Community ownership: the best way forward for UK Wind Power?

by

Mike Stamford
Community ownership: the best way forward for UK Wind Power?

by

Mike Stamford

Thesis presented in part-fulfilment of the degree of Master of Science in accordance with the regulations of the University of East Anglia

School of Environmental Sciences
University of East Anglia
Norwich
NR4 7TJ August 2004

© 2004 Mike Stamford

® This copy of the dissertation has been supplied on the condition that anyone who consults it, is understood to recognise that its copyright rests with the author and that no quotation from the dissertation, nor any information derived therefrom, may be published without the author’s prior written consent. Moreover it is supplied on the understanding that it represents an internal University document and that neither the University nor the Author are responsible for the factual or interpretative correctness of the dissertation.

Michael C R Stamford August 2004
DEDICATION

To my wife, Melody: without her, none of my achievements in life would have been possible. And to my daughter, Tammy, my proudest achievement of all.


ABSTRACT

This study evaluated whether community ownership of wind power schemes could significantly aid the development of UK Wind Power, or whether alternative factors were more influential. Through literature review, semi-structured interview, case study analysis and questionnaire survey, it examined the measures and structures in three European Union Countries: firstly, in Denmark and Germany, where community ownership had been actively encouraged since 1990, and, secondly, in the United Kingdom (UK), where community ownership had not been actively encouraged. It then assessed the significance of these factors in relation to the future development of UK wind power. Although the UK is now making modest progress in wind power installation, with both consents for onshore schemes recently accelerated and ambitious offshore plans under development, the German and Danish Case Studies underscored the need to further stimulate the development of wind power schemes throughout the UK. The study established that the models of community ownership were effective for advancing the development of the nation’s wind power, but that the models were not enough on their own. Denmark and Germany had developed their wind power capabilities by nurturing drivers of a legal, fiscal, financial, technical, manufacturing and public information nature. These drivers had fuelled the models of community ownership and helped them to flourish and produced a range of benefits which had the potential to enhance the development of UK wind power.
ACKNOWLEDGEMENTS

An interesting fact came to light during the preparation of this dissertation. Problems that remain persistently insoluble should always be suspected as questions asked in the wrong way. Or as Winnie the Pooh put it,

“When you are a Bear of VeryLittle Brain, and you think of things, you find sometimes that a Thing which seemed very Thingish inside you is quite different when it gets out into the open and has other people looking at it.” A.A. Milne, (The House at Pooh Corner).

My sincere thanks go to my Course Supervisor Matt Cashmore, to Jon Gurr and Dick Cobb and particularly my Disseration Supervisor Alan Bond for examining the thingish things inside me and knocking them into shape, once out into the open: this dissertation has benefited immeasurably from all their insights and experiences as professional academics. Being gently knocked off your perch is a tremendously useful experience when you’re trying to write a dissertation: dusting yourself down and getting back on the perch is an even more valuable experience.

I am also indebted to my fellow students on the MSc EIAAMS course whose cultural diversity, humour and friendship made the hard groundwork needed to be in a position to even write this dissertation, a labour of love. In recalling our shared experiences I am reminded of the words of Theodore Roosevelt who for me has defined the Herculean efforts made by my colleagues, to achieve their MSc Degrees.

“It is not the critic who counts, not the man who points out how the strong man stumbled or where the doer of deeds could have done better. The credit belongs to the man who is actually in the arena; whose face is marred by dust and sweat and blood; who strives valiantly; who errs and comes short, again and again; who knows the great enthusiasms, the great devotions, and spends himself in a worthy cause; who, at best knows in the end the triumph of high achievement, and who, at worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who know neither victory nor defeat.”

Theodore Roosevelt (1858-1919)

Further thanks go to Simon Gerrard (UEA), David Toke (Birmingham University), Jim Platts (Cambridge University), Thomas Ballantine Dykes (Barrister-at-Law), Rob Hannington and a whole range of people that should have been thanked, but would have caused me to go beyond my word limit.

Finally, I am grateful to the Carbon reduction Team at UEA, in particular Bruce Tofield and Sue Crothers who enabled me to regularly interact with village communities and Parish Councils in Norfolk, throughout the course of this study, and listen closely to the views of the people on the ground.

Michael C R Stamford

August 2004
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>1</td>
</tr>
<tr>
<td>Title Page</td>
<td>2</td>
</tr>
<tr>
<td>Dedication</td>
<td>3</td>
</tr>
<tr>
<td>Abstract</td>
<td>4</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>5</td>
</tr>
<tr>
<td>Contents</td>
<td>6</td>
</tr>
<tr>
<td>List of Figures</td>
<td>12</td>
</tr>
<tr>
<td>List of Tables</td>
<td>12</td>
</tr>
<tr>
<td>List of Abbreviations</td>
<td>13</td>
</tr>
<tr>
<td><strong>1. Introduction</strong></td>
<td><strong>14</strong></td>
</tr>
<tr>
<td>1.1 National and global energy use</td>
<td>14</td>
</tr>
<tr>
<td>1.2 Problems of global warming and climate change</td>
<td>16</td>
</tr>
<tr>
<td>1.3 Historical roots of wind power</td>
<td>17</td>
</tr>
<tr>
<td>1.4 UK strategic policy framework</td>
<td>18</td>
</tr>
<tr>
<td>1.5 Structure of study</td>
<td>19</td>
</tr>
<tr>
<td>1.6 Definitions of wind and wind power</td>
<td>20</td>
</tr>
<tr>
<td>1.7 Definition of community</td>
<td>20</td>
</tr>
<tr>
<td>1.8 Assumptions</td>
<td>21</td>
</tr>
<tr>
<td>1.9 Overall aim</td>
<td>21</td>
</tr>
<tr>
<td>1.10 Specific objectives</td>
<td>22</td>
</tr>
</tbody>
</table>

Michael C R Stamford

- 6 -

August 2004
Community ownership: the best way ahead for UK Windpower?

1.11 Value of the study.............................................. 22

2. Methodology......................................................... 24

2.1 Use of Questionnaire........................................... 24

2.1.1 Questionnaire design...................................... 24

2.1.2 Questionnaire distribution.............................. 25

2.1.3 Questionnaire responses................................. 25

2.2 Interviews......................................................... 26

2.3 Community meetings....................................... 27

2.4 Data analysis..................................................... 28

2.5 Summary.......................................................... 28

Table 2: Wind power installed in Europe by Autumn 2002....... 29

3. Community ownership in Denmark and Germany

3.1 DENMARK

3.2 Why select Denmark for study?............................. 30

3.3 Danish community ownership models....................... 31

3.4 Operating the Danish partnerships......................... 32

3.5 Financing the Danish partnerships......................... 33

3.5.1 Danish capital support................................... 33

3.5.2 Danish bank borrowing.................................. 34

3.5.3 Danish tax advantages.................................. 34

3.5.4 Danish financial liability................................ 35
Community ownership: the best way ahead for UK Windpower?

3.5.5 Danish financial liquidity

3.5.6 Danish feed-in laws

3.5.7 Danish environmental subsidies

3.6 GERMANY

3.6.1 Why select Germany for study

3.6.2 German community ownership models

3.6.3 Operating the GmbH & Co.KG

3.6.4 German financing

3.6.5 German taxation

3.6.6 German liability

3.6.7 German liquidity

3.7 REST OF THE WORLD OMITTED

3.7.2 Why was study narrowed

3.8 CASE STUDIES IN DENMARK

3.8.2 Case Study – Avedore Holme

3.8.3 Case Study – Visberg

3.8.4 Case Study – Muspyt

3.8.5 Case Study - Middelgrunden (Offshore)

3.9 CONCLUSIONS FROM DENMARK

3.10 CASE STUDIES IN GERMANY

3.10.2 Case Study – Pellworm

3.10.3 Case Study – Lubke-Koog

3.10.4 Case Study – Reusen-Koog
Community ownership: the best way ahead for UK Windpower?

3.10.5 Case Study- Melle………………………… 48

3.11 CONCLUSIONS FROM GERMANY…………… 49

4. Community ownership schemes in the United Kingdom (UK)…….. 51

4.1 IMPORTANCE OF UK COMMUNITY OWNERSHIP….. 51

4.1.1 UK Background and wind development trends…….. 51

4.2.1 UK Community ownership models………………. 52

4.2.2 Financing UK community ownership models……… 53

4.2.3 The industrial and provident society – relevance…… 53

4.2.4 The industria. And provident society – detail……… 54

4.2.5 The public limited company (plc) – relevance……. 54

4.2.6 Financing UK community owned ventures………… 55

4.2.7 UK tax advantages ……………………………… 57

4.2.8 UK financial liability (IPS)……………………… 58

4.2.9 UK financial liquidity (IPS)……………………… 58

4.3.1 UK investment fund –led schemes (plc)…………….. 58

4.3.2 Operating investment-led schemes (plc)…………… 59

4.3.3 UK plc financing…………………………………. 60

4.3.4 UK tax advantages for plc’s……………………. 61

4.3.5 UK liability for plc’s……………………………. 61

4.3.6 UK liquidity in plc’s……………………………. 61

4.3.7 UK plc’s future with community-owned projects…. 62

4.4 CASE STUDIES IN UK
5. Significance of factors discovered

5.1 THREE MODELS OF COMMUNITY OWNERSHIP

5.1.1 A range of different models

5.1.2 Developer-led schemes with tangible benefit

5.1.3 Developer-led schemes with little or no benefit

5.1.4 Developer-led schemes where developer takes risk

5.1.5 Developer-led schemes with no direct financial benefit

5.2.1 Community-led, community-owned schemes

5.3 SIGNIFICANCE OF EUROPEAN EXPERIENCE TO UK

5.4 Community-led, Community-owned models (CLCO)

5.5 Community-led, community-owned paradox

5.6 Developer-led, community-owned (DLCO)

5.7 Community investment in DLCO Projects

5.8 Investment fund-led, community-owned (IFLCO)

5.9 Green Funds that follow the IFLCO Model

5.10 Combined impact of the community-owned models

5.11 RANKING THE THREE MODELS

5.12 CRITICAL SUCCESS FACTORS

5.12.1 Five drivers

5.12.2 Feed in tariffs/laws

5.12.3 Significant tax advantages

5.12.4 Standardised grid connection agreements

5.12.5 Incrementally improving manufacturing base
5.12.6 Familiarity with co-operative ownership structures… 80

5.13 BENEFITS OF COMMUNITY OWNERSHIP………………….. 81

5.13.1 Increased public acceptance…………………………. 81

5.13.2 Distributed generation benefits……………………… 82

5.13.3 Enhanced turbine manufacturing environment……… 82

5.13.4 New and cheaper source of capital………………….. 83

6. Conclusions………………………………………………………… 84

7. Recommendations……………………………………………… 89

8. References………………………………………………………… 90

9. Appendices………………………………………………………… 95

10. Appendix I Interview transcript exemplar…………………. 96

11. Appendix II Questionnaire sent out to the village of Frettenham 97

12. Appendix III Case Study – Middelgrunden, Copenhagen…… 98

13. Figures 1 – 6………………………………………………………… 101-106
LIST OF FIGURES

Figure 1 – Polar ice-cap in 1979 (picture taken by NASA space satellite) is the Top picture: Polar ice-cap in 2001 (picture taken by NASA space satellite) is the Bottom picture.

Figure 2 – Traditional 18th Century Windmill near Hamburg in Germany.

Figure 3 – USA Wind power capacity. Source: US Department of Energy.

Figure 4 – Map showing number of wind turbine deployments in Germany.

Figure 5 – Picture of Pantperthog community who had bought shares in the Vestas 75 kw wind turbine (2001).

Figure 6 – Picture showing size and scale of the modern large turbine.

Figure 7 – A proposed model to help find the best way forward for UK wind power (please see page 88 for Figure 7)

LIST OF TABLES

Table 1 – Global primary energy consumption in 2000, by source (World Energy Council).

Table 2 – Wind power installed in Europe by Autumn 2002 in MW (Megawatts). Source: EWEA.

