PERGAMON

Renewable Energy 21 (2000) 49–64

RENEWABLE ENERGY

www.elsevier.com/locate/renene

Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support

Maarten Wolsink

University of Amsterdam, Amsterdam Study Centre for the Metropolitan Environment AME, Nieuwe Prinsengracht 130, NL-1018 VZ Amsterdam, The Netherlands

Received 2 August 1999; accepted 15 December 1999

Abstract

In many countries, the development of wind power capacity has proceeded more slowly than expected. Levels of public acceptance are usually considered primary indicators of support for wind power within society. Surveys generally show strong overall public support for wind power, while concrete projects are felt to suffer from the Not-In-My-Backyard (NIMBY) syndrome. This paper questions the significance of these outcomes. It argues that other barriers to wind power implementation exist beyond attitudes among the population. The argument is made that institutional factors have a greater impact on wind energy facility siting. We will discuss two examples of how institutional factors shape the level of support when implementing wind power. © 2000 Elsevier Science Ltd. All rights reserved.

Keywords: Wind power; NIMBY; Institutions; Institutional arrangements; Siting

1. Introduction

Wind energy has reached the stage of being economically viable under certain conditions. In many countries, however, the speed growth rate of installed capacity is less than what was expected in the past. Obviously some barriers for

E-mail address: m.wolsink@frw.uva.nl (M. Wolsink).

PII: S0960-1481(99)00130-5

wind power projects exist that cannot be overcome easily. Project developers and other parties involved in such developments often react surprised, and sometimes annoyed, impatient and dejected when faced with opposition against their projects.

Public support for wind power runs high in all major wind-power producing countries [10]. Taking the line of strong support one is often surprised when acceptance of new developments is not self-evident, and when initiators encounter resistance. It is one of the most common mistakes in facility siting to take general support for granted and to expect people to welcome developments they claim to support. New developments have proven difficult to realise and the growth in wind power capacity lags behind proposed goals.

Studies on the impediments for wind power developments mostly concentrate on public opinion. The broad base of support for wind energy has been well documented since serious application of this technology began in the 1980s. Some small-scale opinion polls using ad hoc questionnaires around existing turbines showed positive sentiments towards the new technology [4,12,23]. These polls were not systematically designed surveys intended to establish the structure and background of attitudes towards wind power, but simply indicated the popularity of wind power as a source of energy. Compared to other kinds of electricity production, a vast majority favours wind energy. It seems, therefore, quite puzzling why it is so hard to succeed in building new wind turbines when people are so much in favour of wind energy. If it is true that the public favours wind power but not wind power *projects*, why do we emphasise that public popularity of wind energy? Does it really matter if wind power is popular? And should it even be considered as a relevant factor in wind turbine siting in the first place?

2. Attitudes on wind power application

Besides showing support for wind energy, the small-scale surveys revealed some perceived disadvantages of wind energy as well. Arguments against wind power, as put forward in these surveys, were the same as those used in current discussions on local wind-power developments. These include:

- Noise pollution causing annoyance
- Spoiled scenery
- Interference with natural areas, particularly bird endangerment
- Unreliability of the energy supply (dependence on wind; wind power as an unreliable technique)
- The (supposed) expensiveness of wind as a source of energy.

Although the list of potential disadvantages was similar to the early surveys, the weight of these was mostly dependent on the terms used in the questionnaires. The relative significance of these factors, therefore, remained unclear. An assessment of the relevance of the arguments was established by counting the number of respondents who mentioned them spontaneously, or by reporting

assessments of the weight as given by the respondents themselves on single-item questions. These simple methods generated biased results, however. More sophisticated research was needed to establish the impact of all the perceived costs and benefits of wind power on attitude formation. To this end, more systematic research, based on social-psychological knowledge among large and more representative samples on different locations, was carried out in the US and the Netherlands. Multivariate techniques were used to establish the impact of perceptions on attitudes [22,26]. These studies provided a different perspective on the significance of arguments that determine attitudes toward wind power application.

The strongest impact on the attitudes concerned the aesthetic value of wind turbines. The perceived impact on scenery, visual intrusion of the landscape as well as positive judgements, is the best predictor of the attitude. This factor is much more decisive for one's standpoint than the perceived environmental benefits of wind power as compared to other forms of conventional electricity generation, such as reduced carbon dioxide emissions. Concerns about noise pollution and hazards to birds had a small impact on attitudes as well.

