

## Summary

### **Empowering wind power**

#### ***On social and institutional conditions affecting the performance of entrepreneurs in the wind power supply market in the Netherlands***

This dissertation analyses institutional and social conditions that promote or discourage the implementation of renewable electricity technologies and the application of suitable policy instruments. It focuses on wind energy for electricity generation, analysing the evolution of the wind power supply market in the Netherlands. We analysed different kind of wind power entrepreneurs, their capacity to implement wind energy and the social and institutional conditions that affected their investments over the period 1989-2004. Central in the analyses are the institutional regulatory dimension and the social context as explanatory variables for the emergence and performance of these wind power entrepreneurs. Special attention is given to the liberalisation of the electricity market.

The following core research question has been addressed in this study:

*How and to what extent have social and institutional conditions affected the emergence and performance of wind power entrepreneurs in the wind power supply market in the Netherlands, and what lessons can be learned for future wind power policy?*

#### ***Analytical perspective and the concept of implementation capacity***

To realise a shift towards renewable electricity in a liberalised electricity market dominated by fossil fuel electricity generation, it is vital to understand the conditions that prompt entrepreneurs to invest in wind power projects and the conditions that determine the chance of success if these entrepreneurs do implement and exploit their projects. Our analytical perspective to study investment behaviour of wind power entrepreneurs and their capacity to implement wind energy can be referred to as the 'new institutional perspective' and is described in chapter 2. It focuses on the interaction between the behaviour and preferences of the individual actors on the one hand and the opportunities and constraints embedded in the institutional context in which they operate on the other hand. Precisely this interplay is at the heart of our analysis. We used this new institutional perspective to develop an operational research design that enabled us to analyse the dynamics of the wind power supply market, the role of wind power entrepreneurs, their characteristics and performance and the role of governmental steering.

The actual results of investment behaviour, in terms of the amount of wind power capacity actually implemented, has been analysed using the concept of *implementation capacity* (IC). The concept of IC is used as a qualitative variable, which enabled us to describe and explain differences over time in the performances of different types of entrepreneurs. We assumed that the IC is determined by the sum of the relevant economic, technical, institutional and social conditions and mutual interdependencies. These conditions affect the decisions made by entrepreneurs on investments in wind power and determine the opportunities for entrepreneurs to actually implement wind power projects. Every type of condition is necessary but not in itself sufficient for implementation. To analyse (changes in) implementation capacity, our research specifically focused on two groups of conditions and their interdependencies.

The first group of conditions is the group of social conditions: the interactive nature of the preferences and behaviour of wind power entrepreneurs and other stakeholders involved in wind power implementation.

The second group of conditions is the group of institutional conditions: the constellation of rules that structure the interactive behaviour of actors and determine the opportunities and constraints for wind power entrepreneurs.

Third, our research focuses on the interdependencies between these institutional and social conditions. We focused on changes in institutional conditions and on the consequences of these changes for investment behaviour and the possibility to implement wind turbines.

### ***Actors on the Dutch electricity market and in wind power supply***

Chapter 3 presents a short history of the roles and positions of actors on the electricity market. In addressing the positions of these main categories of actors and their essential relationships, special attention is paid to the implementation of wind power generation projects.

The various groups of wind power entrepreneurs have to deal with developments in (inter)national electricity policy. They also have to deal with developments in other policy fields, such as land use, the environment and nature conservation. These policies and instruments from different policy fields converge on the operational level of implementation, and constitute the institutional framework in which wind power entrepreneurs and other stakeholders involved in wind power implementation operate. These institutional conditions are described.

The chapter also provides a quantitative analysis of the development of the wind power supply market in terms of projects, turbines and capacity installed by different entrepreneurial groups over the period 1989 up to 2004. Finally, chapter 3 distinguishes three successive market periods for wind power supply based on changes in institutional conditions, on changes in relationships between the main categories of actors on the electricity market and on the patterns of implementation by the main categories of wind power entrepreneurs. These market periods are *Monopoly powers (1989-1995)*, *Interbellum (1995-1996)* and *Free market (1998-2004)*.

### **The wind power supply market**

As a first characteristic we have seen that the emergence of a wind power supply market in the Netherlands has been the work of four different types of wind power entrepreneurs:

- 1 *Small private investors* (mainly farmers): Wind power exploitation is a supplementary income for this entrepreneurial group. Their core business lies outside the energy sector.
- 2 *Electricity sector* (energy distributors): Wind power exploitation is a small but growing business component for these companies. Their core business is producing and selling a portfolio of (renewable) energy sources.
- 3 *Wind cooperatives*: For this entrepreneurial group wind power exploitation is not a means of making money but a means of working towards a sustainable society.
- 4 *New independent wind power producers*: (NIWP) Wind power exploitation is a (new) part of their core business, which is most likely related to the renewable energy sector.