Table 3 – Renewables policy mix in Denmark, Germany and UK in 2003. (Adapted from Bechberger and Reiche, 2003).
LIST OF ABBREVIATIONS

AONB  Area of Natural Beauty
BWEA  British Wind Energy Association
CCL  Climate Change Levy
DEFRA  Department of Environment, Food and Rural Affairs
DTI  Department of Trade and Industry
DWIA  Danish Wind Industry Association
EfW  Energy from Waste
EGWG  Embedded Generation Working Group
EIA  Environmental Impact Assessment
EU  European Union
EWEA  European Wind Energy Association
FFL  Fossil Fuel Levy
GE  Green Electricity
GWh  Giga Watt Hours (1 Giga Watt = 1,000 Mega Watts)
HMSO  Her Majesty’s Stationery Office
IPCC  Inter-Governmental Panel on Climate Change
IM  Institute of Manufacturing, Cambridge University
MoD  Ministry of Defence
MWh  Mega Watt Hours (1 Mega Watt = 1,000 Kilo Watts)
NETA  New Electricity Trading Arrangements
NIMBY  Not in my back yard (Colloquial expression).
NFFO  Non-Fossil Fuel Obligation
OfGEM  Office of Gas and Electricity Markets
PIU  Performance Innovation Unit (Cabinet Office)
p/kWh  Pence per Kilo Watt hour
PPA  Power Purchase Agreement
PPG  Planning Policy Guidance
PPS  Planning Policy Statement
RCEP  Royal Commission on Environmental Pollution
RO  Renewables Obligation
ROC  Renewables Obligation Certificate
UEA  University of East Anglia
UK  United Kingdom
WEC  World Energy Council
CHAPTER 1

INTRODUCTION

1.1 National and Global Energy Use

To put wind power and the UK’s national energy use in context,

the energy incident on Earth from the sun amounts to about 180,000 thousand million
million watts (or 18,000 Terawatts). This is about 15,000 times the world’s average
energy use of about 12 Terawatts. As much energy arrives at the Earth from the sun in
40 minutes as we can use in a whole year. So providing we can harness it satisfactorily
and economically, there is plenty of renewable energy coming in from the sun to provide
for all demands human society can conceivably make (Houghton, 2002)

Examining the best ways of harnessing the proportion of renewable energy, coming in
from the sun, that is converted to wind, is the central driver of this study. Energy is a
vitally important feature of our daily lives, but there is strong evidence to show that we
are not exploiting this renewable energy to our best advantage. The study also recognises
that

Strictly, energy is never ‘created’ nor ‘consumed’, it is just ‘converted’ from one form to
another. The term ‘power’ is used to describe the conversion capacity of any specific
device, i.e. the rate at which it can convert energy from one form or another. (Elliott, 2003).

According to the World Energy Council ‘s website (http://www.worldenergy.org) only 2.1 per cent, of the world’s average energy use of 12 Terawatts per annum, was channelled through the new renewable sources route (which includes onshore and offshore wind power), in 2000. The full breakdown appears in Table 1 below.

Table 1: Global primary energy consumption in 2000, by source (World Energy Council)

<table>
<thead>
<tr>
<th>Global primary energy consumption in 2000, by source.</th>
<th>Percentage</th>
<th>Exhaustible/Renewable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>34.6%</td>
<td>Exhaustible</td>
</tr>
<tr>
<td>Coal</td>
<td>21.6%</td>
<td>Exhaustible</td>
</tr>
<tr>
<td>Gas</td>
<td>21.4%</td>
<td>Exhaustible</td>
</tr>
<tr>
<td>Biomass</td>
<td>11.3%</td>
<td>Renewable</td>
</tr>
<tr>
<td>Nuclear power</td>
<td>6.6%</td>
<td>Exhaustible</td>
</tr>
<tr>
<td>Hydropower</td>
<td>2.3%</td>
<td>Renewable</td>
</tr>
<tr>
<td>New renewables (including wind power)</td>
<td>2.1%</td>
<td>Renewable</td>
</tr>
</tbody>
</table>

On the face of it, the WEC figures could indicate that the subject area of wind power is relatively insignificant in statistical terms. However, it could also indicate that we are relying too heavily on exhaustible sources of energy and are not harnessing enough
renewable energy from the 18,000 TW daily input from the sun. Two point one per cent of 12 TW in the table above only equates to 0.25 Terawatts of renewable energy harnessed: a tiny proportion of what could be achieved. Furthermore, past trends of global energy consumption are not necessarily an accurate guide to what might happen next, to fuel availability and prices, or to patterns of energy consumption in the many rapidly changing sectors of energy use around the world (Elliott, 2003). Nor do they accurately assess the qualitative aspects of the problem: the danger of just counting instead of both counting and weighing, within a wider context is a very real one. In due course, as easily recoverable gas, coal and oil reserves begin to run out, fossil fuels will become more expensive enabling renewable sources such as wind power to compete more easily (Houghton, 2002). The UK Government’s 2003 Energy White Paper, recognises the growing significance and importance of UK wind power development and this study hopes to make a serious contribution to the debate by attempting to evaluate the best way ahead.

1.2 Problems of Global Warming and Climate Change

*Energy can no longer be thought of as a short-term, domestic issue. Climate change–largely caused by burning fossil fuels – threatens major consequences in the UK and worldwide* (Blair, 2003)

Scientists are now confident about the fact that global warming and climate change have occurred, and that they are, at least partly, due to human activities. (Figure 1 provides a
dramatic example of how much of the polar ice cap has melted in the space of 22 years). However, substantial uncertainty remains about just how great the warming will be and what will be the patterns of change in different parts of the world. Until the predictions improve to the point where they can be used as a clear guide to action, politicians and other decision-makers are faced with the need to weigh scientific uncertainty against the cost of the various actions which could be taken in response to the threat of climate change. Some action can be taken easily at relatively little cost (or even at a net saving) such as programmes to conserve and save energy, schemes to reduce deforestation and encouraging tree planting. Other actions such as a large shift to renewable energy sources which do not lead to significant carbon dioxide emissions, such as developing UK wind power, will be more resource intensive (adapted from Houghton, 2002) but still effective in contributing to the achievement of the UK Government’s Kyoto commitments.

1.3 Historical roots of Wind Power

Of course, energy from wind is not a new discovery and has been exploited through the millennia. Ancient communities in China, India and Persia used wind to pump up water and to mill grain (adapted from Andersen, 1998). In early mediaeval times windmills were a known technology throughout Europe, and the windmill remained the primary energy source until the arrival of the steam engine in the 18th century (adapted from Lomborg, 2003). In countries such as Denmark that did not have their own coal supply, the windmill continued to hold a central position in the production of energy even after the advent of steam (adapted from Lomborg, 2003). Please see figure 2.
Two hundred years ago windmills were a common feature of the European Landscape; for example, in 1800 there were over 10,000 working windmills in Britain. During the past few years, they have again become familiar on the skyline, especially in western Europe and in western North America......... they do not have the rustic elegance of the old windmills, but they are much more efficient (Houghton, 2002).

Wind power would seem to have had public acceptance for over 2,000 years. Nevertheless, the issues linked to public acceptance are dealt with later in Chapters five & six of this study.

1.4 UK Strategic Policy Framework

There is no way ahead for UK windpower, in any shape or form, unless it can achieve strategic fit with the UK institutional and policy framework. Previously it has not created the ideal environment for community ownership of windpower, but change seems to be on its way. The objectives of the UK Government’s strategic renewable energy policy are set out in the Energy White Paper of 2003. Government policy is now to stimulate the exploitation and development of renewable energy sources wherever they have prospects of being economically attractive and environmentally acceptable

The energy policy cites four goals:
Community ownership: the best way ahead for UK Windpower?

1. To put ourselves on a path to cut the UK’s carbon dioxide emissions – the main contributor to global warming – by some 60% by about 2050.

2. To maintain the reliability of energy supplies.

3. To promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve our productivity; and

4. To ensure that every home is adequately and affordably heated. (DTI Energy White Paper, 2003).

1.5 Structure of Study

This study comprises seven chapters. Chapter one briefly introduces UK wind power in the context of global energy use, global warming and UK strategic policy, before setting out the overall aim and the three specific objectives of the Study. Chapter two covers the methodology employed, covering the literature review, the questionnaire survey of a local community in Frettenham, Norfolk, and a series of semi-structured interviews with planning officers, academics and managers. Chapter three examines case studies in Denmark and Germany looking at how community ownership flourished in Europe and why it happened the way it did. Chapter four examines case studies in UK and efforts to deploy community-owned schemes. Chapter five then looks at the significance of the community-ownership drivers discovered in the Denmark and Germany analyses and examines whether or not they could be grafted on to the strategic policy framework in the UK. Chapter six then draws both specific conclusions and overall conclusions from the findings of the study and matches them up with the three major objectives set out in the
Introduction. Finally, Chapter seven makes recommendations for further research based on the model proposed in Chapter six.

1.6 Definitions of Wind and Wind Power

When solar radiation enters the earth’s atmosphere, because of the curvature of the earth, it warms different regions of the atmosphere to differing extents – most at the equator and least at the poles. Since air tends to flow from warmer to cooler regions, this causes what we call ‘winds’: it these air flows that are harnessed in windmills and wind turbines to produce wind power (Boyle et al., 2003).

1.7 Definition and explanation of Community

This study has used, as its corner-stone, Mitchell’s distinction between two types of communities relevant to wind power scheme ownership – ‘communities of locality’ and ‘communities of interest’. Both are included in the meaning of community ownership. Communities of locality are made up of people living in a certain geographical area, be it a small hamlet, village, town, county, or a densely populated city. Communities of interest are comprised of individuals living in many different communities of locality that nevertheless share a common interest (e.g., to promote the development of wind power). Either type of community can own a wind project. Residents of a village (i.e., a community of locality) in a windy area may decide to take advantage of their resource and band together to purchase and install one or more wind turbines. Likewise,
environmentally conscious investors located throughout an entire nation (i.e., a
community of interest) may pool their money in a centralized “wind fund” used to finance
new wind projects throughout the country. There is often considerable overlap and
interaction between these two types of communities: the community of interest (i.e.,
investors in The Triodos Renewable Energy Fund plc, formerly The Wind Fund plc.)
may identify a promising site, and then invite the community of locality (i.e., local
residents, some of whom may also be investors in The Triodos Renewable Energy Fund
plc, formerly The Wind Fund plc,) to share in the ownership of the project. (Mitchell,
1994). In fact, whether or not it joins in the ownership of the project, the community of
locality is almost always involved in a project at least indirectly, in the sense that it
controls the local planning process, and therefore the right to prevent a project from being
built. For this reason, communities of interest – as well as commercial developers – have
found it useful to involve the community of locality in a project as early as possible, and
one way to accomplish this is by offering ownership (Bolinger, 2001)

1.8 Assumptions

The Oxford English Dictionary defines community as a body of people but does not
specify numbers. This study has assumed, therefore, that a community consists of more
than one person.

1.9 Overall Aim
The overall aim of this research is to evaluate whether community ownership of wind power schemes could significantly aid the development of UK Wind Power, or whether alternative factors are more influential.

1.10 Specific Objectives

The specific objectives of the study are threefold:

(1) To report on the nature and role of Community Ownership of Wind Power Schemes in Denmark and Germany.

(2) To report on the nature and role of Community Ownership of Wind Power Schemes in the United Kingdom.

(3) To evaluate the significance of Community Ownership of Wind Power Schemes to the future development of UK Wind Power.

1.11 Value of the Study

This study is intended to expand knowledge and enlarge understanding of the role of the community in the future development of UK wind power. Firstly, it will further the general understanding of the current advantages and disadvantages of the Community Ownership approach to installing Wind Power schemes in the UK, Denmark and Germany. Secondly, it will help planning officers in UK County/District/Borough Councils enlarge their understanding of the suitability, acceptability and feasibility of
Community ownership: the best way ahead for UK Windpower?

Community Owned Wind Power Schemes, as they continually review their Planning Policy Guidance Documents in the light of the recent Planning Policy Statement 22. It is also hoped to give a European perspective to dealing with the challenges they face. Each Planning Officer interviewed, was keen to read a copy of the Study. Thirdly, it is hoped that the Study will provide interested Parish Councils and Local Communities in East Anglia with a greater understanding of renewable energy issues and give them greater confidence to explore further the issues surrounding community-owned wind power schemes. Several Parish Councils have expressed a particular wish to read a copy of the Study.
CHAPTER 2

METHODOLOGY

2.1 Questionnaires

It was vital for the study to generate representative data, at grass-roots, community level, because neither the semi-structured interviews with key, selected actors, nor the published secondary data reviewed, were fully representative of the cross-section of people in the communities on which the study had been designed to focus. The village of Frettenham in Norfolk was selected for study. Members of the Parish Council in Frettenham had approached the School of Environmental Sciences at the University of East Anglia (UEA) for advice on the possibilities of installing a Wind Turbine. The University had been approached because their independence was valued by the Frettenham Community. The village had approximately 300 households and so face-to-face interviews and telephone survey options were discounted in favour of a Questionnaire on Attitudes to Renewable Energy. The questionnaire was accompanied by a separate survey from the Carbon Reduction Team at the School of Environmental Sciences, UEA: a Carbon Audit Survey which concentrated mainly on Energy Efficiency.

2.1.1 Questionnaire design

The Questionnaire needed to address issues surrounding the public acceptance of wind power, but couched in an open a way as possible to avoid leading community members
towards an answer favoured or sought by the researcher. The Survey asked 10 questions which covered the subject areas of energy in general, renewable energy, community involvement in renewable energy schemes and whether or not villagers trusted/distrusted a wide range of stakeholders influencing and interacting in the fields of energy and renewable energy. The question probing most precisely the area of community ownership was placed mid-way through the sequence of questions at question 5.

2.1.2 Questionnaire distribution

Once preliminary discussions with the Parish Council had revealed that distribution of a questionnaire was an acceptable option, postal questionnaires were despatched to 300 households, who were asked to post them back ‘Freepost’ to UEA by 9 July 2004. The hope was that the Questionnaires would achieve a reasonable response rate and generate ample good quality data (Oppenheim, 1992). Questionnaires in the format shown at Appendix 2 were despatched to approximately 290 households in the village of Frettenham in Norfolk.