The fact that perceived visual quality of wind turbines in the landscape is the main factor in attitude formation does not contradict the earlier findings of the small ad-hoc surveys. Attitudes measured with tested multiple-items scales also showed strong general support for wind power. The crucial point, however, is that this positive attitude will not automatically result in concrete support for any wind turbine project. The decision to support or oppose such a project will depend primarily on the visual quality of the site. If the perceived visual quality of a project is positive, people will probably support it. If the perceived visual quality is negative, people may become opponents, even though they remain in support of wind power in general. At first glance, this looks very much like NIMBY-ism, but, as we will illustrate, this conclusion is not valid.

3. The NIMBY explanation for opposition

Opposition to facility siting is conventionally equated with the Not-In-My-Back-Yard (NIMBY) syndrome. This phenomenon has been analysed in many different cases of infrastructure facilities (e.g., the siting of hazardous, nuclear, and conventional waste facilities, nuclear and conventional power plants, offshore oil drilling, roads, railroads etc.) and of social facilities as well (e.g., mental health care, housing, aids nursing homes etc.). Since the application of wind power began, developers have faced resistance with turbine siting, and ever since, these problems have been explained by appealing to the NIMBY argument ([2], p. 317).

The conventional view on the phenomenon is that people are in favour of wind power, but are opposed to wind turbines in their own area. Close reading of the literature on siting issues, however, shows that the content of the NIMBY concept is rather confusing [13]. The NIMBY concept is often considered as common sense, but it actually represents a specific *social dilemma* or *game-situation*. These

concepts are important subjects for economists (who refer to them in game theory) and psychologists (social dilemma theory) when studying the provision of public goods. These theories explain why some public goods are not produced within a society, even though all individuals in that society want that good to be provided. The unintended outcome of such a dilemma is not optimal because of each individual's utility maximising decisions. Although everyone would be better off if the public good were produced, this does not happen due to each individual's decision not to co-operate. In the individual decision-making process, personal costs and benefits are calculated, and this stimulates so-called *free rider* behaviour. Originally, opposition against generally useful facilities has been defined as a multi-person *prisoner's dilemma* [14], the most widely known game-theoretical situation.

In our case, the public good to be provided is large-scale wind power. According to NIMBY-logic, local residents oppose a project in their aim to maximise their own individual utility. Because they are in favour of wind power, they will welcome all turbines not built in their vicinity. They minimise the personally perceived impact of wind turbines by blocking their development. According to the social dilemma, if people refuse to co-operate at all locations, wind power developments cannot be built anywhere. Consequently, wind power will be underused as a source of energy, despite a virtual consensus in favour of it.

Selfish motives are attributed to those harbouring NIMBY sentiments and their behaviour is viewed as impeding the attainment of societal goals. The outcomes of the NIMBY syndrome are a selfish parochialism that generates locational conflict. Lake [11] summarises that the syndrome is blamed...

> ...for virtually all our failures to solve pressing social problems. Our inability to eliminate environmental degradation, traffic congestion, homelessness, crime, and poverty is ascribed to NIMBY. We could make giant strides in all these areas, it is claimed, if local communities would only abandon their selfish opposition to the waste incinerators, transit systems, housing projects, prisons, shelters and clinics society needs to solve these pressing problems. ([11], p. 87).

For example, a study on community response on nuclear-waste siting stated that, "in the typical siting case, much of the opposition is parochial and short-sighted, as captured by the term NIMBY." ([5], p. 469). The obvious implication: this opposition is purely based on self-interest. This argument is clearly raised when the NIMBY syndrome is invoked to describe the opposition to wind turbines. However, proponents of this argument do not distinguish between the interests of the opponents and their motives, and they tend to disregard the opponents' perceptions of risk. In policymaking, NIMBY-ism among residents is considered common knowledge. However, the literature on physical infrastructure facility siting and decision-making processes, increasingly views simple NIMBY explanations of local resistance to facilities as outdated [6,8,11,13,28]. The same holds for social infrastructure, such as housing projects [16] and mental health facilities [18].

4. The poor quality of NIMBY illustrated

The common view on the NIMBY syndrome links a positive attitude to wind power with resistance against a particular project. When we try to locate people that combine a positive attitude and resistance motivated by calculated personal costs and benefits we can hardly find them. We are able to illustrate this with previously unpublished figures. The data are collected in research around three major wind farms in the Netherlands. The surveys included interviews before and after building turbines and the aim was to establish the attitude shift that results from planning and building wind turbines ([28], p. 861). For an analysis of the causes of resistance against wind power developments, an indicator for not-in-my-backyard tendencies was constructed. This was done with multiple items that all contained a formulation of preferences that are crucial for the existence of a social dilemma (Table 1). For example, 21% supported and 65% rejected this statement: ''We have to bear the costs of wind power, because elsewhere they don't accept turbines.'' The use of more than one question improves the quality of the measurement, particularly because it offers the possibility of testing the internal consistency of the survey questions by means of scale analysis. The 'NIMBY-tendency' was measured by asking for the support or rejection of five propositions (Table 1). These items must be considered indicators of one phenomenon, because they appeared to be highly consistent. The quality of this mutual consistency is expressed in a scale reliability coefficient (e.g., Cronbach's α) that is high.