Each of these types of entrepreneurs has been active since the end of the 1980s, but they followed very different development paths and performed differently throughout the years. A second characteristic of the wind power supply market is the shift in the

relative importance of these four entrepreneurial groups. Energy distributors dominated the market at the beginning of the 1990s (*Monopoly power 1989-1995*), but their role has declined in importance in the course of the years. Since the end of the 1990s (*Free market 1998-2004*), small private investors have caught up with – and in 2002 even surpassed – energy distributors in terms of capacity installed over the last 15 years. Third, entrepreneurial groups, that restricted their activities to a certain region, have dominated the market until the end of the 1990s. In fact, new independent wind power producers were the first entrepreneurs who competed for locations in the entire country. A final characteristic is the fragmented character of the wind power supply branch representation. Three different branch organisations were created in the 1980s: a branch organisation for wind turbines manufacturers, a wind energy association for energy distributors and a wind union for private wind power producers. This fragmented and antagonistic character of the market prevented a homogeneous protection of their common interests.

### ***Case study research***

Chapters 4 to 7 include case studies on the implementation capacity of the four entrepreneurial groups in each of the three market periods. The case studies led to conclusions about the way in which social and institutional conditions affected the implementation capacity of different types of entrepreneurs in each of the three market periods.

The case studies illustrate that the shaping of policies and planning of the electricity sector at the national level has affected the development of the wind power supply market. New wind power entrepreneurs emerged and shifts occurred in market shares of different entrepreneurial groups. However, not only national level strategic electricity policies and instruments, which are developed to stimulate wind power production, are relevant for wind power implementation, but also policies and instruments in other fields such as land use policy and law, environmental policy and law and nature conservation policy and law.

The case studies show that positive national social and institutional conditions must be complemented with entrepreneurial capacities, such as expertise and resources, and a process of local capacity building. Local capacity building is a temporary process in which the influence of social conditions prevails. Local social relations like authority relations and relations of trust, facilitate coordinated actions, add to the scope and structure of knowledge and to the bargaining position of investors on the market. Finally the case studies show that the implementation capacity is a temporary capacity. Positive social and institutional conditions at a certain moment in time, with a corresponding high implementation capacity for a certain type of entrepreneur, must be comprehended as a moment, wherein not only national conditions are positive, but wherein also the required local capacities are fulfilled.

### ***Validation workshops***

The results of the case studies have been discussed in three validation workshops with stakeholders involved in wind power implementation in the Netherlands. Two of the workshops involved different types of wind power entrepreneurs (market), and one involved provincial and local authority civil servants (government). In the workshops we analysed the way in which wind power entrepreneurs and local civil servants experience social and institutional conditions in the operational process of realising wind power projects, and their perceptions of policy implications. From the analysis it was concluded that wind power entrepreneurs and civil servants share the opinion that

the institutionally embedded power position of local politicians and the sensitiveness of the local political debate for the popular opinion are most critical for project realisation. With regard to the proposed solutions, both groups differed in their approach. Entrepreneurs stressed procedural solutions, such as limiting the possibilities to appeal, reducing the complexity of the formal authorisation trajectory and using a top down planning approach. Civil servants stressed more strategic solutions, such as providing more public information on the necessity of wind power for local politicians and citizens, and community involvement in planning processes.

### ***Institutional and social conditions***

The case studies on the entrepreneurial groups show that the shifts in importance between entrepreneurial groups, the differences in development paths and performances, have to do with differences in entrepreneurial characteristics and with changes in national and local social and institutional conditions.

With regard to institutional conditions, we analysed the constellation of rules structuring the interactive behaviour of actors and determining the opportunities and constraints for wind power. The formal institutional framework (formal rules, procedures and instruments) comprises (1) the rules that determine positions of actors on the electricity market or the market structure, (2) financial preconditions and (3) preconditions for implementation or planning and permitting procedures.

The major institutional changes in each of the three clusters have been:

1. A transition from a monopolistic market structure, in which strategic energy policies facilitated energy distributors, to a liberalised market structure, in which the bargaining powers of private producers increased.
2. A transition from a subsidy incentive system with a central role for energy distributors in financial support, to a fiscal incentive system, characterised by a very profitable investment climate just as accessible for private power producers as for energy distributors.
3. Though the authorisation trajectory is fragmented and complex of character, the planning and permitting procedures remained relatively stable throughout the years. The only important institutional change was the demand for clustering, which was comparatively speaking more of a disadvantage for small private investors and wind cooperatives than for energy distributors and new independent wind power producers.