2.1.3 Questionnaire responses

A total of 29 were returned by 9 July 2004 providing a representative sample of approximately 10% of the community. Question 5 in the survey which covered the area of this study in most detail asked the following:
What is your level of interest in the idea of members of the Frettenham community having a future financial share in the sources of renewable energy at Frettenham?

The responses are shown on the Table below.

<table>
<thead>
<tr>
<th>Response</th>
<th>Number of replies</th>
<th>Percentage of total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very interested</td>
<td>10</td>
<td>36%</td>
</tr>
<tr>
<td>Fairly interested</td>
<td>12</td>
<td>43%</td>
</tr>
<tr>
<td>Not very interested</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Not interested at all</td>
<td>1</td>
<td>4%</td>
</tr>
<tr>
<td>No opinion</td>
<td>3</td>
<td>11%</td>
</tr>
</tbody>
</table>

2.2 Interviews

To supplement the Questionnaires a semi-structured interview style was used to give the interviewees a more active role in guiding the interview, meaning that the discussion is focused on the areas the interviewee, rather than the interviewer, believe to be most important (Oppenheim, 1992).
Such qualitative interviewing

places the emphasis of the research on validity, because the interviewee is unconstrained, allowing comments to be made that are reflective of the interviewee’s perceptions, motives and intentions (Taylor and Bogden, 1984).

2.3 Community Meetings

To get an unstructured feel for the local factors underlying public acceptance/rejection, two public meetings, to discuss matters connected to renewable energy developments, were attended. The purpose was to see if the experience gained could add value to this study:

- **Cumbria**: the first was a public meeting in Cockermouth, Cumbria, on Saturday 8 May 2004. The purpose of the day was to present to the local community the ideas behind a development to establish a *Community Renewable Energy Source Complex* at Wardhill in Cumbria. The meeting was attended by over 50 local people, mostly from the Allerdale District, and approximately 20 guest speakers from all over the UK.
Norfolk: the second was a public meeting in Dereham Memorial Hall on Friday 18 June 2004 to discuss the newly issued, *Draft Supplementary Planning Guidance on Wind Energy Development* being issued by Breckland District Council. The meeting was intended to achieve public consultation. Three presentations were given before the meeting was given over to public questions. The meeting was chaired by the Leader of Council. Most striking product of the meeting, to the observer, was the lack of knowledge and understanding evident from the questions and arguments posed. The fundamental workings, and largely non-contentious impacts, of wind turbines (e.g. noise, flicker, shadow, grid connection etc..) were not well understood in general. A good deal of myth was confidently presented and left uncorrected or emotively rejected.

### 2.4 Data Analysis

A wide range of literature was analysed and work by Houghton, Elliott, Toke, Imperial College London, the DTI and the Environmental Energy Technologies Division in Berkley, California USA, gave some excellent insights.

### 2.5 Summary

The research was driven by a burning desire. To find out why the two EU countries of Denmark and Germany had developed wind power so effectively whilst the UK, once market leaders in wind turbine technology in the 1970s (Source: Dr Jim Platts, Institute
Community ownership: the best way ahead for UK Windpower?

of Manufacturing, Cambridge University) had developed wind power so ineffectively, in comparison. Community ownership was perceived to be a driver, but its significance was not fully understood. The results of the study were not entirely as expected. However, the discoveries were exciting and refreshing in that the study placed the dynamic of community ownership in context. Community ownership was discovered to be an exciting development model which had great potential to deliver four major benefits which could translate into an accelerated way ahead for UK wind power. However, what the study revealed was that the model would only run on a fuel containing five components or what was referred to in the final model (see final conclusion at 6.4) as drivers. Unless the drivers could be created the way ahead for UK wind power ran the risk of being slow and tortuous.
CHAPTER 3

NATURE AND ROLE OF COMMUNITY OWNERSHIP IN WINDPOWER SCHEMES IN DENMARK AND GERMANY.

3.1 DENMARK

3.2 Why select Denmark for study?

Denmark has been a pioneer of wind power, in part due to its decision in the 1970s not to develop nuclear power, and the driver of a significant energy conservation programme. The financial support structure it operated involved a range of subsidies for operators of wind turbines and other renewable energy systems. There is widespread local community ownership of the wind project – around 80% of wind turbines are owned by local people, including many involved with local co-operatives, the so-called ‘wind guilds.’ The wind turbines that were developed in Denmark in the 1970s and 1980s proved to be world beaters and Denmark now dominates the world manufacturing market. Domestically, it has the world’s highest use of wind power. It was also a pioneer in offshore wind, constructing a 40-MW wind farm (twenty Bonus 2-MW Wind Turbines) at Middelgrunden off the coast near Copenhagen, in 2001. This was not only the first Danish, but also the world’s first large scale offshore wind farm to be built. Following the election of a conservative administration in 2001, the various subsidy schemes...
supporting the development of wind power were cut back, but two more large offshore wind farms were allowed to go ahead: the first, a 160-MW wind farm, consisting of eighty 2-MW Vestas wind turbines, at Horns Rev (pronounced as in English ‘reef’), was completed in 2002; the second, a 158-MW project, off the eastern coast at Rødsand. On 13 July 2004 the Danish government called for tenders to build a second offshore wind farm at Horns Rev in the North Sea, with a capacity of 200-MW. (adapted from Elliott, D. 2003; DWIA, 2004; REW 2004.) For these reasons Denmark was considered a world class achiever and a high performing European comparator, against which to measure the way ahead for UK wind power: it had also experienced the input, process and outcome of community owned schemes. It was therefore selected for study about the significance of community ownership to the future of UK wind power.

### 3.3 The Danish Community Ownership Models

Only one form of community wind ownership is widely used in Denmark – the wind partnership. The Danish wind cooperatives are technically not cooperatives, but general partnerships (‘Interessentskab’ or the abbreviation ‘I/S’). While co-operatives are used extensively in Denmark for other endeavours (for example combined heat and power schemes), Danish electricity law requires that wind turbines be directly owned by electricity consumers (Helby 1998a, 1998c). A partnership, which is understood to be a contractual relationship between several entities (i.e., electricity consumers) to pool certain resources in order to run a business, is the only joint form of ownership to qualify under Danish power law.
Wind partnerships were initially developed from the bottom up by local enthusiasts trying to use existing power and tax law to their best advantage (Helby 1995). Over the years, the Danish Wind Turbine Owners association has become a powerful lobbying force, and has been able to effect changes that are more accommodating to this typical ownership structure (adapted from Bolinger, 2001).

3.4 Operating the Danish Partnerships

Mechanically, Danish wind partnerships are quite simple to operate. Individuals pool their savings to invest in a wind turbine, and sell the power to the local utility at an attractive rate, historically equal to 85% of that utility’s production and distribution costs, but at a fixed rate per kWh under the transitional scheme detailed above. In addition, the wind partnership receives a full refund of the Carbon Dioxide tax and a partial refund of the energy tax. Investors in a wind partnership continue to pay their own electricity bills as normal: the turbine’s output is sold wholesale to the utility, rather than to the individual members of the partnership (adapted from Bolinger, 2001).

Wind partnerships have historically been required to operate on a local basis. Since the negative external costs of wind power – namely noise, flicker and visual intrusion on the natural landscape – are borne locally, while the positive external benefits accrue on a national or global basis, the government has taken steps to ensure that only those bearing the costs receive the financial benefits of government subsidies. This strategy has gone a
long way towards bolstering public support for wind power in Denmark, and has led to many small clusters of wind turbines dotting the Danish landscape (adapted from Bolinger, 2001).

However, as the industry matures, turbine sizes increase, and Denmark looks to a future even more reliant on wind power, the Government has gradually relaxed most ownership restrictions. Thus, while in the early 1980s investment in a wind partnership was limited to those living within 3 kms of the turbine, geographic eligibility was gradually expanded to include those living within 10 km (1985), those living in neighbouring boroughs (1992), those who work or own property in a borough but don’t live there (1996), all of Denmark (1999), and finally in 2000, the entire European Union (DWTMA, 2004 at www.windpower.dk).

3.5 Financing the Danish Partnerships

3.5.1 Danish Capital Support

In 1979 the government enacted a capital investment subsidy programme of 30% of total project costs. In subsequent years, the investment subsidy was gradually phased out, and was completely withdrawn in 1989. Over the 10 years that the subsidy was in place, a total of 2567 wind turbines received investment subsidies totaling DKK 275.72 million (in 1997 DKK) (Andersen 1998).
3.5.2 Danish Bank Borrowing

There are numerous options in Denmark for those wishing to finance their investment. Mortgage banks will provide long-term, market-rate loans for up to 70% of the value of an applicant’s property. Financing is not necessarily linked to the strength of the project, but to the financial health of the property to which the project is tied. Denmark also has a few ‘ethical’ banks that will loan funds for wind turbines at below-market rates. For example, at the 3.6 MW Avedore wind farm in southern Copenhagen, investors were able to obtain share financing from the ethical bank Faellskassen at an interest rate of 4% (when the base rate was around 10%), provided that they had held a savings account with Faellskassen for at least six months (Mitchell and Mackerron 1994).

3.5.3 Danish Tax advantages

A wind partnership has one economic advantage over a co-operative: an individual in a partnership can deduct the interest on a loan for his share of a wind turbine from income tax, while an individual in a co-operative cannot (DWTMA at www.windpower.dk). A partnership is not a taxable entity; instead, taxes are levied proportionally on each individual partner, who is taxed according to his or her individual tax situation. For many years, income from wind turbines (in a household context) had been tax-exempt, as long as it did not exceed certain limits. In 1996, however, the tax laws were reformed, creating three less generous taxation options. Nevertheless, any individual can choose to have...
Community ownership: the best way ahead for UK Windpower?

income from shares taxed as ordinary business investment and the interest on a loan for a wind turbine share is tax deductible (adapted from Bolinger, 2001).

3.5.4 Danish Financial Liability

All partners are held jointly and severally liable for any debts incurred by the partnership, which means that personal liability extends well beyond the level of an individual’s investment. Danish wind partnerships have generally dispensed with this risk, however, by modifying their by-laws to prohibit the partnership from taking on debt. This prohibition means that any financing of wind shares is done at the level of the individual, not the partnership (adapted from Bolinger, 2001).

3.5.5 Danish Financial Liquidity

Although shares are not traded on a public exchange in Denmark, co-operative board members will usually help to match those wishing to sell their shares with prospective buyers. Shares are usually traded at par, with no adjustments for depreciation (Helby 1998a, 1998c).

3.5.6 Danish Feed-in Laws

Since 1993, local utilities have been required to purchase wind energy from independent generators at a rate that is 85% of their production and distribution costs. In 1999, Denmark decided to abandon its feed-in law and move towards a renewable portfolio.
standard (RPS) with a system of tradable green certificates (TGC’s) to support renewable energy. The TGC market opened in 2003 (at which time all electricity consumers were obliged to purchase 20% of their electricity from qualifying renewable resources), after a transitional programme designed to gradually wean wind turbine owners off of their guaranteed profitable market, had begun in April 2001.

3.5.7 Danish Environmental Subsidies

Denmark has historically refunded the entire Carbon Dioxide Tax on electricity consumption and a portion of the Energy Tax to independent wind generators, resulting in a generous total subsidy. Under the transition to TGCs, turbines purchased and permitted prior to 2000 will be eligible for the full subsidy up to a certain production limit and once that limit is reached, the subsidy will drop until the turbine is 10 years old and the TGC market is open, at which point the subsidy will take the form of TGCs, whose value is determined by the market, subject to a minimum and maximum price. New wind turbines purchased between 2000 and 2002 earn the fixed feed-in tariff for the first 10 years of operation, and receive no subsidies other than TGCs (Odgard 2000).
Community ownership: the best way ahead for UK Windpower?

3.6 GERMANY

3.6.1 Why select Germany for study?

Although a relatively late entrant into the renewable energy field, Germany has followed Denmark’s example and is supporting wind power very heavily. It has provided high levels of national and local state support, via grants and market subsidies, and by 2002 wind power was supplying 3.5 per cent of Germany’s electricity with 12,500 Turbines installed (adapted from Elliott, D. 2003, pp.165). Furthermore, Germany’s 2003-recorded wind power capacity of 14,609-MW was capable of generating enough electricity to meet 4.5 per cent of national electricity needs. (adapted from Stenzel et al.2003, pp.19; AWEA, 2003). Germany was also one of the first countries to introduce a so-called feed-in tariff to promote renewable technologies (adapted from Stenzel et al, 2003, pp.) It clearly sees renewable energy as being of major importance: it imports over 55 per cent of its fuel and, in the late 1990s, its red-green coalition decided to phase out nuclear power over the next two decades. Following the UN ‘Earth Summit’ Conference on the Environment and development, in Rio di Janeiro, it committed the German nation to reducing Carbon Dioxide emissions to 25% and in 1997 Germany was the first EU country to ratify the Kyoto climate change treaty (adapted from Elliott, D. 2003, pp.165.). At present, it has the largest installed wind capacity in the world and has the fastest wind installation rate in the world. The recent slowdown in wind development reflects onshore saturation and a reduced feed-in tariff. (adapted from Stenzel et al, 2003, pp.) For these reasons Germany was considered a world class achiever and a high performing European comparator,
against which to measure the way ahead for UK wind power: it had also experienced the input, process and outcome of community owned schemes. It was therefore selected for study about the significance of community ownership to the future of UK wind power.