Remarkable is that only about a quarter of the population clearly looked at the costs and benefits of wind turbines in terms of individual utility. More than half of the respondents rejected the statements and tended to put more weight on the public interest and the interests of others than on the personal cost–benefit calculation. About 25% stayed neutral or could not give an opinion (total $N = 725$). Apparently, only one out of four residents held preferences that could result in free rider or NIMBY choices. However, such a set of preferences is not sufficient for real free rider behaviour.

Because the NIMBY position is characterised by the combined preference for the public good and a refusal to contribute to this public good, we can only speak of NIMBY if someone is in favour of wind energy application. For an assessment

Table 1
Support and rejection of five social dilemma statements on three wind farm locations[a]

	Support (%)	Rejection (%)	N
Only turbines here if sited elsewhere too	17	64	686
Turb's create costs, benefits unlikely, uncertain	25	55	660
Preference for other sites, elsewhere	24	56	687
We bear costs, elsewhere they don't accept	21	65	676
Benefits only for the electricity utilities	41	45	622

[a] The items form a scale ($\alpha = 0.83$), representing the inclination to free rider (= NIMBY) behaviour.

of the impact of free rider preferences on behaviour, we can look at the relations between attitudes and activities against the proposed wind farms (WTRESIST). Activities such as signing a petition, writing a letter, visiting a meeting, consulting neighbours, or taking juridical action, were recorded in a cumulative scale. These activities must be considered local political participation and it is known that the degree of participation is dependent of feelings of self-efficacy. Citizens that doubt their ability to influence decisions are less likely to take any political action than persons that are more self-confident. Political efficacy (EFFIC) was also measured by a scale of five items ($\alpha = 0.84$). Wind power attitude (WPATTIT) was measured by a four item scale ($\alpha = 0.80$). In the following OLS-regression the impact on the behaviour against the wind power developments is indicated:

$$\text{WTRESIST} = 0.21\ \text{NIMBY} + 0.14\ \text{EFFIC} - 0.53\ \text{WPATTIT} \quad \left[R^2 = 0.37\right]$$

These statistically significant standardised regression coefficients (β-weights) are not sensitive to the units of measurement. They may be interpreted as partial correlates between standardised variables (zero means, unit variance). The analysis illustrates the limited significance of NIMBY-preferences for the choice to resist wind power development. NIMBY preferences only explain 4% of the variance of behaviour, while the general wind power attitude explains 28%. Only the combination of free rider preferences and a positive attitude toward wind energy deserves the label 'NIMBY'. The data hardly reveal citizens who combined both inclinations. Most people with NIMBY-feelings are not so much in favour of wind power at all. Their behaviour is primarily based on their lack of support for wind turbines anywhere. This becomes even more evident if we examine the attitudes towards wind projects instead of wind power in general.

5. Further analysis of the background for opposing wind power projects

As emphasised correctly by Krohn and Damborg [10] general attitudes to wind power have to be distinguished from intentions regarding local developments. In a causal analysis, the impact of the wind power attitude and the NIMBY-attitude on opposition behaviour is estimated again for the same sample as used in Table 1. This time arguments concerning general, local and site specific characteristics are included:

- The visual assessment of scenic values of wind turbines (VISUAL);
- The interference factors (birds, nature, noise, shadow flicker) which are causing annoyance (ANNOY);
- The environmental benefits of clean energy (CLEAN).

The impact of these factors on attitudes as well as on behaviour is investigated. Other factors like concerns about reliability and electricity prices did not have significant impact, so they are left out of the analysis presented in Fig. 1.

The explained variance of resistance to wind power developments improves

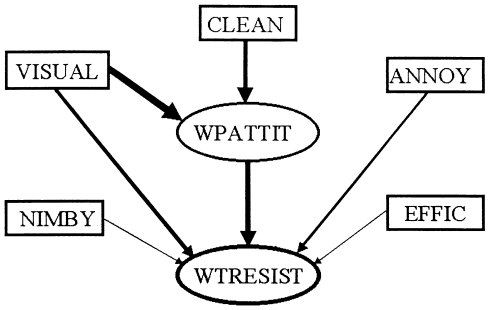

Fig. 1. Direct and indirect impact of arguments and motives on resistance to wind turbine projects.

from $R^2 = 0.37$ to 0.46 by taking the perceived characteristics of wind power into consideration[1]. The arrows in Fig. 1 indicate the strength of the relations. Inclusion of the perceived costs and benefits of wind power offers some striking conclusions. First, we see that only two factors are determining the general wind power attitude: CLEAN, and especially VISUAL. Furthermore, there is no direct relation between ANNOY and attitude. It means that the attitude toward wind power is not influenced by thoughts about noise and birds.