With regard to social conditions, we analysed interactive nature of the preferences and behaviour of wind power entrepreneurs and other stakeholders involved in wind power implementation. The constellation of social conditions comprises (1) characteristics of the entrepreneurial groups, (2) the social constellation of stakeholders and their perceptions and (3) the interaction between wind power entrepreneurs and other stakeholders involved.

1. Entrepreneurial characteristics partly explain the differences in performance. The most important distinctive characteristics are the motivation to invest, the degree of professionalism, and the position of wind energy as investment option.
2. The social constellation of stakeholders with free access to the local decision making process brings about barriers in the local political process. A confrontation of ideas about the necessity and (local) costs of wind power dominates the local political debate. This confrontation of ideas is slippery for entrepreneurs.

3. Interactions between wind power entrepreneurs and other stakeholders involved, both on the local and national level, determine their opportunities. Positive local capacities, such as a collaborative approach by local authorities, collaborative arrangements between local entrepreneurs and social coherence with regard to wind energy, are important social conditions for the implementation capacity.

### ***Interdependencies between social and institutional conditions***

The isolation of institutional and social conditions does not do justice to the empirical observations as described in each of the case studies. We continuously saw interplay between social and institutional conditions. Three important observations can be drawn from our study:

1. The mix of institutional conditions can either stimulate or constrain the implementation capacity. However, what would be a good mix of conditions relates to the characteristics of an entrepreneurial group.
2. Social conditions can weaken, strengthen, or neutralise negative or positive institutional conditions, and vice versa. An institutional condition or structure is not a bottleneck in itself. It is the way stakeholders deal with this institutional structure that clarifies implementation.
3. There is a continuous dynamic in social and institutional conditions at the local, provincial and national level. This dynamic for the larger part proves to be an undirected process.

### ***Governance of wind power***

Looking at the development of social and institutional conditions and the role of governmental steering over the last 15 years, we notice that governmental policy making has always been based on a very specific interpretation of reality. The renewable energy policy theory mainly comprised (a) ideas about the market structure and the proper type of investor and (b) ideas about the proper type of financial incentive system. Clearly, the government did not go deeply into the question which type of entrepreneur could become a driving force in the market. This, however, was an important question to address, since the market did not comprise a homogeneous set of actors or entrepreneurs. For long renewable energy policy facilitated only one type of investor: the energy distributors. It would be the end of the 1990s before the bargaining power on the market became more balanced between different types of entrepreneurs. This change in power positions occurred due to the broader process of liberalisation, which was induced externally by European developments. The process of liberalisation and the subsequent changes in the wind power market were completely opposite to the original renewable energy policy theory.

### ***Lessons for future wind power policy***

Our *first recommendation* is to always take the heterogeneity of the market as the central point of departure in the renewable energy policy theory. Effective policy making on the implementation of wind power should start with identifying the potential of different market players and their characteristics and use this analysis to design strategies that accommodate the potentials of the most motivated groups. Our *second recommendation* is to explicitly test the renewable energy policy theory with regard to gaps or tensions in steering at different levels of government. A specific institutional instrument or a specific argumentation at the national level proves to be useless if it contradicts local social conditions.

Our *third recommendation* is that at the national level a clearly communicated and broadly supported commitment to wind power implementation should be established. The renewable energy policy theory should be a co-product of different ministries and other government authorities, and a coherent view in line with this policy theory should be actively shown to the public, the market and to other authorities. Our *fourth recommendation* is that the use of ex ante potential studies stressing economic and technical conditions should be supplemented with *social potential studies* in order to design ‘smart policies’. Smart policies explicitly include ideas about social and institutional conditions on different levels of government. Finally our *fifth recommendation* is to secure a stable investment climate for the target groups of wind power policy as identified by social potential studies.

### ***Using the implementation capacity concept***

For researching a complex and dynamic reality, the concept turned out to be useful. We adopted a mix of methods to establish the implementation capacity for different types of investors over the long term. This long-term perspective enabled us to analyse long-term dynamics in the market. We effectively showed that a continuous focus on implementation in its social and institutional context is essential for coping with the challenges for an accelerated implementation of renewable energy sources. We demonstrated that the changing mix of social and institutional conditions dictated the degree to which the wind power market emerged and especially the way it developed in terms of entrepreneurial groups. On the basis of these findings we recommend the use of our analytical perspective and the implementation capacity concept in a variety of social potential studies. The implementation capacity concept may be used for cross-national comparison between markets, and for analysing market developments of other renewable energy technologies. These social potential studies can serve to systematically typify important social and institutional conditions on different levels of government in order to design smart policies. Such smart policies will be needed to achieve the substantial goal of a transition to a non fossil fuel based energy infrastructure, which is required for addressing the climate impacts of fossil fuel based economies and addressing the geo-political impacts of depleting resources. A social science perspective will be indispensable in this.