3.6.2 German Community Ownership Models

Traditional wind co-operatives are rare in Germany, due to (1) high start up costs and (2) the existence of a more attractive tax-advantaged alternative – the GmbH & Co. KG (Langniss 1999). GmbH & Co. KG stands for a Limited partnership with a Limited liability company as general partner. The study has revealed this entity to be the most common form of community wind ownership in Germany.

3.6.3 Operating the GmbH & Co.KG

In this model, a wind developer initially incorporates his business as a limited liability company (GmbH). For each project undertaken, the developer forms a limited partnership (KG) with his limited liability company as general partner and individual investors as limited partners. The developer may target local investors, but usually does not restrict share ownership to a particular area, and one study indicates that local residents typically make up only 20-30% of all limited partners (ECOTEC 1999). Project revenues are distributed proportionate to the level of each partner’s investment. Even though the high feed-in tariff allows most projects to turn a profit right from the start, dividends are generally not paid during the first two years, and instead are diverted into a maintenance
Community ownership: the best way ahead for UK Windpower?

or reserve fund. This model is valuable to the developer in several ways. First, the cost of setting up a limited liability company (GmbH) is fairly high, while it is relatively easy and inexpensive to form a partnership (KG). Thus, this model allows developers to spread the high costs of GmbH formation over multiple projects and partnerships. Second, by offering shares to the public, this model allows developers to liquidate their part-ownership in one project in order to finance another (Ecotec 1999), and also potentially reduces planning objections.

3.6.4 German Financing

A GmbH & Co. KG must raise a minimum share capital of € 25,000. The minimum contribution per member is € 250. In practice, however, shares are often offered in minimum increments of € 10,000 significantly larger than in other European countries. This disparity reflects the commercial nature of wind projects in Germany; the EFL tariffs and tax advantages are high enough in Germany to attract a different investor class: those motivated primarily by profits, rather than primarily by environmental or community concerns. Since a GmbH & Co. KG ownership structure is not linked in any way (i.e., neither legally nor by tax advantages) to an individual’s electricity consumption, wind projects in Germany tend to be larger, with larger minimum investment thresholds, than is the case in the more cooperative-oriented countries such as Denmark. Projects of 10-20 MW that are 25% equity-financed primarily by individuals are not uncommon in Germany.
The ready availability of low-cost debt financing also favours larger projects. The
Deutsche Ausgleichsbank (DtA) is a government-owned bank that distributes funds from
the European Recovery Programme, (a legacy of the post-war Marshall Plan) and the
Environment Programme, to wind projects, in the form of loans that average 1-2% below
market rates. Up to 100% of the cost of a project can be financed in this manner, though
a mix of 75% debt to 25% equity is more common (Harrison and Milborrow 2000).
Almost all German wind projects receive DtA financing. In 1999, 1450 MW of the 1600
MW installed (or 90%) received DtA financing (Harrison and Milborrow 2000). A
similar pattern held in 2000 (Stein 2001). The combination of below-market financing
from the DtA and above-market returns from attractive feed-in tariffs and favourable tax
laws has favoured larger, highly-leveraged projects (Bolinger, 2001).

3.6.5 German Taxation

A GmbH & Co. KG that is considered a private partnership pays no corporate tax. Each
partner is taxed at the individual level. Furthermore, partners in a private partnership have
historically been able to offset losses from the depreciation of a wind share against all
other forms of taxable income, making investments in a wind fund a popular tax haven
for wealthy Germans. A relatively attractive 10-year depreciation schedule applied until
July 1997, when the government extended it to 12 years. Recently, the government has
announced plans to extend the depreciation period beyond 12 years, and to require that
losses only be offset against income from the same investment, rather than against all
forms of income (Knight 2000).
3.6.6 German Liability

Limited partners are liable for the full amount of their investment. The general partner has unlimited liability, but since the general partner is most often the developer’s limited liability company (GmbH), personal liability is limited.

3.6.7 German Liquidity

Shares can be transferred to other partners, or new partners. Some transfers may require the agreement of the other partners.

3.7 REST OF THE WORLD OMITTED IN STUDY

3.7.2 Why was the study narrowed?

Resource limits narrowed the scope of this study. Notable omissions were Sweden (close linguistic and cultural links to Denmark) Spain and the USA. While a weak single-phase distribution grid throughout much of the rural US will limit the degree to which Europe’s experience can be replicated domestically (Princeton Economic Research Inc. 1998), distributed generation benefits may still be realized in more developed areas of the US. USAs wind power potential is massive: but the subject area too big to cover in this study. Please see Figure 3.
Community ownership: the best way ahead for UK Windpower?

3.8 CASE STUDIES IN DENMARK

3.8.2 Case Study- Avedore Holme

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Avedore Holme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EU Country</strong></td>
<td>Denmark</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td>Hvidovre near Copenhagen</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>Avedore Holme</td>
</tr>
<tr>
<td><strong>Wind Turbines</strong></td>
<td>12 x 300 kw: 6 owned by NESA (local utility company) and 6 owned by local Co-operative of citizens from the City of Copenhagen.</td>
</tr>
<tr>
<td><strong>Financing</strong></td>
<td>50% utility owned and 50% community owned</td>
</tr>
<tr>
<td><strong>Investors</strong></td>
<td>NESA and Copenhagen Citizens’ Co-operative</td>
</tr>
<tr>
<td><strong>Benefits</strong></td>
<td>Urban achievement of wind turbine siting in the district of a large city, Copenhagen</td>
</tr>
<tr>
<td><strong>Key Issues</strong></td>
<td>Reinforced long standing tradition of co-operative ventures. Revealed high level of environmental awareness amongst citizens Achieved better price by teaming up with Utility NESA</td>
</tr>
</tbody>
</table>

(Source: ECOTEC, 1999)

3.8.3 Case Study- Visberg

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Visberg</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Country</td>
<td>Denmark</td>
</tr>
<tr>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>Region</td>
<td>South Jutland</td>
</tr>
<tr>
<td>Location</td>
<td>Visberg near Logumkloster</td>
</tr>
<tr>
<td>Wind Turbines</td>
<td>1 x 600 kw Turbine</td>
</tr>
<tr>
<td>Financing</td>
<td>Sold shares in the Co-operative.</td>
</tr>
<tr>
<td>Investors</td>
<td>Annus Ericson + 2 others</td>
</tr>
<tr>
<td>Benefits</td>
<td>Costs kept down by person to person marketing and local newspaper advertising.</td>
</tr>
<tr>
<td>Key Issues</td>
<td>By 1999 it was getting harder to sell shares in Co-operatives. This was partly because the amount of the investment which could be offset against tax, had been reduced.</td>
</tr>
</tbody>
</table>

(Source: Toke, 1999)

### 3.8.4 Case Study- Muspyt

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Muspyt</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Country</td>
<td>Denmark</td>
</tr>
<tr>
<td>Region</td>
<td>South Jutland</td>
</tr>
<tr>
<td>Location</td>
<td>Muspyt</td>
</tr>
<tr>
<td>Wind Turbines</td>
<td>8 x 600 kw Turbines</td>
</tr>
<tr>
<td>Financing</td>
<td>Bank offered 80% of borrowing at low interest rates</td>
</tr>
<tr>
<td>Investors</td>
<td>Farmers Commune : one of which was Annus Ericson. Ericson was driving force.</td>
</tr>
</tbody>
</table>

Michael C R Stamford

August 2004

- 43 -
Community ownership: the best way ahead for UK Windpower?

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Money was borrowed from the Bank at soft rates. Bank took Farmer’s land as collateral for 20% of the equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Issues</td>
<td>Success for a small community of Farmers.</td>
</tr>
<tr>
<td></td>
<td>Bank was extremely helpful in facilitating project</td>
</tr>
</tbody>
</table>

(Source: Toke, 1999)

3.8.5 Case Study – Middelgrunden, Offshore Copenhagen

Please see Appendix III for details of the Middelgrunden case study.

3.9 CONCLUSIONS FROM DENMARK

At present, Denmark is the largest wind power manufacturer in the world and also heads the world rankings with the highest proportion of electricity supplied from wind power. It has the largest installed offshore capacity in the world and is characterised by a history of strong research and development (R&D) support, capital subsidies and strong community incentives. (Reiche, 2002) Wind development in Denmark has been overwhelmingly community-based.
Table 3: Adaptation for Denmark. Community-Owned Wind Development in Europe (2000)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Wind Capacity (MW)</th>
<th>Community-Owned Wind Capacity* (MW)</th>
<th>Community-Owned Share of Total Capacity</th>
<th>Number of Wind Turbine Owners**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>6,161</td>
<td>4,621</td>
<td>75%</td>
<td>100,000</td>
</tr>
<tr>
<td>Denmark</td>
<td>2,268</td>
<td>284</td>
<td>13%</td>
<td>175,000</td>
</tr>
<tr>
<td>UK</td>
<td>414</td>
<td>3</td>
<td>1%</td>
<td>1,802</td>
</tr>
</tbody>
</table>

(adapted from Bolinger, 2001)
3.10 CASE STUDIES IN GERMANY

3.10.2 Case Study – Pellworm

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Pellworm</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Country</td>
<td>Germany</td>
</tr>
<tr>
<td>Region</td>
<td>Schleswig- Holstein</td>
</tr>
<tr>
<td>Location</td>
<td>Island of Pellworm, North Friesland</td>
</tr>
<tr>
<td>Wind Turbines</td>
<td>Eight 600-kw wind turbines</td>
</tr>
<tr>
<td>Financing</td>
<td>10% equity raised by 45 residents on the Island</td>
</tr>
<tr>
<td>Investors</td>
<td>Henning Holst, an experienced Consultant from Husum in North Friesland</td>
</tr>
<tr>
<td>Benefits</td>
<td>Money from sales of electricity went to the locals</td>
</tr>
<tr>
<td>Key Issues</td>
<td>A ‘Burgerwindpark’ community scheme</td>
</tr>
<tr>
<td></td>
<td>The local authority (Gemeinde) turned down applications from outside companies.</td>
</tr>
</tbody>
</table>

(Source: Toke, 1999)

3.10.3 Case Study – Lubke-Koog

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Lubke-Koog</th>
</tr>
</thead>
</table>
### Community ownership: the best way ahead for UK Windpower?

<table>
<thead>
<tr>
<th>EU Country</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Schleswig-Holstein</td>
</tr>
<tr>
<td>Location</td>
<td>Lubke-Koog, North Friesland</td>
</tr>
<tr>
<td>Wind Turbines</td>
<td>Fourteen 330-kw wind turbines</td>
</tr>
<tr>
<td>Financing</td>
<td>20% of equity was raised through shareholders and 80% came from the Bank.</td>
</tr>
<tr>
<td>Investors</td>
<td>40 out of the 176 Householders in the locality were shareholders and the Bank was the major financier.</td>
</tr>
<tr>
<td>Benefits</td>
<td>One of the earliest ‘Burgewindparks’. Sited on land reclaimed from the sea in the 1950s. Scheme has built incrementally since the early days of 1992. In 1998 three 1.5-MW turbines were added to the wind farm putting total capacity up to 18.2-MW</td>
</tr>
<tr>
<td>Key Issues</td>
<td>Armin Szeimes, a farmer, formed a company with 2 farmer colleagues to build 14 wind turbines. Aim was for benefits to directly accrue to the local community.</td>
</tr>
</tbody>
</table>

(Source: Toke, 1999)

#### 3.10.4 Case Study – Reusen Koog

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Reusen-Koog</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Country</td>
<td>Germany</td>
</tr>
<tr>
<td>Region</td>
<td>Schleswig-Holstein</td>
</tr>
</tbody>
</table>
Community ownership: the best way ahead for UK Windpower?

- 48 -

<table>
<thead>
<tr>
<th>Location</th>
<th>Reusen-Koog, North friesland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Turbines</td>
<td>28 x 5-KW wind turbines</td>
</tr>
<tr>
<td>Financing</td>
<td>Shareholders raised 10% and bank raised remaining 90%</td>
</tr>
<tr>
<td>Investors</td>
<td>28 Households, then 38 Households, then 46 Households.</td>
</tr>
<tr>
<td>Benefits</td>
<td>This site was a few miles up the coast from Lubke-Koog. Stage 2 in 1995 saw 5 x 600 kw turbines added and stage 3 consisting of two 500 kw turbines was installed in 1998.</td>
</tr>
<tr>
<td>Key Issues</td>
<td>The local authority (Gemeinde) turned down applications from outside companies. Gemeinde favoured another local scheme.</td>
</tr>
</tbody>
</table>

(Source: Toke, 1999)

3.10.5 Case Study – Melle

<table>
<thead>
<tr>
<th>Case Study for:</th>
<th>Melle</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Country</td>
<td>Germany</td>
</tr>
<tr>
<td>Region</td>
<td>Lower Saxony</td>
</tr>
<tr>
<td>Location</td>
<td>Between Osnabruck, Bielefeld and Minden</td>
</tr>
<tr>
<td>Wind Turbines</td>
<td>One 250 kw wind turbine (Nordex)</td>
</tr>
<tr>
<td>Financing</td>
<td>Total cost was £197,000. A total of £53,500 was raised from the Deutsche Ausgleichs bank. £143,000 was raised by shareholders.</td>
</tr>
</tbody>
</table>
Community ownership: the best way ahead for UK Windpower?