Second, the annoyance factor may not be significant for the attitude, but it does have a direct impact on the intentions to resist wind projects. Furthermore, the VISUAL factor comes into play again when people judge a specific wind power development. The visual assessment of scenic values of wind turbines has a double impact: indirectly via the wind power attitude and directly on resistance. Hence, people are concerned about possible annoyance and most of all about the visual scenic impact when they consider the qualities of a project. At the same time, arguments that are not linked to the local situation have no direct impact on behaviour. The perceived clean character of wind power only has an indirect impact on the intentions of resistance.

Third, there is a statistically significant impact of the NIMBY inclination as well as of perceived self-efficacy. However, these are very weak relations. The syndrome really exists, but simultaneously we must conclude that its significance remains very limited.

The main problem is that concerns about the impact of wind power become salient when a project is announced. The general wind power attitude grows more critical in the planning phase [10,28]. The reason is that the concerns are not of a global nature, but primarily linked to local variables. Type of landscape is the most important factor determining scenic beauty ratings of turbines within the landscape. Hence, characteristics of the selected site are crucial for the attitudes

[1] Because of the complexity of the relations, Fig. 1 is not based on simple regression analysis. It is carried out by LISREL (LInear Structural RELations) methodology. Neither the technical details nor the exact estimated coefficients will be discussed, but we will concentrate on the qualitative aspects of the results.

that people develop. Obviously, concerns about interference (mainly noise) are dependent on the location. Hence, any intention to resist is explained either by characteristics of the selected location, or by an overall aversion to large numbers of wind turbines in the countryside. The personal assessment of the benefits of wind power hardly enters the argument in the trade-off.

The attitudes are formed in a public debate. In Table 2, a classification of the content of articles in the regional and local press about six wind power developments is presented. It shows that public discussion during the decision making process is also concentrated mainly on site-specific variables. The attention paid to arguments in the local and regional press varies between locations. The different characteristics of the projects and the course of the local political process cause this. In Table 2, Herbaijum is given as an example case where an active local group opposed the wind farm. Here public attitudes were mainly shaped by visual assessments as well. Nevertheless, noise was the formal argument on which the political and juridical discussion concentrated. The crucial factor in the juridical dispute about that project was noise. The selected location was 250 m from the village. The conditions in the permit for noise were raised from 40 dB(a) to 50 dB(A); otherwise, the turbines could not have been built. The media content was strongly determined by this struggle. However, although the struggle formally focused on annoyance, the press still wrote more frequently about landscape and scenic values. This subject was significantly raised more frequent than on other locations. As the surveys showed attitudes are dynamic and influenced by the features of a project, the content of the entire public discussion is strongly dependent on these features as well. This supports the idea of changing feelings about an infrastructure project over time and particularly that the discussion tends to concentrate on site specific features.

6. Decision making and dynamic attitudes

Apparently, the common sense phrase 'wind power is perfectly fine, but not in my backyard' is a very poor explanation for the opposition against wind power developments. In fact, very few people exhibit free rider behaviour in this social dilemma context. Moreover, the common sense view of NIMBY-ism is damaging to the implementation of wind power. A clear view on the NIMBY-concept is

Table 2
Percentage of the press articles with references to aspects of wind power [27]

	6 cases (%, $n = 471$)	Herbaijum (%, $n = 60$)
Env. benefits (emissions, resources etc.)	26	8
Interference (noise, nature, birds)	27	44
Malfunctioning (accidents, unreliable electricity)	7	5
Landscape (scenery, visual intrusion)	39	70

needed, because the current use of the concept has large consequences for all parties involved in the siting process ([13], p. 87). The concept simply does not allow any distinction to be made among the broad range of attitudes. By labelling all protests as NIMBY one misses the multitude of underlying motivations [16]. Looking at the possible positions people can have towards any infrastructure facility, we can distinguish different roots of opposition [3,8]. The following is an adaptation of forms of resistance — originally described for waste incineration plant ([28], p. 86) and a genetic modification facility ([21], p. 159) — to a wind energy context.

Resistance Type A. A positive attitude towards wind power, combined with opposition to the construction of a wind farm anywhere in one's own neighbourhood. This attitude-behaviour combination reflects the only true NIMBY standpoint.

