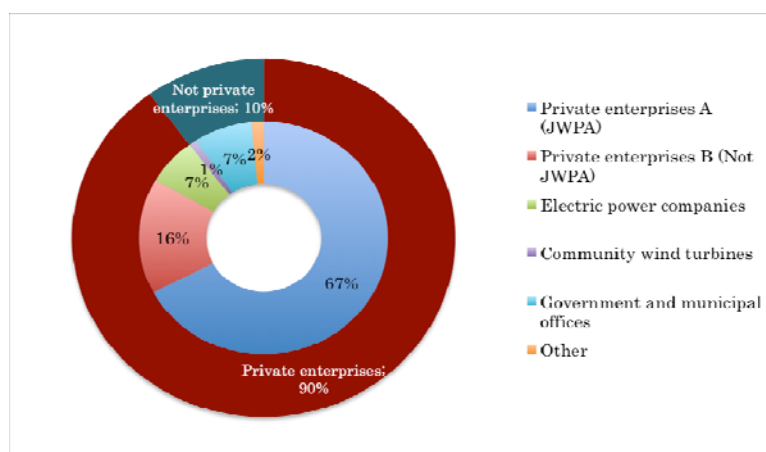


Figure 5-1 Forms of ownership of wind power
 Source: Created by authors based on NEDO’s documents.⁽⁷⁾

On the other hand, efforts for community wind power have been increasing. Such efforts started in 2001 and 11 projects had been commenced by 2009. Investments totaling about 2 billion yen have been collected from 4,000 people. As in wind power generation using publicly issued bonds in Yokohama City, some municipalities are the project implementing body.

5. Procedural Design

NEDO has prepared a guidebook on brief procedures for introducing wind power generating systems⁽⁵⁾. There is also a manual for environmental impact assessment⁽⁶⁾. However, the guidebook and the manual merely state that introduction requires the consent of residents, and do not describe the actual consensus-building process. With the introduction of wind power generating systems, environmental issues and impacts on regional environments have recently been pointed out, and therefore more detailed procedures for introduction are becoming increasingly necessary. In fact, in one case the participation of stakeholders helped to build consensus. Though it is important to build a consensus through participation, a large majority of the public is not necessarily willing to participate in the process. Therefore careful procedural design is significant for wind power introduction.

a. Procedural design

Rough guidelines on procedures for constructing wind power generation facilities have already been developed, though it is not clear if they help build consensus. It is considered necessary to establish more detailed procedures or to make such procedures obligatory (for details, refer to “7-c. Checklists, guidelines”). However, in some cases, interconnection of power systems is decided by drawing lots, which makes it difficult to conduct sufficiently an environmental impact assessment and build a consensus (for details, refer to “3-c. Developers/investors”).

Actually, responses of the developers and the local authorities influence whether a consensus is achieved or not, during the process of introduction. Though it is important to build a consensus through participation, a large majority of the public is not necessarily willing to participate in the process⁽²¹⁾. Therefore careful procedural design such as agenda-setting and identifying an extent of participation is significant for wind power introduction. When the issues on wind power introduction are deliberated in the formal process, agenda-setting varies depending on each circumstance of the local authority. Consequently, it is recommended for procedural design to apply a step-by-step participatory approach in which agenda starts from the general topic such as the necessity of the facility and then move on to the particular topic such as the location of sites⁽²²⁾.

b. Communication strategies, public consultation

Wind turbines are generally considered valuable for preventing global warming and air pollution, contributing to energy security, etc. However, their construction may place a burden on the regional environment and local communities, and local residents in planned sites are highly interested in such issues. A large majority of the local residents is concerned about such as viability, local ecosystem and landscape before construction. Landscape issue has turned out to be resolved after construction however viability and local ecosystem have been matters of concern⁽²³⁾. It is necessary for the developers and the local authorities to have communication strategies with consideration for the issues. Such a communication makes the wind turbine become a topic of conversation in the local community, and consequently tends to bring a change of environment-conscious behaviors to the residents⁽²⁴⁾.

In addition, some consider that it is necessary to establish a contact point for receiving complaints and consultations from residents, and that opposition movements may arise due to a lack of means of communication to convey residents' complaints to a company.

c. Cultural relationship, local context

There have not been many cases of environmental controversy with disputes over the landscape of a planned site as main issue. However, there is a case of a national park, which was expected to be designated as a World Heritage Site; its landscapes became a point of dispute and the plan was cancelled⁽²⁵⁾. In some cases with landscape controversy over historic environments (for details, refer to “4-c. Dynamic of regional identity, place attachment”), agreement was reached between both parties by proposing to change the location or height, for example, to keep wind turbines out of sight of sunset points, and finally the construction started⁽²⁶⁾.

6. Implementation Strategies

NEDO has prepared a guidebook on the introduction of wind power generation and a manual for environmental impact assessment, both of which are designed as guides for business establishments and are not enforceable. Each business establishment has its own manual and there are no established procedures for introduction in the country.