---

£53,500 came from the local authority (Melle Municipality). Rate of return is about 2-3%

**Investors**

Owned by shareholder company of 70 investors: 60 live in the local community

**Benefits**

Guaranteed sale from Feed-in Laws
Involved a lot of the community who felt strongly about climate change and replacing nuclear powered stations
Chernobyl in 1986 soarked off the scheme.

**Key Issues**

Favourable financing arrangements
Easy access to technical support
Presence of similar schemes in the area
Availalbility of suitable legal framework
One Farmer objected to the scheme

(Source: ECOTEC, 1999)

3.11 CONCLUSIONS FROM GERMANY

Germany has the largest installed wind capacity in the world and has also achieved the fastest wind power installation rate. It is characterised by a history of capital subsidies, the availability of soft loans, feed-in laws (rigorously defended and highly differentiated by technology) and incentives to encourage local community ownership. (Reiche, 2002). More than 100,000 Germans either individually or jointly own wind turbine (Ecotec 1999).

---

Michael C R Stamford

August 2004
Table 3. Adaptation for Germany. Community-Owned Wind Development in Europe (2000)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Wind Capacity (MW)</th>
<th>Community-Owned Wind Capacity (MW)</th>
<th>Community-Owned Share of Total Capacity</th>
<th>Number of Wind Turbine Owners**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>6,161</td>
<td>4,621</td>
<td>75%</td>
<td>100,000</td>
</tr>
<tr>
<td>Denmark</td>
<td>2,268</td>
<td>284</td>
<td>13%</td>
<td>175,000</td>
</tr>
<tr>
<td>UK</td>
<td>414</td>
<td>3</td>
<td>1%</td>
<td>1,802</td>
</tr>
</tbody>
</table>

(adapted from Bolinger, 2001)
CHAPTER 4

NATURE AND ROLE OF COMMUNITY
OWNERSHIP IN WINDPOWER SCHEMES IN
THE UNITED KINGDOM (UK)

4.1 IMPORTANCE OF UK COMMUNITY OWNERSHIP

4.1.1 UK Background and Wind Development Trends

Whereas the UK enjoys the best wind resource in Europe, North Germany has ten times as many wind turbines per square kilometre, and Denmark has 5-6 times as many per square kilometre. (Palmer, 2004) Moreover, the UK is characterised by a history of limited capital subsidies, cautious investment and, until recent changes in 2004, a wide range of planning obstacles. The UK has the best wind resource in Europe both on and off shore, yet is ranked a sixth among European countries in terms of installed wind capacity, by Autumn 2002 (EWEA, 2004). See Table 2 pp 29-30. The roughly 648 MW of wind capacity currently on-line in the UK, in 2004 (Palmer, 2004), is dwarfed by the 14,609 + MW in Germany (2004) and the 2,515 + MW in Denmark (2002). The UK’s mediocre showing can be attributed in part to the relative lack of government support for wind energy prior to the Energy White Paper of 2003, and in part to planning difficulties highlighted by an intense opposition on the part of a minority of British citizens to the
visual intrusion of wind turbines on the landscape. (See Figure 6) To some degree, the two causes are related. Of the roughly 648 MW of wind capacity installed in the UK at the end of 2003, only 4.15 MW had emanated from three community-owned projects: Harlock Hill (1997), Haverigg II (1998) in Cumbria, and Pantperthog (2003) near Machynlleth, Powys, Wales. (adapted from Baywind Energy, 2004; EWEA 2004)

4.2.1 UK Community Ownership Models – barriers to development

Community wind ownership has been slow to develop in the UK, for a number of reasons. Firstly, because the Non-Fossil Fuel Obligation (NFFO) system of price support is administratively burdensome and therefore not well-suited for small wind projects. Secondly, because the negative sentiment created by planning and permit wars over large wind projects spilled over to smaller projects as well. Thirdly, because unlike many of its European neighbours, the UK does not offer any attractive tax incentives or capital investment subsidies for wind projects – the NFFO and its successor the the Renewables Obligation (RO) has been the sole source of support, and the number of projects able to receive NFFO/ RO support is by nature limited. Fourthly, because the UK does not have a specific co-operative law, it is difficult to structure legal forms of business along co-operative principles (Mitchell, 1994). Notwithstanding these barriers to development local developers, citizens, and the UK government (at least in principle) have begun to show great interest in community-owned wind projects.
4.2.2 Financing UK Community Ownership Models

Unlike Denmark and Germany, both of which have offered a variety of support mechanisms for wind power throughout the 1990s (including attractive feed-in tariffs and tax incentives), the UK has relied on a competitive tendering process known as the Non-Fossil Fuel Obligation (NFFO) and its successor in 2002 the Renewables Obligation (RO) to support renewable energy.

4.2.3 The Industrial and Provident Society (IPS) - relevance

An industrial and provident society is a legal structure appropriate for organizations pursuing both economic as well as social goals, and may be registered either as a *bona-fide co-operative society* or as a *society for the benefit of the community*. Since the latter is most commonly associated with organizations conducting charity work, this study focuses on the industrial and provident society registered as a *bona-fide cooperative*, which is more relevant to community-owned wind schemes. To date there has been only two industrial and provident societies involved in the ownership of wind turbines in the UK. As a result, much of the case study examination, is based on the Baywind Energy Cooperative’s ownership of two of the five turbines at Harlock Hill in Cumbria and the Bro Dyfi Renewables Ltd’s ownership of the Vestas 75 kw wind turbine at Pantperthog, near Machynlleth, Powys, Wales.
4.2.4 The Industrial and Provident Society (IPS) - detail

An industrial and provident society (IPS) in England and Wales, must have at least seven members, and can issue a maximum of £20,000 worth of shares to each member. An IPS will generally be organized according to standard co-operative principles, such as open membership, one member one vote, and distribution of profits. Because an IPS is not technically by law a co-operative, however, there is considerable room for flexibility in operations. For example, it is possible to restrict membership to (or favour members from) certain geographic areas, and to require the purchase of a minimum number of shares. Perhaps more importantly, an IPS need not abide by the strict co-operative practice of basing dividends on the degree of patronage, but rather may pay dividends according to the level of investment (as in the Harlock Hill case study). This freedom facilitates fundraising, although the £20,000 investment limit placed on IPS members dilutes this benefit to a certain extent. One advantage that an IPS has over other forms of ownership is the unrestricted ability to advertise shares to the public.

4.2.5 The Public Limited Company (plc) - relevance

The other legal business form that has been used in the UK for community-owned wind projects – the public limited company (plc) – can also offer shares to the general public, but must raise the target amount stated in its prospectus within 40 days, which is a tight deadline for mobilizing diverse community money.
4.2.6 Financing the UK community owned ventures

Conditions in the UK during the 1990s have favoured developer-led, developer-owned over community-led, community-owned wind power schemes, regardless of the structure chosen. Reasons for this have been firstly, a general lack of familiarity with wind power in the UK relative to other European countries; secondly, the significant time commitment and complexity of bidding in an NFFO/ROC environment tended to discourage community involvement from the start; thirdly, in order to maximize what limited economies of scale could be achieved projects were often larger than would otherwise be undertaken by a community group; finally, the terms of the Non-Fossil Purchasing Agency (NFPA) contract awarded to successful NFFO bidders restricted sub-contracted relationships with third parties, more or less requiring the bidder to develop and operate the project. The NFPA wanted assurances that the project would operate within a certain range of expectations, and thus had little confidence in the ability of community groups to properly develop and manage a large project. All of these factors have worked together to discourage community-led participatory wind schemes and to favour a developer-led, developer-owned approach. The primary practical implication of a developer-led approach in terms of financing is that the developer must still arrange for financing to construct the project. Because UK community groups, with their limited wind power experience, cannot reasonably be expected to raise enough capital to purchase a 5 MW wind farm (for example) that has not yet been built, community investment typically occurs only after the project has been commissioned, and perhaps only in single turbine increments. In the UK, therefore, community involvement in a
project does not necessarily relieve the developer of the burden of financing the project (as it often does in Denmark). While community-owned wind projects do not directly benefit from the lower cost of financing seen in community-led projects in Denmark, there are some indications that having a community willing to invest in a project can lower the cost of finance to a developer. In fact, The Wind Company (the developer of Harlock Hill) claims that not only did its financiers take comfort in the fact that the Baywind Cooperative share subscription was proceeding on schedule, but also that Baywind members took comfort in The Wind Company’s (TWC) ability to raise development financing from commercial sources. In other words, the two concurrent processes fed on each other, with both investor classes being reassured by their counterpart’s willingness to finance the project (adapted from Boxer and Harrop 1997; Bolinger, 2001). The Baywind Cooperative at Harlock Hill sold shares for £1 with a minimum investment of 300 shares. The co-operative offered a savings scheme that allowed members to accumulate their investment over the six-month period that shares were offered. The fact that only 35 out of approximately 650 initial members who purchased the first turbine took advantage of this offer indicates that a sum of £300 is within reach of most households’ personal savings. In fact, the average investment in the Baywind Cooperative’s first turbine was £1000, above even the £500 minimum to qualify for EIS tax relief. Conversely, the upper limit on IPS investment of £20,000 per investor will generally not be a binding constraint on wind development, except, possibly, in the case of small or sparsely populated areas (e.g., small islands) where fewer potential investors may need to raise larger amounts of capital per person in order to finance a project. In such an instance (exemplified by the installation of 2 wind turbines on Fair
Isle) another form of ownership may be more advantageous; for example, a private limited company is not subject to maximum investment limits, and its main drawback – the fact that it cannot legally advertise shares to the public – would probably not prohibit the word from spreading in such a micro environment (adapted from Boxer and Harrop 1997).

4.2.7 UK Tax advantages

An individual who invests in new eligible shares of a qualifying unquoted society may be eligible for tax relief under the provisions of the Enterprise Investment Scheme (EIS). Eligible shares are ordinary shares that carry no preferential rights, and must have been issued for the purpose of raising money for a qualifying business activity to be carried out in the UK. Providing these and other conditions are met, the EIS provides tax relief of 20% of invested amounts greater than or equal to £500 in the year the investment is made. Although EIS tax relief is not specific to wind energy, the Baywind Energy Cooperative took steps to ensure that its members would qualify for EIS relief if the members themselves were eligible. They prohibited the cooperative from redeeming shares for a period of five years from issuance. Members could sell their shares to other members or non-members during this period, but the cooperative itself could not redeem them. After five years, Baywind decided whether or not to alter its by-laws to allow share redemption. Besides EIS tax relief on investment, the UK offers no other tax incentives to encourage community wind ownership. Dividends from the IPS are taxed as regular income (adapted from Bolinger, 2001)
4.2.8 UK Financial Liability (IPS)

All members of a UK IPS have limited liability for any unpaid amount on outstanding shares. Since most societies require all shares to be pre-paid, each individual’s liability is limited to the amount invested. (adapted from Bolinger, 2001)

4.2.9 UK Financial Liquidity (IPS)

Shares in an IPS are usually redeemable by the society, and are usually issued and redeemed at par. Shares are also transferable to other members or those seeking membership. However, rules governing EIS tax relief may prohibit an IPS from redeeming shares for some initial period, in which case an investor’s only exit option is to transfer shares to another willing party. The Baywind Cooperative facilitated such transfers by maintaining a register of interested buyers and sellers, and posting the audited value of a share each year at its annual meeting (adapted from Bolinger, 2001).