Resistance Type B. Rejection and opposition to a wind farm in the neighbourhood because one rejects wind turbine technology in general. This position is sometimes called 'NIABY', or Not-In-Any-Backyard. This kind of opposition is based on concerns about the general consequences of wind power on the scenery.

Resistance Type C. A positive attitude towards wind power, which becomes negative as a result of the discussion surrounding the proposed construction of a wind farm. This type shows the significance of the dynamics in attitudes, as it reflects a NIABY attitude resulting from changing risk perceptions during the decision-making process.

Resistance Type D. Resistance created by the fact that particular projects are considered faulty, without a rejection of the technology as a whole. This type advocates the generation of wind power, but only under some conditions. This opposition is particularly limited to proposed wind farms on specific locations, as it is based on concerns about the consequences of a wind power plant, on primarily the scenery and, to a lesser degree, on interference and nuisance. People here may be unconvinced about the suitability of the selected site. They may expect interference or they may consider the landscape on the chosen location too sensitive, especially when other available locations nearby are considered more suitable.

All four behaviour–motive combinations can and will exist with the siting of any facility, but one may become dominant during a particular effort. In most countries, nuclear waste facilities and nuclear power plants are textbook examples of Type B resistance. However, this has not always been the case. Most people shifted in the past from support to opposition during a public debate on the siting of new nuclear facilities, which is an example of Type C: developing opposition. This happened in the US, for example, between 1980 and 1982 [19].

All four types of opposition exist for wind power as well. Since most people favour wind power as an energy source, the second type is limited to a small part of the population. Because these people are not motivated for free-rider-behaviour, approaches using the common sense NIMBY viewpoint, like the

compensation strategy will not be effective for these people. Particularly the fact that attitudes can be dynamic and consequently may change during the planning phase of a project is easily overlooked. Although this fault can be recognised in the NIMBY-concept, it is even more widespread, and planning scholars have observed such a tendency within planning practice. Healey [7], for example, describes such problems in current spatial planning practice, and notes that the groups and organisations involved in spatial planning are viewed as having fixed interests. Her analysis concentrates on developments in procedural opportunities for public consultation and participation in spatial planning policy in the UK. As in other European countries, these are considered inadequate because people generally do not come forward with positive responses to planners' agendas. This same issue arises when planning wind-power facilities. Nowadays these procedures are increasingly being used by lobby groups, from both the pro-development as well as the environmental side ([7], p. 1538). Although attitudes and behaviour may be personal, they are apparently influenced by the decision-making process. These processes develop patterns that depend highly on the way physical planning is organised. These institutional factors can also be recognised in place making processes for wind power. Hence, the success of wind power appears to be strongly dependent on institutional arrangements within the policy domains of physical planning and energy. We will illustrate this through a description of the crucial institutional arrangements within the wind-power sector in the Netherlands that can be held responsible for the insufficient results of Dutch wind-power policy. Finally, an example will be offered of a crucial stakeholder, an important environmental organisation, becoming, for institutional reasons, more reluctant towards the siting than its own members.

7. Example 1: institutional factors in wind power policy

Since the 1973 oil crisis, the efficient use of energy, better exploitation of resources and a reduction in external dependence have been the main lines of Dutch energy policy. From 1975 onwards, the government initiated the development and implementation of wind power by various programmes. The first programme concentrated on research, and estimated that wind power could meet 10% of the domestic electricity demand, and could do so without using expensive storage systems. In 1981, an official policy objective was formulated: by the year 2000 about 1500 MW of large-scale wind power capacity, and 350 MW of small scale decentralised facilities were to be installed. In 1982, the National Development programme for Wind Energy began with two clear choices: development was to be geared towards large-scale centralised facilities, and the utilities were defined as the key actors in the process of developing wind power. The environmental impact of wind turbines seemed relatively small, although it was also concluded that physical planning and environmental impact could place limits on wind power capacity. A revised policy goal of 1000 MW by the year 2000 was officially formulated in January 1985.

After the two R & D programmes, three subsequent implementation programmes with market stimulation, including subsidies for building turbines, were carried out within new energy policy lines aimed at stabilising CO_2 emissions. According to the new style of environmental policy, several sectors were called upon to co-operate and to achieve these goals [25]. The energy supply sector was requested (with voluntary agreements) to invest in co-generation and renewables. The utilities were offered a new tool, Environmental Action Plans, to generate funds using a special tax on distributed electricity.

In spite of all these programmes, funds and market stimulation, Dutch wind-energy policy remained ineffective. The reasons are of an institutional nature. The stagnating implementation rates in the Netherlands are mainly due to structural impediments in the electricity sector and the actions of the other policy actors [29]. The predominantly top-down policy style and the consequently ineffective planning of wind-turbine siting were to blame for this. Assuming broad public support, projects are usually initiated from an approach that is described in the facility siting literature as the 'engineer's' and 'planner's fallacy' [15].