In Japan, wind power generation is characterized as an environmental enlightenment activity and various attempts have been made to create ripple effects. This has had a positive effect on not only creating added value in investment through wind turbine tours and inscription of names on the wind turbines, but also establishing a network of human exchange through the ceremony to mark completion of wind turbines and the sale of special local products.

a. Visual impacts, photomontage, Communication campaigns

As a landscape impact assessment method, a landscape simulation system is being developed⁽²⁷⁾. This tool has a head mounted display (HMD) to assess landscapes in three dimensions. However, it has not yet been used for actual landscape simulations when selecting planned sites.

As communication campaigns, the Asahi Shimbun, J-POWER (Electric Power Development Co., Ltd.), the Ministry of the Environment, and the Ministry of Economy, Trade and Industry jointly have held a drawing contest titled the "Wind Turbine Landscape Contest."

b. Checklists, guidelines: conclusions from existing examples

NEDO has prepared a guidebook on introducing wind power generation for wind power producers. It summarizes the flow of introduction of wind power generation from surveys on the planned site to operation and maintenance, and the items to be considered in each process. However, this manual assumes that power producers will voluntarily follow it, and it is not enforceable.

NEDO has also prepared a manual for environmental impact assessments. This summarizes the flow of the environmental impact assessment process, including items for assessment details based on examples and laws and regulations related to environmental impact assessment. Besides this, many power producers have prepared their own manuals for environmental impact assessments. In response to recent environmental controversy over wind power generation, power producers voluntarily conduct an environmental impact assessment to investigate the impact on planned sites. Nevertheless, some have doubts about the investigation method and the credibility of the investigation results, because power producers themselves conduct an environmental impact assessment and investigation methods, etc. are not enforceable.

Given this situation, some local authorities have enacted an ordinance adding wind power generation to the target businesses of environmental impact assessment. As of February 2009, five prefectures and four cities have enacted an environmental impact assessment ordinance relating to wind power generation⁽²⁸⁾. In addition to the above, four prefectures have drawn up an implementation outline or guidelines for environmental impact assessment, environmental research, etc.⁽²⁸⁾ and three other prefectures are now considering whether they should be covered by the ordinance⁽²⁸⁾. There is also a discussion about the addition of wind power generation to the target businesses covered by the Environmental Impact Assessment Law.

c. Scientific results and practical application

Health hazards caused by infrasonic sound are attracting the attention of Japanese people, and it is necessary to clarify whether there is a correlation or not. Measures to prevent bird strikes are considered to prevent damage to ecosystems, and other measures are also taken, including camouflage-painting the blades of wind turbines and developing a system to detect birds utilizing marine radar⁽¹⁷⁾.

In addition, to enhance the reliability of wind power generation as a source of electricity, the development of a system for predicting wind power generation based on weather forecasts has been promoted.

d. Cascading effects

In some cases of community wind power, various attempts have been made to create ripple effects. Attempts for investors include issuing certificates, inscribing the names of applicants on wind turbines, publicly soliciting nicknames for a wind turbine, and holding wind turbine tours. These attempts aim to add value to investment as well as to motivate investors toward environmental action⁽²⁹⁾. Above all, some investors find great significance in having their names inscribed on the wind turbine and apply for it as a wedding present for their friends and to commemorate certain stages in their life.

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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. Moreover, there is a fund for town development which is created by asking investors to contribute their profit dividends and receiving the same amount in contributions from NPOs and twice the amount from the local administration⁽³⁰⁾.

Summary and Conclusions

7. Conclusions

Summarizing the domestic situation, there is still no systematic and strategic approach to gaining social consensus in Japan, and we are merely reactively coping with individual issues, including natural parks, bird strikes, and low-frequency sound. With regard to ways of coordinating such social consensus, the following three points are future issues:

First, although a guidebook on introducing wind power generation has been prepared, nobody checks whether it is used effectively.

Secondly, although the guidebook describes the technical procedures for introduction, it does not describe the procedures for building social consensus. Therefore, wind power producers try to build consensus based on experience. Put simply, a comprehensive manual has not been prepared yet.

Thirdly, although regulatory frameworks have been discussed under pressure from public opinion, including the addition of wind power generation to the businesses subject to the Environmental Impact Assessment Law, nobody assesses the effect.

Going forward, in addition to the above three points, detailed discussions on care for local residents in planned sites would increase social acceptance.

a. What we know already

If interconnection of power systems is opened or the national legislation is reformed, the introduction of wind power generation is expected to expand. Accordingly, it is necessary to prepare a technical manual for introduction as well as to build a consensus with stakeholders. Under present circumstances, concrete methods for consensus building have not been discussed yet, while activities for information sharing among various stakeholders have been promoted with the aim of providing a platform for social dialogue⁽³¹⁾.

b. What needs to be done yet

It is necessary to prepare a comprehensive manual for introduction, including the consensus-building process. It is also necessary to evaluate the manual in order to improve it. Furthermore, it will be necessary to determine who evaluates the manual, and how.

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