4.3.1 UK Investment fund-led schemes – the Public Limited Company (plc)

The main public limited company, involved in community wind ownership schemes in the UK, identified by this study was the Triodos Renewable Energy Fund plc which was formerly The Triodos Renewable Energy Fund plc, formerly The Wind Fund plc, plc.
4.3.2 Operating Investment-led Community-owned schemes in the UK

The Triodos Renewable Energy Fund plc, formerly The Wind Fund plc, is the UK’s first direct investment fund for small renewable energy projects (particularly wind and hydro, which are the most commercially viable technologies). A public limited company is well structured to serve this purpose: there is no limit on the amount each member can invest, and the fund is able to offer shares to the public. Public limited companies are required by law to raise a minimum total share capital of £50,000, but this amount is low enough to not be restrictive, given the capital-intensive nature of wind and hydro. To raise capital, a plc must offer shares via a prospectus, and must raise the minimum amount of capital listed in the prospectus within forty days. Because of this time constraint, a plc is more likely to seek investors on a national rather than local basis, and this is the approach taken by The Triodos Renewable Energy Fund plc (TREF plc), formerly The Wind Fund plc (TWF plc). The TREF plc is essentially a financier of small renewable energy projects, pooling its investors’ capital to provide equity financing to small developers or companies set up specifically to develop a wind or hydro project (such as Harlock Hill Ltd.). Such projects are often badly in need of financing, yet are often overlooked by commercial financiers who do not consider it worth their while to dabble in projects below a certain size. TREF plc’s objective is to fill this gap by providing equity finance to projects that are both environmentally responsible and supported by the local community. As the project generates revenue, TREF plc distributes that revenue to its shareholders in the form of dividends. While its fundraising occurs on a national basis,
TREF plc encourages local community involvement in its projects. For example, its first investment – in the 2.4 MW Haverigg 2 wind cluster in Cumbria – was structured to allow community ownership, and in May 1999, 10 months after the project’s commissioning, the local Baywind Energy Cooperative purchased one of the four 600 kW turbines. (adapted from Bolinger, 2001)

4.3.3 UK plc Financing

As with an IPS, shares in a plc are generally sold at par for £1, with some minimum purchase threshold to reduce administrative burdens. TREF plc’s first share offering took place in 1995, raising more than £575,000. Another £311,000 was placed privately in January 1998, and the second share offering was launched in May 1998, with a goal of raising at least £2 million. At the end of 1999, TREF plc’s total assets came to £2,786,287. Of that total, only £812,730 was invested in the fund’s community wind power projects, with the rest in bank deposits (The Triodos Renewable Energy Fund plc, 2004, formerly The Wind Fund plc, 2000). With its nationwide pool of investors and quick access to capital, TREF plc, can help small projects that will ultimately be owned by the local community to get through the development phase while local funds are being raised.
4.3.4 UK Tax advantages for Investment fund-led Community-owned projects

Investments of over £500 may qualify for tax relief under the Enterprise Investment Scheme, depending upon the status of both the investor and the plc. There are no other tax advantages afforded to investors in a public limited company.

4.3.5 UK Liability in plcs

Investors in a public limited company are liable only for their own shares; i.e., liability is limited to the total of paid-up and any unpaid shares. TREF plc requires shares to be fully paid-up in advance.

4.3.6 UK Liquidity in plcs

Public limited companies may be listed on a stock exchange, but most are not, and it is unlikely that a plc involved in community wind ownership would choose to be listed. As a result, investors wishing to exit must find others willing to purchase their shares. Triodos Bank, the parent company behind TREF plc, maintains a ‘matched bargain market’ in which it seeks to match up interested sellers with prospective buyers, and also calculates the correct market value of a share at regular intervals.

4.3.7 UK plc’s future with community-owned projects
Community ownership in the UK remains in a tenuous position. There is no indication that small projects will continue to receive even the minimal level of preferential treatment that they have enjoyed in the past (15 year price certainty under the old NFFO contract, but no price certainty under the new RO). As a result, the long-term investment forecast is uncertain. Furthermore, TREF plc is finding it more difficult than it had anticipated to identify suitable new projects for investment (The Triodos Renewable Energy Fund plc, formerly The Wind Fund plc, plc 2000). The three pioneering community efforts to date – (1) the Baywind Cooperative, (2) The Triodos Renewable Energy Fund plc, formerly The Wind Fund plc, and (3) the bona fide co-operative known as Bro Dyfi Renewables Ltd have broken new ground and proven that community wind ownership can succeed in the UK, establishing models for others to follow. There are also signs of new models emerging involving green pricing (Massy 1999), and still others will no doubt be developed under the new renewable portfolio standard introduced in 2002 (RO). Finally, given the strength of the UK wind resource, the small amount of wind capacity installed to date, and the growing need to develop the resource more fully in the future, it is perhaps likely that the political situation towards wind power will only improve. With public opposition to large-scale wind farms still strong, (eg in Devon and Cornwall) smaller community-owned projects may stand to benefit the most over the next decade (adapted from Bolinger, 2001). The survey carried out in this study, in Frettenham, Norfolk indicated that 79% of those that completed and returned their questionnaires, were either fairly interested or very interested in having a future financial share in a source of renewable energy in their village (Frettenham Survey, 2004). If this sort of public acceptance is indicative there may well be huge potential to
launch community-owned wind power schemes throughout UK. Even the offshore programme could utilise the developer-led, community-owned model, used by the Danes in the Middelgrunden project, off the coast of Copenhagen, to forge the way ahead for UK windpower.
CHAPTER 5

SIGNIFICANCE OF FACTORS

DISCOVERED: CRITICAL SUCCESS

FACTORS POINTING THE WAY AHEAD FOR
UK WIND POWER?

5.1 THREE MODELS OF COMMUNITY INVOLVEMENT

5.1.1 A range of different models

Analysis of the conditions surrounding the establishment of community wind power schemes in Denmark and Germany threw up five major drivers which appear to have influenced the success of such schemes. Although a full quantitative analysis has not been possible in this study, these drivers merit further consideration in this chapter, in order to tease out more carefully their relevance and significance to the UK situation. Although the study aimed, in its early stages, to identify drivers that had exclusively encouraged community ownership of wind power schemes, research has revealed that many of the drivers identified, also encouraged small scale entrepreneurs and private individuals to enter the market as well. Moreover, no drivers were identified which specifically encouraged only community participation, which did not also offer benefit to
any small and medium sized community scheme (adapted from DTI, 1999). However, community involvement in wind power schemes did generally fall into two broad categories: either the community bought in to a project led by an established developer (hereinafter referred to as developer-led, community-owned) or the project was initiated, owned and managed by the community themselves (hereinafter referred to as community-led, community-owned). As the study showed in the Baywind co-operative and Bro Dyfi renewables Ltd cases, both models have been tried in the UK and both are relevant to the way ahead for UK wind power. However, the predominant model in the UK at present, is the developer-led, large utility/large developer-owned model, which is not a community ownership model at all. For now we can set this model to one side. Denmark, where community ownership began, makes use solely of general partnerships that for the most part operate according to cooperative principles. Germany’s primary model is more commercial in nature – a limited partnership with a developer’s limited liability company as general partner. The UK, which lacks clear co-operative laws, has employed a legal structure known as an industrial and provident society, which operates like a cooperative, though is not bound by strict cooperative limits on investment. The UK has also pursued an investment fund-led structure, which is similar in nature to a mutual fund, though it invests in renewable energy projects and not publicly traded companies. Each of these models is explored in depth in this chapter. (adapted from Bolinger, 2001)
DEVELOPER LED

5.1.2 Developer-led Schemes with tangible benefit to the community

The study reveals that for developer-led, large developer/large utility-owned schemes to be perceived as true community ventures they need to confer some sort of tangible benefits on the local community. Part of the benefit conferred on the Breckland community by Enertrag UK Ltd was the arrangement to pay an annual sum into a special fund set up for the community. A local panel, with only one representative from Enertrag UK Ltd, but several local representatives and a representative from the local authority will decide how the money is spent. However, there are no strings attached by Enertrag UK Ltd. The proposal for their wind farm, consisting of eight 2-MW wind turbines to be sited on a disused airfield at North Pickenham, near Watton, was given conditional planning consent on 19 July 2004. The proposal is interesting as it spent less than 6 months in the planning process: the Environmental Statement which accompanied the planning application was issued in March 2004 (Britton, 2004. pers.comm).

5.1.3 Developer-led Schemes with little or no tangible benefit to the community

The North Pickenham case sits in sharp contrast to a separate proposal from developer Ecotricity to construct two 2-MW wind turbines close to the village of Shipdam, less than 10 miles from the Enertrag UK Ltd development at North Pickenham, Norfolk. In this case little or no benefit was perceived to accrue by a vociferous section of the local community: the developer had made a contract with a single farmer in the locality. Whilst
the case is likely to receive planning consent in the future, in spite of having gone to appeal, it has spent over 2 years in the planning process since the first environmental statement was raised in December 2001 (Britton, 2004, pers.comm).

5.1.4 Developer-led Schemes where developer involves community but takes all the risk

In cases where the developer assumes all the development risk and communities are offered an opportunity to become involved and enjoy some direct or indirect benefit, the community does so assuming very little business risk. It could be argued, therefore, that where the developer confers any kind of tangible benefit on the community, direct or indirect, that the community is enjoying partial financial ownership of the wind power scheme. For example, where the developer offers the community shares in an established project, or in an embryonic project, the community is clearly acquiring a form of financial ownership, however small. Where the developer seeks investment from the community, from the outset, but guarantees a nearly full refund, should the scheme not succeed (as in the case of Energiekontor Windkraft GmbH in Germany) there is clearly an indirect tangible benefit to the community and arguably, once more, a type of financial ownership of the project is conferred on part of the community.
5.1.5 Developer-led Schemes where community identifies with development and takes on a social ownership with no direct financial benefit

A further dimension, which is far less clear, in community ownership terms, is the case of the construction of two wind turbines at Swaffham in Norfolk: the first was built in 1998 and the second in 2003. Evidence, from semi-structured interviews carried out in this study, reveals the phenomenon of *social ownership without financial benefit*. (Saunders, 2004. pers.comm) A large number of the local community refer to the Turbines as *their turbines* and use photographs of them commercially, as branding and marketing tools, to attract custom to the local area. They are almost part of the heritage of Swaffham. However, the local community receives no direct financial benefit from the two *Enercon* wind turbines: the developer, *Ecotricity*, enjoys most of the financial benefits accruing from the two projects. What the local Swaffham community are perceived to have, is a social ownership of the wind turbines: a nice warm feeling about what they are doing and what they represent, but no direct or indirect financial benefit. (Saunders, 2004. pers.comm) This social ownership is a very important dynamic because it signals a social acceptance of UK wind power, which this study has shown to be a critical success factor in the development of UK wind power, further down the line (adapted from DTI, 1999).

COMMUNITY LED

5.2.1 Community-led, community-owned Schemes
Conversely, the study reveals that community-led schemes are true community ventures. Because they confer direct benefits on the local people. Europe has traditionally relied on a system of community ownership and financing of wind projects, in which individual citizens, or groups of citizens, invest the necessary equity to purchase and install one or more turbines, and then sell the electricity to the local utility at a profit. Because the amount of capital that can be raised in this manner is typically modest, and many of these projects have been intended to offset personal electricity consumption, project size has typically been small, usually only a few MW. As a result, parts of the European landscape, and much of Denmark’s in particular, are dotted with small wind clusters (Bolinger, 2001)

5.3 Significance of European experience to the UK situation

The preceding European case studies detailed a total of four models for community wind ownership: general partnerships in Denmark, limited partnerships in Germany, and co-operatives and public limited companies in the UK. While broad similarities exist between some of these models, there are also many specific differences driven by characteristics particular to each country. For example, Denmark’s general partnerships operate in a similar manner to co-operatives, but are not bound by strict co-operative principles limiting investment to consumption, due largely to peculiarities of Danish electricity law that prohibit co-operatives from owning wind turbines. Nevertheless it is possible to consolidate these models into three general categories in order to facilitate discussion of their impacts on the UK. The next part of this chapter, therefore, identifies
and discusses these three broad categories: community-led models, developer-led models, and investment fund-led models.

5.4 Community-led, community-owned models (CLCO)
Community-led, community-owned (CLCO) models are those under which projects are initiated, developed, and operated primarily by the local community, or community of locality. This category, which includes Denmark’s general partnerships, encompasses perhaps the purest forms of community wind ownership, often involving significant grass-roots efforts and participant sweat equity. Many other community-owned wind projects in Denmark, and a smaller number of projects in other countries, have evolved in a similar manner. As the ‘original’ form of community ownership, the CLCO approach has been an important element in getting the wind industry and the market for wind power off the ground. The Pantperthog wind turbine in Powys, Wales was arguably the first of its kind in UK to take the true CLCO approach after its first public meeting May 2000, by establishing a 75 kw Vestas turbine under the governance of a bona fide co-operative registered under section 2 of the Industrial and Provident Societies Act. 1965-1978. (Ecologist, June 2004, pp 43-49; Share Offer Document issued by Bro Dyfi Renewables Ltd in 2001).