The level of public acceptance in the Netherlands is similar to acceptance in Germany, where the growth in wind-power capacity has been impressive [17]. The striking difference between the two countries is not a result of significant differences in public support, but of institutional settings. The main factor in the German success was the 'electricity feed law' (*Stromeinspeisungsgesetz*) that stimulated other parties than the electricity utilities to invest in wind turbines [20]. The fixed remuneration for electricity supply to the grid, as prescribed by this law, was fiercely disputed by the utility sector. However, within the institutional conditions of Germany, the utilities could not muster enough power to change this policy. In the Netherlands, however, the institutional conditions are not favourable for effective measures to stimulate wind power. For example, the position of utilities is pivotal in the Netherlands, not only regarding their own investments, those of private initiatives as well [29]. An 'electricity feed law' that mandates how much utilities pay for electricity delivered to the grid is inconceivable within the context of the Dutch electricity sector and political system.

The dominant position of utilities also creates little institutional capacity for successful siting of wind-power facilities. Rather, it underpins the planning fallacy. Although siting is recognised as the most important factor in the development of wind energy, those active in the electricity sector tend to view this as merely a 'market imperfection' or a 'bureaucratic obstacle' [20]. Such a narrow view is hardly conducive to effective planning.

8. Example 2: institutions overruling public attitudes

Powerful contradictions between renewable energy and environmental values often become manifest. Wind as a clean energy source requires turbine sites in environmentally valued locations. In many countries, wind power potential is

geographically concentrated in ecologically sensitive areas. These ecological aspects play a significant role in public debates on wind-power developments. Consequently, environmentalists often consider the development of wind power as problematic from a conservationist point-of-view.

Half of the economically feasible wind energy potential in the Netherlands is located in the north and northwestern part of the country. The largest part is situated around the Waddensea wetland, an ecologically important area of shallows extending along the coast of Germany and Denmark. According to international agreements and national law, all activities within the Waddensea region should be considered carefully with respect to ecological consequences. For this purpose, the *WaddenVereniging* (Wadden Union) was founded in 1965 as a reaction to a proposal to connect two of the six Friesian Islands to the continent by dikes. Although this measure was defeated, the 'WaddenVereniging' (WV) continued to act as a national environmental organisation.

The WV often objected to proposed wind farms and, largely due to their legal prowess, most were cancelled. However, as part of the environmental movement they felt caught in a dilemma. A serious struggle ensued among the membership, ultimately resulting in a crisis in 1997. To break the impasse, the board asked an advisory commission to prepare a survey of all members. The random sample survey carried out in May 1998 had the remarkably high response rate of 80% [1]. The 505 respondents lived throughout the country, and 23% lived near the Wadden area. The significant result was that indeed opinions show large variations in opinion, but there was not a majority supporting the policy of rejecting wind power installations in the Wadden area. Many gradations of support for wind power exist among the members. The reactions on five statements are listed in Table 3 in ascending order of support.

In addition, the members were asked which standpoint would be the best for the WV to take. The statement concerning siting on selected sites scored the best, and a majority supported either this view, or even more powerful statements in favour of wind turbines. Obviously, a majority did not support the former official standpoint of the WV of opposing wind turbines. The statement showing the strongest support was to select preferable locations

Table 3
Judgements of WV-members on statements about wind turbines in the Wadden region

Item	Mean on 5-point scale (1 disagree – 5 agree)	% agreement with statement ($n = 505$)
No siting wind turbines anywhere	2.8	38
Siting on selected sites	3.5	65
Siting proportionally to other regions	2.9	38
Siting desirable	2.7	29
Siting necessary	2.3	19

within the Wadden region and build wind turbines at these sites. Over half (65%) favoured building turbines on selected sites, or preferred even more wind-power developments.

The answers were very consistent. The five items, together with the question regarding which viewpoint was preferred as the policy line of the WV, comprise a strong scale ($\alpha = 0.84$) indicating the inclination towards support for wind energy in the Wadden region. The support for prudent siting in the Wadden region came as a surprise to the opponents within the WV. Many had expected differences in opinion between those actually living in the north of the country and those further away from the Wadden region. As usual, common sense dictated a NIMBY-ist response, with members living near the Waddensea opposing wind turbines more than those further away. However, there was no relation between support for wind power and living near the Wadden region. This conforms to the previously described role of NIMBY-ism in public acceptance of wind power.

In this survey, the assessment of the degree to which wind turbines would spoil the landscape in the Wadden region was also the strongest reason to oppose to further wind turbine developments. Although, the shallows are very important to large numbers of birds, this remained a secondary consideration only. The contribution of wind energy to slowing the greenhouse effect was totally insignificant. This indicates that the choice between sustainable energy and ecological values is not really a dilemma for the members. They simply assess the applicability and acceptability of wind turbines in terms of visual intrusion and the consequences for the chosen location. From that point of view, most WV-members think that even in a sensitive area like the Wadden, suitable sites will exist for wind turbines. Therefore, the most important question for members is which sites are acceptable.

To investigate this point, the respondents were presented with a list of 19 options. About half of these were rejected by a majority, some due to their location in nature reserves (only 2% found these a 'good location'), the dunes along the North Sea coast (4% 'good') and off-shore in the Waddensea (6% 'good'). Other examples of poor siting were recreational areas and locations near dwelling mounds, which are important cultural relics (70% and 61% 'bad', respectively). However, some other locations were considered suitable places for wind turbines by about half the membership, and some by a clear majority. Obviously, industrial areas and military training grounds, both harshly criticised by the environmentalists, were found acceptable for wind turbines (2% and 15% 'bad'). Considerations about spoiling landscape and scenic values are hardly relevant for these areas. No relation was found with attitudes towards wind energy: both opponents and supporters displayed similar attitudes towards these locations. For the other locations, there is a slight tendency among the opponents to reject them. The majority of members that do not oppose turbines in the Wadden region, however, tend to view these locations as suitable sites. They offer many opportunities for providing large amounts of wind-power capacity. These locations are: young polders, dikes at the North Sea, agricultural areas, sites

alongside railways, roads and waterways, and at the *Afsluitdijk*, the large 32 km dike between the provinces of Friesland and North-Holland separating the Waddensea from the Ysselmeer [1].

The internal conflict within the WaddenVereniging reached a climax and a staff member was eventually fired. The WV adopted a new policy based on the survey. It accepted the establishment of wind-power facilities, particularly in industrial and harbour areas. Nevertheless, this is a very conservative interpretation compared to what the majority of the individual members of the WV would be willing to accept. The mission statement of the WV's recent campaign "The other side of the Shallow" states that, "The scenery may not be lost yet, but the threat is drawing ever nearer: advancing greenhouses and new housing developments, gas drillings, and wind turbines". Hence, the organisation remains reluctant, instead of co-operative, in selecting suitable and acceptable locations.

Institutional factors lie at the heart of this reluctance. Within the context of everyday Dutch physical planning practice, stakeholders tend to assume conservative standpoints for legal-strategic reasons. Otherwise, they would feel as if they were relinquishing precious bargaining power in the decision-making process. Therefore, the WV acts more conservative than its members would appreciate. Consequently, the board of the WV still objects wind power developments and initiates legal action in cases where a majority of the members thinks turbines are acceptable. Since the new policy was formulated, they have continued to oppose sites, even in a case of siting turbines in a small industrial area on the island of Texel. The reluctant policy of environmental organisations is inspired by the top-down style in which wind-power projects are usually planned in the Netherlands [29]. Mostly projects are planned first and third party acceptance is requested later, according to the *decide-announce-defend* model. This practise tends to offend other parties and turns out to be destructive for achieving wind-power capacity.

9. Conclusion and discussion: the significance of institutional arrangements

The stagnating implementation of wind energy in the Netherlands and the reticent position of the WaddenVereniging in the face of the more accommodating attitude of its members, both are examples of the crucial impact of institutional arrangements. Institutional constraints are more important than public acceptance. It should be noted that the significance of the institutional component in wind power development is not exceptional, it exists in all environmentally relevant policy domains [25]. Institutional arrangements in the waste sector, for example, create conditions that generate impediments for effective waste reduction [9]. Furthermore, the significance of institutional factors will not be limited to wind power. This will certainly appear to be important for the implementation of other renewable sources as well [24].

The question of whether or not public acceptance is a relevant factor in successful siting can only be answered from this perspective. What is really needed

for better implementation rates and improved development of wind power and other renewables, is to build up *institutional capital*. Healey [7] maintains that we may create such institutional capital when engaging in sustainable spatial planning in open societies. Institutional capital has three dimensions: knowledge resources, relational resources, and the capacity for mobilisation. All three dimensions are bolstered by collaborative approaches to planning. A collaborative style in siting renewable energy infrastructure as well will probably be more effective than top–down planning. Strong public support is not sufficient for the development of wind-power capacity, but it will contribute favourably to siting policy. The problem is that other institutional arrangements may not be so favourable. Policy actors and wind-power developers should direct themselves towards building up institutional capital for wind power and other renewable resources, instead of complaining about public attitudes. This implies that more open planning practises are needed. These can only emerge from reducing the arrogance of utilities, wind power developers, and public bodies involved.