5.5 Community-led, community-owned (CLCO) models - paradox

Paradoxically, some of the same factors that have contributed to the success of the CLCO approach (1) geographic ownership restrictions; (2) tax advantages that are tied
to the level of consumption) now threaten to limit the scalability of this approach. The potential pool of investors who haven’t already invested in a local wind project, is growing increasingly smaller in Denmark. The Danish government have acknowledged this trend by gradually eliminated geographic ownership restrictions. These developments may be signalling the beginnings of a paradigm shift. (adapted from Bolinger, 2001)

Pooling capital from across the nation (or, in the case of Denmark, from across Europe) will be more transaction-cost-intensive than pooling capital from within the local community, and in many cases will be beyond the means (or will) of a local community group. Similarly, the larger projects that are likely to result from diverse new capital streams may require a degree of wind development and maintenance expertise that is beyond the capabilities of the average investor. The growing trend towards large offshore developments, as well as the sophistication that will be required to negotiate the tradable green certificate (TGC) market as Denmark continues to implement renewable portfolio standards (RPSs), is a good example of how wind energy in Denmark is moving beyond the local level. However, these developments need not be the death of the CLCO approach. Indeed, they may be signalling the need to move on to a different model of community ownership. A model in which a third party minimizes transaction costs by handling many of the details: a so-called developer-led, community-owned approach (DLCO) dealt with next (adapted from Bolinger, 2001).
5.6 Developer-led, community-owned model (DLCO)

Developer-led, community-owned (DLCO) models are those under which wind projects are initiated, developed, and perhaps operated by developers, with the community playing only a passive investment role. The DLCO is the broadest of the three categories, and includes Germany’s limited partnerships (example at Melle), the UK’s Baywind Energy Cooperative (examples at Harlock Hill, Haverigg II, and Shrivenham) and Denmark’s Middelgrunden off-shore project. Although they all involved the community of locality, in the first instance they also looked to the larger community of interest for equity financing. In Germany, the absence of any geographic ownership restrictions or limits on investment size has encouraged the development of larger projects than are typically seen in Denmark. This has been a driving factor behind Germany’s adoption of the DLCO approach. The UK has favoured the DLCO approach but for three different reasons: firstly, a lack of familiarity with wind power in general; secondly, no wind turbine manufacturing base worth boasting about; and thirdly, the relatively high transaction costs of securing an NFFO/RO contracts (adapted from Bolinger, 2001).

5.7 Community investment in DLCO wind power projects

Community investment in a DLCO project can occur either before or after the development. In Germany, where familiarity and comfort with investments in wind projects are relatively high, due both to the stability of an attractive feed-in tariff as well as readily available low-cost debt financing from the DtA, community investors often
fund projects prior to development (ECOTEC 1999). This is also the case in Denmark. In the UK, on the other hand, the community-owned wind projects to date, were purchased from the developer on a turn-key basis once operational. While post-development investment reduces the community investors’ risk, it also forces the developer to arrange development financing, which will almost certainly increase the project’s cost, and may even be impossible to secure over the range of smaller projects that are typically community-owned. To fulfil the requirement for financing smaller projects that are often below the minimum size threshold of commercial financiers, there was a need to create an investment fund-led model. This is dealt with next (adapted from Bolinger, 2001).

5.8 Investment fund-led, community-owned model (IFLCO)

The third broad category of community wind ownership models is the investment fund-led, community-owned model (IFLCO). In this model a fund manager pools investment capital from the community of interest and then invests that capital in a DLCO projects. The distinction between the IFLCO and DLCO approaches is subtle but important. The DLCO approach raises a defined amount of capital for a specific project, whereas the IFLCO approach simply amasses an unspecified amount of capital from those individuals interested in investing in wind or renewable energy in general at a later date. He then searches for suitable projects in which to invest. Whilst community investment in a DLCO project may occur either before or after the development, an investment fund invests either prior to or during development, taking an equity stake in a company specially created to develop the project. In this way, investment funds provide financing
Community ownership: the best way ahead for UK Windpower?

for the community when it is most needed – while the project is being built. Later, once the project is operational, the investment fund may choose to sell part (or all) of the project to a local community group, as happened in the UK when The Triodos Renewable Energy Fund plc (TREF plc) formerly The Wind Fund plc, sold one of its four 600 kW turbines at Haverigg II to the Baywind Energy Cooperative (Bolinger, 2001).

5.9 Green funds follow the IFLCO model

In addition to the TREF plc other notable investment funds include the tax-advantaged green funds offered by a handful of banks in the Netherlands. Individuals investing in green funds are not taxed on the interest earned, allowing banks to offer a lower rate of return to investors, and likewise loan the funds out a low rate, usually about 1.5% below market rate. As a form of debt financing, green funds are different from the equity ownership structures that are the focus of this paper, but nevertheless merit attention as a

5.10 Combined impact of community-owned models – niche or mainstream?

Table 3. Community-Owned Wind Development in Europe (2000)

<table>
<thead>
<tr>
<th>Total Wind Capacity (MW)</th>
<th>Community-Owned Wind Capacity (MW)</th>
<th>Community-Owned Share of Total Capacity</th>
<th>Number of Wind Turbine Owners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>6,161</td>
<td>4,621</td>
<td>100,000</td>
</tr>
<tr>
<td>Denmark</td>
<td>2,268</td>
<td>284</td>
<td>175,000</td>
</tr>
<tr>
<td>The UK</td>
<td>414</td>
<td>3</td>
<td>1,802</td>
</tr>
</tbody>
</table>

Michael C R Stamford

August 2004
Community ownership: the best way ahead for UK Windpower?

(Source: adapted from Bolinger, 2001)

The capacity numbers in the table above represent only joint forms of ownership: limited partnerships (GmbH & Co. KG) and partnerships of sole proprietors (GbR) in Germany, general partnerships in Denmark, and co-operatives or investment funds in the UK. Expanding the definition of community ownership to include individually owned turbines would boost the figures by approximately 1600 MW in Denmark and 800 MW in Germany, raising the share of community-owned development in these countries to about 80%, and in the world to over 40%. These sizable numbers demonstrate that, despite the quaintness implied by its name, community-owned wind energy is not a niche market, but rather a mainstream form of wind development. (Bolinger, 2001)

5.11 Ranking the three community ownership models

Of the three categories of community ownership models identified, the developer-led approach (DLCO), which includes not only Germany, but also Denmark’s large Middelgrunden project, has installed the largest capacity amongst community-owned projects. Developers have the capability and resources to complete larger projects than a typical community group would warrant, and in less time. The community-led approach (CLCO), dominant in Denmark, ranks second in the amount of capacity installed (with notably more capacity than shown in the table if individually-owned turbines are included), whilst the investment fund approach (IFLCO) ranks third, with just a few megawatts installed in the UK. The poor performance of the investment fund approach
relative to the other two model categories is not necessarily a sign of inferiority, but signifies the importance of government policy stimuli and the institutional framework of the nation-state concerned, in creating an environment conducive to community ownership in general. (adapted from Bolinger 2001)

5.12 Factors enabling community ownership – critical success factors

5.12.1 Five drivers

A comparison of underlying policies and institutions supporting wind power development in Germany and Denmark, to those in the UK, reveals five primary factors that are virtually absent in the UK but have contributed to the success of community wind power ownership in the other two countries:

- feed-in tariffs/laws,
- significant tax advantages,
- standardised grid connection and interconnection agreements,
- a domestic wind turbine manufacturing base,
- familiarity with co-operative forms of ownership.
5.12.2 Feed in tariffs/laws

Germany and Denmark both offer, or have offered, attractive feed-in tariffs for wind power. These tariffs, historically set at 90% of the average nationwide retail rate for all customer classes in Germany and 85% of the local retail rate for small consumers in Denmark, have created a stable, profitable, and essentially unlimited market for wind power, and one that can be accessed with very low transactions costs. The UK, however, has offered limited and intermittent support to wind power through five NFFO orders (three of which have had a separate small wind band) in eight years and an RO system geared to a liberalised electricity market and not a fixed price rate. The understandably intense competition for these limited funds increased the transactions costs of compiling a bid, and at the same time decreased the likelihood of being awarded a contract. Small community-owned projects have found it hard to compete in this new liberalised environment. (adapted from Bolinger, 2001)

5.12.3 Significant Tax Advantages

With the exception of those in the UK, most European community-owned wind ventures have enjoyed favourable tax status. Significant tax advantages generally come in three forms: tax-free generation, refund of energy and/or Carbon Dioxide taxes, and favourable depreciation rules for businesses. Tax-free generation is found primarily in Denmark, where each member of a cooperative or partnership is not taxed on his or her share of the income from the turbine’s production as long as the income (or the amount of electricity
produced) does not exceed that member’s annual expenditure on (or consumption of) electricity. Moreover, Denmark is the only country studied that refunds some portion of electricity and/or carbon Dioxide taxes, although in 2001 the UK enacted a climate change levy, from which renewable generation is exempt. Favourable depreciation rules for wind turbine capital are found in both Denmark and Germany, but not in the UK. Denmark allows businesses to depreciate the value of a wind turbine by up to 30% each year using the declining balance method, and to use the depreciation expense to offset other forms of business income (instead of, or in addition to, income from the wind turbine) (Helby 1998c, 1998f). This is one of the principal reasons many individual Danish farmers have installed one or more wind turbines on their property as part of their farming business: to defer taxation to their other farming profits. Interestingly, Limited partners (i.e., individual investors) in German wind partnerships have been able to write off fairly aggressive depreciation expenses (over 10 years until July 1997, when extended to 12 years) against all forms of income, including wage income. A recent redesign of German tax laws, however, has largely eliminated this tax shelter by requiring that depreciation of an investment be offset against income from that same investment or similar investments, rather than all income (Knight 2000, Langniss 2001). In tandem with this change, the government has also threatened to extend the depreciation period beyond 12 years (Knight 2000).
5.12.4 Standardised Grid connection and interconnection agreements

In concert with the feed-in tariffs offered by Germany and Denmark, distribution utilities in these two countries (and others in Europe, though not the UK) are required to interconnect small wind projects to the grid according to a pre-determined set of rules defining technical requirements and division of financial responsibility. In Germany, and Denmark the generator must pay the cost of connecting to the nearest feasible point on the grid, while the distribution utility must pay the costs of strengthening or upgrading the grid as necessary to interconnect the generator. In Germany and Denmark, the utility can recover these costs through a surcharge on rates. Requiring interconnection ensures that a community-owned project has access to a market (most often the utility itself, through a feed-in tariff), while pre-defining interconnection requirements and responsibilities (both technical and financial) enables a community-owned project to accurately estimate the cost of interconnection in advance. Both of these factors reduce the project owners’ risk.

5.12.5 An incrementally improving Wind Turbine Manufacturing Base

Denmark’s world-class wind turbine manufacturing industry has played an important role in community wind development. Representatives or sales agents from turbine manufacturers have often been the initial instigators of wind partnerships or cooperatives, providing resource assessment, financial projections, general guidance, and development
assistance (Helby 1998d). This beneficial relationship is less evident in Germany, where developers, rather than sales representatives, have taken on most of these functions. Nevertheless, the very existence of a domestic wind turbine manufacturing industry in Germany and Denmark has no doubt influenced politicians in those countries to favour policies that are friendly towards domestic ownership. The UK, the absence of a strong domestic turbine manufacturing industry means that there is no strong lobbying force to put pressure on the government. (Bolinger,2001)

5.12.6 Familiarity with Cooperative Ownership Structures

Many co-operative businesses today are organized according to the Rochdale principles of cooperation, first established in 1844 by one of the most successful early cooperative businesses, the Rochdale Society of Equitable Pioneers in Rochdale, England. The Rochdale cooperative principles include open membership, democratic control (one member, one vote), distribution of surpluses in proportion to the level of patronage, and limited interest on capital. Despite this auspicious and pioneering effort, however, the use of co-operatives has not permeated UK society to the degree that it has in other European countries such as Denmark. Inspired by the Danish Folk movement of the mid-19th century, which aroused a national consciousness promoting the ideals of self-sufficiency and working together to improve people’s lives, Danish agricultural co-operatives spread rapidly to almost every village following the formation of the world’s first dairy cooperative in Denmark in 1882, creating one of the greatest commercial revolutions in the history of Denmark (Tranæs 2001). In contrast, co-operatives in the
UK have rarely moved beyond their agricultural base, meaning that the UK public tends to be less familiar with this legal structure. For example, the organizers of the Baywind Energy Cooperative felt it necessary to undertake a strong educational campaign to familiarize the public about the benefits of cooperative ownership as few were familiar with the IPS. (Centre for Sustainable Energy 1997).

5.13 Benefits of Community Ownership

So, it is not community ownership in itself, or the specific structure of the ownership model employed, that is responsible for Europe’s strong growth in wind power, but rather the underlying institutions and supportive policies that have allowed individual investors to earn an acceptable rate of return from investing in wind energy. Some of the benefits exemplified by Europe are detailed below.

5.13.1 Benefit 1: Increased public acceptance

The first benefit on the list, offering perhaps the greatest value of all to community wind ownership is increased public acceptance. The UK lacks all five of the drivers which fuel the models of community wind ownership in Denmark and Germany yet it has still managed to make made a concerted push towards community ownership in reaction to a string of planning denials and some intense public opposition to the siting of larger commercial wind projects. By allowing the public to reap wind power’s economic
benefits, many in the UK hope to bolster public acceptance of and support for wind energy to levels seen in Denmark and Germany.

5.13.2 Benefit 2: Realized distributed generation benefits

With the exception of a noticeably heavier concentration along Denmark’s windy northwest coast, the distribution of turbines throughout the country is remarkably consistent. This high degree of geographic dispersion not only reduces transmission losses, but also helps to reduce the potential severity of fluctuations in power output to the grid at any given moment (as compared to what might occur if all wind development were concentrated in one area). Such geographic diversification enables greater levels of grid penetration, which Denmark will need in order to reach its official policy goal of obtaining 50% of its nationwide electricity consumption from wind power by 2030 (from Andersen 1998).