References

[1] Beukema-Siebenga H, Alles J, Revier H, Wolsink M. Vechten tegen windmolens. Groningen University, NL, 1998.
[2] Bosley P, Bosley K. Public acceptability of California's wind energy developments: three studies. Wind Engineering 1988;12(5):311–8.
[3] deBruin JA, deJong P, Korsten AFA, vanZanten WPC. Grote projecten Besluitvorming en management. Samsom HD Tjeenk Willink, Alphen aan den Rijn, 1996.
[4] Carlman I. Public opinion on the use of wind power in Sweden. In: European Wind Energy Conference, Rome. vol. 2. 1986. p. 569–73.
[5] Easterling D. Fair rules for siting a high-level nuclear waste repository. J of Policy Analysis and Management 1992;11(3):442–75.
[6] Freudenburg WR, Pastor SK. NIMBYS and LULUs: stalking the syndromes. J of Social Issues 1992;48(4):39–61.
[7] Healey P. Building institutional capacity through collaborative approaches to urban planning. Environment and Planning A 1998;30:1531–46.
[8] Hunter S, Leyden KM. Beyond NIMBY: explaining opposition to hazardous waste facilities. Policy Studies Journal 1995;23(4):601–19.
[9] deJong P, Wolsink M. The structure of the Dutch waste sector and impediments for waste reduction. Waste Management & Research 1997;15(6):641–58.
[10] Krohn S, Damborg S. On public attitudes towards wind power. Renewable Energy 1999;16(1–4):954–60.
[11] Lake RW. Rethinking NIMBY. J of the American Planning Association 1993;59(1):87–93.
[12] Lee TR, Wren BA, Hickman ME. Public responses to the siting and operation of wind turbines. In: European Wind Energy Conference, Glasgow. vol. 1. 1989. p. 434–8.
[13] Luloff AE, Albrecht SL, Bourke S. NIMBY and the hazardous and toxic waste siting dilemma: the need for concept clarification. Society and Natural Resources 1998;11(1):81–9.
[14] O'Hare M. 'Not on MY Block you don't': facility siting and the strategic importance of compensation. Public Policy 1977;25(4):407–58.
[15] O'Hare M, Bacow L, Sanderson D. Facility siting and public opposition. New York: Van Nostrand Reinhold, 1983.
[16] Pendall R. Opposition to housing: NIMBY and beyond. Urban Affairs Review 1999;35(1):112–36.

[17] Rehfeldt K. Windenergienützung in der Bundesrepublik Deutschland — stand 31.12.1998. DEWI Magazin 1999;14:6–22.
[18] Repper J, Brooker C. Public attitudes towards mental health facilities in the community. Health and Social Care in the Community 1996;4(5):290–9.
[19] Rosa EA, Freudenburg WR. The historical development of public reactions to nuclear power: implications for nuclear waste policy. In: Dunlap RE, Kraft ME, Rosa EA, editors. Public reactions to nuclear waste: citizens' views of repository siting. Durham: Duke University Press, 1993. p. 33–63.
[20] Slingerland S. Energy conservation electricity sector liberalisation. Ph.D. thesis. University of Amsterdam, 1999.
[21] Tellegen E, Wolsink M. Society and its environment: an introduction. Amsterdam: Gordon and Breach, 1998.
[22] Thayer RL, Hansen H. Wind on the land: renewable energy and pastoral scenery vie for dominance in the siting of wind energy developments. Landscape Architecture 1988;78(2):69–73.
[23] Varley MJ, Davies TD, Bentham CG, Palutikof JP. Local attitudes to three existing wind turbine sites in the UK. In: Swift Hook DT, editor. Wind energy and the environment. London: Peter Peregrinus, 1988. p. 148–59.
[24] Walker G. Renewable energy and the public. Land Use Policy 1995;12(1):49–59.
[25] Weale A. The new politics of pollution. Manchester, UK: Manchester University Press, 1992.
[26] Wolsink M. Attitudes and expectancies about wind turbines and wind farms. Wind Engineering 1989;13(4):196–206.
[27] Wolsink M. Publicity about wind energy and turbine siting: analysis of newspaper content. In: Smulders P, van Hulle F, Dragt J, editors. Wind energy: technology and implementation. Amsterdam: Elsevier, 1991. p. 931–5.
[28] Wolsink M. Entanglement of interests and motives: assumptions behind the NIMBY-theory on facility siting. Urban Studies 1994;31(6):851–66.
[29] Wolsink M. Dutch wind power policy: stagnating implementation of renewables. Energy Policy 1996;24(12):1079–88.