5.13.3 Benefit 3: Enhanced turbine manufacturing environment

Whilst the presence of a strong wind turbine manufacturing industry has already been identified as a driver of community wind ownership, a strong tradition of community wind ownership may also have contributed to the rise of Denmark’s world dominance in wind turbine manufacturing. For many years, wind development in Denmark occurred at a rate of a few wind turbines at a time. This gradual and steady development enabled the Danish wind turbine manufacturing industry to learn from experience about what worked
and what did not, and allowed it to correct any problems as they arose. As an aside, this pattern is in sharp contrast to wind development in the United States, where fast and feverish development spurts led to orders for thousands of turbines at a time, resulting in rushed engineering and mass production of flawed turbine designs (Berger 1997).

5.13.4 Benefit 4: New and cheaper source of capital

Commercial financiers have up until recently been shut out of the European wind market by the availability of cheaper equity capital from individuals, as well as low-cost debt financing from various sources. The fact that commercial financiers have not been able to compete implies that community ownership has indeed lowered financing costs for European wind projects (Bolinger, 2001).

CHAPTER 6

CONCLUSIONS

6.1 This Study

This study has evaluated whether community ownership of wind power schemes could significantly aid the development of UK Wind Power, or whether alternative factors are more influential. Effective use of complementary methods of data collection and analysis have produced significant and useful findings. The findings have enabled the generation of range of conclusions which are set out below. Conclusions, drawn from each of the preceding chapters, are now pulled together to produce the overall conclusions which specifically address each of the study’s objectives. Principal areas requiring further research are highlighted in Chapter 7, under Recommendations.

6.2 Overall Conclusions

The conclusions address each specific objective in turn:

Objective 1: To report on the nature and role of Community Ownership of Wind Power Schemes in Denmark and Germany.
Conclusion one

Denmark and Germany use a mixture of arrangements to support community wind power development. A range of policy instruments exist, including:

- **Fiscal incentives**, such as energy tax exemptions.
- **Special tariffs** for renewable electricity, combined with a regulatory duty to purchase output, so called ‘feed in laws’.
- **Capital Investment Subsidies**.

Community ownership appears to have enhanced the development of wind energy in Europe beyond merely serving as a vehicle through which public policies are implemented. Specifically, community ownership has increased public acceptance of wind power, realized distributed generation benefits, improved the manufacturing environment, and provided a large and relatively cheap source of capital to finance wind development. At present, Denmark is the largest wind power manufacturer in the world and also heads the world rankings with the highest proportion of electricity supplied from wind power. It has the largest installed offshore capacity in the world and is characterised by a history of strong research and development (R&D) support, capital subsidies and strong community incentives. Germany is now the world leader in installed wind capacity and accounts for 55% of total European wind turbine generating capacity.
Conclusion two

Objective 2: To report on the nature and role of Community Ownership of Wind Power Schemes in the United Kingdom.

UK uses a mixture of arrangements to support community wind power development. A range of policy instruments exist, including:

- Tenders for tranches of renewable output, such as the UK’s NFFO scheme superceded by th RO.
- Capital Investment Subsidy.
- Fiscal incentives, such as the Enterprise Investment Scheme.
- Quota based schemes such as the UK’s Renewables Obligation, sometimes called Renewables Portfolio Standard or ‘RPS’ Schemes

However, the UK’s track record in developing wind power has been modest. Comparison with Denmark and Germany has highlighted the gulf in performance that has appeared. Table 3 below illustrates this point:
Community ownership: the best way ahead for UK Windpower?

Table 3 – Parts adapted from Renewables policy mix in Denmark, Germany and UK in 2003. (Adapted from Bechberger and Reiche, 2003).

<table>
<thead>
<tr>
<th>Country</th>
<th>Capital Subsidy</th>
<th>Feed in Laws</th>
<th>Certificates/ Obligations (RPSs)</th>
<th>Tendering</th>
<th>Fiscal</th>
<th>MW of Wind Power installed by 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>✓</td>
<td>✓</td>
<td>✓ (ROCs) from 2002</td>
<td>Replaced</td>
<td>✓</td>
<td>530</td>
</tr>
<tr>
<td>Denmark</td>
<td>Replaced</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>2,515</td>
</tr>
<tr>
<td>Germany</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>10,650</td>
</tr>
</tbody>
</table>

**Conclusion three**

*Objective 3: To evaluate the significance of Community Ownership of Wind Power Schemes to the future development of UK Wind Power.*

Community ownership appears to have enhanced the development of wind energy in Europe beyond merely serving as a vehicle through which public policies are implemented. Specifically, community ownership has increased public acceptance of wind power, realized distributed generation benefits, improved the manufacturing environment, and provided a large and relatively cheap source of capital to finance wind development. The model on the next pager is offered as a method of mapping a better way ahead for UK wind power.
Figure 7: A model to help find the best way forward for UK wind power

<table>
<thead>
<tr>
<th>Drivers enabling Community Ownership in Denmark &amp; Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Driver 1</strong></td>
</tr>
<tr>
<td>Existence of Feed-in Laws</td>
</tr>
</tbody>
</table>

The more of these Drivers that exist in the UK, the easier it is likely to be to facilitate the models of Community Ownership below.

<table>
<thead>
<tr>
<th>Models of Community Ownership identified in this Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community-led, Community Owned Models</strong></td>
</tr>
<tr>
<td><strong>Denmark</strong></td>
</tr>
<tr>
<td>General Partnerships</td>
</tr>
<tr>
<td><strong>UK</strong></td>
</tr>
<tr>
<td>Bro Dyfi Community Renewables Ltd (Pantperthog)</td>
</tr>
<tr>
<td><strong>Denmark</strong></td>
</tr>
</tbody>
</table>

Specific Projects in mind at time of investment

| Community of Locality | Community of Interest |

If Community Owned Models are allowed to proliferate, four main areas of Benefit can be produced

<table>
<thead>
<tr>
<th>Benefit Area 1</th>
<th>Benefit Area 2</th>
<th>Benefit Area 3</th>
<th>Benefit Area 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased public acceptance of wind power.</td>
<td>Electrical transmission and distribution benefits.</td>
<td>Incremental improvement to manufacturing base.</td>
<td>New and less expensive sources of capital.</td>
</tr>
</tbody>
</table>

Creating an environment supporting the best way forward for UK wind power

(Parts of this model have been adapted from Bolinger, 2001)
CHAPTER 7

RECOMMENDATIONS

7.1.1 Recommendation – need for further research

The study was limited in its scope because of imposed restrictions. A word limit, a time resource limit and a financial resource limit necessitated the setting of tight boundaries and restricted the size and scope of the study: research beyond these boundaries is still needed. Further research is recommended therefore, to explore more fully each of the factors which appear to have the potential to drive the future development of UK Wind power. Four important areas are recommended for further study.

- Significance of increased UK public acceptance of UK wind power.
- Significance of the electrical transmission and distribution benefits from UK wind power schemes owned by the community.
- Significance of developing an incrementally improving UK manufacturing base for wind turbines.
- Significance of the availability of new and less expensive sources of capital to fund future UK wind power schemes owned by the community.
REFERENCES


Bolinger, M. 2001, *Community Wind Power Schemes in Europe and their relevance to the USA*, Environmental Energy and Technologies Division of the Lawrence Berkley National Laboratory, 1 Cyclotron Road, Berkley, California 94720, USA


Britton, G. 2004, Principal Planning Officer at Breckland District Council, Dereham, Norfolk. Greg Britton was interviewed on 12 July 2004 on site. A signed transcript of
Community ownership: the best way ahead for UK Windpower?

the interview is available for inspection by University of East Anglia InteREAM academic staff of the School of Environmental Sciences, at 490 Earlham Road, Norwich, NR4 7HP.


Ecologist, June 2004. Article on the community co-operative formed to install the 75 kW Vestas Wind Turbine at Pantperthog, Near Machynlleth, Powys, Wales, 2001-2.


Energy White Paper, DTI, 2003. Our Energy Future – Creating a low carbon economy, Published by TSO, PO Box 29, Norwich NR3 1GN, paragraph 1.18 on page 11.


Community ownership: the best way ahead for UK Windpower?


Platts, J. 2004, pers.comm. 18 May 2004 at the Institute of Manufacturing, Silver Street, University of Cambridge.


Saunders, D. 2004, pers.comm. Manager of the Eco-tech Centre, Swaffham, Norfolk. Don Saunders was interviewed on 5 July 2004 on site. A signed transcript of the interview is available for inspection by UEA ENV academic staff at 490 Earlham Road, Norwich, NR4 7HP.


Stein, C. 2001, of the Deutsche Ausgleichsbelnk (DtA). Personal communication via e-mail in March 2001 between M.Bolinger and C. Stein.


Toke, D. 1999, Community ownership – the only way ahead for UK wind power? Report commissioned by Professor David Elliott in the Open University’s Department of Technology from Doctor David Toke of Birmingham University.


Community ownership: the best way ahead for UK Windpower?


APPENDICES

1. Example of semi-structured interview: original transcript of interview carried out with Planning Officer, Greg Britton of Breckland District Council, Norfolk.

2. Example of Questionnaire sent to 300 households in the village of Frettenham, Norfolk.

3. Case Study: Middelgrunden, Copenhagen, Denmark, 2001
APPENDIX I

SEMI-STRUCTURED INTERVIEW

Principal Planning Officer
Breckland District Council
Norfolk
APPENDIX II

EXAMPLE OF QUESTIONNAIRE

Survey of Local Community
Frettenham Village
Norfolk
APPENDIX III

CASE STUDY

Offshore Wind Power Scheme
Middelgrunden
Copenhagen
Denmark
MIDDELGRUNDEN, COPENHAGEN, DENMARK – OPERATIONAL 6 MAY 2001

The recently completed 40 MW Middelgrunden project, however, has proven that wind partnerships are alive and well – at least for the time being. Located about 2 km off of Copenhagen’s harbour in the narrow sound between Denmark and Sweden, Middelgrunden is both the largest community-owned wind project ever, as well as the first sited offshore.

The 40 MW project consists of twenty 2-MW Bonus wind turbines, ten of which are owned by the partnership, with the other half owned by the local municipal utility, Copenhagen Energy. With the annual output of its ten turbines guaranteed by Bonus at 40,500 MWh, the partnership consists of 40,500 shares (each share is 1,000 kWh/year) owned by nearly 9,000 members who invested DKK 4,250 per share for between four and five shares on average, reflecting the tax-free status of the first five shares.

While Middelgrunden has taken wind partnerships to a new level in Denmark, it could be argued that the project merely represents a “last hurrah”. Because receipt of planning permission and the turbine purchase order both took place in 1999, the Middelgrunden project will for six years receive the same attractive feed-in tariff that wind turbine owners in Denmark have enjoyed in the past. In years 7 through to year 10, income is still guaranteed, but at a lower level, and after 10 years the project must sell both its output and its “green certificates” (TGCs) on the open market. This is likely to lead to lower returns in years 11 through 20.

Thus, through fortunate timing, Middelgrunden remains insulated from the full impact of market pricing for the first half of its projected life-span, meaning that the high degree of investor enthusiasm it has attracted may not be indicative of what lies ahead for future partnerships that are more exposed to the market. The following table shows the expected cash flows for one 1,000 kWh/year share in the Middelgrunden project. All cash flows are virtually locked in, with the exception of the feed-in tariff in years 11-20, which is highly uncertain.

Assuming that the project can continue to sell its output for 0.33 DKK/kWh in years 11-20, and receives the minimum guaranteed TGC price of 0.10 DKK/kWh for all of its output, the project yields a 20-year IRR of 8.25%. In a worst-case scenario, where the project is simply unable to sell any of its output in years 11-20 (i.e., the 0.33 goes to zero), yet still receives the minimum guaranteed TGC price, the 20-year IRR falls to 4.44%. The first 3000 DKK of revenue (corresponding to the first 5 shares) is free from income tax, while 60% of all revenue beyond 3000 DKK is taxed, usually at a rate of 60%.

The completion of Middelgrunden brings the total amount of wind power capacity in Copenhagen to 47.8 MW, enough to supply about 35,000 homes with electricity.
assuming a 25% capacity factor and average usage of 250 kWh/household/month. Wind partnerships own 27.8 MW of that total.

The project has a simple payback of nine years. The tax exemption on 40% of revenue in excess of 3,000 DKK reflects the effect of a 20-year straight-line depreciation; writing off 5% of the investment each year reduces taxable income by about 40%.


(1979)

(2001)
FIGURE 2: Windmill near Hamburg
FIGURE 3: USA WIND POWER CAPACITY

United States - 2003 Year End Wind Power Capacity (MW)

Total: 6,374 MW
(Updated 12/01/2003)

Wind Power Capacity
- Megawatts (MW)
- 1,000 - 2,000
- 100 - 1,000
- 20 - 100
- 1 - 20

U.S. Department of Energy
National Renewable Energy Laboratory

August 2004
FIGURE 4: NUMBER OF WIND TURBINE DEPLOYMENTS IN GERMANY (Position as at the end of 2003)
FIGURE 5: PICTURE OF THE PANTPERTHOG COMMUNITY WHO HAD BOUGHT SHARES IN THE VESTAS 75 KW WIND TURBINE (2001)
FIGURE 6: PICTURE SHOWING SIZE AND SCALE OF THE BIG WIND TURBINES